

POLLARD STREET MANCHESTER

FINAL PHASE 2 GEO-ENVIRONMENTAL INVESTIGATION, RISK ASSESSMENT AND REMEDIATION STRATEGY

Job Number: LKC 20 1301

Date: December 2022

Client: General Projects



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LK Consult Document Verification			
Site Address	Pollard Street, New Islington, Manchester, M4 7BN		
Report Title	Final Phase 2 Geo-Environmental Investigation, Risk Assessment and Remediation Strategy		
Job Number	LKC 20 1301	Document Ref.	CL-602-LKC 20 1301-02
Date Issued	20 th December 2022	Report Version	R1
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Revision Record			
Revision No.	Date	Nature of Revision	Approved By
R1	20/12/22	Final following completion of gas monitoring	PD

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EXECUTIVE SUMMARY

Site Details

Site Location:	Land surrounding New Islington Metrolink tram stop, bound by Great Ancoats Street to the south-west, Pollard Street to the south and the Ashton Canal to the north. Centred at approximate National Grid Reference 385430E 389230N.
Site Area:	1560m ² .
Current Land Use:	Currently forms landscaped areas around the New Islington Metrolink station and tram track which runs southwest to northeast through the middle of the site.
Proposed Development:	1no. 8 storeys commercial and workspace building and 2no. 5 storey commercial and workspace buildings with external amenity spaces.
Purpose of Report:	Contamination and Geotechnical Assessment.

Preliminary Risk Assessment

PRA Details:	Undertaken by LKC in March 2020. Ref: LKC 20 1301
Preliminary Conceptual Model:	PL1 Direct Contact (Human Health): Moderate Risk (asbestos, metals, PAHs, PCBs). PL2 Inhalation of Vapours: Moderate/Low Risk (volatile contaminants). PL3 Gas: Moderate Risk (hazardous and ground gas).
PL=Pollutant Linkage	PL4 Controlled waters: Moderate Risk (mobile contaminants). PL5 Water Pipelines: Moderate Risk (organic contaminants).
Recommendations:	Site Investigation was recommended to further assess all the above pollutant linkages.

Ground Investigation Work Undertaken

Date of Investigation:	26 th September -13 th October
Intrusive Investigation Work Undertaken:	6no. window sample boreholes drilled to 0.2-5.45 metres below ground level (mbgl) (ref. WS1 to WS7). 7no. cable percussion boreholes drilled to 1.8-25.0mbgl (ref. BH1-BH6, and BH8) with follow on rotary coring carried out in BH6 to 36.00mbgl. 2no. follow on open hole rotary boreholes drilled to 40.00mbgl (ref. BH1 and BH2). 11no. trial/ foundation pits (using JCB, vacuum extractor and hand excavations excavated to 0.2-3.7mbgl (ref. TP1 to TP15). 3no. service location trenches (ST1-3).
Monitoring Wells:	Installed in WS1, WS4, WS5 and WS7.
Soil Sampling:	13no. samples tested for metals, speciated PAHs, pH, sulphate, asbestos and SOM. 5no. samples tested for metals, speciated PAHs, cyanide, pH, sulphate, asbestos, BTEX, and SOM. 2no. samples tested for waste acceptance criteria. 2no. samples tested for pH and sulphate.
Monitoring:	6no. gas monitoring visits.
In situ and Laboratory Geotechnical Testing:	SPTs, shear vanes, PSDs, plasticity, point load tests, triaxial tests, UCS.
Other Work:	Soakaway Tests

Ground Conditions and Geotechnical Assessment

General Ground conditions	Allowable Bearing Pressure	Anticipated Foundation Type	Other Considerations
Maximum investigation depth 36.00mbgl. Made Ground to between 1.90m and 3.50mbgl. Natural clay to between 15.00m and 19.40mbgl. At 2.00mbgl SPT 'N' values range from 8 to 12. At 3.00mbgl 'N' from 7 to 23. Bedrock encountered at 30.00mbgl in BH6 comprising Mudstones, Siltstones and Marls.	The proposed load is unknown. The ground does not reliably provide an Allowable Bearing Capacity of 100kPa until a depth of around 6.00mbgl. As such ground improvement or a piled solution are recommended.	It is recommended that the proposed building is piled. Ground improvement through the use of vibro stone columns may also be acceptable dependant on the proposed end load.	Consideration needs to be given to any effect the proposed works may have on the existing retaining structures along the tramway in the centre of the site and the canal to the north. The bulb of pressure from any proposed foundations will need to out of the zone of influence of the side walls of the retaining walls or their foundations. All drainage needs to be suitable to prevent excess load to the retaining walls and to avoid inundating the existing track draining which could lead to flooding of the line. It is recommended that an assessment of the existing retaining walls is undertaken to assess their response to the proposed development. From the sporadic presence of shallow groundwater noted in some of the investigation locations, it is likely that the Ashton Canal is leaking in places and that these strikes are not the actual groundwater level. Based on BRE Digest 2005 concrete of specification DS-1 AC-1 is acceptable across the majority of the site. However one slightly elevated result was observed in TP15 (0.10-1.00m). Should infrastructure be placed in contact with the area of made ground DS-2 AC-1s is recommended.

Contamination Risk Assessment

The table below shows a summary of the risk assessments undertaken for each pollutant linkage, the revised conceptual model and recommendation for either remediation and / or further investigation.

Pollutant Linkage		Risk	Assessment
1	-Dermal contact. -Inhalation of soil, fibres and dust. -Ingestion of soils, dust. - Windblown dust.	Moderate	-Likely probability as ACM and elevated PAHs identified, in the made ground across the site which could come into contact with site users in soft landscaping areas. -JIWG assessment identifies low risk from ACMs beneath clean cover soils. -Recommendation*: Remediation required. Likely to include an environmental cover system in soft landscaping areas.
		Low	-No elevated volatile concentrations identified. -Recommendation: No remediation required subject to watching brief during earthworks.
2	-Inhalation of vapours. - Migration through permeable strata and preferential pathways	Low	-No elevated volatile concentrations identified. -Recommendation: No remediation required subject to watching brief during earthworks.
3	-Inhalation of gas. -Migration through permeable strata and preferential pathways. - Explosion in confined spaces (methane only).	Moderate/Low	-No significant concentrations of methane or carbon dioxide and no flow identified in gas monitoring. -Recommendation: CS1 recommended.
4	-Surface Run-off. -Migration through permeable strata and preferential pathways -Perched waters migration.	Moderate/Low	-No significant evidence of potentially mobile contamination identified in soils during site investigation. -Environmental setting means no significant preferential pathways to receptors. -Recommendation: No specific remediation required. Watching brief during earthworks
5	Ingestion of tainted water supply.	Moderate	-Likely probability as elevated concentrations encountered. -Recommendation: Barrier piping likely to be required, subject to UU risk assessment.

Recommendations and Remedial Strategy

The table below shows the remediation and validation requirements for the site. This information should be documented in a Site Completion Report for submission to the local authority.

PL	Phase	Remediation Requirements	Validation Requirements
ALL	Pre-Construction	<u>Earthworks Inspections/Unexpected Contamination</u> 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.	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.
PL1	Build-Phase Construction	<u>Environmental Cover System</u> In gardens and soft landscaping areas, an environmental cover system will be required. Shared landscaping: 450mm thick environmental cover system comprising: Either 100mm physical break layer (MOT type 1 material, 20-30mm, minimal fines) and at least 200mm comprising clean inert fill and sufficient topsoil for a growing medium OR geotextile membrane and at least 300mm comprising clean inert fill and sufficient topsoil for a growing medium. A diagram of a typical environmental cover system is shown in section 9.1.2.	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.
PL5		<u>Potable Water Pipes</u> It is recommended that a Water Pipeline Assessment is undertaken once the location and depth of potable water pipes are known. It is likely that barrier pipe will be required.	Delivery notes of pipe Material. Photographs of the installed pipe.

The remediation recommended in the table above should be validated to ensure it has been carried out appropriately. This should be documented in a Completion/Validation Report and submitted to the local authority for completion.

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FIGURES

- Figure 1: Site Location Plan
Figure 2 : Site Boundary Plan
Figure 3: Site Investigation Location Plan
Figure 4: Section Drawings Sheet 1-4

Hawkins Brown Drawing PLS-HBA-SW-ZZ-DR-A-00-0003 Rev P2

APPENDICES

- Appendix A: Risk Matrix
Appendix B: Profile Logs
Appendix C: Certificate of Analysis - Soil
Appendix D: Certificate of Analysis - Geotechnical
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Appendix F: Generic Assessment Criteria Values
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Appendix I: Permeability Tests

1 Introduction

1.1 Background

LK Consult Ltd (LKC) has been commissioned by General Projects to carry out a Phase 2 Geo-Environmental Investigation, Risk Assessment and Remediation Strategy for Pollard Street, Manchester. The investigation was undertaken in support of a planning application (reference number 128191/FO/2020) to develop the site for commercial use.

The following work has previously been undertaken:

- Preliminary Risk Assessment (PRA) report, undertaken by LKC (Ref: LKC 20 1301, dated 12th March 2020).

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 specific scope of works was described in the scoping document (reference 969-01 P02 dated 10/2/2021) undertaken by Civic Engineers.

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

1.2 Site Details

A summary of the site details is presented in Table 1-1. Figure 1 indicates the site location, the site boundary is shown on Figure 2. The proposed development is shown on Hawkins Brown drawing PLS-HBA-SW-ZZ-DR-A-00-0003 Rev P2.

Location	Land surrounding New Islington Metrolink tram stop, bound by Great Ancoats Street to the south-west, Pollard Street to the south and the Ashton Canal to the north. Centred at approximate National Grid Reference 385430E 389230N.
Area	1,560m ² .
Topography	49-55 metres Above Ordnance Datum (AOD). Site slopes down gently to the southwest.
Land Use	<u>Site</u> Currently forms landscaped areas around the New Islington Metrolink station and tram track which runs southwest to northeast through the middle of the site. <u>Surrounding Area</u> North: Ashton Canal and mixed residential and commercial land use. East: Residential and commercial buildings. South: Pollard Street with residential and commercial buildings beyond. West: Great Ancoats Street with residential and commercial building beyond.
Proposed Development	1no. 8 storeys commercial and workspace building and 2no. 5 storey commercial and workspace buildings with external amenity spaces.

Table 1-1. Summary of site details.

2 Previous Work

2.1 Phase 1 Preliminary Risk Assessment (PRA)

A PRA report (Ref: LKC 20 1301, dated 12th March 2020) has previously been undertaken by LKC. Table 2-1 summarises the site details, historical review, environmental settings and site reconnaissance.

Main Historical Features	The site is within an area of Manchester with an extensive industrial heritage and the site itself has been occupied by a sawmill, chemical works, iron works, a corporation yard and various other smaller industries. Two canal basins were also present spanning the site from north to south historically, but these have since been infilled.
Geology / Hydrogeology	A previous ground investigation at the site in 2009 for the purposes of geotechnical design of the adjacent Metrolink line and station identified made ground to depths of up to 3.4mbgl underlain by significant thicknesses of natural clay with occasional bands of sand or sand and gravel. Sandstone bedrock was encountered between 25mbgl and 35mbgl.
Landfills / Infilled ground	No known or registered landfills within 250m. Infilled land associated with former canal basins on site.
Site walkover	The site currently comprises landscaped grassed areas adjacent to the New Islington Metrolink station and tracks. The tramline runs southwest to northeast, almost dissecting the site completely and enters a tunnel beneath Great Ancoats Road in the west of the site.

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

The preliminary contamination conceptual model (PCCM) produced in the PRA is provided in Table 2-2.

The preliminary contamination conceptual model has been updated to be in line with LKC current risk assessment methodology using contaminant-pathway-receptor pollutant linkages based on guidance in LCRM¹. The model is provided in Table 2-2.

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.

Due to the minor consequence associated with the phytotoxic effect to flora (i.e. loss of plants in a landscaping scheme), the overall risk for the majority of sites will be very low to low. Where soils contain significant concentrations of heavy metals, in general there will be other pollutant linkages (i.e. the risk to human health) that will trigger the requirement for remediation (e.g. a clean environmental cover system). As such the risk to flora associated with phytotoxic contaminants will not be considered further.

The risk to buildings associated with elevated sulphate will be considered as part of the geotechnical assessment and will not be included in the contamination risk assessment.

2.2 Recommendations

Based upon the Preliminary Contamination Conceptual Model a site investigation was recommended to assess the potential pollutant linkages further.

¹ Land Contamination Risk Management (LCRM) <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

² CIRIA (2001). "Contaminated Land Risk Assessment: A Guide to Good Practice". C552.

Pollutant Linkage	Pathway	Receptor	Contaminant (source)	Probability	Consequence	Risk	Assessment & Recommendations
PL1	- Dermal contact. - Inhalation of soil, fibres and dust. - Ingestion of soils, dust, vegetables, soil attached to vegetables. - Windblown dust.	- Future site users. - Offsite receptors.	- ACM (former buildings, potentially in made ground). - Heavy metals, PAHs, hydrocarbons (made ground, former industries on site).	Likely	Medium	Moderate	- Likely probability given history of site and potential pathway to receptors in proposed soft landscaping - Recommendation: Intrusive investigation to include soil samples.
PL2	- Inhalation of vapours. - Migration through permeable strata and preferential pathways.	- Future site users. - Offsite receptors.	- Volatile contaminants such as hydrocarbons (made ground, former industries on site).	Low Likelihood	Medium	Moderate / Low	- Low likelihood, as although a number of potential sources of volatile contamination identified, previous site investigation on the site only recorded evidence of volatile contamination in localised areas. - Moderate risk assumed at this stage. - Recommendation: Volatile testing if evidence encountered during site investigation.
PL3	- Inhalation of gas. - Migration through permeable strata and preferential pathways. - Explosion in confined spaces.	- Future site users. - Buildings. - Offsite land users.	- Hazardous Gas: - Methane, carbon dioxide (potentially infilled features on and within 250m of the site).	Low Likelihood	Medium	Moderate	- Viable source of gas identified onsite (infilled canal basins and potential for deep made ground). - No significant preferential pathways anticipated due to ground conditions. - Recommendation: Gas monitoring required.
PL4	- Surface run-off. - Migration through permeable strata and preferential pathways. - Perched waters migration.	- Groundwater (Principal Bedrock Aquifer, Secondary B and Secondary Undifferentiated Superficial Aquifer). - Surface water (Ashton Canal).	- Mobile contaminants such as metals, PAHs, hydrocarbons, (made ground, former industries onsite).	Likely	Medium	Moderate	- Likely probability of mobile contamination given the extensive industrial history of the site and sensitivity of controlled waters. - Previous investigation work on the site identified localised olfactory evidence of contamination and at depth within bands of permeable strata within the natural deposits. - Clay recorded below the site will reduce the extent of vertical migration to the underlying aquifers. - Recommendation: Groundwater sampling required if evidence of significant potentially mobile contamination is noted during site investigation.
PL5	- Ingestion of tainted water supply.	- Future site users. - Water pipes.	- Organic contaminants such as hydrocarbons (made ground, former industries onsite).	Likely	Medium	Moderate	- Likely probability as potential for significant contamination at pipeline depth (0.75-1.35m). - Previous investigation work at the site identified made ground to depths of between 2mbgl and 3.4mbgl. - Recommendation: Intrusive investigation including soil testing at likely potable water pipeline depth.

Table 2-2. Preliminary Contamination Conceptual Model.

3 Ground Investigation

3.1 Site Investigation Design and Methodology

In order to assess the ground conditions at the site and to investigate the potential pollutant linkages identified in the preliminary contamination conceptual model an intrusive investigation was undertaken.

Exploratory hole locations, depths and methods of investigation were scoped by the Client's Engineer, within their pre-tender documentation (dwg no. 969-01-CE-SK-200, dated Apr 2021).

The investigation was carried out on 26th September – 13th October 2022 and comprised the following:

- 6no. window sample boreholes drilled to 0.2-5.45 metres below ground level (mbgl) (ref. WS1 to WS7).
- 7no. cable percussion boreholes drilled to 1.8-25.0mbgl (ref. BH1-BH6, and BH8) with follow on rotary coring carried out in BH6 to 36.00mbgl.
- 2no. follow on open hole rotary boreholes drilled to 40.00mbgl (ref. BH1 and BH2).
- 11no. trial/ foundation pits (using JCB, vacuum extractor and hand excavations excavated to 0.2-3.7mbgl (ref. TP1 to TP15). Note that TP7 was hand excavated to allow collection of shallow soil sample due to presence of archaeological works.
- 3no. service location trenches (ST1-3).

BH4 was re-positioned twice (BH4b-BH4c) due to concrete and relic wall obstructions at 1.6m, 1.8m and 2.5m respectively. The extent of concrete and relic wall could not be confirmed.

WS2 was repositioned three times (WS2b-WS2d) due to relic floor obstructions a depths of 0.3-1.0m. WS3 was also repositioned twice (W3b-WS3c) due to relic floor obstructions. The extent of the floors was not confirmed.

All site investigation locations are shown in Figure 3.

The locations were chosen to allow adequate assessment of ground conditions across the site as well as to provide geotechnical assessment of ground conditions for the proposed development. Site investigation locations were proposed within the specification provided and on-site constraints due to on-going archaeological investigation works and stand-off/ easements associated with the tramline and canal.

Table 3-1 details the targeted and general coverage (non-targeted) site investigation locations.

Site Investigation Locations	Rationale
WS1-WS7	General site coverage of shallow ground information and gas monitoring within footprints of proposed buildings and infilled canal.
BH1-BH8	General site coverage of deeper ground information.
TP10-TP14	Foundation pits along tram cutting retaining wall.
TP15	Expose existing canal wall and associated below ground structure.
TP1, TP3, TP7, TP8, TP9	General site coverage.
ST1	To locate services entering and exiting site.
ST2 and ST3	Locate services in location of proposed loading bays.

Table 3-1: Summary of sampling locations.

Note: Figure 3 shows trial pits locations included in the specification where further investigation is required as part of further archaeological investigation works.

All profile logs are provided in Appendix B and are in line with BS14688-1³ and BS5930⁴.

3.2 Well Installations

4no. (WS1, WS4, WS5, WS7) of the boreholes were installed with monitoring wells for gas and groundwater level monitoring. Monitoring wells were installed in accordance with BS10175 and CIRIA C665⁵ 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.

It should be noted that some boreholes were unable to be installed (WS2 and WS3) due to insufficient depths achieved during drilling.

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 investigation⁶.

Soil was collected for onsite testing. 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 for total volatile organic compounds (TVOCs) using a photoionisation detector (PID). Results of the PID readings are presented on the profile logs (Appendix B). The on-site monitoring was carried out in line CIRIA C665⁷ to aid in screening samples for volatile analysis.

Soil samples of approximately 500g were recovered in amber jars, amber vials for volatile analysis and plastic tubs. All the samples were labelled and stored in cool boxes prior to being collected by courier at the end of the day for delivery to the Chemtest laboratory in Newmarket for chemical testing. If collection was not possible the same day then samples were stored in the sample storage fridge at the LK Group

³ British Standards (2002) Geotechnical investigation and testing – Identification and Classification of Soil. Part 1: Identification and description. BS EN ISO 14688-1:2002.

⁴ British Standard (2015). "Code of Practice for Ground Investigations". BS5930:2015.

⁵ CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665.

⁶ EA (2000). "Technical Aspects of Site Investigation. Volumes 1 & 2 Text Supplements Research and Development Technical Report." P5-065/Tr.

⁷ CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665.

offices below 4°C. Samples were tracked using appropriate Chain of Custody forms provided by Chemtest.

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.

Suites and Contaminants	No. Samples	Location & Depth	Justification
Metals / metalloids, pH, water soluble sulphate, speciated PAHs, SOM and asbestos screen.	10	BH1 0.5-1.4m BH2 0.4-1.3m BH4 0.7-1.6m BH6 2.0-2.45m TP7 0.0-0.5m TP8 0.2-1.2m TP9 1.0-2.0m WS101 1.0-2.0m WS104 1.0-2.0m WS105 0.0-1.0m	A basic suite with a broad selection of contaminants tested on samples across the site where no significant evidence of contamination was identified (with the exception of occasional ash, tarmacadam, glass, plastic and coal) and no TVOCs identified from the PID tests.
Metals / metalloids, pH, water soluble sulphate, cyanide suite, phenol, TPHCWG, BTEX, MTBE, speciated PAHs, SOM and asbestos screen.	5	BH3 0.0-1.2m BH5 0.0-1.2m BH6 0.5-1.2m TP8 2.2-3.2m TP15 0.1-1.0m	Although no evidence of contamination identified, detailed suite undertaken to confirm the absence of contamination. Evidence of hydrocarbon contamination (visual / olfactory) identified in or close to BH3 0.0-1.2m therefore detailed suite undertaken to confirm contamination risk and extent.
Waste Acceptance Criteria	2	TP8 0.2-1.2m TP15 0.1-1.0m	Representative samples of soils to aid in waste classification for potential disposal.

Table 3-2. Summary of soil sample testing undertaken.

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, SOM=Soil Organic Matter.

3.3.2 Water Sampling

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

A moderate risk was identified in the preliminary contamination conceptual model for controlled waters (pollutant linkage 4) and sampling recommended if evidence of potentially mobile contamination was encountered. Based on the ground conditions encountered, LKC did not consider testing to be required. This is discussed further in Section 6.4.

3.4 Gas Monitoring

Six gas monitoring visits have been undertaken over a 10-week period (10th October 2022 to 19th December 2022) in all installed boreholes.

Monitoring was undertaken using a Geotechnical Instruments GA5000 in accordance with the monitoring protocol outlined in CIRIA C665⁸ (flow rate measured first). The monitoring will aim to be undertaken over a range of weather conditions (including low and falling barometric pressure and heavy rain) to demonstrate worst-case conditions.

⁸ CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665.

The gas monitoring results to date, are reproduced in full in Appendix E.

3.5 Geotechnical Testing

3.5.1 In-situ Onsite 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, generally within the natural strata.
- » Shear Vane tests (giving undrained shear strength) were performed in the window sample boreholes (to a maximum depth of 3mbgl) and trial pits at approximately 1m intervals, within the natural clay strata.

The SPT and shear vane readings are provided within the profile logs (Appendix B).

3.5.2 Laboratory Geotechnical Testing

Soil samples taken during the investigation were collected in bulk bags and sealed U100 tubes and sent to Murray Rix Laboratories for geotechnical testing.

Many of the tests are UKAS accredited and further details are given in the laboratory report presented in Appendix D. Table 3-3 shows the geotechnical testing undertaken.

Suites and Contaminants	No. Samples	Justification
pH and water-soluble sulphate	2	Additional samples of natural ground taken across the site to assess the pH and sulphate for geotechnical purposes. pH and water-soluble sulphate are also included in Suites 1 and 5.
Atterberg Limits (plasticity testing)	8	A selection of clay samples across the site were tested for Atterberg Limits to assess their shrinkability potential associated with current and proposed trees.
Single Stage Triaxial	8	Undertaken on cable boreholes across the site are varying depths to confirm the strength of the clay strata.
Particle Size Distribution (PSD)	8	PSD undertaken to confirm grading of granular material.
Unconfined Compression Test	4	To confirm the strength of the rock strata.

Table 3-3. Summary of geotechnical testing undertaken.

3.6 Soakaway Tests

Soakaway tests were undertaken in TP1 and TP8 in accordance with BRE Digest 365⁹.

The trial pits were machine excavated to dimensions of 0.6-0.7m wide, 2.0m long and 1.6-3.7m depth. The arisings were logged in accordance with BS14688-1¹⁰ and BS5930.

⁹ BRE (2003) 'Soakaway Design' British Research Establishment BRE Digest 365 2003

¹⁰ British Standards (2002). Geotechnical investigation and testing – Identification and Classification of Soil. Part 1: Identification and description. BS EN ISO 14688-1:2002.

A slotted standpipe was placed vertically in the pit and gravel was backfilled into the bottom of the pit to prevent the sides falling in during water influx.

The pits were filled from a water bowser and the drop in level timed and recorded using a dip meter inside the temporary standpipe.

Results of permeability tests are included in Appendix I.

4 Ground Conditions

4.1 Geology – Generalised Sequence

The ground conditions beneath the site comprised made ground underlain by natural sandy gravelly clay and sandy gravels. A summary section of the logs is provided in Plate 4-1, with additional comments below.

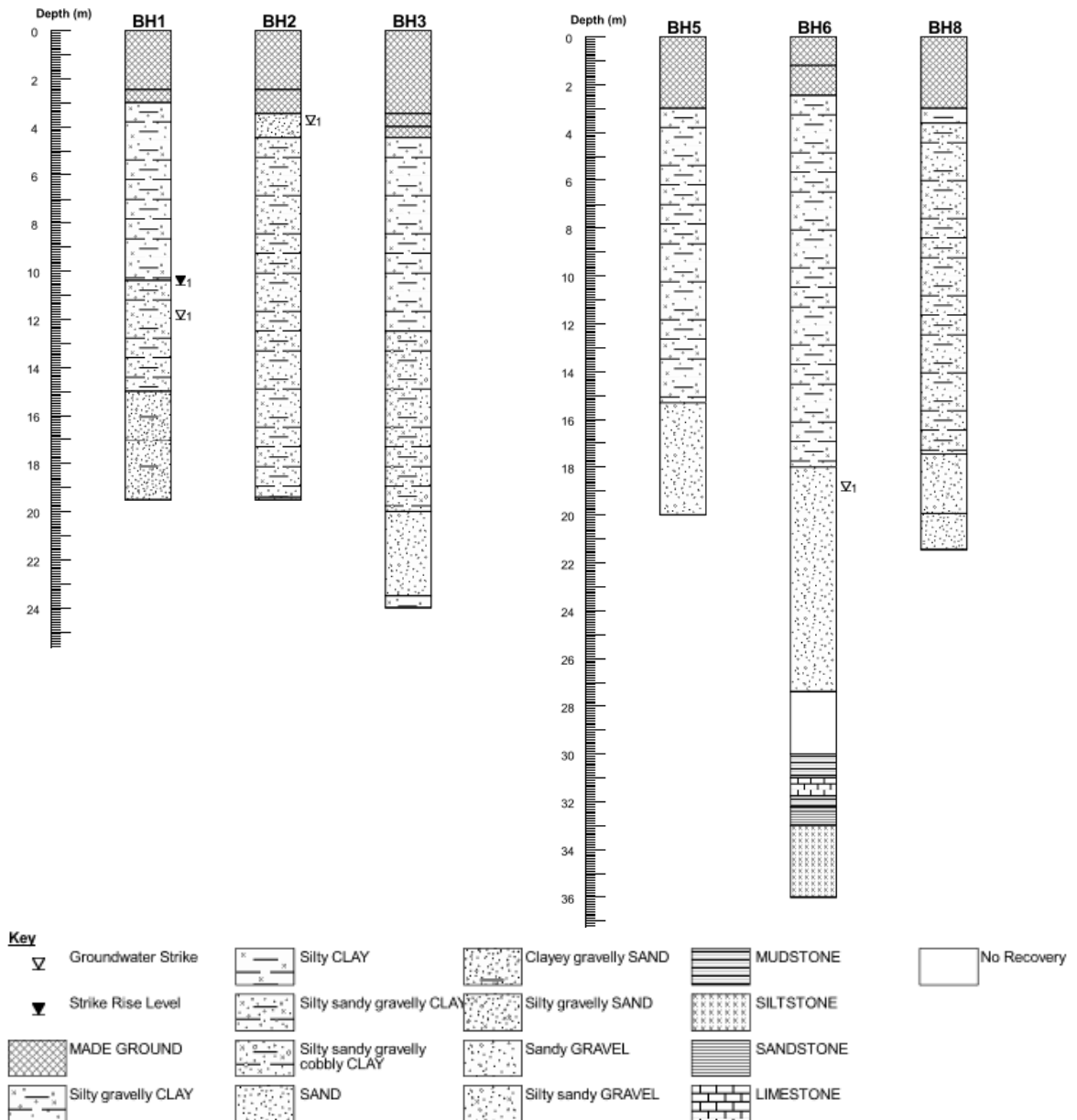


Plate 4-1: Summary of ground conditions

Additional information on ground conditions:

➤ Made ground was recorded from depths of 1.90m to 3.50mbgl and generally consisted of four main types:

- Gravel/clay/silt with frequent brick, concrete and tarmacdam.
- Silt with frequent ash, bricks, concrete, occasional plastic, glass.
- Sandy gravel comprising limestone-possible 6N/6P fill.
- Silt with frequent rootlets, occasional plastic, ash and brick.

- Olfactory evidence of hydrocarbon BH3 from 0.10mbgl to 1.65mbgl.
- In-ground structures were identified in TP10-TP15 full drawings can be found in Figure 4.
- In ground obstructions were also identified as follows (note similar structures may be anticipated were former buildings were present across the site):
 - Possible relic walls was encountered in BH4-BH4C 1.60-2.50mbgl.
 - Possible relic floors were encountered in WS2-WS3 0.50-1.00mbgl.
 - Metal pipe at 2.00mbgl in TP9.
 - Concrete slabs were encountered in TP8 at 0.80m and 2.20mbgl.
- TP1 was described as unstable / collapsing (0.00-1.60mbgl).

Natural clay was encountered beneath the made ground to depths of 15.00- 20.00mbgl where dense sandy gravels were encountered.

Bedrock was recorded in BH6 at 30.00mbgl. In BH1 and BH2 it was encountered at 40.00mbgl.

4.2 Groundwater

4.2.1 Groundwater Levels

No groundwater was present in the trial pits. Results of the groundwater depths within the boreholes are summarised in Table 4-1.

BH/TP	Water Strike Depths (mbgl)	Well Response Zone (mbgl)	No. of Monitoring Visits	Monitoring Depths (mbgl)		
				Min	Max	Base
BH1	12.00	-	-	-	-	-
BH2	3.90	-	-	-	-	-
BH3	2.40	-	-	-	-	-
BH4	Dry	-	-	-	-	-
BH5	Dry	-	-	-	-	-
BH6	19.00	-	-	-	-	-
BH8	Dry	-	-	-	-	-
WS1	Dry	1.00-2.00 (MG)	6	Dry	Dry	1.80
WS2	Dry	-	-	-	-	-
WS3	Dry	-	-	-	-	-
WS4	4.00	1.00-4.00 (C/MG)	6	1.68	2.10	3.90
WS5	2.50	1.00-3.00 (MG)	6	1.32	1.75	2.70
WS7	Dry	1.00-4.00 (C/MG)	6	1.51	1.60	3.90

Table 4-1: Summary of water strike depths within boreholes and trial pits.

Response Zones:

MG=Made Ground; C=Clay.

4.2.2 Permeability Tests

Ground conditions on site meant that soakaway testing within natural strata could only be undertaken at one location (TP8). Due to deep made ground/ refusals a second soakaway test was carried out in made ground in TP1. It should be noted that soakaways are generally not acceptable within made ground.

In TP8 soakaway testing was carried out within the clay strata from 2.2m. BRE365¹¹ indicates that the calculation of the soil infiltration rate is made from the time taken for the water level to fall from 75% to 25% effective storage depth in each pit.

¹¹ BRE (2003) 'Soakaway Design' British Research Establishment BRE Digest 365 2003

$$\text{Soil infiltration rate, } f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

Where:

V_{p75-25} = the effective storage volume of water in the trial pit between 75% and 25% effective depth.

a_{p50} = the internal surface area of the trial pit up to 50% effective depth including the base area.

t_{p75-25} = the time for the water level to fall from 75% to 25% effective depth.
and reported .

Results of permeability tests are included in Appendix I.

No measurable change in water level was able to be observed in the soakaway test undertaken in TP8 and as such the test was deemed to have failed. Therefore the soakaways in the natural strata are unlikely to be feasible. It was not possible to calculate the infiltration rate for the soakaway test in TP1 due to the fast rate at which the water drained away. It should be noted that soakaways are generally not acceptable within made ground.

Regardless of calculated permeability, due to the thickness of made ground and the proximity of the site to a retaining structure housing a buried tramway soakaways are not considered suitable for the site. The increased discharge of water to ground onsite may lead to increased water pressure against the retaining wall and, if the wall was designed with seepage holes to prevent this, could lead to flooding of the tramlines.

4.3 In-Situ Geotechnical Testing

4.3.1 Standard Penetration Tests

In-situ standard penetration tests (SPTs) were undertaken, in the made ground and natural ground. The results are provided within the profile logs in Appendix B.

4.3.2 Shear Vanes Readings

Hand shear vane readings, recording undrained shear strength (s_u), were taken within the clay strata. The readings are provided within the profile logs in Appendix B.

4.4 Geotechnical Laboratory Testing

4.4.1 Single Stage Triaxial Test

Single stage triaxial testing has been undertaken on eight samples of the natural clay strata. The results are presented in Appendix D and summarised in Table 4-2.

Location	Depth (mbgl)	Undrained Shear strength (kPa)
BH1	13.50-13.95	52
BH2	12.00-12.45	135
BH3	5.00-5.45	108
BH3	19.50-19.95	134
BH5	9.00-9.45	106
BH5	13.50-13.95	127
BH8	13.50-13.95	68
BH8	16.50-16.95	193

Table 4-2: Summary of single stage triaxial results.

4.4.2 Particle Size Distribution

Particle size distribution (PSDs) tests were carried out on granular strata to confirm the material type. Full results are presented in Appendix D and summarised below in Table 4-3.

Location	Depth (mbgl)	Percent passing through sieve		
		63mm	2mm	0.063mm
BH1	1.20-1.65	100%	60%	27%
BH2	1.20-1.65	100%	26%	10%
BH3	3.00-3.45	100%	41%	24%
BH3	18.00-18.45	100%	92%	70%
BH5	15.00-15.45	100%	83%	27%
BH6	0.50-1.20	100%	41%	21%
BH6	18.00-18.45	79%	18%	7%
BH6	21.00-21.45	100%	22%	5%

Table 4-3: Summary of particle size distribution results.

Notes:

% passing: 63mm = cobble / gravel boundary; 2mm = gravel / sand boundary; 0.063mm = sand / silt boundary

4.4.3 Unconfined Compressive Strength (UCS)

UCS testing was conducted on three samples of sandstone and the Uniaxial Compressive Strength (C_0) was obtained. The results are presented in Appendix D and summarised in Table 4-4.

Location	Depth (mbgl)	Load at Failure (kN)	Compressive Strength (MPa)
BH3	31.25	6.00	0.90
BH6	32.50	177.80	27.90
BH6	34.30	31.40	4.90

Table 4-4: Summary of unconfined compressive strength tests.

4.4.4 Point Load Tests

Point Load Tests have been undertaken on two samples of the natural red sandstone strata. The results are presented in Appendix D and summarised in Table 4-5.

Location	Depth (mbgl)	Test Type	I _{s(50)} (MPa)
BH6	30.75	D	0.06
BH6	30.75	A	0.09
BH6	30.75	A	0.07
BH6	31.50	D	0.08
BH6	31.50	A	2.36
BH6	31.50	A	5.11
BH6	32.25	D	0.55
BH6	32.25	A	0.9
BH6	32.25	A	0.46
BH6	33.75	D	0.29
BH6	33.75	A	0.51
BH6	33.75	A	0.41
BH6	34.50	D	0.23
BH6	34.50	A	0.26
BH6	34.50	A	0.29
BH6	35.25	D	0.32
BH6	35.25	A	0.69
BH6	35.25	A	0.33
BH6	35.75	D	0.03
BH6	35.75	A	0.02
BH6	35.75	A	0.32

Table 4-5: Summary of point load tests.

4.4.5 Atterberg Limits

Representative samples of natural clay were subjected to Atterberg Limits (plasticity) and Moisture Content testing. Results are presented in Appendix D and summarised in Table 4-6.

Table 4-6 also includes the modified plasticity index as detailed in Chapter 4.2-D5 of the NHBC standards (modified plasticity index = plasticity index x % less than 425µm sieve / 100%).

Location	Depth (mbgl)	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Class	Passing 425 micron (%)	Modified Plasticity Index (%)
WS104	2.50-3.00	14.5	41	12	29	CIM	100	29.00
WS105	3.50-4.00	17.8	39	13	26	CIM	100	26.00
WS107	2.00-2.45	30.0	41	14	27	CIM	99	26.73
BH1	3.00-3.45	20.9	42	13	29	CIM	100	29.00
BH5	3.00-3.45	19.5	43	14	29	CIM	98	28.42
BH6	3.00-3.45	24.7	40	15	25	CIM	100	25.00
BH8	3.00-3.60	24.6	41	14	27	CIM	99	26.73
BH8	4.00-4.45	23.1	43	15	28	CIM	95	26.60

Table 4-6: Summary of plasticity index testing.

The modified plasticity index is between 26.60% and 29.00%. This characterises the clay as having a medium volume change potential.

4.4.6 Sulphate and pH

Water soluble sulphate and pH tests were carried out on soil samples. Full results are presented in Appendix C and summarised in Table 4-7.

Strata	pH	Sulphate (g/l)
Made Ground	8.10 to 9.00	0.07 to 0.57
Natural	8.10 to 8.50	<0.01 to 0.33

Table 4-7: Summary of pH and sulphate results.

5 Geotechnical Assessment

5.1 Proposed Development

It is understood that the proposed development will comprise multistorey buildings with associated landscaping and infrastructure. 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, underground car parks etc.) are unknown and therefore have not been taken into account in the following assessment. It is considered that any such works will be designed so as not to have an effect on, or compromise, proposed or existing foundations and retaining structures or ground stability.

Given the nature of the proposed development it is considered that the structure meets the criteria of Geotechnical Category 2 of Euro Code 7.

5.2 Summary of Ground Conditions

Ground conditions identified at the site are detailed in Section 4.1, and typically comprises Made Ground to depths of between 1.90m to 3.50mbgl over natural cohesive superficial deposits to depths of between 15.00m and 20.00mbgl. The CLAY was underlain by SANDS and GRAVELS, with bedrock encountered at 30.00mbgl.

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 Works. This should include:

- » Roots present below the footprint of proposed structures and infrastructure should be grubbed out and the resulting void infilled with suitable compacted engineered fill;
- » Redundant services should be sealed off and grubbed out and replaced with suitable compacted engineered fill; and,
- » Buried structures and old foundations encountered on site 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. 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. While bog mats or geogrid may be suitable for the safe movement of construction plant it is recommended that a geotextile membrane with 150mm of 6F2 or crush (potentially reclaimed from Made Ground / Demolition Rubble onsite) be used to form a raised road if poor weather and waterlogging are likely to be an issue.

5.4 Foundation Conditions and Bearing Capacity

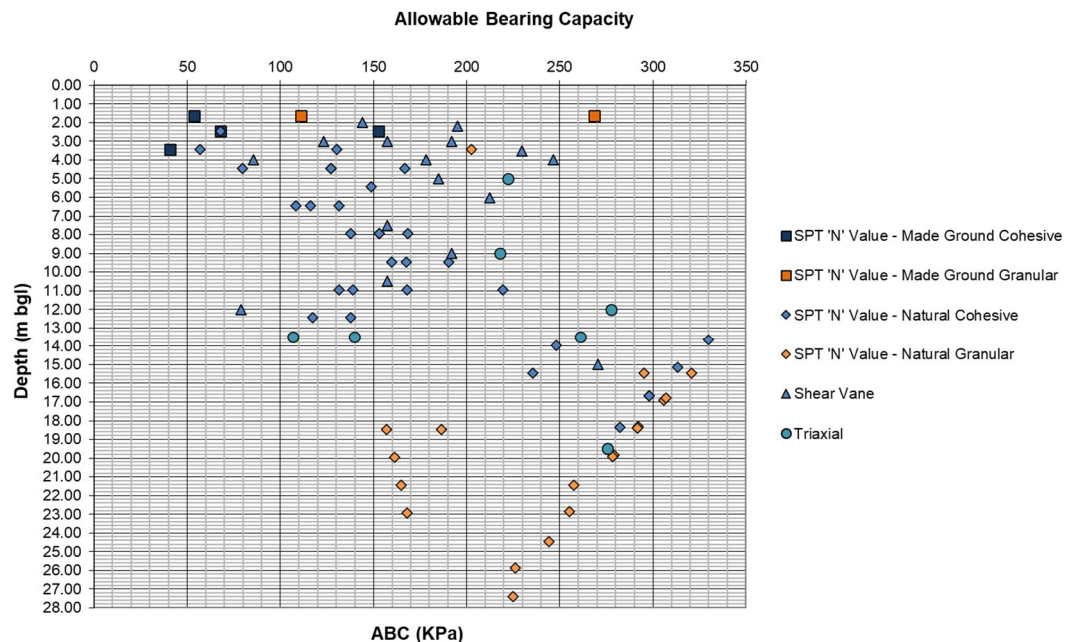
5.4.1 General

It is considered that the Made Ground is not suitable for a founding strata due to the inherent variability of the material. It is understood that a piled solution is the preferred method, however the following options are suitable:

- Piled Foundations,
- Conventional strip footings or raft on vibro granular columns.

These options are discussed below.

The results of the In-situ SPT, Hand Shear Vane and Quick Undrained Triaxial tests were plotted as Allowable Bearing Capacity (ABC) against depth (m) and are shown in Graph 5-1. This is Allowable Bearing Capacity for a strip footing assuming a Factor of Safety of 2.5 for comparison purposes.



Graph 5-1: Summary of ABC vs depth from in-situ SPT, Shear Vane and Triaxial testing.

From Graph 5-1 it can be seen that the strength of the Made Ground ranges greatly and as such cannot be relied on.

Natural strata that reliably achieves an Allowable Bearing Capacity of around 100kPa (for a strip footing) is only encountered at depths below 5.00mbgl.

The strength of the natural cohesive strata appears to increase with depth.

High density natural granular strata is encountered at roughly 18.00mbgl.

The potential foundation options are discussed in the following sections.

5.4.2 Ground Improvement

The use of ground improvement techniques such as vibro granular columns will allow shallow foundations to be utilised with the Made Ground. The vibro granular columns

should provide a bearing capacity of around 150kN/m² but will also remove variability within the Made Ground.

It should be noted that vibro stone columns are not suitable in clays with a Plasticity Index greater than 40% or with an undrained shear strength of less than 30kPa. As such the natural clays encountered onsite should not prevent the use of this technique.

Specialist advice should be sought from a suitably experienced contractor with regard to allowable bearing capacity and settlements.

5.4.3 *Piled Foundations*

Bored piles are recommended due to the presence of infrastructure and historic buildings in the local area that could be effected by vibrations should driven piles be used.

It is recommended that the present hard standing and Made Ground would first be removed down to at least 0.30mbgl and replaced with a suitably compacted material in order to allow safe deployment of the piling rig. It is considered that any obstructions, such as old foundations, would be grubbed out at the same time so as not to 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 SFHW Series 600 (2016). Plate load and CBR testing 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 such as rags and timber as noted in logs.

Static load tests should be undertaken on the first few piles installed in order to confirm the pile design. Shaft friction in fine grained soils is generally taken as no more than 100kN/m² unless higher values can be proven, either through the use of pile testing or through experience in similar ground conditions¹². 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 due to the presence of sands and groundwater. This will help minimise ground disturbance and prevent collapse into the borehole causing areas of weakness.

Due to the deep made ground with potential for obstructions, and the presence of soft wet sand, 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, that 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 15.00mbgl, natural sand to 30.00mbgl.
- » Groundwater at 15.00mbgl, within the sand.

¹² ICE Manual of Geotechnical Engineering (2012). Chapter 54 Single Piles.

- » The natural clay is on average of firm consistency so assumed to be 19.00kN/m³.
- » Average undrained shear strength value of 60kPa within the clay (conservative N_c value of 9¹³).
- » The natural sand is predominantly medium dense so assumed to be 19.00kN/m³.
- » Angle of internal friction of 34.5° within the natural sand (N_q value of 80 based on Berezantsev et al. 1961).
- » 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 take into effect the potential for negative skin friction due to settlement of the made ground.
- » Settlement of the pile has not been considered.

Depth	Pile Carrying Capacity (kN)		
	300mm dia	450mm dia	600mm dia
5.00	21	41	67
10.00	63	104	152
15.00	105	168	237

Table 5-1: Preliminary Pile Carrying Capacity.

The use of driven piles will increase the pile carrying capacity significantly due to their higher adhesion factor, however this is unlikely to be suitable due to the noise and vibration in close proximity to retaining structures and infrastructure.

Consideration will also need to be given to lateral loading that may be applied to the tramway tunnel and the adjacent Ashton Canal.

Deeper piles to bedrock may be required dependant on the load of the proposed newbuild.

Pile design should be undertaken by a specialist contractor to allow them to reduce the factor of safety based on their extensive pile testing data.

Recommendation

Deep strip foundations below 2.50m depth are generally not economic and whilst a piling solution is viable it is considered that vibro granular columns will provide the most reliable and cost-effective option for the site dependant on the proposed load required.

5.5 Pavement Construction

While high CBR values were obtained from the Made Ground this is likely due to the presence of bricks and gravel. The untreated Made Ground is considered unsuitable as a sub-grade due to its potential variability. It should be removed to a depth of 0.50m below formation level and sorted to remove any unsuitable or deleterious materials. Suitable testing should be undertaken to assess whether the material can then be reused.

¹³ ICE Manual of Geotechnical Engineering (2012). Chapter 54 Single Piles.

The sub formation should then be rolled and suitable excavated material can then be replaced, up to formation level, in fully compacted thin layers as per SHW Series 600. Any deficit should be made up with suitable imported fill compacted as above. Following this treatment an overall design CBR of 3-5% should be available, although this will require confirmation at a later date through in-situ CBR tests.

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

5.6 Drainage

The presence of substantial depths of Made Ground across the site may result in settlement. It is therefore recommended that drainage runs are designed using steeper gradients and flexible joints to allow for some differential settlement between the piled buildings and the service runs.

Due to the presence of a retaining structure at the mouth of the tramway tunnel in the west of the site, it is recommended that soakaways are not utilised in this area. Drainage will have been installed behind the retaining wall of the tunnel mouth in order to prevent groundwater to building up behind the wall and exerting pressure against it. As such, any works that may increase the flow of water to ground in this area may inundate the drainage and put increased pressure against the wall.

The same could also be said for the walls of the Ashton canal in the north of the site, however these are old and unlikely to have been installed with adequate drainage.

Should the proposed buildings be piled, some differential settlement may occur between the building and the services within the made ground. It is therefore recommended that drain runs are designed using steeper gradients and flexible joints to allow for some differential settlement.

5.7 Concrete Durability

Based upon the results of the chemical analyses summarised in Table 4-7 it is considered that subsurface concrete can be designed in accordance with Design Sulphate Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1s in accordance with the recommendations provided in BRE Special Digest 1 (2005).

However, it should be noted that one sample in the location of TP15 (0.10-1.00m) returned slightly elevated sulphate results and DS-2 AC-1s may be required in this area where potential infrastructure comes into contact with the made ground.

5.8 Excavations

Site observations indicate that excavations should be feasible in the near surface with normal plant, however obstructions were identified in the near surface including former foundations and masonry. It is anticipated that any obstructions will be grubbed prior to installing piles.

Some of the exploratory holes were observed to be unstable during the excavation/drilling and the Made Ground was noted in places to contain perched groundwater. The short- and long-term stability of near vertically sided excavations can therefore not be guaranteed and random and sudden instability within these soils should be anticipated.

Due to the variability of the Made Ground it is considered that all excavations are supported or battered back in accordance with guidance contained in CIRIA R97¹⁴.

Groundwater seepages were noted in several locations, caution should be exercised as these may be in continuity with the Ashton Canal.

Should de-watering in granular soils be required, then consideration must be given to the potential for settlement to impact off site structures.

5.9 Re-Use of Materials

Consideration should be given to the potential re-use of site won arisings from substructure works as an engineered fill. The soils should be assessed in line with Specification for Highways Works Series 600 and considering the following:

- » Physical description of the soils encountered (variability and organic content).
- » Particle Size Distribution in relation to Specification for Highway Works.
- » Moisture Content and plasticity data in relation to Specification for Highway Works.
- » Compaction Test or MCV Tests will need to be undertaken.

5.10 Minerals

There are no minerals of economic value underlying the site at shallow depth. The site is not within a Development High Risk Area and is outside of the area potentially affected by the Great Mine Limestone extraction that took place towards Ancoats.

The Site is considered to be minerally stable.

5.11 Construction Activity and Inspection

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

- » Should piling be undertaken a suitable pile mat should be engineered and tested prior to use to ensure it is safe and suitable.
- » 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 R97 utilised.
- » Removal of surface water should be possible with conventional sump pumping, however, should deeper excavations be required there is a potential that the groundwater is in continuity with the canal. 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.
- » 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).

¹⁴ CIRIA Report 97 – Trenching Practice – Second Edition (2001 revision)

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 (LCRM¹⁵). 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).
- LQM Suitable 4 Use Levels (S4ULs).

C4SLs were published in 2013^{16,17}. The change to the contaminated land guidance has changed the evaluation of risk from 'minimal' (referred to as Health Criteria values (HCVs))¹⁸ used to generate Soil Guideline Values (SGVs) to 'low' (referred to as Lowest Level of Toxicological Concern (LLTCs)). The policy companion document and supporting letter by Defra, dated 3rd September 2014, states that C4SLs *'could be used under the planning regime, as well as within Part 2A'*. Based on these comments LKC considers the justifications and assumptions used to generate 'low' risk are suitable for the planning regime.

Where no C4SLs have been generated LKC will use the LQM S4ULs¹⁹. Similar assumptions and land uses to C4SLs have been used. However, toxicological information has been based on 'minimal risk' as per previous guidelines and assumptions^{20,21,22,23}.

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^{24,25} and naphthalene the most volatile and soluble²⁶. The new 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 negligible²⁷. For B(a)P to be used as a surrogate marker it should follow the profile described by the

¹⁵ Land Contamination Risk Management (LCRM) <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

¹⁶ Defra (2014). "SP1010: Development of Category 4 Screening Levels and Assessment of Land Affected by Contamination – Policy Companion Document."

¹⁷ CL:AIRE (2013). "SP1010: Development of Category 4 Screening Levels and Assessment of Land Affected by Contamination – Final project Report."

¹⁸ EA (2008). "Human Health Toxicological Assessment of Contaminants in Soils." Science Report – SC050021/SR2.

¹⁹ LQM (2014). "The LQM/CIEH S4ULs for Human Health Risk Assessment."

²⁰ EA (2008). "Updated Technical Background to the CLEA Model." Science Report – SC050021/SR3.

²¹ EA (2008). "Human Health Toxicological Assessment of Contaminants in Soils." Science Report – SC050021/SR2.

²² EA (2008). "A Review of Body Weight and Height Data used within the Contaminated Land Exposure Assessment Model (CLEA)." Project SC050021/Technical Review 1.

²³ EA (2009). "Compilation of Data for Priority Organic Pollutants for Derivation of Soil Guideline Values." Science report SC050021/SR7.

²⁴ EA (2002). "Contaminants in Soils: Collation of Toxicological Data and Intake Values for Humans. Benzo[a]pyrene." R&D Publication TOX2.

²⁵ USEPA (1984). "Health Effects Assessment of Polycyclic Aromatic Hydrocarbons (PAHs). EPA 540/1-86-013."

²⁶ EA (2003). "Review of the Fate and Transport of Selected Contaminants in the Soil Environment." Draft technical report P5- 079/TR1.

²⁷ CL:AIRE (2013). "SP1010: Development of Category 4 Screening Levels and Assessment of Land Affected by Contamination – Final project Report."

HPA (2008)²⁸ and CL:AIRE (2013). Naphthalene will be treated separately using the LQM S4ULs.

The proposed development is for commercial and office buildings with public open space. Due to proximity of residences, a precautionary approach is to use Public Open Space (POSres) assessment criteria.

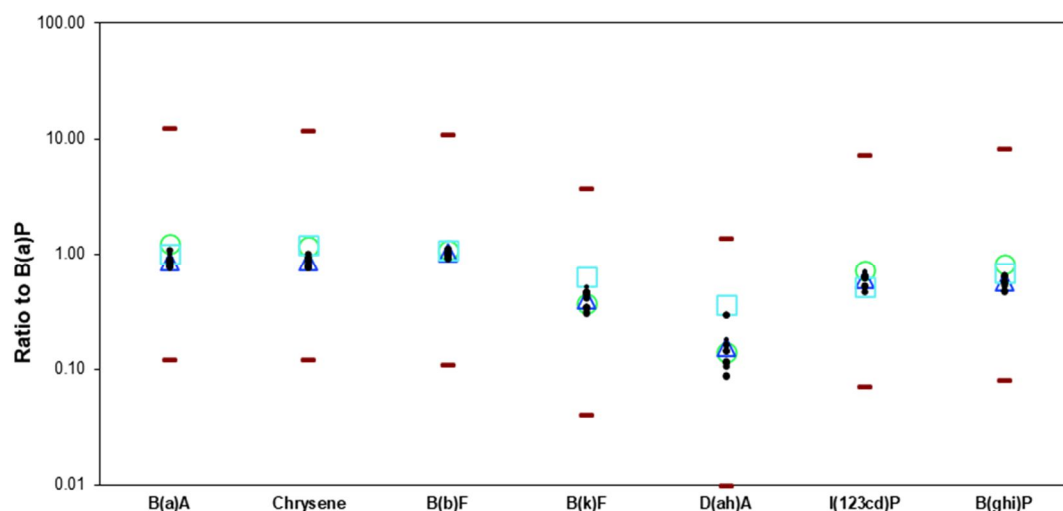
All criteria have been generated using the CLEA V1.06 model²⁹ based either on 1%, 2.5% and 6% Soil Organic matter (SOM). Results will be compared to the nearest appropriate SOM.

A summary of the generic assessment criteria is provided in Appendix F.

B(a)P as Surrogate Marker

Based on the above assumption for PAHs, LKC undertook an assessment of the 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.*³⁰, 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 13 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
 ● = Ratio to B(a)P for all data ○ = Mean ratio to B(a)P for Culp data △ = Mean ratio to B(a)P from all data at the site; □ = Mean ratio to B(a)P for UK data presented by HPA — = Upper and Lower limits (order of magnitude from Culp data)

²⁸ HPA (2010). "HPA Contaminated Land Information Sheet: Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs)." Version 3.

²⁹ EA (2008). "CLEA Software (Version 1.05) Handbook." Science Report – SC050021/SR4.

³⁰ Culp, S; Gaylor, D; Sheldon, W; Goldstein, L and Beland, F (1998). "A Comparison of Tumours Induced by Coal Tar and Benzo-a-pyrene in a 2-Year Bioassay." Carcinogenesis. Vol 19, no. 1, pp. 117-124.

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. Elevated and pertinent results are presented in Table 6-1.

Contaminant	Units	No. of samples	Elevated Results	Sample Location	Criteria (1%/2.5%/6%)	Source of Criteria
PAHs						
Benzo(a)pyrene	mg/kg	11	41.0	BH2 (0.40-1.30m)	10	C4SL
			38.0	WS105 (0.0-1.0m)		
			29.0	WS101 (1.0-2.0m)		
			38	WS105 (0.0-1.0m)		
			20	BH6 (2.0-2.45m)		
			110	BH3 (0.0-1.2m)		
			49.0	BH4 (0.70-1.60m)		
GENERAL						
pH	pH	6	8.3-9.1			
SOM	%	6	1.5-14.0			
Asbestos	N/A	6	Detected (see Table 6-2)			

Table 6-1: Summary of elevated and pertinent analytical results.

Notes:

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.

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

Sample Location	ID	Type	Total Asbestos (%)
TP8 (2.20-3.20m)	Chrysotile	Lagging	0.110
BH4 (0.70-1.60m)	Chrysotile	Insulation	0.075
TP7 (0.0-0.5m)	Amosite/Chrysotile	Fibres/clumps	0.075
BH3 (0.2-1.0m)	Chrysotile	Fibres/clumps	0.002

Table 6-2: Details of asbestos identified.

6.2.3 Direct Contact Risk – Pollutant Linkage 1

PAHs

Elevated PAHs have been identified on site, given the number and location of elevated samples, the contamination is considered to be site wide.

The source of the contamination is expected to the ash, clinker and tarmacadam noted in the made ground.

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

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

Asbestos

Asbestos insulation, lagging and fibres/clumps containing chrysotile and amosite fibres was variously identified in TP7, TP8, BH3 and BH4. Given the similar made ground across the site and historical background it should be assumed that these samples are not localised and are generally representative of made ground across the site.

Asbestos may affect site users in the soft landscaping 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 and remediation (clean cover soils) is recommended.

LKC have utilised the Joint Industry Working Group (JIWG) Decision Support Tool for receptor risk ranking of ACM onsite. This model incorporates guidance from CL:AIRE CAR-SOIL³¹ and CIRIA C733³².

In this model a child of school age playing in the landscaped area for 1 hour was assumed in close proximity to the source. A high respirable index was assumed based on the ACM identified onsite as per RIVM³³.

The assessment was carried out considering placement of suitable clean cover soils in soft landscaping areas (refer to Section 9), therefore *'material buried at depth, unlikely to be disturbed except for deeper construction related excavation'* was selected.

For added conservatism, the model does not consider moisture content, which can significantly reduce the potential for airborne fibre release from soil in a typical UK climate. AGS interim guidance³⁴, based on work by Addison et al³⁵, notes that the addition of 10% water to soil decreases the risk of potential fibre release by a factor of between 2 and 10. The moisture content of the soil from this area was 7-21 % (average 12.65%) making fibre release unlikely.

Data from Addison *et al* shows that a sandy soil with Chrysotile fibre concentrations of 0.01%w/w (1 order of magnitude lower recorded) when agitated in a moderately aggressive way, produced between 0.01fibres/ml and no recordable fibres at moisture contents of 5% and above. It should be noted that the clearance level is 0.01f/ml.

The JIWG model output sheet is presented in Appendix G. A very low risk was identified to key receptors based on general worst-case scenario when soils are beneath a clean cover system, therefore no additional remediation with respect to ACMs is considered necessary, subject to a watching brief.

Additional consideration should also be given to the risk to workers and offsite receptors during groundworks and construction. This is discussed further in Section 9.

³¹ CL:AIRE (2016). "CAR-SOIL Controlled Asbestos Regulations 2012: Interpretation for Managing and Working with Asbestos in Soil and Construction and Demolition Materials" Industry Guidelines.

³² CIRIA (2014). "Asbestos in Soil and Made Ground: A guide to Understanding and Managing Risks." CIRIA C733.

³³ RIVM (2003). "Assessment of the Risks of Soil Contamination with Asbestos" CIRIA C733." RIVM Report 711701034/2003.

³⁴ AGS (2013). "Site Investigation Asbestos Risk Assessment." AGS Interim Guidance, Feb 2013, Ver 2.4.

³⁵ Addison et al (1988). "The Release of Dispersed Asbestos Fibres from Soils." Institute of Occupational Medicine Report No. TM/88/14.

Heavy Metals, Hydrocarbons

No elevated heavy metals were identified during the site investigation. Slight hydrocarbon odours were noted in shallow soils within BH3, however no elevated concentrations of hydrocarbons were reported in laboratory results.

LKC therefore consider the probability of metals and hydrocarbons affecting future site users as unlikely. With a medium consequence, the risk is considered low and no remediation is required. As a precaution, a watching brief should be maintained during the earthworks for the potential presence of contamination. This is discussed further in Section 9.

6.2.4 Risk from Inhalation of Vapours – Pollutant Linkage 2

A bituminous odour was noted within Made Ground soils containing tarmacadam fragments in BH3 (0-1.1m). No other visual evidence of volatile contaminants was identified during the investigation.

Confirmatory soil analysis did not detect any potentially volatile contaminants 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 with respect to pollutant linkage 2.

A watching brief should be maintained for potential volatile contamination during earthworks.

6.3 Gas Risk Assessment

Six gas monitoring visits have been undertaken on the study site. Gas monitoring results in full are presented in Appendix E. Following guidance set out in CIRIA C665³⁶ and BS8485³⁷ 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.

Limited flow was recorded across the site with peaks of -0.1l/hr to 0.1l/hr. No methane was recorded above detection limits in any of the boreholes across the site. Negligible carbon dioxide was recorded with a peak of 4.1%v/v in WS4 on Visit 5. Reduced oxygen readings were observed in WS5 in each Visit, ranging from 0.1% to 1.3%.

Carbon monoxide levels ranged from <0.1ppm to 5.0ppm. The maximum concentration was recorded in WS1. Only workplace exposure limits defined by the HSE are available for carbon monoxide. A Short-Term Exposure Limit of 200ppm (15-minute period) and Long-Term Exposure Limit of 30ppm have been defined (8-hour period). Based on the above exposure limits, carbon monoxide is not expected to pose a significant risk to the proposed site receptors.

Gas Screening Value

In accordance with CIRIA C665³⁸, a Gas Screening Value (GSV) may be calculated. Assuming worst-case scenario maximum gas concentrations and flow for each

³⁶ CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665.

³⁷ BSI (2019). "Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings." BS8485:2015+A1 2019.

³⁸ CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665.

borehole have been used to calculate the GSV. The GSV can be used to determine the characteristic situation (CS).

Table 6-3 shows the maximum GSV for each borehole and the appropriate characteristic situation (based on GSV only). An overall site assessment has also been included (worst case values across the site).

Boreholes	Max GSV (l/hr)	CS
WS1	0.0014	CS1
WS4	0.0041	CS1
WS5	0.0006	CS1
WS7	0.0032	CS1
WS1-7	0.0001 (CH ₄) 0.0041 (CO ₂)	CS1

Table 6-3: Summary of worst-case Gas Screening Values (GSV).

Notes:

CS – Characteristic Situation.

LKC consider that CS1 would be appropriate for the site.

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.

6.4 Controlled Water Assessment

The PRA identified a moderate risk with respect to controlled waters due to the industrial history of the site, the sensitivity of the receptors and previously identified (as part of the 2009 investigation) olfactory evidence of contamination.

During the site investigation, with the exception of bituminous odours within shallow made ground of BH03, no evidence of potential mobile contamination was identified on the site during the site investigation work. Although elevated PAHs were identified within the soils, the source is anticipated to be ash and tarmacadam noted within the made ground. Contamination associated with ash and clinker and bituminous material is not anticipated to be mobile due to the residual crystalline nature of the matrix.

The factual report from 2009 describing previous investigations of the site had identified potential visual/ olfactory evidence of contamination (odours) within shallow Made Ground, within the south of the site. The 2009 report also identified olfactory evidence of contamination was noted in sand bands at approximately 10.5mbgl in two boreholes in the central south area of the site. No further information (lab data, risk assessment, etc) has been provided other than notes of odours in borehole logs. Both boreholes were located close by each other below the current tramline, approximately centrally equidistant between LKC boreholes BH1, 2 and 3)

As only two, close by, boreholes during 2009 and none during LKC investigation identified olfactory evidence of contamination, if present, it is likely to be highly localised and not representative of general groundwater conditions on the site.

Ground conditions beneath the site mean that the site is relatively low sensitivity to potential mobile contamination. The Principal Aquifer associated with sandstone bedrock is >40mbgl, overlain by largely low permeability clay strata with sand bands which are unlikely to be in direct hydraulic continuity with the Principal Aquifer. Similarly, the adjacent canal is likely to hydraulically isolated from on-site groundwater and represent a hydraulic head of water to groundwater flow.

The clay present on the site should significantly reduce any sub-surface migration and processes include dilution, attenuation and biodegradation will reduce the concentration of contamination.

Based on the above, the likelihood of contamination affecting controlled waters is low. With a medium consequence, the risk is considered moderate/low. A low risk is considered appropriate due to ground conditions and there are no groundwater or surface water abstractions close to site.

A watching brief for potentially mobile contaminants should be maintained during the site works.

6.4.1 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 contamination³⁹. Only contaminants of concern, based on the preliminary conceptual model and ground conditions encountered, were analysed. The following contaminants were not considered to be a risk and therefore not included in the analysis suites: chlorinated compounds, phenols, cresols, ethers, nitrobenzene, ketones, aldehydes and amines.

The following elevated contaminants were identified:

➤ Elevated TVOCs and petroleum hydrocarbons.

It is likely that barrier pipe will be required subject to the depth and location of the water pipes and in consultation with UU.

Once details of the pipeline location and depths are known a UU Risk Assessment should be undertaken.

At this stage, the probability of organic contaminants affecting potable water pipes is likely. Given the consequence is considered to be medium, the risk (pollutant linkage 5) is anticipated to be moderate risk and remediation (i.e. barrier pipe) is likely to be required (subject to further risk assessment).

6.5 Revised Contamination Conceptual Model

The preliminary contamination conceptual model (Table 2-2) has been revised following the risk assessments undertaken in Sections 6.1-6.5. 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 6-4.

³⁹ UU(2011). "United Utilities Water Supplementary Guidance for the Selection of Water Pipes in Land Potentially Affected by Contamination."

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.

Further details of the remedial proposals and a remedial option appraisal are given in Section 9.

Pollutant Linkage	Pathway	Receptor	Contaminant	Probability	Consequence	Risk	Assessment
PL1	-Dermal contact. -Inhalation of soil, fibres and dust. -Ingestion of soils, dust. -Windblown dust.	-Future site users.	-ACMs. -PAHs.	Likely	Medium	Moderate	-Likely probability as ACM and elevated PAHs identified, in the made ground across the site which could come into contact with site users in soft landscaping areas. -JIWG assessment identifies low risk from ACMs beneath clean cover soils. -Recommendation*: Remediation required. Likely to include an environmental cover system in soft landscaping areas.
			-Hydrocarbons. -Heavy metals.	Unlikely	Medium	Low	-No elevated volatile concentrations identified. -Recommendation: No remediation required subject to watching brief during earthworks.
PL2	-Inhalation of vapours. -Migration through permeable strata and preferential pathways.	-Future site users.	-Volatile Contaminants.	Unlikely	Medium	Low	-No elevated volatile concentrations identified. -Recommendation: No remediation required subject to watching brief during earthworks.
PL3	-Inhalation of gas. -Migration through permeable strata and preferential pathways. -Explosion in confined spaces (methane only).	-Future site users. -Buildings. -Offsite land users.	-Carbon dioxide, methane	Unlikely	Severe	Moderate/ Low	-No significant concentrations of methane or carbon dioxide and no flow identified in gas monitoring. -Recommendation: CS1 recommended.
PL4	-Surface Run-off. -Migration through permeable strata and preferential pathways -Perched waters migration.	-Groundwater (Principal Aquifer). -Surface water (Ashton Canal).	-Mobile contaminants such as metals, PAHs, hydrocarbons.	Low	Medium	Moderate/ Low	-No significant evidence of potentially mobile contamination identified in soils during site investigation. -Environmental setting means no significant preferential pathways to receptors. -Recommendation: No specific remediation required. Watching brief during earthworks.
PL5	-Ingestion of tainted water supply.	-Future site users (via potable water).	Organic Contaminants: -TVOCs -Petroleum hydrocarbons	Likely	Medium	Moderate	-Likely probability as elevated concentrations encountered. -Recommendation: Barrier piping likely to be required, subject to UU risk assessment.

Table 6-4: Revised Contamination Conceptual Model.

Notes* The conceptual model only takes into consideration the future use of the site and long-term exposure. Consideration should also be given to the short-term exposure of construction workers and nearby land users to ACM containing soils during groundworks.

7 Waste Disposal Assessment

The soil contamination results as presented in Appendix C have been used to help determine the waste classification of material for off-site disposal.

As an initial screen the soil results were inputted into Hazwaste Online™. This is a web-based facility that allows an assessment waste as either hazardous or non-hazardous waste based on relevant guidance and legislation^{40, 41, 42, 43, 44, 45, 46, 47, 48}.

Hazwaste Online™. has been designed to cover, amongst other waste types, the European Waste List of Waste (LoW) code number 17 "Construction and Demolition Waste (Including Excavated Soil from Contaminated Sites)".

Where less than limits of detection (LOD) were recorded, the value of the LOD was inputted.

Where applicable, appropriate metal species based on hazard statements/ molecular weight, site history, ground conditions and likely species present in soils were used (e.g. metal oxides relating to an ash-based source).

Two samples out of the twelve tested are classed as hazardous, the output sheet is presented in Appendix H and details of the two hazardous samples are summarised in Table 7-1.

Sampling Location	Hazardous Waste Y/N	LoW Code	Hazard (Risk Phrase)	Contaminants
TP8	Y	17 05 03	HP7 (Carcinogenic)	asbestos
TP15	Y	17 05 03	HP7 (Carcinogenic) HP11 (Mutagenic)	TPH (C6 to C40)

Table 7-1: Summary of Hazwaste Online™ findings.

Irrespective of the above assessment, the soils on site were noted to contain significant amounts of other material (such as wood, metal, plastic, etc) and therefore may be regarded as a mixed waste.

Mixed wastes must be separated where technically and economically feasible. It is recommended that hand picking or sorting of materials such as wood, metal, plastic etc is undertaken and an appropriate disposal route for each waste stream is ascertained.

7.1 Waste Acceptance Criteria (WAC) Testing

Waste Acceptance Criteria (WAC) testing was also undertaken on 2no. samples representative of material likely to be earmarked for off-site disposal. WAC test results are included in Appendix C.

⁴⁰ EA (2018). "Guidance on the Classification and Assessment of Waste (1st Edition v1.1)". Technical Guidance WM3.

⁴¹ CLP Regulation - Regulation 1272/2008/EC of 16 December 2008.

⁴² 1st ATP - Regulation 790/2009/EC of 10 August 2009

⁴³ Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013

⁴⁴ WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014

⁴⁵ Revised List of Wastes 2014 - Decision 2014/955/EU of 18 December 2014

⁴⁶ 13th ATP - Regulation (EU) 2018/1480 of 4 October 2018

⁴⁷ POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004

⁴⁸ 2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010

The WAC limits cannot be used to assess whether a waste is hazardous. Landfills are classified according to whether they can accept hazardous or non-hazardous wastes. Wastes can only be accepted at a landfill if they meet the WAC for that class of landfill.

With regards to non-hazardous waste, material can only be designated to an inert cell of a non-hazardous landfill based on WAC testing. With regards to hazardous waste, material can only be designated as SNRH cell within a non-hazardous landfill or hazardous landfill from WAC testing.

A WAC sample of natural strata recovered from TP8 (2.2-2.3m) is likely to be considered suitable for disposal at an inert landfill. A representative sample of made ground material classified as 'hazardous' from TP15 (0.1-1.0m) is unlikely to be considered suitable for a non-hazardous landfill due to elevated TOC%

It is recommended that material earmarked for removal from site is tested prior to disposal and data is sent to the landfill operator for assessment. It should be noted that the licenced landfill operator would determine the designation, which may differ to this assessment.

8 Conclusions

8.1 Geotechnical

Geotechnical observations and conclusions are contained in Table 8-1 below, more detailed discussions are contained within Section 5.

Proposed Development	Multistorey buildings with associated landscaping and infrastructure.
General Ground conditions / Geotechnical Testing	Maximum investigation depth 40.00mbgl. Made Ground to between 1.90m and 3.50mbgl. Natural clay to between 15.00m and 19.40mbgl. At 2.00mbgl SPT 'N' values range from 8 to 12. At 3.00mbgl 'N' from 7 to 23. Bedrock encountered at 30.00mbgl in BH6 comprising Mudstones, Siltstones and Marls.
Allowable Bearing Pressure	The proposed load is unknown. The ground does not reliably provide an Allowable Bearing Capacity of 100kPa until a depth of around 6.00mbgl. As such ground improvement or a piled solution are recommended.
Anticipated Foundation Type	Due to the presence of deep Made Ground and both cohesive and granular natural strata, it is recommended that the proposed building is piled. The appointed specialist piling contractor will be able to optimise pile design such as pile grouping per pile cap, pile diameter & pile spacing, installation methodology, pile cap settlement, and socket lengths to suit from the SI data. Ground improvement through the use of vibro stone columns may also be acceptable dependant on the proposed end load.
Existing Retaining Walls	Consideration needs to be given to any effect the proposed works may have on the existing retaining structures along the tramway in the centre of the site and the canal to the north. The bulb of pressure from any proposed foundations will need to out of the zone of influence of the side walls of the retaining walls or their foundations. All drainage needs to be suitable to prevent excess load to the retaining walls and to avoid inundating the existing track draining which could lead to flooding of the line. It is recommended that an assessment of the existing retaining walls is undertaken to assess their response to the proposed development.
Shallow Groundwater	From the sporadic presence of shallow groundwater noted in some of the investigation locations, it is likely that the Ashton Canal is leaking in places and that these strikes are not the actual groundwater level. It may be prudent to assess and repair the canal along the site boundary prior to any groundworks as, not only will the water cause difficulties with excavation and reduce the soil strength but pumping to lower it may cause further damage to the canal wall.
Concrete Requirements	Based on BRE Digest 2005 ⁴⁹ concrete of specification DS-1 AC-1 is acceptable across the majority of the site. However one slightly elevated result was observed in TP15 (0.10-1.00m). Should infrastructure be placed in contact with the area of made ground DS-2 AC-1s is recommended.
Services	Any services running through the site may need to be re-routed. Due to the presence of significant thickness of made ground services may settle differentially to the likely piled proposed structures. Increasing the gradient of drains and the use of flexible joints will help mitigate this.
Temporary support of excavation	May be required as boreholes were noted as collapsing and significant depth of Made Ground encountered in areas of the site.
Plasticity	Due to the depth of overlying made ground the plasticity of the soil and its likely movement due to tree roots is unlikely to be an issue. Plasticity of clays encountered onsite ranged between 26% and 29%. As such the ground should be suitable for the use of vibro stone columns.

Table 8-1: Geotechnical Observations and Conclusions Table.

⁴⁹ BRE (2005). "Concrete in Aggressive Ground." Special Digest 1.

8.2 Contamination Assessment

A revised contamination conceptual model has been produced by LKC which is summarised in Table 8-2 below (more detailed model provided in Section 6).

Pollutant Linkage		Risk	Recommendations
1	Contaminants posing a risk to site users via dermal contact, ingestion and inhalation (of soil, dust and fibres).	Moderate (ACMs, PAHs)	-Likely probability as ACM and elevated PAHs identified, in the made ground across the site which could come into contact with site users in soft landscaping areas. -JIWG assessment identifies low risk from ACMs beneath clean cover soils. -Recommendation*: Remediation required. Likely to include an environmental cover system in soft landscaping areas.
		Low (metals, hydrocarbons)	-No elevated volatile concentrations identified. -Recommendation: No remediation required subject to watching brief during earthworks.
2	Volatile contaminants posing a risk to site users via the inhalation of vapours.	Low	-No elevated volatile concentrations identified. -Recommendation: No remediation required subject to watching brief during earthworks.
3	Gas posing a risk to buildings and site users via the migration of gas into building causing explosion and asphyxiation.	Moderate/ Low	-No significant concentrations of methane or carbon dioxide and no flow identified in gas monitoring. -Recommendation: CS1 recommended.
4	Mobile contamination posing a risk to controlled waters via the migration through permeable strata.	Moderate/ Low	-No significant evidence of potentially mobile contamination identified in soils during site investigation. -Environmental setting means no significant preferential pathways to receptors. -Recommendation: No specific remediation required. Watching brief during earthworks.
5	Organic contaminants posing a risk to water pipes.	Moderate	-Likely probability as elevated concentrations encountered. -Recommendation: Barrier piping likely to be required, subject to UU risk assessment.

Table 8-2: Summary Risk Table.

Remedial recommendations are presented in Section 9.

9 Recommendations and Remedial Strategy

The recommendations 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.

9.1 Remediation and Validation Recommendations

9.1.1 *Earthworks Inspections/ Unexpected Contamination (All Pollutant Linkages)*

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.

Any soils deemed to be impacted by contamination based on visual / olfactory evidence and the use of a PID should be excavated and removed. Impacted soils should be placed on an impermeable surface to await 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.

Soil samples will be taken and analysed for a suite of contaminants, including *inter alia* heavy metals, Soil Organic Matter, VOCs, SVOCs, BTEX, TPHCWG and asbestos. Soil samples should represent the impacted material. In order 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.

9.1.2 *Environmental Cover System (PL1)*

In gardens and soft landscaping areas, an environmental cover system will be required. The environmental cover system should constructed be as follows:

» **Shared Landscaping: 450mm thick environmental cover system comprising:** Either 100mm physical break layer (MOT type 1 material, 20-30mm, minimal fines) and at least 200mm comprising clean inert fill and sufficient topsoil for a growing medium **OR** geotextile membrane and at least 300mm comprising clean inert fill and sufficient topsoil for a growing medium.

A diagram of a typical environmental cover system is shown in Plate 9-1 below.

Either (physical break layer)		Or (geotextile membrane)	
450mm & shared landscaping (minimum)	150mm (minimum) chemically validated TOPSOIL	450mm & shared landscaping (minimum)	150mm (minimum) chemically validated TOPSOIL
	200mm chemically validated SUBSOIL		300mm chemically validated SUBSOIL GEOTEXTILE MEMBRANE (at base of subsoil)
	100mm (minimum) PHYSICAL BREAK LAYER		
Existing MADE GROUND			

Plate 9-1: Typical Environmental Cover System Construction.

Notes:

Subsoil can be replaced with additional topsoil.

Where there are TPO's in influencing distance of environmental cover systems it is likely the arboriculture officer may only allow a 150mm clean cover system over a geotextile membrane.

Hardstood Areas – No Remediation Required.

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 9.3.

9.1.3 Potable Water Pipes (PL5)

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

Validation of pipeline installation should include delivery notes of pipe materials, photographs of installed pipe and confirmation of connections.

9.2 Other Considerations

9.2.1 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. 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.

This risk can be managed by careful procedures and site monitoring to reduce the risk of airborne fibres, and it is recommended that an appropriate 'Asbestos Management Strategy' is developed and adopted for all intrusive ground works which disturb the made ground in the area of concern. This should be carried out in line with CIRIA C733⁵⁰.

This may include asbestos awareness training for all site staff, provision of suitable personal and respiratory protective equipment and air monitoring.

⁵⁰ CIRIA (2014). "Asbestos in Soil and Made Ground: A Guide to Understanding and Managing Risks". C733

With regards to cement bound asbestos, this can be handpicked, doubled bagged and disposed of appropriately to a licenced landfill. Guidance on removing asbestos cement is described in HSE (2012)⁵¹.

If ACM is identified in soil arisings then soil should be placed directly into covered skips and disposed of at a suitable licenced landfill, after further testing to quantify the extent of asbestos contamination of the soils. It should be considered that blue asbestos is notifiable and must be removed by a licenced contractor.

9.2.2 *Grubbing Out of In-ground Structures*

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

Note that it may not be possible to include full turnover, e.g. in areas of deep made ground, close to site boundaries, or around easements due to limits of plant and constraints from adjacent properties/ features. Any in-ground structures which remain in-situ should be logged and position surveyed and reported.

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.

9.2.3 *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 used):

- 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 Practice 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 9-1.

9.2.4 *Stockpile Management*

Stockpiled material should be suitably managed. The source of each stockpile should be recorded and appropriate validation testing for the proposed re-use or potential

⁵¹ HSE (2012). "Removing Asbestos Cement (AC) Debris." A11 Asbestos Essential – Non-licenced Tasks.

offsite disposal should be undertaken as required. Depending on the nature of the material the potential for dust generation will be mitigated by dampening down and covering as required.

Material should be segregated by type and source. For example, construction / demolition arisings, site won subsoil.

A quarantine area for suspect contaminated soils should be established on site. This should comprise an impermeable lined area with a small bund to prevent run off and to minimise the risk of contaminating other areas of the site. The material should also be covered to minimise the generation of vapours, fibres, dust and possible nuisance to adjacent receptors, and to prevent rainwater ingress which may mobilise soluble contaminants.

9.2.5 *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.

9.2.6 *Health & 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 guidance⁵²) should be adopted by all workers involved with site enabling and construction works.

9.2.7 *Piling in Contamination Land*

It is understood that the building will be piled into the bedrock. This may provide a preferential pathway for contaminants. Once the method of piling has been determined, good practice for the drilling of piles on contaminated sites should be adhered to, such as guidance provided by the Environment Agency⁵³.

9.3 **Validation of Subsoil / Topsoil**

Chemical validation of all imported 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 9-1, based on MCC 'Guidelines to Developer' (2021)⁵⁴. However, 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. However, where this is not possible then material imported should be segregated based on source and

⁵² HSE (1991). "Protection of Workers and the General Public During Development of Contaminated Land" London HMSO.

⁵³ Environment Agency (2001) Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention.

⁵⁴ Manchester City Council (February 2021). "Planning and Contaminated Land Technical Guidance".

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	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 9-1: Sampling requirements for imported 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.

9.4 Site Completion Report

All the remediation and validation work should be documented in a Site Completion Report. The following Completion Reports should be provided to satisfy the outstanding contaminated land planning conditions:

- » **Pre-construction Phase Completion Report:** Site level reduction details, offsite disposal information, validation testing of site won material to be used in gardens, findings of the watching brief including details of any unexpected contamination and verification testing.
- » **Build-phase Construction Completion Report:** Validation testing of any imported subsoil and topsoil, completion of UU potable water supply document and/or discussion with UU and details of installation.

The aim of the completion reports will be to demonstrate to the Local Authority that the site has been suitably remediated to the extent that construction works may commence and, in accordance with the National Planning Policy Framework (NPPF)⁵⁵:

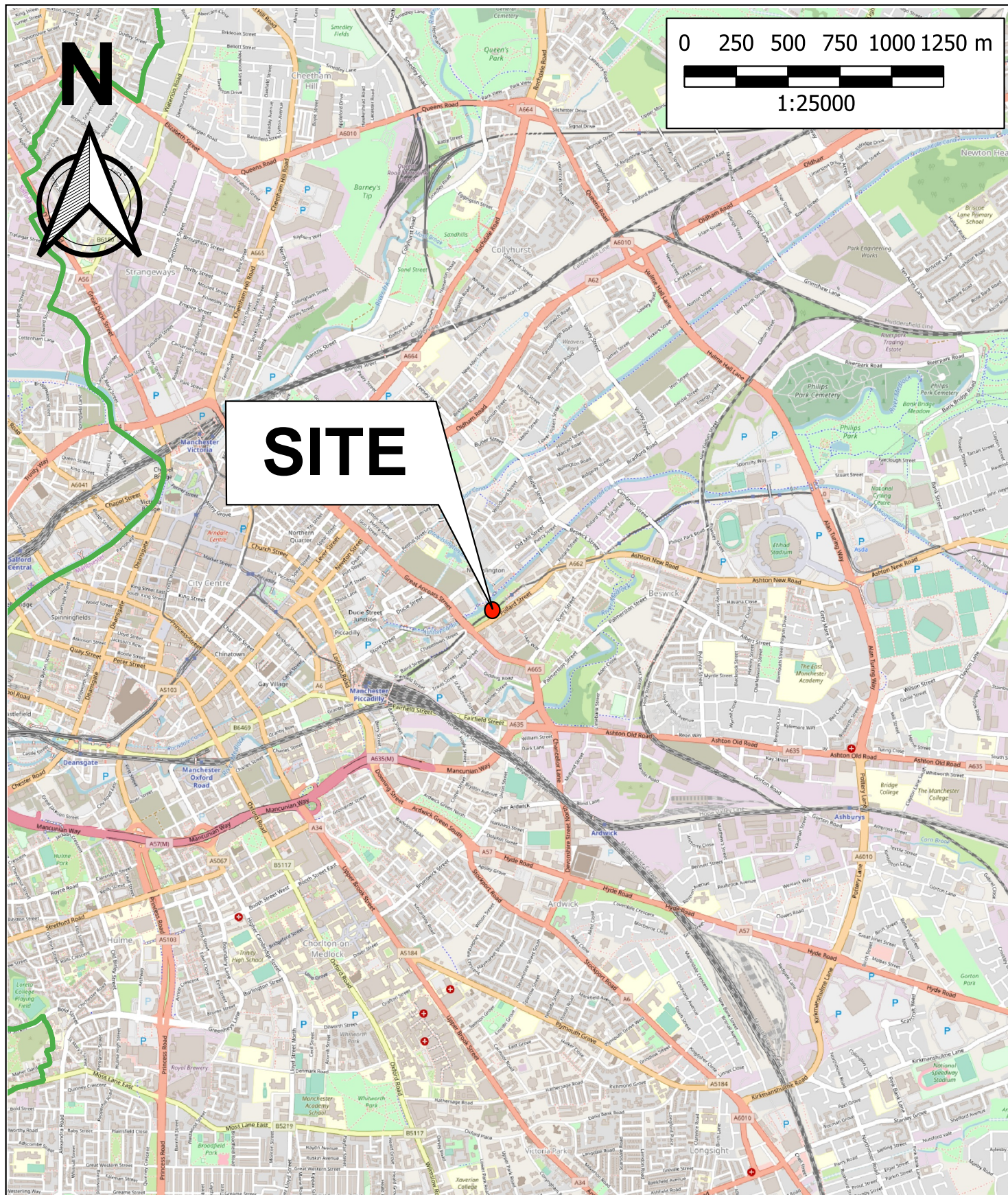
- » The site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation;
- » After remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990⁵⁶; and,
- » Adequate site investigation information, prepared by a competent person, is presented.

Once the above is satisfied the Local Authority should be able to discharge all the relevant contaminated land conditions.

⁵⁵ DCL (2018). "National Planning Policy Framework." Department of Communities and Local Government.

⁵⁶ Defra (2006). "Environmental Protection Act 1990: Part 2A Contaminated land." Defra Circular 01/2006.

Figures



KEY

- Site Location

(C) OpenStreetMap Contributors

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: General Projects Ltd

Site: Pollard Street, Manchester

Job No.: LKC 20 1301	Drawn By: EM	Checked By: CH	Drawn: Mar 2019
-------------------------	-----------------	-------------------	--------------------

Title:

Site Location Plan

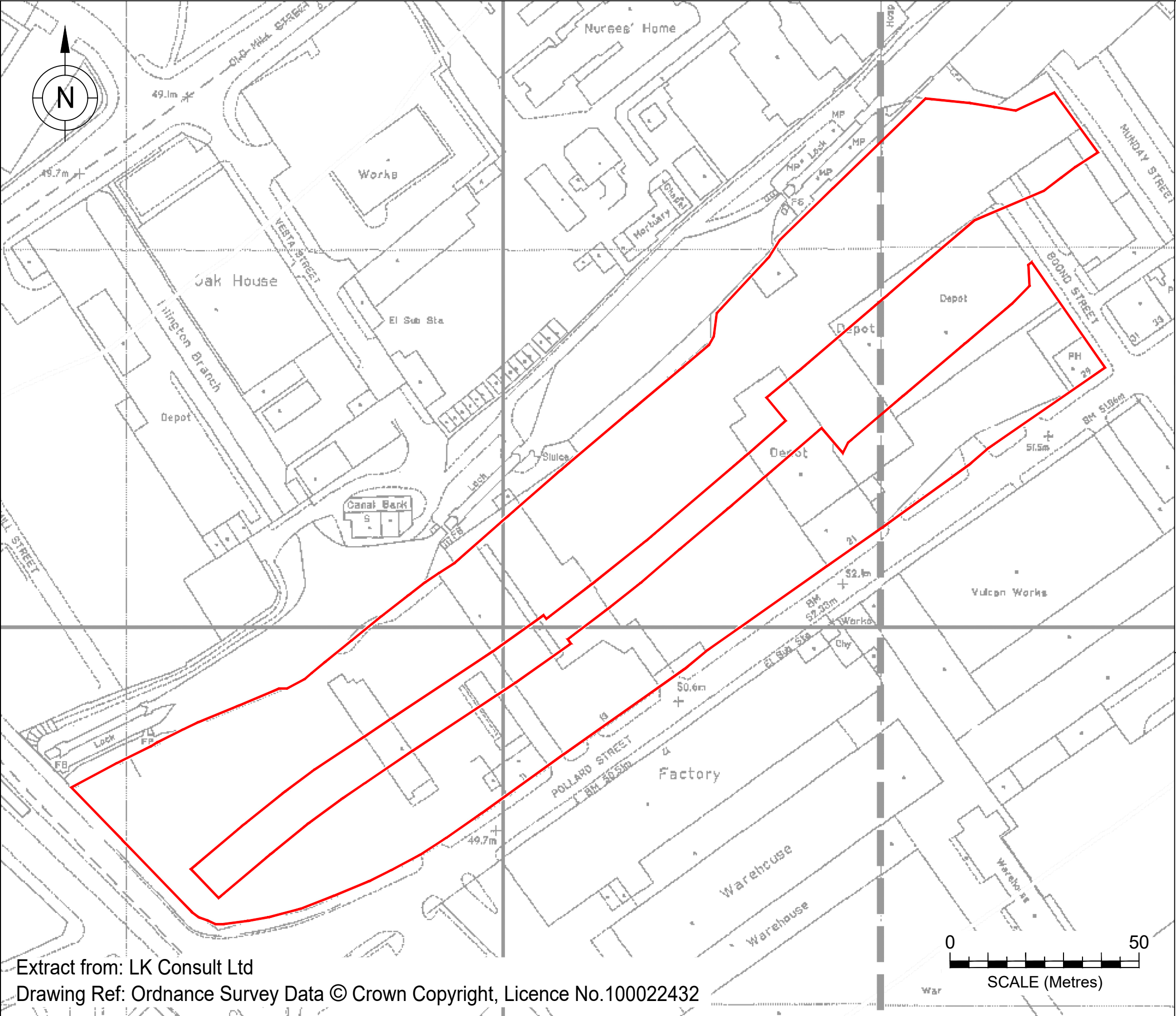
Scale (see scale bar):

1:25,000 @ A4

Figure: 1

Revision:





KEY

Site Boundary

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 LIMITED

Client:

General Projects

Site:

Pollard Street, Manchester

Title:

Site Boundary Plan

Job No.:

LKC 20 1301

Scale (See Scale Bar):

1:1000 @ A3

Figure:

2

Revision:

Drawn By:

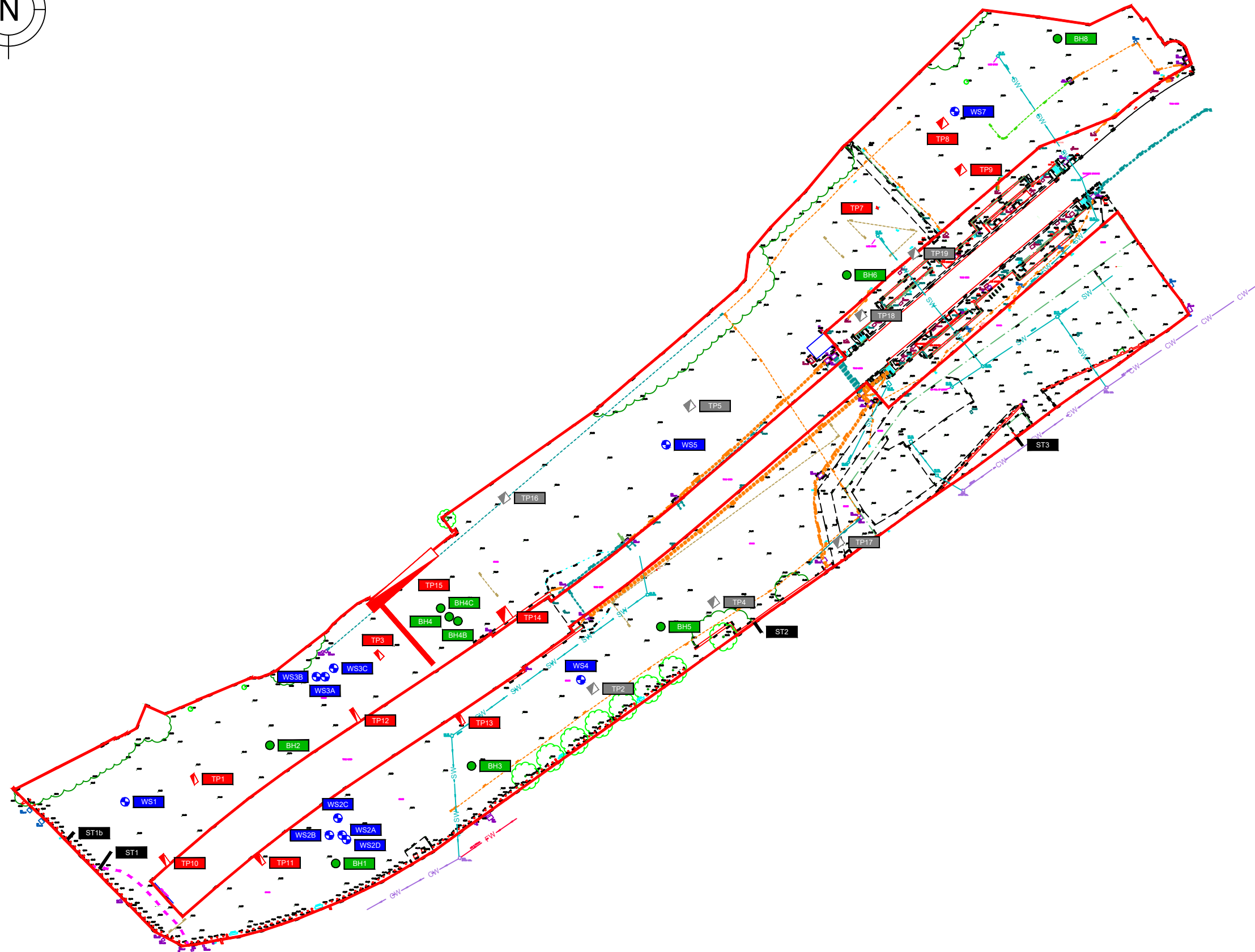
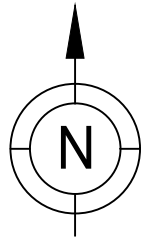
AC

Checked By:

EM

Drawn:

Mar 2020



KEY

- Site Boundary
- Window Sample Borehole (WS)
- Trial Pit (TP)
- Borehole (BH)
- Slot Trench (ST)
- Low Voltage Electricity Cable

NOTE:

- Trial Pit Requiring Further Investigation (TP)

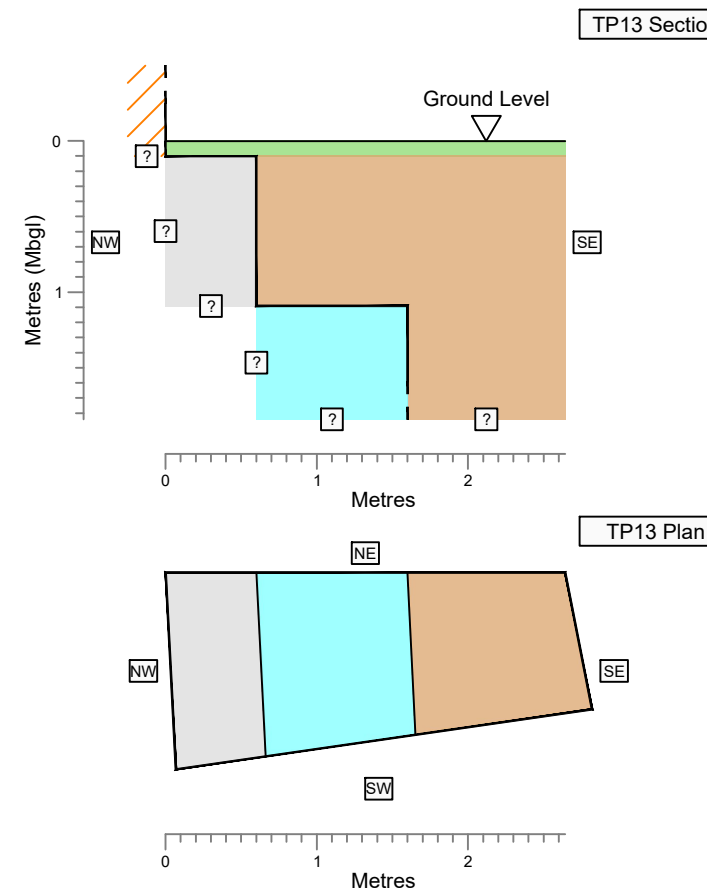
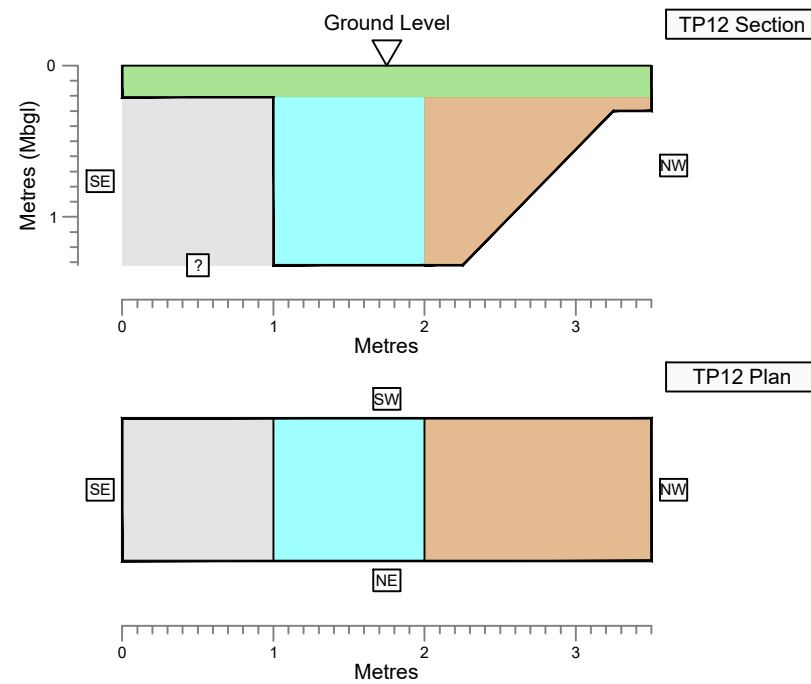
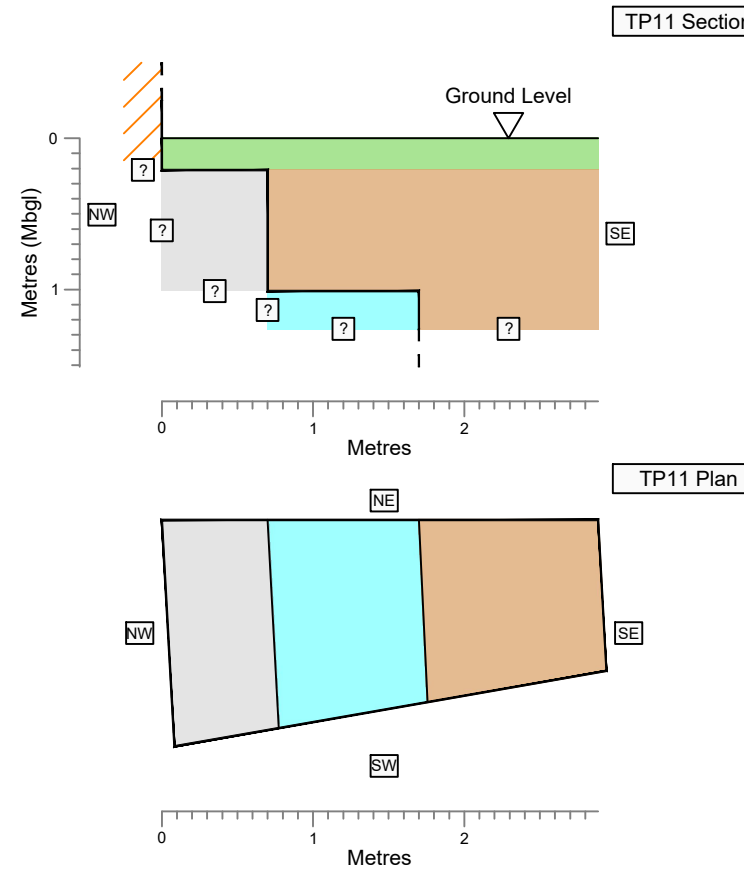
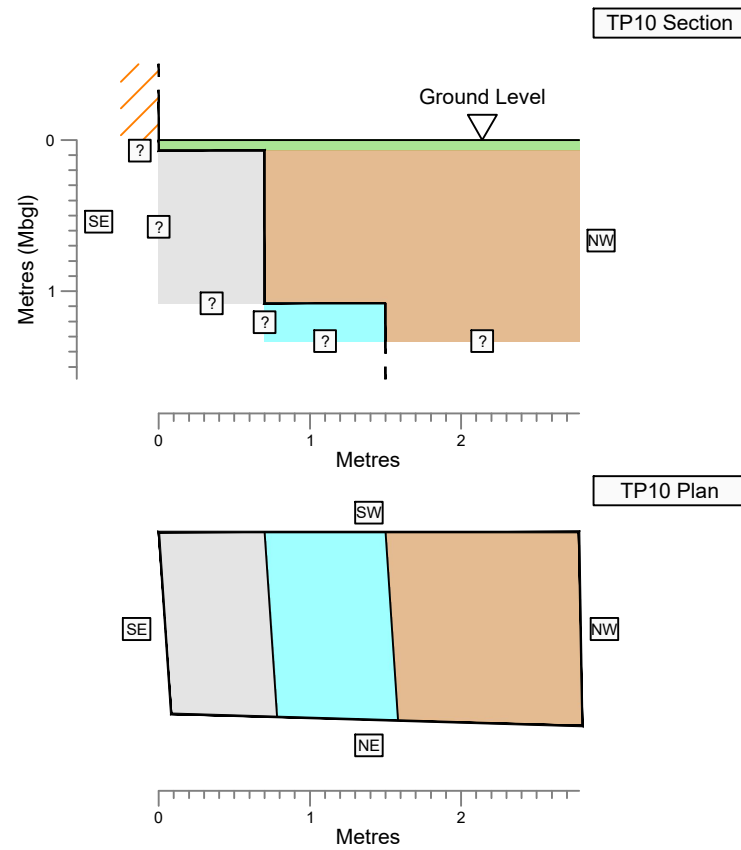
Sampling Locations and features annotated by LK Consult Ltd are approximate and are based upon observed measurements unless otherwise stated. Do not scale from this drawing and work from marked dimensions only. All dimensions and features should be confirmed on site by the Contractor. Where this drawing 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: General Projects			
Site: Pollard Street, Manchester			
Title: Site Investigation Location Plan			
Job No.: LKC 20 1301	Scale (See Scale Bar): 1:1000 @ A3	Figure: 3	Revision:
Drawn By: AC	Checked By: RW	Drawn: Oct 2022	

Extract from: Layer Surveys Ltd
Drawing Ref: Survey Drawing (Ref:POL090720), No.01, Rev:01 (July 2020)

0 50
SCALE (Metres)



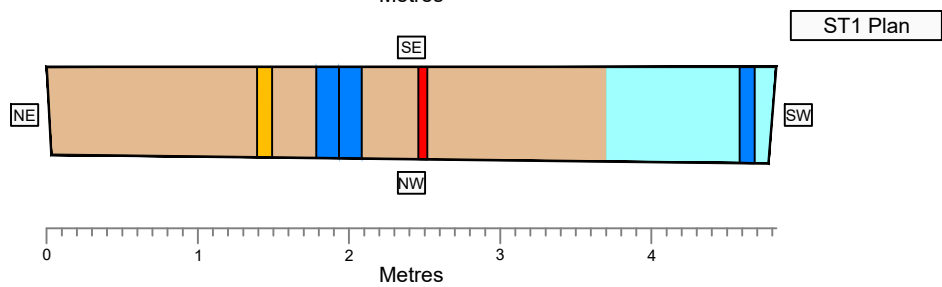
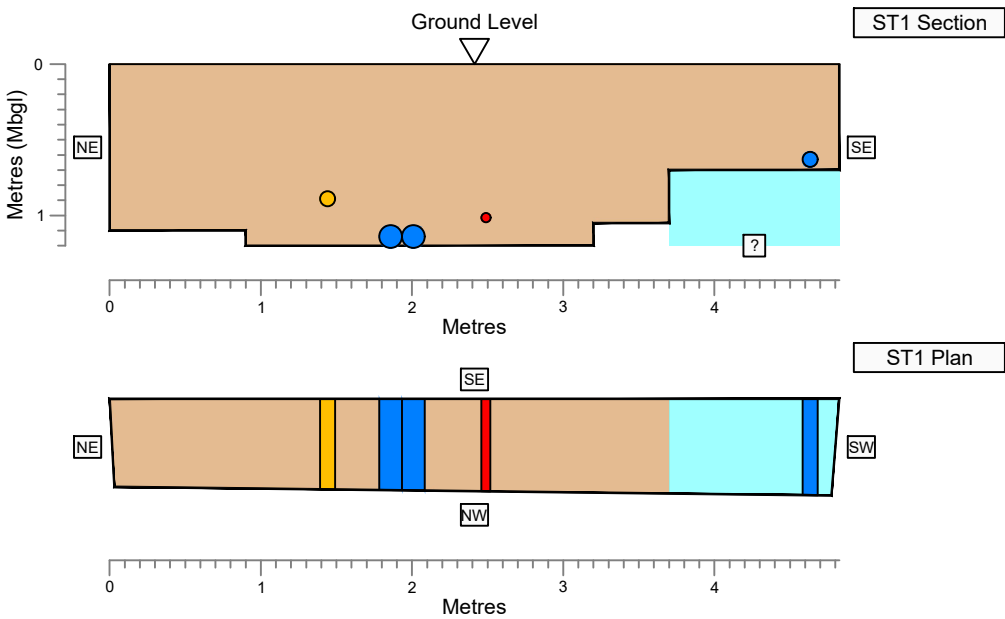
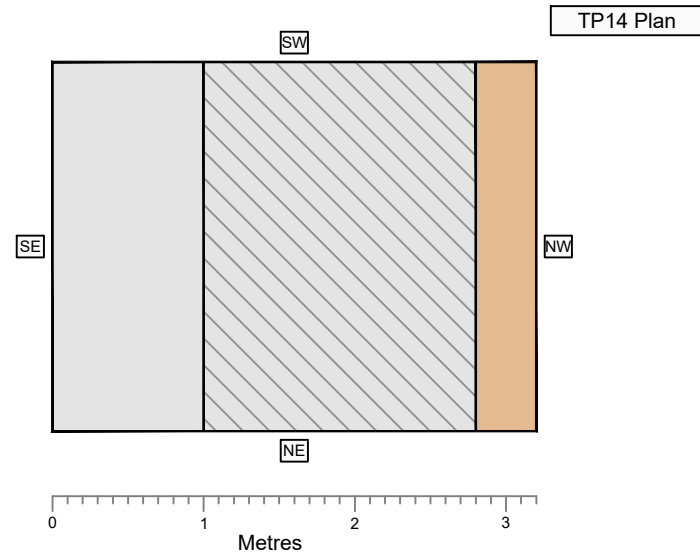
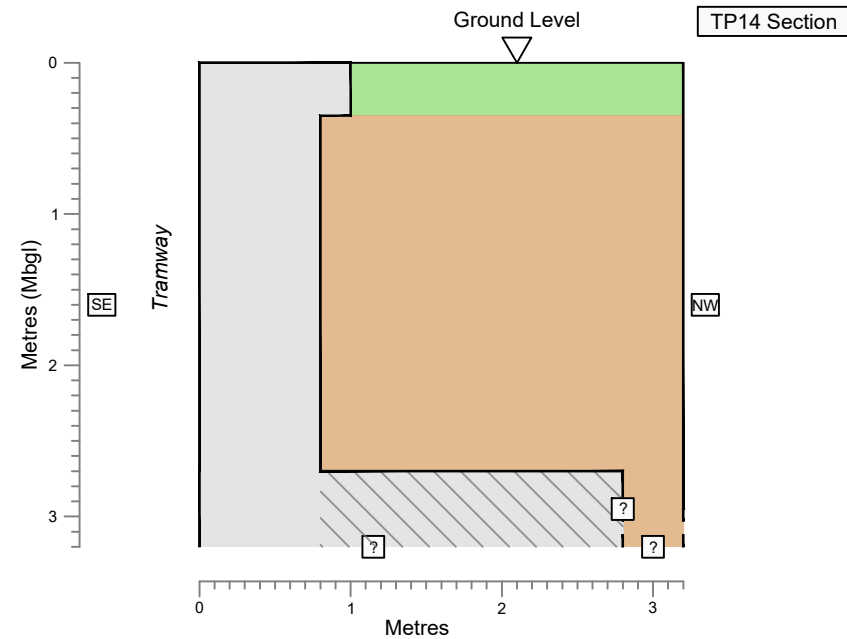
KEY

-  Brick Wall
-  Concrete (Possible Capping Beam)
-  Concrete
-  Made Ground (Fill)
-  Made Ground (Topsoil with Anthropogenic Material)

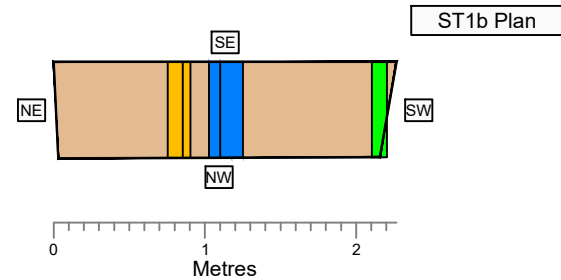
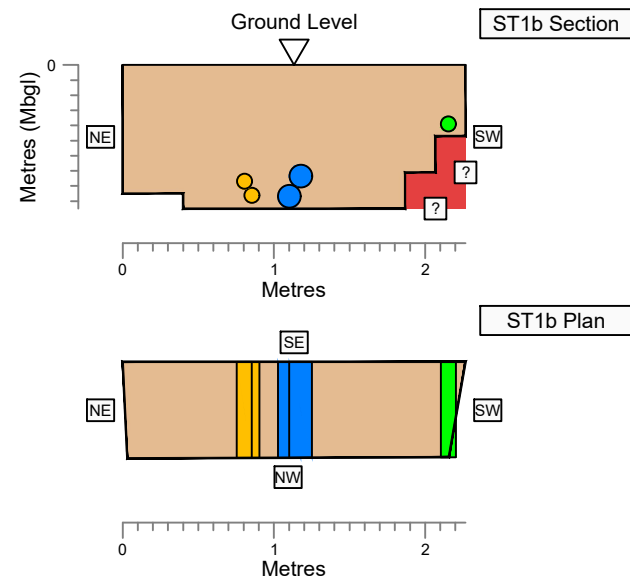
Sampling Locations and features annotated by LK Consult Ltd are approximate and are based upon observed measurements unless otherwise stated. Do not scale from this drawing and work from marked dimensions only. All dimensions and features should be confirmed on site by the Contractor. Where this drawing 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:			
General Projects			
Site:			
Pollard Street, Manchester			
Title:			
Section Drawings - Sheet 1			
Job No.:	Scale (See Scale Bar):	Figure:	Revision:
LKC 20 1301	See Scale Bar	4	
Drawn By:	Checked By:	Date:	
AC	RW	Oct 2022	



Section TP15
Can be Found
on Sheet 3



KEY

- Brick Wall
- Concrete (Possible Capping Beam)
- Concrete
- Concrete
- Made Ground (Fill)
- Made Ground (Topsoil with Anthropogenic Material)
- Bricks/Manhole

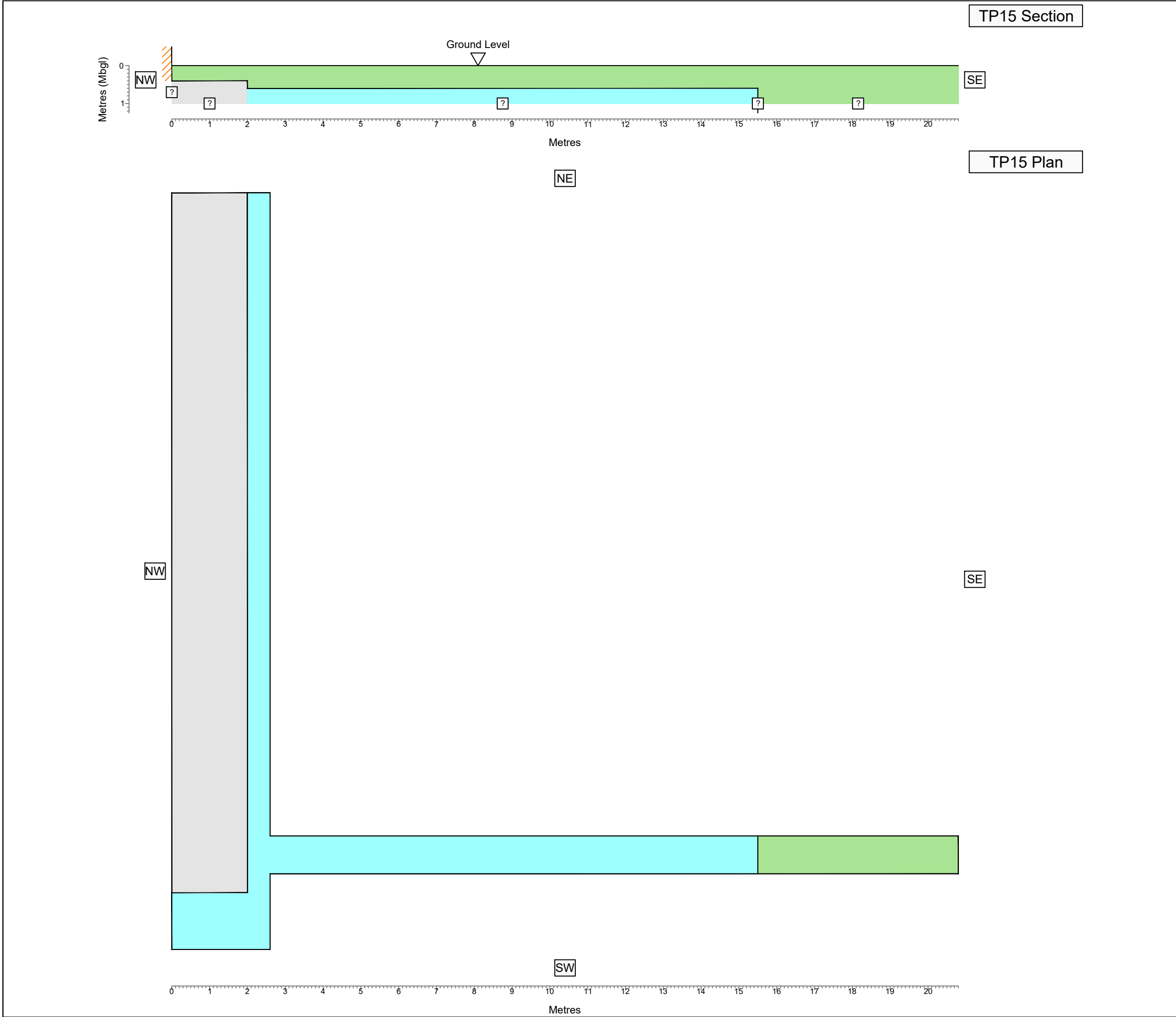
SERVICES:

- Fibre Optic Cable
- Telecom Service
- Low Voltage Electric Cable
- Unknown

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:			
General Projects			
Site:			
Pollard Street, Manchester			
Title:			
Section Drawings - Sheet 2			
Job No.:	Scale (See Scale Bar):	Figure:	Revision:
LKC 20 1301	See Scale Bar	4	
Drawn By:	Checked By:	Date:	
AC	RW	Oct 2022	



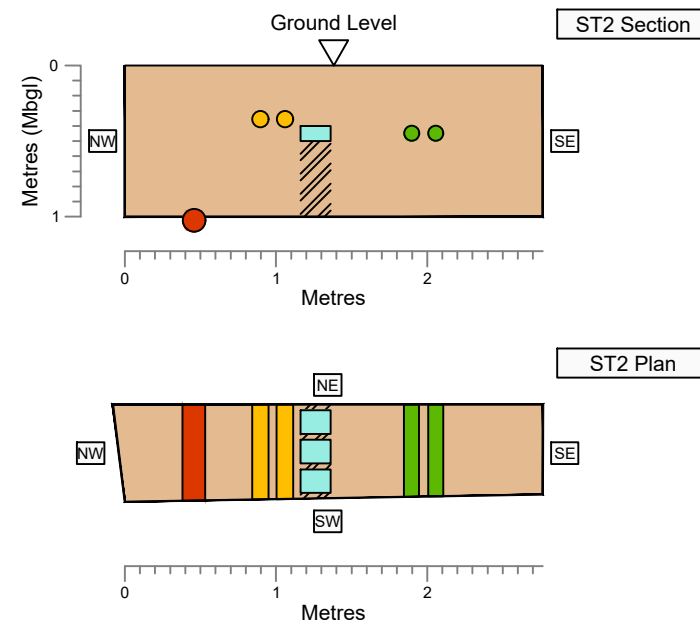
KEY

-  Brick Wall
-  Concrete Slab
-  Concrete
-  Made Ground (Topsoil with Anthropogenic Material)

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:			
General Projects			
Site:			
Pollard Street, Manchester			
Title:			
Section Drawings - Sheet 3			
Job No.:	Scale (See Scale Bar):	Figure:	Revision:
LKC 20 1301	See Scale Bar	4	
Drawn By:	Checked By:	Date:	
AC	RW	Oct 2022	



KEY

- Made Ground (Fill)
- Concrete
- Unable to Access

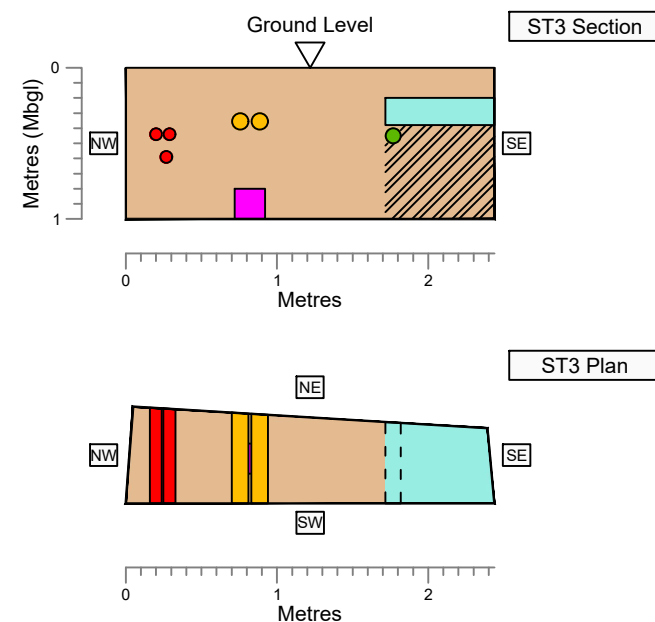
SERVICES ST2:

- Old Drain With Electric Cable
- Fibre Optic Cable
- Possible Gas/Water Pipe

SERVICES ST3:

- Electric Cable
- Fibre Optic Cable
- Possible Gas/Water Pipe
- Connection Box

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:			
General Projects			
Site:			
Pollard Street, Manchester			
Title:			
Section Drawings - Sheet 4			
Job No.:	Scale (See Scale Bar):	Figure:	Revision:
LKC 20 1301	See Scale Bar	4	
Drawn By:	Checked By:		
AC	RW	Oct 2022	

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 552⁵⁷. 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 results 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.

⁵⁷ CIRIA C552 (2001) Contaminated Land Risk Assessment - A Guide to Good Practice.

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 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

Boring Method

Cable Percussion

Casing Diameter

150mm cased to 19.50m

Ground Level (mOD)

49.55

Client

General Projects

**Job
Number**

LKC 20 1301

Location (Handheld GPS)

385361 E 398141 N

Dates

04/10/2022-
05/10/2022

Engineer

LKC

Sheet

1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.20	B						MADE GROUND: Brown gravelly sandy SILT with occasional cobbles of concrete and whole bricks. Sand is fine to coarse. Gravel is fine to coarse, subangular comprising sandstone and mudstone.		
1.20-1.65 1.20-1.65 1.20-1.65	SPT N=6 B SD			2,1/2,1,2,1		(2.45)			
2.00-2.45 2.00-2.45	SPT N=8 CB			2,2/2,1,2,3					
					47.10	2.45	MADE GROUND: Soft consistency silty CLAY with abundant brick fragments.		
						(0.55)			
3.00-3.45 3.00-3.45 3.00-3.45	SPT N=16 B SD			4,4/4,4,4,4	46.55	3.00	Soft to firm consistency medium strength gravelly silty CLAY. Gravel is fine to medium, subangular to subrounded comprising mudstone.		
4.00-4.45 4.00-4.45	SPT N=16 SD			3,4/3,4,5,4					
5.00-5.45	U			36 blows					
5.50	D								
6.00-6.45 6.00-6.45 6.00-6.45	SPT N=15 B SV=72kPa SD			2,3/3,4,4,4					
						(7.40)			
7.50-7.95 7.50-7.95 7.50-7.95	SPT N=20 B SD			3,3/5,5,5,5					
9.00-9.45 9.00-9.45	SPT N=21 SD			2,4/5,5,6,5					

Remarks

Location and elevation taken from GPS survey.
Water strike at 12.00mbgl.
Rotary open hole follow on to rockhead found at 40.00mbgl.
Chiselling from 0.20m to 0.60m for 1.0 hour.

**Scale
(approx)**

1:50

**Logged
By**

RW

Figure No.

LKC 20 1301.BH1

**LK CONSULT LTD**Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS
Tel: 0161 763 7200 web: www.thelkgroup.com**Site**

Pollard Street, Manchester

**Borehole
Number****BH1****Boring Method**

Cable Percussion

Casing Diameter

150mm cased to 19.50m

Ground Level (mOD)

49.55

Client

General Projects

**Job
Number**

LKC 20 1301

Location (Handheld GPS)

385361 E 398141 N

Dates04/10/2022-
05/10/2022**Engineer**

LKC

Sheet

2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.50-10.95 10.50-10.95 10.50-10.95	SPT N=18 B SV=70kPa SD			3,4/4,4,5,5	39.15	10.40	Soft consistency medium strength brown gravelly sandy silty CLAY. Sand is fine to medium. Gravel is fine to medium, subangular to subrounded comprising mudstone.		▼1
12.00-12.45	SD			Water strike(1) at 12.00m, rose to 10.60m in 20 mins, sealed at 13.00m.					▽1
12.00-12.45	SPT N=17			3,3/3,4,5,5		(4.60)			
13.50-13.95	U			42 blows					
14.00	D								
15.00-15.45 15.00-15.45	SPT N=50 SD			6,11/14,16,16,4	34.55	15.00	Very dense orange slightly gravelly clayey SAND. Sand is fine to coarse. Gravel is fine to coarse, subangular to rounded comprising mudstone and sandstone.		
16.50-16.92 16.50-16.95	SPT 50/265 SD			3,5/7,15,13,15		(4.50)			
18.00-18.41 18.00-18.45	SPT 50/255 SD			6,10/10,12,13,15					
19.50-19.93 19.50-19.95	SPT 50/275 SD			8,13/15,16,19	30.05	19.50	Complete at 19.50m		

RemarksLocation and elevation taken from GPS survey.
Water strike at 12.00mbgl.
Rotary oepn hole follow on to rockhead found at 40.00mbgl.**Scale
(approx)**

1:50

**Logged
By**

RW

Figure No.

LKC 20 1301.BH1

Boring Method

Cable Percussion

Casing Diameter

200mm cased to 6.00m
150mm cased to 19.50m

Ground Level (mOD)

49.76

Client

General Projects

**Job
Number**

LKC 20 1301

Location (Handheld GPS)

385345 E 398168 N

Dates

30/09/2022-
03/10/2022

Engineer

LKC

Sheet

1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.20	B						MADE GROUND: Dark brown sandy silty GRAVEL comprising predominantly brick, concrete and tarmacadam with frequent ash. Sand is fine to coarse. Gravel is fine to coarse, subangular.		
1.20-1.65 1.20-1.65	SPT N=29 CB			3,7/9,10,7,3		(2.45)			
2.00-2.45	SPT N=18			3,5/5,6,4,3	47.31	2.45	MADE GROUND: Soft consistency brown silty CLAY with occasional brick fragments.		
3.00-3.45 3.00-3.45	SPT N=24 CB			10,10/9,8,4,3	46.31	(1.00) 3.45	Brown gravelly silty SAND. Sand is fine to coarse. Gravel is fine, subangular comprising mixed lithologies. Noted to be wet.		
4.00-4.45 4.00-4.45	CB SPT N=10			Water strike(1) at 3.90m. 2,2/2,3,2,3	45.31	(1.00) 4.45	Very stiff to stiff consistency medium to high strength brown gravelly slightly sandy silty CLAY. Sand is fine to medium. Gravel is fine to medium, subangular comprising mudstone.		
4.50-5.00	B								
5.00-5.45 5.00-5.45	SV 72kPa U			125 blows					
5.50	D								
6.00-6.45 6.00-6.45	SPT N=17 SB			4,4/3,4,4,6					
7.50-7.95 7.50-7.95	SPT N=20 SB			3,3/4,5,5,6					
8.00-8.50	SV 64kPa								
9.00-9.45 9.00-9.45	SPT N=25 SB			4,4/6,5,7,7					

Remarks

Location and elevation taken from GPS survey.
Rotary oepn hole follow on to rockhead found at 40.00mbgl.
Water strike at 3.90mbgl.

**Scale
(approx)**

1:50

**Logged
By**

RW

Figure No.

LKC 20 1301.BH2

**LK CONSULT LTD**Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS
Tel: 0161 763 7200 web: www.thelkgroup.com**Site**

Pollard Street, Manchester

**Borehole
Number****BH2****Boring Method**

Cable Percussion

Casing Diameter200mm cased to 6.00m
150mm cased to 19.50m**Ground Level (mOD)**

49.76

Client

General Projects

**Job
Number**

LKC 20 1301

Location (Handheld GPS)

385345 E 398168 N

Dates30/09/2022-
03/10/2022**Engineer**

LKC

Sheet

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Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.50-10.95 10.50-10.95	SPT N=30 SB			4,5/7,7,8,8					
12.00-12.45	U			125 blows		(14.95)	Very stiff clay between 12.00mbgl to 16.50mbgl.		
12.50	D								
13.50-13.95 13.50-13.95	SPT N=38 SB			6,6/8,8,11,11					
15.00-15.45 15.00-15.45	SPT N=38 SB			5,6/7,8,11,12					
16.50-16.66 16.50-16.95	SPT 25*/60 50/95 CB			25/40,10					
17.00-17.50 17.00-17.50	B SV 98kPa						High strength from 17.00mbgl.		
18.00-18.45 18.00-18.45	SPT N=32 SB			5,6/7,7,8,10					
					30.36 30.26	19.40 19.50	Brown SAND. Sand is fine to coarse. Complete at 20.00m		

RemarksLocation and elevation taken from GPS survey.
Rotary open hole follow on to rockhead found at 40.00mbgl.
Water strike at 3.90mbgl.
Chiselling from 16.50m to 17.00m for 0.4 hours.**Scale
(approx)**

1:50

**Logged
By**

RW

Figure No.

LKC 20 1301.BH2

Boring Method

Cable Percussion

Casing Diameter

140mm cased to 1.50m
200mm cased to 6.00m

Ground Level (mOD)

50.18

Client

General Projects

**Job
Number**

LKC 20 1301

Location (Handheld GPS)

385392 E 398163 N

Dates

28/09/2022-
30/09/2022

Engineer

LKC

Sheet

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Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.20	ES						MADE GROUND: Black sandy silty GRAVEL comprising predominantly ash, clinker and tarmacadam fragments with occasional brick fragments. Sand is fine to coarse. Gravel is fine to medium, subangular.		
1.20-1.65	SPT N=12			2,3/3,4,2,3		(3.45)	Strong bitumen odour from 0.00m to 1.10mbgl. Becoming milder to 1.65mbgl.		
2.00-2.45 2.00-2.45	SPT N=20 ES			2,3/5,5,4,6					
3.00-3.45 3.00-3.45	SPT N=5 CB			1,1/1,2,1,1					
3.70-4.00	B				46.73	3.45 (0.55)	MADE GROUND: Soft consistency slightly gravelly sandy silty CLAY. Sand is fine to medium. Gravel is fine, subangular comprising mudstone.		
4.00-4.45 4.00-4.45 4.30-4.75	SPT N=21 CB B			10,15/9,5,4,3	46.18	4.00 (0.45)	MADE GROUND: CONCRETE recovered as gravel. Gravel is fine to coarse, angular.		
5.00-5.45	U			80 blows	45.73	4.45	Firm to stiff consistency medium to high strength gravelly slightly sandy silty CLAY. Sand is fine to medium. Gravel is fine to medium, subangular comprising mudstone. Medium strength from 4.50m to 4.70mbgl.		
5.50	D								
6.00-6.45 6.00-6.45	SPT N=14 B			3,2/3,3,4,4					
7.50-7.95 7.50-7.95	SPT N=22 SB			2,3/4,5,6,7					
9.00-9.45 9.00-9.45	SPT N=22 SB			3,3/3,5,6,8		(8.05)			

Remarks

Water strike at 11.00mbgl. Dry from 19.50mbgl. Water added at 20.00mbgl.
Location and elevation taken from GPS survey.
Chiselling from 4.00m to 4.20m for 0.25 hours.

**Scale
(approx)**

1:50

**Logged
By**

RW

Figure No.

LKC 20 1301.BH3

**LK CONSULT LTD**Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS
Tel: 0161 763 7200 web: www.thelkgroup.com**Site**

Pollard Street, Manchester

**Borehole
Number****BH3****Boring Method**

Cable Percussion

Casing Diameter140mm cased to 1.50m
200mm cased to 6.00m**Ground Level (mOD)**

50.18

Client

General Projects

**Job
Number**

LKC 20 1301

Location (Handheld GPS)

385392 E 398163 N

Dates28/09/2022-
30/09/2022**Engineer**

LKC

Sheet

2/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.50-10.95 10.50-10.95	SPT N=23 SB			3,3/4,5,6,8					
12.00-12.45	U			125 blows					
12.50	D				37.68	12.50	Very stiff to stiff brown gravelly sandy silty CLAY with bands of sand and low cobble content. Sand is fine to medium. Gravel is fine to coarse, subangular comprising mudstone. Cobbles are subrounded comprising sandstone.		
13.50-13.66 13.50-13.95 13.50-14.00	SPT 25*/60 50/95 SB B			25/40,10					
15.00-15.13 15.00-15.45	SPT 25*/65 50/60 CB			25/50			Boulder encountered at 15.00mbgl.		
16.50-16.80 16.50-16.95	SPT 25*/145 50/150 CB			25/50		(7.50)			
18.00-18.34 18.00-18.45	SPT 25*/125 50/210 CB			15,10/17,18,15					
19.00-19.50	B								
19.50-19.95	U			125 blows					

RemarksWater strike at 11.00mbgl. Dry from 19.50mbgl. Water added at 20.00mbgl.
Location and elevation taken from GPS survey.
Chiselling from 13.50m to 14.00m for 1.0 hour. Chiselling from 15.00m to 16.00m for 1.5 hours. Water added from 20.00m to 23.00m.**Scale
(approx)**

1:50

**Logged
By**

RW

Figure No.

LKC 20 1301.BH3



LK CONSULT LTD

Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS
Tel: 0161 763 7200 web: www.thelkgroup.com

Site
Pollard Street, Manchester

**Borehole
Number**
BH3

Boring Method Cable Percussion	Casing Diameter 140mm cased to 1.50m 200mm cased to 6.00m	Ground Level (mOD) 50.18	Client General Projects	Job Number LKC 20 1301
	Location (Handheld GPS) 385392 E 398163 N	Dates 28/09/2022- 30/09/2022	Engineer LKC	Sheet 3/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
20.00	D				30.18	20.00	Very dense sandy GRAVEL with lenses of silty clay between 18.00mbgl to 19.00mbgl. Sand is fine to coarse. Gravel is fine to coarse, subrounded to rounded comprising mixed lithologies. Stiff consistency brown silty CLAY from 19.00m to 20.00mbgl.		
21.00-21.45	SPT N=50			7,8/9,10,15,16		(3.50)			
22.50-22.85 22.50-22.95	SPT 50/200 CB			10,15/18,20,12					
23.50-24.00	B				26.68	23.50	Stiff consistency brown gravelly sandy CLAY. Sand is fine to medium. Gravel is fine to medium, subangular to subrounded comprising mudstone.		
					26.18	24.00	Terminated at 25.00m		

Remarks Water strike at 11.00mbgl. Dry from 19.50mbgl. Water added at 20.00mbgl. Location and elevation taken from GPS survey. Water added from 20.00m to 23.00m.	Scale (approx) 1:50	Logged By RW
	Figure No. LKC 20 1301.BH3	

**LK CONSULT LTD**Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS
Tel: 0161 763 7200 web: www.thelkgroup.com**Site**

Pollard Street, Manchester

**Borehole
Number****BH4****Boring Method**Machine excavated to
1.60mbgl.**Casing Diameter****Ground Level (mOD)**

50.16

Client

General Projects

**Job
Number**

LKC 20 1301

Location (Handheld GPS)

385387 E 398198 N

Dates

05/10/2022

Engineer

LKC

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Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10-0.60	ESD				50.06	(0.10) 0.10	MADE GROUND: Dark brown very gravelly silty SAND with frequent rootlets, rare brick fragments and concrete fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular comprising mudstone.		
						(0.50)	MADE GROUND: Dark brown sandy silty GRAVEL with frequent whole bricks, brick fragments and concrete fragments. Sand is fine to coarse. Gravel is fine to coarse, sub rounded to angular comprising mudstone.		
0.70-1.60	ESD				49.56 49.46	0.60 (0.10) 0.70	MADE GROUND: Concrete.		
						(0.90)	MADE GROUND: Grey sandy silty GRAVEL comprising predominantly concrete, whole bricks and brick fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular.		
					48.56	1.60	Terminated at 1.60m		

RemarksBorehole refused on possible brick wall.
Borehole was dry and unstable.
Location and elevation taken from GPS survey.
Borehole moved to other location see separate log (ref.BH4B).**Scale
(approx)**

1:25

**Logged
By**

RW

Figure No.

LKC 20 1301.BH4

**LK CONSULT LTD**Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS
Tel: 0161 763 7200 web: www.thelkgroup.com**Site**

Pollard Street, Manchester

Borehole Number**BH4B****Boring Method**

Machine excavated to 1.8mbgl.

Casing Diameter**Ground Level (mOD)**

50.16

Client

General Projects

Job Number

LKC 20 1301

Location (Handheld GPS)

385389 E 398197 N

Dates

05/10/2022

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							MADE GROUND: Dark brown very gravelly sandy SILT with frequent brick fragments, timber, concrete fragments, ash and occasional metal. Sand is fine to coarse. Gravel is fine to coarse, subangular comprising mudstone.		
						(1.00)			
					49.16	1.00	MADE GROUND: Concrete.		
						(0.50)			
					48.66	1.50	MADE GROUND: Grey sandy GRAVEL comprising predominantly concrete and whole bricks. Sand is fine to coarse. Gravel is fine to coarse, subangular.		
						(0.30)			
					48.36	1.80	Terminated at 1.80m		

RemarksBorehole refused on possible brick wall.
Borehole was dry and unstable.
Location and elevation taken from GPS survey.
Borehole moved to other location see separate log (ref.BH4C).**Scale (approx)**

1:25

Logged By

RW

Figure No.

LKC 20 1301.BH4B

**LK CONSULT LTD**Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS
Tel: 0161 763 7200 web: www.thelkgroup.com**Site**

Pollard Street, Manchester

Borehole Number**BH4C****Boring Method**

Machine excavated to 2.5mbgl.

Casing Diameter**Ground Level (mOD)**

49.90

Client

General Projects

Job Number

LKC 20 1301

Location (Handheld GPS)

385385 E 398200 N

Dates

05/10/2022

Engineer

LKC

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Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							MADE GROUND: Dark brown very gravelly sandy SILT with frequent brick fragments, ash, occasional metal and plastic. Sand is fine to coarse. Gravel is fine to coarse, subangular comprising mudstone.		
						(1.00)			
					48.90	1.00	MADE GROUND: Concrete.		
						(0.30)			
					48.60	1.30	MADE GROUND: Black very gravelly sandy CLAY with occasional brick fragments, concrete fragments, ash, rare metal and plastic. Sand is fine to coarse. Gravel is fine to coarse, subangular comprising mudstone.		
						(1.10)			
					47.50	2.40	MADE GROUND: Concrete.		
					47.40	(0.10) 2.50	Terminated at 2.50m		

RemarksBorehole refused on concrete slab.
Location and elevation taken from GPS survey.
Borehole was dry and stable.**Scale (approx)**

1:25

Logged By

RW

Figure No.

LKC 20 1301.BH4C

Boring Method

Cable Percussion

Casing Diameter

150mm cased to 20.00m

Ground Level (mOD)

50.80

Client

General Projects

**Job
Number**

LKC 20 1301

Location (Handheld GPS)

385436 E 398196 N

Dates

06/10/2022-
07/10/2022

Engineer

LKC

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Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.20	ES PID=<0.1ppm						MADE GROUND: Dark brown gravelly sandy silty CLAY with abundant ash, frequent brick fragments, concrete cobbles. Sand is fine to coarse. Gravel is fine to coarse, subangular comprising sandstone and mudstone.		
3.00-3.45 3.00-3.45 3.00-3.45	SPT N=7 B SD			2,2/2,1,2,2	47.80	3.00	Soft to firm consistency greyish brown slightly gravelly silty CLAY. Gravel is fine to medium, subangular to subrounded comprising mudstone.		
4.00-4.45 4.00-4.45 4.00-4.45	SPT N=16 B SD			2,2/3,4,4,5					
5.00-5.45 5.00-5.45	SPT N=19 SD			2,3/4,5,5,5					
6.00-6.45	U			34 blows					
6.50	D								
7.50-7.95 7.50-7.95 7.50-7.95	SPT N=18 B SD			3,3/4,4,5,5					
9.00-9.45	U			37 blows		(12.30)			
9.50	D								

Remarks

Location and elevation taken from GPS survey.
Borehole was dry and stable.

**Scale
(approx)**

1:50

**Logged
By**

RW

Figure No.

LKC 20 1301.BH5

**LK CONSULT LTD**Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS
Tel: 0161 763 7200 web: www.thelkgroup.com**Site**

Pollard Street, Manchester

**Borehole
Number****BH5****Boring Method**

Cable Percussion

Casing Diameter

150mm cased to 20.00m

Ground Level (mOD)

50.80

Client

General Projects

**Job
Number**
LKC 20 1301**Location (Handheld GPS)**

385436 E 398196 N

Dates06/10/2022-
07/10/2022**Engineer**

LKC

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Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.50-10.95 10.50-10.95 10.50-10.95	SPT N=19 B SD			3,4/4,5,5,5					
12.00-12.45 12.00-12.45	SPT N=20 SD			3,4/4,5,5,6					
13.50-13.95	U			43 blows					
14.00	D								
15.00-15.45 15.00-15.45 15.00-15.45	SPT N=46 B SD			5,7/9,11,13,13	35.50	15.30	Very dense sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, subangular to rounded comprising mudstone, sandstone and quartz.		
16.50-16.80 16.50	SPT 25*/115 50/180 CD			10,15/16,20,14		(4.70)			
18.00-18.33 18.00-18.45	SPT 50/180 CD			9,14/16,16,18					
19.50-19.82 19.50-19.95	SPT 25*/95 50/225 CD			10,15/16,20,14	30.80	20.00			

RemarksLocation and elevation taken from GPS survey.
Borehole was dry and stable.
Water added from 15.40m to 16.50m. Water added from 16.30m to 20.00m.**Scale
(approx)**

1:50

**Logged
By**

RW

Figure No.

LKC 20 1301.BH5

Boring Method

Cable percussive to
27.60mbgl. Open rotary to
30.00mbgl. Rotary core to
36.00mbgl.

Casing Diameter

200mm cased to 4.50m
150mm cased to 22.50m

Ground Level (mOD)

52.02

Client

General Projects

**Job
Number**

LKC 20 1301

Location (Handheld GPS)

385392 E 398278 N

Dates

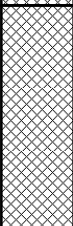
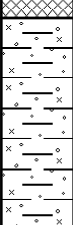
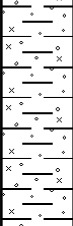
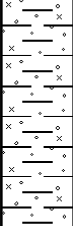
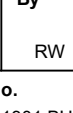
26/09/2022-
29/09/2022

Engineer

LKC

Sheet

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Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.50 0.00-0.50	B ES PID= 0.1ppm						MADE GROUND: Brown sandy silty GRAVEL comprising predominantly concrete and brick with frequent ash, clinker, rare tarmacadam, plastic and rootlets. Sand is fine to coarse. Gravel is fine to coarse, subangular to angular.		
0.50-1.20 0.50-1.20	B ES PID=0.8ppm					(1.20)			
1.20-1.40 1.20	SPT 25*/95 50/105 B			10,15/25,25	50.82	1.20	MADE GROUND: Dark brown very gravelly sandy SILT with frequent brick fragments. Sand is fine to coarse. Gravel is fine to coarse, subrounded to angular.		
						(1.25)			
2.00-2.45 2.00-2.45 2.00-2.45	SPT N=8 B ES PID=0.4ppm			2,2/3,2,2,1			Soft to firm consistency high to very high strength slightly gravelly silty CLAY. Gravel is fine, subrounded to subangular comprising mudstone.		
					49.57	2.45			
3.00-3.45 3.00-3.45 3.00-3.45	SPT N=13 B SD PP=78kPa			1,1/3,3,3,4			Very high strength from 5.00m to 5.45mbgl.		
4.00-4.45	SPT N=13			2,2/2,3,4,4					
5.00-5.45 5.00-5.45 5.00-5.45	SPT N=15 B SD PP=174.75kPa			3,2/3,4,4,4					
6.00-6.45	U			37 blows					
6.45	D								
7.50-7.95 7.50-7.95 7.50-7.95	SPT N=15 B PP=73.58kPa SD			2,2/3,4,4,4					

Remarks

Open hole rotary follow on to 30.00mbgl. No recovery.
Refusal on very dense sandy gravel at 27.395mbgl.
Rotary core from 30.00mbgl.

**Scale
(approx)**

1:40

**Logged
By**

RW

Figure No.

LKC 20 1301.BH6

**LK CONSULT LTD**Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS
Tel: 0161 763 7200 web: www.thelkgroup.com**Site**

Pollard Street, Manchester

**Borehole
Number**
BH6**Boring Method**Cable percussive to
27.60mbgl. Open rotary to
30.00mbgl. Rotary core to
36.00mbgl.**Casing Diameter**200mm cased to 4.50m
150mm cased to 22.50m**Ground Level (mOD)**

52.02

Client

General Projects

**Job
Number**

LKC 20 1301

Location (Handheld GPS)

385392 E 398278 N

Dates26/09/2022-
29/09/2022**Engineer**

LKC

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Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
9.00-9.45 9.00-9.45	SPT N=16 SD			3,4/4,4,4,4		(15.55)			
10.50-10.95 10.50-1.95 10.50-10.95	SPT N=15 SD B			1,2/3,4,4,4					
12.00-12.45 12.00-12.45	SPT N=14 SD			1,2/2,3,4,5					
13.50-13.95 13.50-13.95 13.50-13.95	SPT N=15 B SD			2,3/4,4,3,4					
15.00-15.45 15.00-15.45 15.00-15.45	SPT N=15 B SD			3,3/4,3,4,4			Band of sand from 15.10m to 15.20mbgl.		

RemarksOpen hole rotary follow on to 30.00mbgl. No recovery.
Refusal on very dense sandy gravel at 27.395mbgl.
Rotary core from 30.00mbgl.**Scale
(approx)**

1:40

**Logged
By**

RW

Figure No.

LKC 20 1301.BH6

**LK CONSULT LTD**Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS
Tel: 0161 763 7200 web: www.thelkgroup.com**Site**

Pollard Street, Manchester

**Borehole
Number****BH6****Boring Method**Cable percussive to
27.60mbgl. Open rotary to
30.00mbgl. Rotary core to
36.00mbgl.**Casing Diameter**200mm cased to 4.50m
150mm cased to 22.50m**Ground Level (mOD)**

52.02

Client

General Projects

**Job
Number**

LKC 20 1301

Location (Handheld GPS)

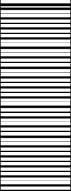
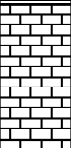
385392 E 398278 N

Dates26/09/2022-
29/09/2022**Engineer**

LKC

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Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
24.00-24.45	CB						Very dense sandy gravel encountered at 24.00mbgl.		
25.50-25.89 25.50-25.95	SPT 50/235 CB			11,15/15,15,11,9					
27.00-27.40	SPT 50/245			6,11/15,14,17,4	24.62	27.40	No recovery.		
						(2.60)			
30.00	TCR	SCR	RQD	FI	22.02	30.00	Extremely to very weak thinly laminated and destructured reddish brown MUDSTONE.		
	99	80	73	0		(1.00)			
31.00				10	21.02	31.00	Extremely to very weak thinly to very thinly laminated grey with purple band MARL with occasional calcite filling vesicles. Distinctly weathered (Grade III).		
31.50						(0.77)			
31.77				2	20.25	31.77	Extremely to very weak thinly laminated and destructured reddish brown MUDSTONE.		
							Band of SANDSTONE from 31.77m to 31.82mbgl.		

RemarksOpen hole rotary follow on to 30.00mbgl. No recovery.
Refusal on very dense sandy gravel at 27.395mbgl.
Rotary core from 30.00mbgl.**Scale
(approx)**

1:40

**Logged
By**

RW

Figure No.

LKC 20 1301.BH6

Boring Method

Cable percussive to
27.60mbgl. Open rotary to
30.00mbgl. Rotary core to
36.00mbgl.

Casing Diameter

200mm cased to 4.50m
150mm cased to 22.50m

Ground Level (mOD)

52.02

Client

General Projects

**Job
Number**

LKC 20 1301

Location (Handheld GPS)

385392 E 398278 N

Dates

26/09/2022-
29/09/2022

Engineer

LKC

Sheet

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Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
32.22	99	88	75	4	Very closely to widely spaced subhorizontal open clean fractures (10-20degrees), planar smooth.	19.80	(0.45) 32.22	Medium strength fine to medium thinly laminated red SANDSTONE. Partially weathered (Grade II).		
33.00				7	Closely to widely spaced subhorizontal clayey gravelly infilled fractures (10degrees), planar rough. Subvertical open clean fractures (80degrees), planar rough.	19.02	(0.78) 33.00	Weak to very weak thinly to thickly bedded destructured SILTSTONE.		
34.00	100	75	51	8	Closely to widely spaced subhorizontal clay filled fractures, planar smooth. Subvertical open clean fractures, planar smooth.		(3.00)	Medium strength thickly bedded SILTSTONE from 34.20m to 34.50mbgl. Partially weathered (Grade II).		
34.50										
35.00	100	97	79	4	Widely spaced subhorizontal open clean fractures, planar smooth to planar rough.			Medium strength thickly bedded SILTSTONE from 35.10m to 35.40mbgl. Partially weathered (Grade II).		
36.00						16.02	36.00	Terminated at 36.00m		

Remarks

Open hole rotary follow on to 30.00mbgl. No recovery.
Refusal on very dense sandy gravel at 27.395mbgl.
Rotary core from 30.00mbgl.

**Scale
(approx)**

1:40

**Logged
By**

RW

Figure No.

LKC 20 1301.BH6

**LK CONSULT LTD**Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS
Tel: 0161 763 7200 web: www.thelkgroup.com**Site**

Pollard Street, Manchester

**Borehole
Number****BH8****Boring Method**

Cable Percussion

Casing Diameter200mm cased to 3.00m
150mm cased to 15.50m
150mm cased to 22.00m**Ground Level (mOD)**

52.08

Client

General Projects

**Job
Number**

LKC 20 1301

Location (Handheld GPS)

385529 E 398333 N

Dates29/09/2022-
03/10/2022**Engineer**

LKC

Sheet

1/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.50	B						MADE GROUND: Dark brown sandy silty GRAVEL with frequent brick fragments, concrete fragments and rare rootlets. Sand is fine to coarse. Gravel is fine to coarse, sub rounded to sub angular.		
0.50-1.20	B								
3.00									
3.00-3.60	SV 60kPa B			80,60,40/Av. 60.00	49.08	3.00	Soft to firm consistency medium strength dark grey silty CLAY.		
						(0.60)			
					48.48	3.60	Soft to stiff consistency low to high strength grey gravelly sandy silty CLAY. Sand is fine to coarse. Gravel is fine to medium, sub rounded to sub angular comprising mixed lithologies.		
4.00-4.45	B SV 120kPa SPT N=8 SD			120,110,130/Av. 120.00 2,2/2,2,2,2					
5.00									
5.00-5.45	SV 90kPa SPT N=11 B SD			80,95,95/Av. 90.00 2,3/3,2,3,3					
6.00-6.45	B SV 103.33kPa SPT N=16 SD			120,100,90/Av. 103.33 3,3/4,4,4,4					
7.50									
7.50-7.95	SV 76.67kPa SPT N=16 B SD			75,65,90/Av. 76.67 2,3/4,3,4,5					
9.00									
9.00-9.45	SV 93.33kPa SPT N=18 B SD			90,90,100/Av. 93.33 1,2/4,4,5,5					

RemarksWater added from 17.00m to 22.00m.
Refusals of SPT at depths of 18.0m and 19.5m on dense gravels.
Chiselling from 2.10m to 2.70m for 0.5 hours.**Scale
(approx)**

1:50

**Logged
By**

MP

Figure No.

LKC 20 1301.BH8

**LK CONSULT LTD**Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS
Tel: 0161 763 7200 web: www.thelkgroup.com**Site**

Pollard Street, Manchester

**Borehole
Number****BH8****Boring Method**

Cable Percussion

Casing Diameter200mm cased to 3.00m
150mm cased to 15.50m
150mm cased to 22.00m**Ground Level (mOD)**

52.08

Client

General Projects

**Job
Number**

LKC 20 1301

Location (Handheld GPS)

385529 E 398333 N

Dates29/09/2022-
03/10/2022**Engineer**

LKC

Sheet

2/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.50 10.50-10.95 10.50-10.95 10.50-10.95	SV 76.67kPa SPT N=19 B SD			95,70,65/Av. 76.67 3,3/4,4,5,6		(13.85)	Soft consistency low strength grey gravelly sandy silty CLAY. Between 12.00m to 12.45mbgl.		
12.00 12.00-12.45 12.00-12.45	SV 38.33kPa SPT N=19 B			30,40,45/Av. 38.33 3,3/4,5,5,5					
13.50-13.90	U			25 blows					
13.95	D								
15.00-15.45 15.00 15.00-15.45 15.00-15.45	B SV 131.67kPa SPT N=24 SD			120,130,145/Av. 131.67 4,4/5,6,6,7					
16.50-16.95	U			47 blows			Light brown sandy silty GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, sub rounded.		
17.00	D				34.63	17.45			
18.00-18.41 18.00-18.45	SPT 50/260 CB			6,10/11,11,13,15		(2.50)			
19.50-19.92 19.50-19.95	SPT 50/270 CB			4,8/14,14,16,6	32.13	19.95			

RemarksWater added from 17.00m to 22.00m.
Refusals of SPT at depths of 18.0m and 19.5m on dense gravels.
Water added from 17.00m to 22.00m.**Scale
(approx)**

1:50

**Logged
By**

MP

Figure No.

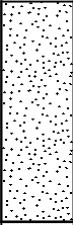
LKC 20 1301.BH8



LK CONSULT LTD
Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS
Tel: 0161 763 7200 web: www.thelkgroup.com

Site Pollard Street, Manchester	Borehole Number BH8
---	--------------------------------------

Boring Method Cable Percussion	Casing Diameter 200mm cased to 3.00m 150mm cased to 15.50m 150mm cased to 22.00m	Ground Level (mOD) 52.08	Client General Projects	Job Number LKC 20 1301
	Location (Handheld GPS) 385529 E 398333 N	Dates 29/09/2022- 03/10/2022	Engineer LKC	Sheet 3/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
21.00-21.45 21.00-21.45	B SD				30.63	(1.50) 21.45	Gravelly silty SAND. Sand is fine to coarse. Gravel is fine, sub rounded. Complete at 21.45m		

Remarks Water added from 17.00m to 22.00m. Refusals of SPT at depths of 18.0m and 19.5m on dense gravels.	Scale (approx) 1:50	Logged By MP
	Figure No. LKC 20 1301.BH8	

Excavation Method

Machine excavated to 1.6mbgl.

Dimensions

0.6m x 2.0m x 1.6m

Ground Level (mOD)

49.50

Client

General Projects

**Job
Number**

LKC 20 1301

Location
Dates

12/10/2022

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				47.90	(1.60) 1.60	MADE GROUND: Brown sandy silty GRAVEL comprising predominantly brick fragments and concrete cobbles with frequent ash, tarmacadam and rare metal. Sand is fine to coarse. Gravel is fine to coarse, subangular comprising mudstone and sandstone. Terminated at 1.60m		


Remarks

Trial pit terminated due to instability of side walls.
Trial pit was dry.
Location and elevation taken from GPS survey.
Soakaway test carried out in trial pit, see separate sheet with corresponding location name.

Scale (approx)

1:50

Logged By

RW

Figure No.

LKC 20 1301.TP1

Excavation Method

Vaccum excavated to 1.08mbgl.

Dimensions

0.90m x 1.60m x 1.08

Ground Level (mOD)

49.44

Client

General Projects

**Job
Number**

LKC 20 1301

Location
Dates

27/09/2022

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				49.34	0.10	MADE GROUND: Dark brown gravelly sandy SILT with frequent rootlets and rare brick fragments. Sand is fine to medium. Gravel is fine to coarse, subangular to subrounded comprising limestone, sandstone and mudstone.		
					(0.80)			
				48.54	0.90	MADE GROUND: Brown sandy GRAVEL comprising limestone (possible 6P/6N fill). Sand is fine to coarse. Gravel is fine to coarse, subangular.		
				48.36	(0.18) 1.08	MADE GROUND: Brown gravelly sandy SILT with frequent brick fragments and rare ash. Sand is fine to medium. Gravel is fine to coarse, subangular comprising sandstone.		
						Complete at 1.08m		


Remarks

Detailed drawing can be found in figure 4.
Concrete slab (possible capping beam) encountered at 0.07mbgl. Extending out from brick wall by 0.70mbgl.
Additional concrete encountered at 1.01mbgl. Extending out from possible capping beam by 0.80m.
Pit was noted to be stable and dry.
Location and elevations taken from GPS survey.

Scale (approx)

1:50

Logged By

RW

Figure No.

LKC 20 1301.TP10

Excavation Method

Vaccum excavated to 1.01mbgl.

Dimensions

1.90m x 0.90m x 1.01m

Ground Level (mOD)

49.67

Client

General Projects

**Job
Number**

LKC 20 1301

Location
Dates

27/09/2022

Engineer

LKC

Sheet

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Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				49.57	0.10	MADE GROUND: Dark brown gravelly sandy SILT with frequent rootlets and rare brick fragments. Sand is fine to medium. Gravel is fine to coarse, subangular to subrounded comprising limestone, sandstone and mudstone.		
				48.82	0.85	MADE GROUND: Brown sandy GRAVEL comprising limestone (possible 6P/6N fill). Sand is fine to coarse. Gravel is fine to coarse, subangular.		
				48.66	0.16	MADE GROUND: Brown gravelly sandy SILT with frequent brick fragments and rare ash. Sand is fine to medium. Gravel is fine to coarse, subangular comprising sandstone.		
						Complete at 1.01m		


Remarks

Concrete slab (possible capping beam) encountered at 0.21mbgl. Extending out from brick wall by 0.7mbgl.
Additional concrete encountered at 0.80mbgl. Extending out from possible capping beam by 1.00m.
Pit was noted to be stable and dry.
Location and elevations taken from GPS survey.
Detailed drawing can be found in figure 4.

Scale (approx)

1:50

Logged By

RW

Figure No.

LKC 20 1301.TP10

Excavation Method

Vaccum excavated and
machine excavated t 1.30mbgl.

Dimensions

3.50m x 0.70m x 1.30m

Ground Level (mOD)

50.13

Client

General Projects

**Job
Number**

LKC 20 1301

Location
Dates

27/09/2022-
28/09/2022

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				49.83	(0.30) 0.30	MADE GROUND: Dark brown gravelly sandy SILT with frequent rootlets and rare brick fragments. Sand is fine to medium. Gravel is fine to coarse, subangular to subrounded comprising limestone, sandstone and mudstone.		
				49.23	(0.60) 0.90	MADE GROUND: Brown sandy GRAVEL comprising limestone (possible 6P/6N fill). Sand is fine to coarse. Gravel is subangular.		
				48.83	(0.40) 1.30	MADE GROUND: Brown gravelly sandy SILT with frequent brick fragments and rare ash. Sand is fine to medium. Gravel is fine to coarse, subangular comprising sandstone.		
						Terminated at 1.30m		


Remarks

Detailed drawing can be found in figure 4.
Concrete slab (possible capping beam) encountered at 0.21mbgl. Extending out from brick wall by 1.00m.
Additional concrete encountered at 1.11mbgl. Extending out and rising to groundlevel from possible capping beam by minimum 2.50m, unable to located edge.
Pit was noted to be stable and dry.
Location and elevations taken from GPS survey.

Scale (approx)

1:50

Logged By

RW

Figure No.

LKC 20 1301.TP12

Excavation Method

Vaccum excavated and machine excavated t 1.10mbgl.

Dimensions

3.50m x 0.70m x 1.10m

Ground Level (mOD)

50.31

Client

General Projects

**Job
Number**

LKC 20 1301

Location
Dates

27/09/2022-
28/09/2022

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				50.11	(0.20) 0.20	MADE GROUND: Dark brown gravelly sandy SILT with frequent rootlets and rare brick fragments. Sand is fine to medium. Gravel is fine to coarse, subangular to subrounded comprising limestone, sandstone and mudstone.		
				49.41	(0.70)	MADE GROUND: Brown sandy GRAVEL comprising limestone (possible 6P/6N fill). Sand is fine to coarse. Gravel is subangular.		
				49.21	0.90 (0.20) 1.10	MADE GROUND: Brown gravelly sandy SILT with frequent brick fragments and rare ash. Sand is fine to medium. Gravel is fine to coarse, subangular comprising sandstone.		
						Terminated at 1.10m		


Remarks

Detailed drawing can be found in figure 4.
Concrete slab (possible capping beam) encountered at 0.10mbgl. Extending out from brick wall by 0.60m.
Additional concrete encountered at 0.99mbgl. Extending out from possible capping beam by 1.00m.
Pit was noted to be stable and dry.
Location and elevations taken from GPS survey.

Scale (approx)

1:50

Logged By

RW

Figure No.

LKC 20 1301.TP13

Excavation Method

Vaccum excavated and
machine excavated t 3.00mbgl.

Dimensions

2.40m x 3.00m x 3.00m

Ground Level (mOD)

50.39

Client

General Projects

**Job
Number**

LKC 20 1301

Location
Dates

27/09/2022

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				50.29	0.10	MADE GROUND: Dark brown gravelly sandy SILT with frequent rootlets and rare brick fragments. Sand is fine to medium. Gravel is fine to coarse, subangular to subrounded comprising limestone, sandstone and mudstone.		
					(2.60)	MADE GROUND: Brown sandy GRAVEL comprising limestone (possible 6P/6N fill). Sand is fine to coarse. Gravel is subangular.		
				47.69	2.70	MADE GROUND: Brown gravelly sandy SILT with frequent brick fragments and rare ash. Sand is fine to medium.		
				47.39	(0.30) 3.00	Gravel is fine to coarse, subangular comprising sandstone.		
						Terminated at 3.00m		


Remarks

Detailed drawing can be found in figure 4.
Concrete slab (possible capping beam) encountered at 0.10mbgl. Extending out from brick wall by 0.20m.
Concrete foot encountered at 2.70mbgl. Extending out from possible capping beam by 2.00m.
Pit was noted to be stable and dry.
Location and elevations taken from GPS survey.

Scale (approx)

1:50

Logged By

MP

Figure No.

LKC 20 1301.TP14

Excavation Method

Machine excavated to 1.00mbgl.

Dimensions

5.80m x 10.50m x 1.00m

Ground Level (mOD)

49.62

Client

General Projects

**Job
Number**

LKC 20 1301

Location
Dates

29/09/2022

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.10	ES			49.52	(0.10) 0.10	MADE GROUND: Dark brown gravelly silty SAND with occasional timber fragments, rootlets, rare glass and brick fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising mudstone and sandstone.		
0.10-1.00	ES				(0.90)	MADE GROUND: Black sandy silty GRAVEL comprising predominantly whole bricks, brick fragments and concrete fragments with frequent metal, membrane fragments, wood, rare ceramics and plastics. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded.		
				48.62	1.00	Terminated at 1.00m		


Remarks

Detailed drawing can be found in figure 4.
Location and elevation taken from GPS survey.
Trial pit was dry and stable.
Concrete slab encountered at 0.40mbgl from brick wall, extending 2.00mbgl away from wall.
Lower concrete slab encountered at 0.6mbgl, extending to 10.90m away from brick wall.
Pit extended parallel with brick wall by 16.0m. Edge of upper concrete slab encountered to the southwest, see separate diagram. Edge to the northeast not encountered.

Scale (approx)

1:25

Logged By

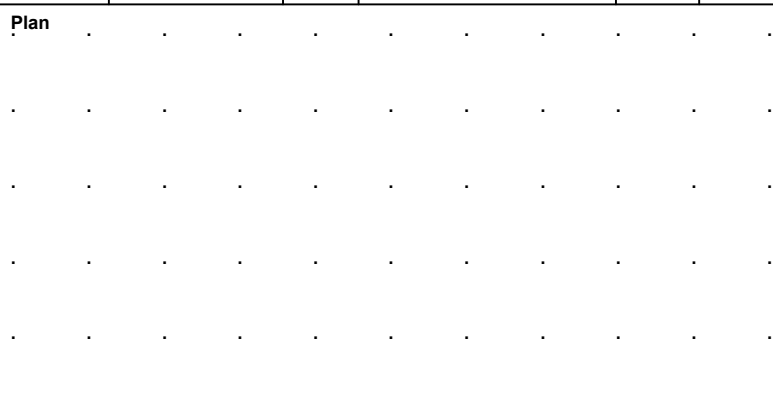
MP

Figure No.

LKC 20 1301.TP15

Excavation Method Machine excavated to 0.2mbgl.	Dimensions 0.6m x 2.0m x 0.2	Ground Level (mOD) 49.95	Client General Projects	Job Number LKC 20 1301
	Location	Dates 12/10/2022	Engineer LKC	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				49.75	(0.20) 0.20	MADE GROUND: Concrete. Terminated at 0.20m		

Plan 	Remarks Trial pit terminated due deep concrete. Trial pit was dry. Location and elevation taken from GPS survey. Trial was moved to 2 other locations and encountered the same conditions.		
	Scale (approx) 1:50	Logged By RW	Figure No. LKC 20 1301.TP3

Excavation Method

Hand excavated to 0.7mbgl.

Dimensions

0.3m x 0.3m x 0.7m

Ground Level (mOD)
Client

General Projects

**Job
Number**

LKC 20 1301

Location
Dates

26/09/2022

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.50	ES PID=<0.1ppm				(0.70) 0.70	MADE GROUND: Dark brown sandy silty GRAVEL comprising predominantly brick and concrete with occasional ash, clinker, rare rootlets, tarmacadam and metal. Sand is fine to coarse. Gravel is fine to coarse, subangular. Complete at 0.70m		


Remarks

Pit was dry and stable.
Carried out in previously excavated area.

Scale (approx)

1:50

Logged By

RW

Figure No.

LKC 20 1301.TP

Excavation Method

Machine excavated to 3.70mbgl.

Dimensions

2.0m x 0.7m x 3.7m

Ground Level (mOD)
Client

General Projects

**Job
Number**

LKC 20 1301

Location
Dates

28/09/2022

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.20	ES PID=2.3ppm				(0.20)	MADE GROUND: Dark brown gravelly silty SAND with frequent rootlets, rare ceramic, brick fragments and concrete fragments, Sand is fine to coarse. Gravel is fine to coarse, subrounded to angular comprising sandstone.		
0.20-1.20	ES PID=0.6ppm				0.20	MADE GROUND: Dark brown sandy silty GRAVEL with frequent whole bricks, brick fragments, concrete fragments, tarmacadam, occasional metal, broken wires and plastics. Sand is fine to coarse. Gravel is fine to coarse, subrounded to angular comprising sandstone and mudstone.		
1.20-2.20	D				(2.00)	Concrete slab noted at 0.80mbgl.		
2.20-3.20	ES PID=0.5ppm				2.20	Stiff consistency high strength brown with grey mottling silty CLAY.		
2.20-3.20	SV 140kPa				(1.50)	Concrete slab noted at 2.20mbgl.		
					3.70	Terminated at 3.70m		


Remarks

Trial pit was dry and stable.
Location and elevation taken from GPS survey.

Scale (approx)

1:25

Logged By

MP

Figure No.

LKC 20 1301.TP8

Excavation Method

Machine excavated to 2.00mbgl.

Dimensions

2.0m x 0.7m x 2.0m

Ground Level (mOD)

52.15

Client

General Projects

**Job
Number**

LKC 20 1301

Location
Dates

29/09/2022

Engineer

LKC

Sheet

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Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.20-0.70	ES PID=0.3ppm			51.95	(0.20) 0.20	MADE GROUND: Dark brown gravelly silty SAND with frequent rootlets, rare ceramics, brick fragments and concrete fragments, Sand is fine to coarse. Gravel is fine to coarse, subrounded to angular comprising sandstone.		
				51.45	(0.50) 0.70	MADE GROUND: Light grey sandy silty GRAVEL comprising predominantly concrete crush with occasional brick fragments. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular.		
1.00-2.00	ES PID=5.3ppm			50.15	(1.30) 2.00	MADE GROUND: Brown sandy silty GRAVEL comprising predominantly bricks and concrete with rare rebar, textiles and broken wires. Sand is fine to coarse. Gravel is fine to coarse, subrounded to angular. Metal pipe present at 2.00mbgl. Terminated at 2.00m		


Remarks

Trial pit was dry. Noted to be collapsing at 0.70mbgl.
Terminated due to presence of metal pipe at 2.00mbgl.
Location and elevation taken from GPS survey.

Scale (approx)

1:25

Logged By

MP

Figure No.

LKC 20 1301.TP9

Excavation Method

Drive-in Windowless Sampler
driven to 2.09mbgl.

Dimensions
Ground Level (mOD)

49.40

Client

General Projects

**Job
Number**

LKC 20 1301

Location (Handheld GPS)

385311 E 398155 N

Dates

06/10/2022

Engineer

LKC

Sheet

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Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.10	ESD PID=4.0ppm				(0.10)	MADE GROUND: Dark brown gravelly sandy silty CLAY with frequent rootlets and rare concrete fragments. Sand is fine to coarse. Gravel is fine to medium, sub rounded to angular.			
0.10-0.40	ESD PID=3.1ppm			49.30	0.10				
					(0.30)	MADE GROUND: Light grey sandy silty GRAVEL with frequent concrete fragments and occasional brick fragments. Sand is fine to coarse. Gravel is fine to medium, sub rounded to angular.			
				49.00	0.40				
1.00-2.00	ESD PID=11.2ppm								
1.20-1.65	SPT N=29		3,5/7,7,8,7		(1.69)				
2.00-2.09	SPT 25*/40 50/50		25/50	47.31	2.09	MADE GROUND: Black sandy silty GRAVEL with frequent brick fragments, concrete fragments and rare metalliferous slag. Sand is fine to coarse. Gravel is fine to coarse, sub rounded to angular.			
						Complete at 2.09m			

Remarks

Location and elevation taken from GPS survey.
Borehole dry and stable.
Refusal at 2.09mbgl on probable made ground.

Scale (approx)

1:20

Logged By

MP

Figure No.

LKC 20 1301.WS1



LK CONSULT LTD

Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS
Tel: 0161 763 7200 web: www.thelkgroup.com

Site

Pollard Street, Manchester

Number
WS2B

Excavation Method

Drive-in Windowless Sampler
driven to 0.30mbgl.

Dimensions

Location (Handheld GPS)
385359 E 398147 N

Ground Level (mOD)

49.95

Dates

06/10/2022

Client

General Projects

Engineer

LKC

Job Number
LKC 20 1301

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				49.85	(0.10) 0.10	MADE GROUND: Dark brown gravelly sandy silty CLAY with frequent rootlets and occasional concrete fragments. Sand is fine to coarse. Gravel is fine to medium, sub rounded to angular.		
				49.65	(0.20) 0.30	MADE GROUND: Dark brown sandy silty GRAVEL with frequent brick fragments and concrete fragments. Sand is fine to coarse. Gravel is fine to coarse, sub rounded to angular.		
						Complete at 0.30m		

Remarks

Elevation estimated using www.freemaptools.com/elevation-finder.htm.
Grid reference estimated using www.gridreferencefinder.com.
Borehole dry and stable.
Refusal at 0.30mbgl on potential relic floor.

Scale (approx)

1:20

Logged By

MP

Figure No.

LKC 20 1301.WS102B

**LK CONSULT LTD**Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS
Tel: 0161 763 7200 web: www.thelkgroup.com**Site**

Pollard Street, Manchester

Number
WS3A**Excavation Method**Drive-in Windowless Sampler
driven to 0.50mbgl.**Dimensions****Ground Level (mOD)**

49.80

Client

General Projects

Job
Number
LKC 20 1301**Location** (Handheld GPS)

385358 E 398184 N

Dates

06/10/2022

Engineer

LKC

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10-0.50	ESD PID=4.5ppm			49.70	(0.10) 0.10	TOPSOIL: Dark brown gravelly sandy silty CLAY with frequent rootlets. Sand is fine to coarse. Gravel is fine to medium, sub rounded to sub angular.		
					(0.40)	MADE GROUND: Light brown sandy silty GRAVEL with frequent brick and concrete fragments. Sand is fine to coarse. Gravel is fine to coarse, sub rounded to angular.		
				49.30	0.50	Complete at 0.50m		

RemarksGrid reference estimated using www.gridreferencefinder.com.
Elevation estimated using www.freemaptools.com/elevation-finder.htm.
Borehole dry and stable.
Refusal at 0.50mbgl on potential relic floor.**Scale**
(approx)

1:20

Logged
By

MP

Figure No.

LKC 20 1301.WS103A

Excavation Method

Drive-in Windowless Sampler
driven to 5.45mbgl.

Dimensions
Location (Handheld GPS)
385418 E 398183 N

Ground Level (mOD)

50.67

Client

General Projects

**Job
Number**

LKC 20 1301

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-1.00	ESD PID=4.7ppm					MADE GROUND: Dark brown sandy silty clayey GRAVEL with frequent brick fragments and concrete fragments. Sand is fine to coarse. Gravel is fine to coarse, sub rounded to angular.			
1.00-2.00	ESD PID=5.4ppm				(2.20)				
1.20-1.65	SPT N=7		1,2/2,2,2,1						
2.00-2.45	SPT N=12		2,2/2,3,3,4						
2.20	SV 95kPa		85,90,110/Av. 95.00	48.47	2.20	Soft to stiff consistency medium to high strength dark brown gravelly sandy silty CLAY. Sand is fine to coarse. Gravel fine to medium, sub rounded to sub angular comprising mudstone and sandstone.			
2.50-3.00	ESD PID=3.2ppm								
3.00	SV 93.33kPa		110,90,80/Av. 93.33						
3.00-3.45	SPT N=18		2,3/3,4,5,6						
3.00-3.45	D								
3.50-4.00	D				(3.25)				
4.00-4.45	D		Water strike(1) at 4.00m.			Dark brown silty SAND. Sand is fine to coarse. Between 4.00m to 4.10mbgl.			
4.00	SV 41.67kPa		40,40,45/Av. 41.67						
4.00-4.45	SPT N=33		4,5/7,8,8,10						
4.50-5.00	D								
5.00-5.45	SPT N=26		6,6/6,6,7,7						
5.00-5.45	D			45.22	5.45	Complete at 5.45m			

Remarks

Borehole stable, water strike at 4.00mbgl.
Location and elevation taken from GPS survey.

**Scale
(approx)**

1:40

**Logged
By**

MP

Figure No.

LKC 20 1301.WS104

Excavation Method

Drive-in Windowless Sampler
driven to 4.40mbgl.

Dimensions
Ground Level (mOD)

51.12

Client

General Projects

**Job
Number**
LKC 20 1301

Location (Handheld GPS)

385437 E 398238 N

Dates

06/10/2022

Engineer

LKC

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-1.00	ESD PID=12.2ppm					MADE GROUND: Dark brown sandy silty GRAVEL with frequent brick and concrete fragments. Sand is fine to coarse. Gravel is fine to coarse, sub rounded to angular. Cobble pushed down between 2.00-3.00mbgl, recovery 5-10%.			
1.00-2.00	ESD PID=3.7ppm								
1.20-1.65	SPT N=4		2,2/1,1,1,1						
					(3.50)				
2.00-2.45	SPT N=7		1,1/2,2,2,1						
2.00-3.00	D		Water strike(1) at 2.50m.						
3.00-3.45	SPT N=13		5,3/3,3,3,4						
3.50	SV 111.67kPa		110,115,110/Av. 111.67	47.62	3.50	Stiff consistency dark grey gravelly sandy silty CLAY. Sand is fine to coarse. Gravel is fine, sub rounded.			
3.50-4.00	ESD PID=2.3ppm				(0.90)				
4.00-4.40	SPT 50/250		7,10/12,13,14,11						
4.00-4.40	D			46.72	4.40	Complete at 4.40m			

Remarks

Grid reference estimated using www.gridreferencefinder.com.
Elevation estimated using www.freemaptools.com/elevation-finder.htm.
Borehole stable with a water strike at 2.50mbgl.

Scale (approx)

1:40

Logged By

MP

Figure No.

LKC 20 1301.WS105

Excavation Method

Drive-in Windowless Sampler
driven to 5.45mbgl.

Dimensions
Location (Handheld GPS)
385505 E 398316 N

Ground Level (mOD)

51.90

Dates

06/10/2022

Client

General Projects

Engineer

LKC

**Job
Number**
LKC 20 1301

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.10 0.10-1.00	ESD PID=5.6ppm ESD PID=2.8ppm			51.80	(0.10)	MADE GROUND: Dark brown gravelly sandy silty CLAY with frequent rootlets, occasional concrete fragments and rare brick. Sand is fine to coarse. Gravel is fine to coarse, sub rounded to angular.			
1.20-1.65	SPT N=9		2,2/3,3,2,1		(1.80)	MADE GROUND: Dark brown sandy silty GRAVEL with frequent concrete fragments occasional brick fragments. Sand is fine to coarse. Gravel is fine to coarse, sub rounded to angular.			
1.90-2.50 2.00 2.00-2.45 2.00-2.45	ESD PID=9.8ppm SV 70kPa SPT N=8 D		60,70,80/Av. 70.00 1,2/2,2,2,2	50.00	1.90	Soft to stiff consistency medium to high strength grey gravelly sandy silty CLAY. Sand is fine to coarse. Gravel is fine, sub rounded.			
2.50-3.00	D								
3.00 3.00-3.45 3.00-3.45	SV 76.67kPa SPT N=23 D		70,80,80/Av. 76.67 2,3/4,5,7,7						
3.50-4.00	D				(3.55)				
4.00 4.00-4.45 4.00-4.45	SV 86.67kPa SPT N=29 D		100,80,80/Av. 86.67 4,5/6,7,8,8						
4.50-5.00	D								
5.00-5.45 5.00-5.45	SPT N=32 D		5,6/7,8,8,9	46.45	5.45	Complete at 5.45m			

Remarks

Grid reference estimated using www.gridreferencefinder.com.
Elevation estimated using www.freemaptools.com/elevation-finder.htm.
Borehole dry and stable.

Scale (approx)

1:40

Logged By

MP

Figure No.

LKC 20 1301.WS107

Appendix C

Certificates of Analysis – Soil

Final Report

Report No.:	22-38537-1		
Initial Date of Issue:	24-Oct-2022		
Client	LK Consult		
Client Address:	Unit 29 Eton Business Park Eton Hill Road Radcliffe Manchester Lancashire M26 2ZS		
Contact(s):	Contaminated Land Peter Dunn		
Project	LKC 20 1301 Pollard Street Manchester		
Quotation No.:	Q22-29106	Date Received:	10-Oct-2022
Order No.:	LKC 20 1301/PD	Date Instructed:	14-Oct-2022
No. of Samples:	2		
Turnaround (Wkdays):	5	Results Due:	20-Oct-2022
Date Approved:	24-Oct-2022		
Approved By:			
Details:	Stuart Henderson, Technical Manager		

Results - Soil

Project: LKC 20 1301 Pollard Street Manchester

Client: LK Consult	Chemtest Job No.:				22-38537	22-38537
Quotation No.: Q22-29106	Chemtest Sample ID.:				1521405	1521407
	Client Sample ID.:				WS105	WS105
	Sample Type:				SOIL	SOIL
	Top Depth (m):				0	3.5
	Bottom Depth (m):				1	4
	Date Sampled:				06-Oct-2022	06-Oct-2022
	Asbestos Lab:				DURHAM	
Determinand	Accred.	SOP	Units	LOD		
ACM Type	U	2192		N/A	-	
Asbestos Identification	U	2192		N/A	No Asbestos Detected	
Moisture	N	2030	%	0.020	11	15
Soil Colour	N	2040		N/A	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Clay
pH	U	2010		4.0	9.0	8.3
Magnesium (Water Soluble)	N	2120	g/l	0.010		0.018
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.35	0.28
Total Sulphur	U	2175	%	0.010		0.094
Chloride (Water Soluble)	U	2220	g/l	0.010		0.015
Nitrate (Water Soluble)	N	2220	g/l	0.010		< 0.010
Ammonium (Water Soluble)	U	2220	g/l	0.01		< 0.01
Sulphate (Acid Soluble)	U	2430	%	0.010		0.090
Arsenic	U	2455	mg/kg	0.5	5.8	
Cadmium	U	2455	mg/kg	0.10	0.21	
Chromium	U	2455	mg/kg	0.5	7.7	
Copper	U	2455	mg/kg	0.50	29	
Mercury	U	2455	mg/kg	0.05	0.17	
Nickel	U	2455	mg/kg	0.50	6.8	
Lead	U	2455	mg/kg	0.50	130	
Selenium	U	2455	mg/kg	0.25	0.27	
Vanadium	U	2455	mg/kg	0.5	8.8	
Zinc	U	2455	mg/kg	0.50	46	
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	
Organic Matter	U	2625	%	0.40	3.4	
Naphthalene	U	2800	mg/kg	0.10	6.1	
Acenaphthylene	N	2800	mg/kg	0.10	2.8	
Acenaphthene	U	2800	mg/kg	0.10	7.4	
Fluorene	U	2800	mg/kg	0.10	7.8	
Phenanthrene	U	2800	mg/kg	0.10	63	
Anthracene	U	2800	mg/kg	0.10	15	
Fluoranthene	U	2800	mg/kg	0.10	77	
Pyrene	U	2800	mg/kg	0.10	74	
Benzo[a]anthracene	U	2800	mg/kg	0.10	36	
Chrysene	U	2800	mg/kg	0.10	37	
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	40	

Results - Soil

Project: LKC 20 1301 Pollard Street Manchester

Client: LK Consult	Chemtest Job No.:				22-38537	22-38537
Quotation No.: Q22-29106	Chemtest Sample ID.:				1521405	1521407
	Client Sample ID.:				WS105	WS105
	Sample Type:				SOIL	SOIL
	Top Depth (m):				0	3.5
	Bottom Depth (m):				1	4
	Date Sampled:				06-Oct-2022	06-Oct-2022
	Asbestos Lab:				DURHAM	
Determinand	Accred.	SOP	Units	LOD		
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	15	
Benzo[a]pyrene	U	2800	mg/kg	0.10	38	
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10	20	
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	4.0	
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10	20	
Total Of 16 PAH's	N	2800	mg/kg	2.0	460	

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measurement by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenzo[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

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

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

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

Sample Deviation Codes

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

Sample Retention and Disposal

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

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

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com

Final Report

Report No.:	22-38532-1		
Initial Date of Issue:	24-Oct-2022		
Client	LK Consult		
Client Address:	Unit 29 Eton Business Park Eton Hill Road Radcliffe Manchester Lancashire M26 2ZS		
Contact(s):	Contaminated Land Peter Dunn		
Project	LKC 20 1301 Pollard Street Manchester		
Quotation No.:	Q22-29106	Date Received:	10-Oct-2022
Order No.:	LKC 20 1301/PD	Date Instructed:	14-Oct-2022
No. of Samples:	3		
Turnaround (Wkdays):	5	Results Due:	20-Oct-2022
Date Approved:	24-Oct-2022		
Approved By:			
Details:	Stuart Henderson, Technical Manager		

Results - Soil

Project: LKC 20 1301 Pollard Street Manchester

Client: LK Consult	Chemtest Job No.:				22-38532	22-38532	22-38532
Quotation No.: Q22-29106	Chemtest Sample ID.:				1521389	1521394	1521395
	Client Sample ID.:				WS101	WS104	WS104
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				1	1	2.5
	Bottom Depth (m):				2	2	3
	Date Sampled:				06-Oct-2022	06-Oct-2022	06-Oct-2022
	Asbestos Lab:				DURHAM	DURHAM	
Determinand	Accred.	SOP	Units	LOD			
ACM Type	U	2192		N/A	-	-	
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	
Moisture	N	2030	%	0.020	14	21	14
Soil Colour	N	2040		N/A	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Clay	Clay
pH	U	2010		4.0	9.0	8.3	8.1
Magnesium (Water Soluble)	N	2120	g/l	0.010			0.021
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.46	0.075	0.33
Total Sulphur	U	2175	%	0.010			0.091
Chloride (Water Soluble)	U	2220	g/l	0.010			0.020
Nitrate (Water Soluble)	N	2220	g/l	0.010			< 0.010
Ammonium (Water Soluble)	U	2220	g/l	0.01			< 0.01
Sulphate (Acid Soluble)	U	2430	%	0.010			0.10
Arsenic	U	2455	mg/kg	0.5	8.9	6.6	
Cadmium	U	2455	mg/kg	0.10	0.40	0.11	
Chromium	U	2455	mg/kg	0.5	9.0	7.7	
Copper	U	2455	mg/kg	0.50	44	21	
Mercury	U	2455	mg/kg	0.05	0.23	0.19	
Nickel	U	2455	mg/kg	0.50	9.0	6.3	
Lead	U	2455	mg/kg	0.50	160	64	
Selenium	U	2455	mg/kg	0.25	0.25	< 0.25	
Vanadium	U	2455	mg/kg	0.5	12	12	
Zinc	U	2455	mg/kg	0.50	100	24	
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	
Organic Matter	U	2625	%	0.40	4.2	3.3	
Naphthalene	U	2800	mg/kg	0.10	5.3	0.45	
Acenaphthylene	N	2800	mg/kg	0.10	2.3	0.11	
Acenaphthene	U	2800	mg/kg	0.10	5.5	0.21	
Fluorene	U	2800	mg/kg	0.10	6.4	0.22	
Phenanthrene	U	2800	mg/kg	0.10	46	1.4	
Anthracene	U	2800	mg/kg	0.10	10	0.33	
Fluoranthene	U	2800	mg/kg	0.10	57	1.6	
Pyrene	U	2800	mg/kg	0.10	54	1.5	
Benzo[a]anthracene	U	2800	mg/kg	0.10	26	0.77	
Chrysene	U	2800	mg/kg	0.10	26	0.79	
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	30	0.97	

Results - Soil

Project: LKC 20 1301 Pollard Street Manchester

Client: LK Consult	Chemtest Job No.:				22-38532	22-38532	22-38532
Quotation No.: Q22-29106	Chemtest Sample ID.:				1521389	1521394	1521395
	Client Sample ID.:				WS101	WS104	WS104
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				1	1	2.5
	Bottom Depth (m):				2	2	3
	Date Sampled:				06-Oct-2022	06-Oct-2022	06-Oct-2022
	Asbestos Lab:				DURHAM	DURHAM	
Determinand	Accred.	SOP	Units	LOD			
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	12	0.41	
Benzo[a]pyrene	U	2800	mg/kg	0.10	29	0.91	
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10	15	0.58	
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	3.1	0.15	
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10	14	0.60	
Total Of 16 PAH's	N	2800	mg/kg	2.0	340	11	

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measurement by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenzo[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS

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customerservices@chemtest.com

Final Report

Report No.: 22-38510-1

Initial Date of Issue: 24-Oct-2022

Client LK Consult

Client Address: Unit 29 Eton Business Park
Eton Hill Road
Radcliffe
Manchester
Lancashire
M26 2ZS

Contact(s): Contaminated Land
Peter Dunn

Project LKC 20 1307 Pollard Street,
Manchester

Quotation No.:		Date Received:	10-Oct-2022
Order No.:	LKC 20 1301/PD	Date Instructed:	14-Oct-2022
No. of Samples:	1		
Turnaround (Wkdays):	5	Results Due:	20-Oct-2022
Date Approved:	24-Oct-2022		

Approved By:



Details: Stuart Henderson, Technical
Manager

Results - Soil

Project: LKC 20 1307 Pollard Street, Manchester

Client: LK Consult	Chemtest Job No.:				22-38510
Quotation No.:	Chemtest Sample ID.:				1521323
	Client Sample ID.:				117400
	Sample Location:				BH4
	Sample Type:				SOIL
	Top Depth (m):				0.70
	Bottom Depth (m):				1.60
	Asbestos Lab:				COVENTRY
Determinand	Accred.	SOP	Units	LOD	
ACM Type	U	2192		N/A	insulation
Asbestos Identification	U	2192		N/A	Chrysotile
Asbestos by Gravimetry	U	2192	%	0.001	0.075
Total Asbestos	U	2192	%	0.001	0.075
Moisture	N	2030	%	0.020	13
Soil Colour	N	2040		N/A	Brown
Other Material	N	2040		N/A	Stones
Soil Texture	N	2040		N/A	Sand
pH	U	2010		4.0	[A] 8.1
Sulphate (2:1 Water Soluble) as SO ₄	U	2120	g/l	0.010	[A] 0.39
Arsenic	U	2455	mg/kg	0.5	23
Cadmium	U	2455	mg/kg	0.10	0.99
Chromium	U	2455	mg/kg	0.5	20
Copper	U	2455	mg/kg	0.50	160
Mercury	U	2455	mg/kg	0.05	0.43
Nickel	U	2455	mg/kg	0.50	26
Lead	U	2455	mg/kg	0.50	280
Selenium	U	2455	mg/kg	0.25	0.69
Vanadium	U	2455	mg/kg	0.5	23
Zinc	U	2455	mg/kg	0.50	780
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50
Organic Matter	U	2625	%	0.40	[A] 15
Naphthalene	U	2800	mg/kg	0.10	7.3
Acenaphthylene	N	2800	mg/kg	0.10	4.8
Acenaphthene	U	2800	mg/kg	0.10	7.6
Fluorene	U	2800	mg/kg	0.10	9.6
Phenanthrene	U	2800	mg/kg	0.10	81
Anthracene	U	2800	mg/kg	0.10	16
Fluoranthene	U	2800	mg/kg	0.10	91
Pyrene	U	2800	mg/kg	0.10	93
Benzo[a]anthracene	U	2800	mg/kg	0.10	42
Chrysene	U	2800	mg/kg	0.10	49
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	51
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	21
Benzo[a]pyrene	U	2800	mg/kg	0.10	49
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10	26
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	5.8
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10	26

Results - Soil

Project: LKC 20 1307 Pollard Street, Manchester

Client: LK Consult	Chemtest Job No.:		22-38510	
Quotation No.:	Chemtest Sample ID.:		1521323	
	Client Sample ID.:		117400	
	Sample Location:		BH4	
	Sample Type:		SOIL	
	Top Depth (m):		0.70	
	Bottom Depth (m):		1.60	
	Asbestos Lab:		COVENTRY	
Determinand	Accred.	SOP	Units	LOD
Total Of 16 PAH's	N	2800	mg/kg	2.0
				580

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request. The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1521323		117400	BH4		A	Amber Glass 250ml
1521323		117400	BH4		A	Amber Glass 60ml
1521323		117400	BH4		A	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenzo[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

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

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

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

Sample Deviation Codes

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

Sample Retention and Disposal

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

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

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com

Final Report

Report No.: 22-38355-1

Initial Date of Issue: 27-Oct-2022

Client LK Consult

Client Address: Unit 29 Eton Business Park
Eton Hill Road
Radcliffe
Manchester
Lancashire
M26 2ZS

Contact(s): Contaminated Land
Peter Dunn

Project LKC 20 1301 Pollard Street
Manchester

Quotation No.:		Date Received:	07-Oct-2022
Order No.:	lkc 20 1031/PD	Date Instructed:	14-Oct-2022
No. of Samples:	1		
Turnaround (Wkdays):	10	Results Due:	27-Oct-2022
Date Approved:	27-Oct-2022		

Approved By:



Details: Stuart Henderson, Technical
Manager

Results - Soil

Project: LKC 20 1301 Pollard Street Manchester

Client: LK Consult	Chemtest Job No.:		22-38355		
Quotation No.:	Chemtest Sample ID.:		1520554		
	Client Sample ID.:		BH5		
	Sample Type:		SOIL		
	Top Depth (m):		0.00		
	Bottom Depth (m):		1.20		
	Date Sampled:		05-Oct-2022		
	Asbestos Lab:		DURHAM		
Determinand	Accred.	SOP	Units	LOD	
ACM Type	U	2192		N/A	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected
Moisture	N	2030	%	0.020	12
Soil Colour	N	2040		N/A	Brown
Other Material	N	2040		N/A	Stones
Soil Texture	N	2040		N/A	Sand
Chromatogram (TPH)	N			N/A	See Attached
pH	U	2010		4.0	8.4
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	0.92
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.068
Cyanide (Free)	U	2300	mg/kg	0.50	< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	0.50
Arsenic	U	2455	mg/kg	0.5	12
Cadmium	U	2455	mg/kg	0.10	0.45
Chromium	U	2455	mg/kg	0.5	8.9
Copper	U	2455	mg/kg	0.50	140
Mercury	U	2455	mg/kg	0.05	0.21
Nickel	U	2455	mg/kg	0.50	15
Lead	U	2455	mg/kg	0.50	270
Selenium	U	2455	mg/kg	0.25	0.40
Vanadium	U	2455	mg/kg	0.5	18
Zinc	U	2455	mg/kg	0.50	120
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50
Organic Matter	U	2625	%	0.40	14
Diesel Present	N	2670		N/A	False
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0

Results - Soil

Project: LKC 20 1301 Pollard Street Manchester

Client: LK Consult	Chemtest Job No.:		22-38355		
Quotation No.:	Chemtest Sample ID.:		1520554		
	Client Sample ID.:		BH5		
	Sample Type:		SOIL		
	Top Depth (m):		0.00		
	Bottom Depth (m):		1.20		
	Date Sampled:		05-Oct-2022		
	Asbestos Lab:		DURHAM		
Determinand	Accred.	SOP	Units	LOD	
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C16-C21	N	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10
Benzene	U	2760	µg/kg	1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0	< 1.0
Naphthalene	U	2800	mg/kg	0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10
Acenaphthene	U	2800	mg/kg	0.10	< 0.10
Fluorene	U	2800	mg/kg	0.10	< 0.10
Phenanthrene	U	2800	mg/kg	0.10	1.5
Anthracene	U	2800	mg/kg	0.10	0.29
Fluoranthene	U	2800	mg/kg	0.10	2.2
Pyrene	U	2800	mg/kg	0.10	2.0
Benzo[a]anthracene	U	2800	mg/kg	0.10	1.1
Chrysene	U	2800	mg/kg	0.10	0.81
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	1.0
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	0.30
Benzo[a]pyrene	U	2800	mg/kg	0.10	1.0
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10	< 0.10
Total Of 16 PAH's	N	2800	mg/kg	2.0	10
Total Phenols	U	2920	mg/kg	0.10	< 0.10

TPH Chromatogram on Soil Sample: 1520554

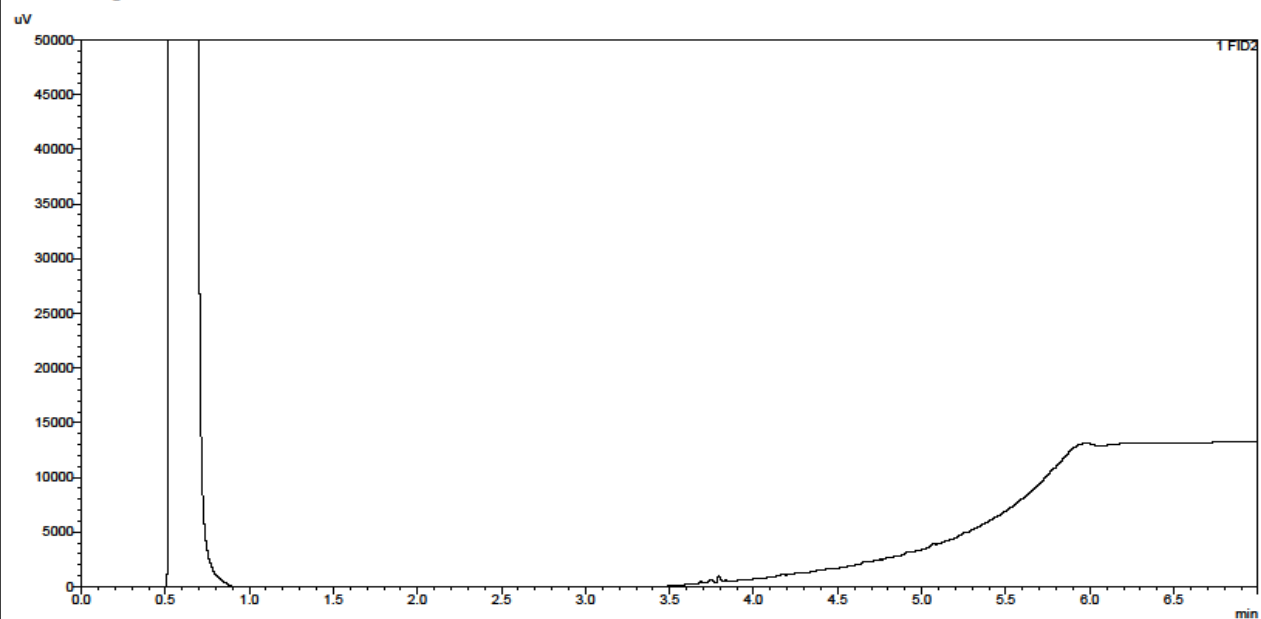
<Sample Information>

Sample Name : Back 1520554 22-38355
Data Filename : 2022-10-17_17102022_Back 1520554 22-38355_058.gcd
Method Filename : TPH 12m Fast OSv2.gcm
Sample # : 103
Date Acquired : 17/10/2022 22:20:27
Date Processed : 26/10/2022



Chemtest

<Chromatogram>



TPH Interpretation

Job	Sample	Matrix	Location	Sample Ref	Sample ID	Sample Depth (m)	Gasoline / Diesel Present	TPH Interpretation
22-38355	1520554	S			BH5	0.00	No	N/A

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenzo[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

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Final Report

Report No.: 22-37935-1
Initial Date of Issue: 17-Oct-2022
Client LK Consult
Client Address: Unit 29 Eton Business Park
Eton Hill Road
Radcliffe
Manchester
Lancashire
M26 2ZS

Contact(s): Contaminated Land
Peter Dunn

Project LKC 20 1301 Pollard Street,
Manchester

Quotation No.: **Date Received:** 05-Oct-2022

Order No.: LKC 20 1301/PD **Date Instructed:** 05-Oct-2022

No. of Samples: 2

Turnaround (Wkdays): 7 **Results Due:** 13-Oct-2022

Date Approved: 17-Oct-2022

Approved By:

Details: Stuart Henderson, Technical
Manager

Results - 2 Stage WAC

Project: LKC 20 1301 Pollard Street, Manchester

Chemtest Job No: 22-37935							Landfill Waste Acceptance Criteria			
Chemtest Sample ID: 1518616							Limits			
Sample Ref:							Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill	
Sample ID: TP8										
Sample Location:										
Top Depth(m): 2.20										
Bottom Depth(m): 3.20										
Sampling Date: 28-Sep-2022										
Determinand	SOP	Accred.	Units							
Total Organic Carbon	2625	M	%				1.4	3	5	6
Loss On Ignition	2610	M	%				31	--	--	10
Total BTEX	2760	M	mg/kg				< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg				< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg				58	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg				< 2.0	100	--	--
pH	2010	M					8.8	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.015	--	To evaluate	To evaluate			
Eluate Analysis			2:1 mg/l	8:1 mg/l	2:1 mg/kg	Cumulative mg/kg 10:1	Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg			
Arsenic	1455	U	< 0.0002	0.0026	< 0.0002	0.020	0.5	2	25	
Barium	1455	U	0.006	0.046	0.011	0.37	20	100	300	
Cadmium	1455	U	0.0011	< 0.00011	0.0022	0.0025	0.04	1	5	
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70	
Copper	1455	U	< 0.0005	0.0028	< 0.0005	< 0.0005	2	50	100	
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2	
Molybdenum	1455	U	0.0026	0.0083	0.0051	0.070	0.5	10	30	
Nickel	1455	U	< 0.0005	0.0006	< 0.0005	0.0049	0.4	10	40	
Lead	1455	U	< 0.0005	0.0010	< 0.0005	0.0075	0.5	10	50	
Antimony	1455	U	< 0.0005	0.023	< 0.0005	0.18	0.06	0.7	5	
Selenium	1455	U	< 0.0005	0.0012	< 0.0005	0.0091	0.1	0.5	7	
Zinc	1455	U	0.003	0.003	0.005	0.031	4	50	200	
Chloride	1220	U	1.1	< 1.0	< 10	< 10	800	15000	25000	
Fluoride	1220	U	0.27	0.12	< 1.0	1.5	10	150	500	
Sulphate	1220	U	5.8	1.4	11	24	1000	20000	50000	
Total Dissolved Solids	1020	N	52	35	100	390	4000	60000	100000	
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-	
Dissolved Organic Carbon	1610	U	3.3	3.3	< 50	< 50	500	800	1000	

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	13

Leachate Test Information	
Leachant volume 1st extract/l	0.324
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.397

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: LKC 20 1301 Pollard Street, Manchester

Chemtest Job No: 22-37935							Landfill Waste Acceptance Criteria			
Chemtest Sample ID: 1518617							Limits			
Sample Ref:							Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill	
Sample ID: TP15										
Sample Location:										
Top Depth(m): 0.10										
Bottom Depth(m): 1.00										
Sampling Date: 29-Sep-2022										
Determinand	SOP	Accred.	Units							
Total Organic Carbon	2625	M	%				6.9	3	5	6
Loss On Ignition	2610	M	%				6.6	--	--	10
Total BTEX	2760	M	mg/kg				< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg				< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg				400	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg				< 2.0	100	--	--
pH	2010	M					8.3	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg				0.023	--	To evaluate	To evaluate
Eluate Analysis			2:1 mg/l	8:1 mg/l	2:1 mg/kg	Cumulative mg/kg 10:1	Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg			
Arsenic	1455	U	0.0032	0.0033	0.0063	0.033	0.5	2	25	
Barium	1455	U	0.027	0.009	0.054	0.13	20	100	300	
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5	
Chromium	1455	U	0.0008	0.044	0.0015	0.34	0.5	10	70	
Copper	1455	U	0.0040	0.020	0.0079	0.0091	2	50	100	
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2	
Molybdenum	1455	U	0.0031	0.0087	0.0062	0.075	0.5	10	30	
Nickel	1455	U	0.0008	0.0020	0.0016	0.018	0.4	10	40	
Lead	1455	U	0.0057	0.0007	0.011	0.018	0.5	10	50	
Antimony	1455	U	0.0088	0.0011	0.018	0.028	0.06	0.7	5	
Selenium	1455	U	0.0006	0.0018	0.0011	0.015	0.1	0.5	7	
Zinc	1455	U	0.006	0.006	0.012	0.062	4	50	200	
Chloride	1220	U	< 1.0	< 1.0	< 10	< 10	800	15000	25000	
Fluoride	1220	U	0.37	0.16	< 1.0	2.1	10	150	500	
Sulphate	1220	U	67	9.7	130	230	1000	20000	50000	
Total Dissolved Solids	1020	N	150	67	310	870	4000	60000	100000	
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-	
Dissolved Organic Carbon	1610	U	5.5	5.8	< 50	57	500	800	1000	

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	9.5

Leachate Test Information	
Leachant volume 1st extract/l	0.332
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.398

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Test Methods

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge
650	Characterisation of Waste (Leaching WAC)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

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

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

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

Sample Deviation Codes

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

Sample Retention and Disposal

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

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

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com

Final Report

Report No.: 22-37523-1

Initial Date of Issue: 14-Oct-2022

Client LK Consult

Client Address: Unit 29 Eton Business Park
Eton Hill Road
Radcliffe
Manchester
Lancashire
M26 2ZS

Contact(s): Contaminated Land
Peter Dunn

Project LKC 20 1301 Pollard Street,
Manchester

Quotation No.:		Date Received:	03-Oct-2022
Order No.:	LKC 20 1301/PD	Date Instructed:	05-Oct-2022
No. of Samples:	5		
Turnaround (Wkdays):	5	Results Due:	11-Oct-2022
Date Approved:	14-Oct-2022		

Approved By:



Details: Stuart Henderson, Technical
Manager

Results - Soil

Project: LKC 20 1301 Pollard Street, Manchester

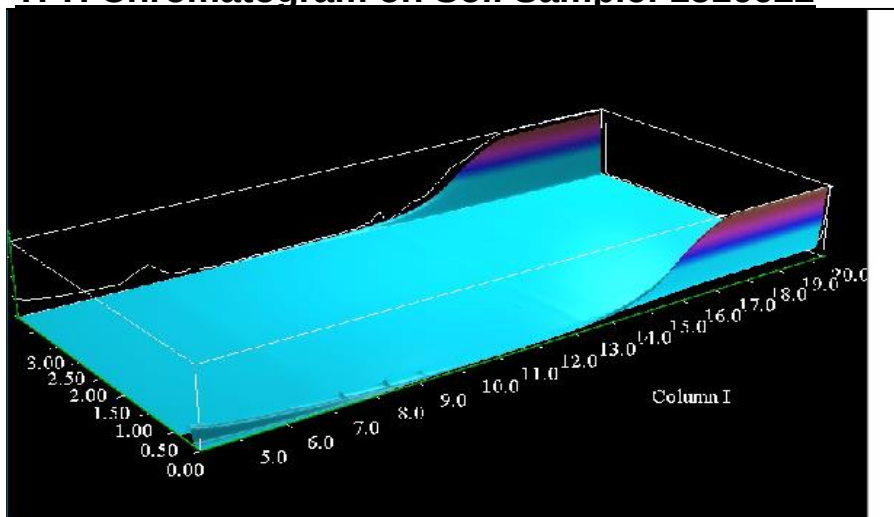
Client: LK Consult	Chemtest Job No.:				22-37523	22-37523	22-37523	22-37523	22-37523
Quotation No.:	Chemtest Sample ID.:				1516618	1516621	1516622	1516624	1516626
Order No.: LKC 20 1301/PD	Client Sample Ref.:				ES	ES	ES	ES	ES
	Client Sample ID.:				BH2	TP8	TP8	TP9	TP15
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.4	0.2	2.2	1.0	0.1
	Bottom Depth (m):				1.3	1.2	3.2	2.0	1
	Date Sampled:				30-Sep-2022	28-Sep-2022	28-Sep-2022	28-Sep-2022	29-Sep-2022
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD					
ACM Type	U	2192		N/A	-	lagging	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	Chrysotile	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Asbestos by Gravimetry	U	2192	%	0.001		0.11			
Total Asbestos	U	2192	%	0.001		0.11			
Moisture	N	2030	%	0.020	11	7.3	11	13	11
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones, Roots, Wood and Glass	Stones, Roots and Wood	Stones and Roots	Stones, Roots and Wood	Stones, Roots, Wood and Glass
Soil Texture	N	2040		N/A	Sand	Sand	Sand	Sand	Sand
Chromatogram (TPH)	N			N/A			See Attached		See Attached
pH	U	2010		4.0	8.3	8.6	8.5	8.6	8.1
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40			1.2		1.6
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.31	0.12	< 0.010	0.068	0.57
Cyanide (Free)	U	2300	mg/kg	0.50			< 0.50		< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50			< 0.50		< 0.50
Arsenic	U	2455	mg/kg	0.5	6.9	4.7	1.3	12	6.8
Cadmium	U	2455	mg/kg	0.10	0.46	0.37	< 0.10	0.57	0.35
Chromium	U	2455	mg/kg	0.5	11	7.4	3.8	13	10
Copper	U	2455	mg/kg	0.50	39	24	4.4	62	39
Mercury	U	2455	mg/kg	0.05	0.15	0.19	< 0.05	0.10	0.08
Nickel	U	2455	mg/kg	0.50	9.7	8.4	5.6	14	12
Lead	U	2455	mg/kg	0.50	120	120	3.4	140	140
Selenium	U	2455	mg/kg	0.25	0.35	0.25	< 0.25	0.50	0.39
Vanadium	U	2455	mg/kg	0.5	12	10	4.0	20	14
Zinc	U	2455	mg/kg	0.50	97	130	12	120	110
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	7.1	2.6	1.5	5.9	9.9
Diesel Present	N	2670		N/A			False		False
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0			< 1.0		< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0			< 1.0		< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0			< 1.0		< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0			< 1.0		< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0			< 1.0		< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0			< 1.0		< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0			< 1.0		210

Results - Soil

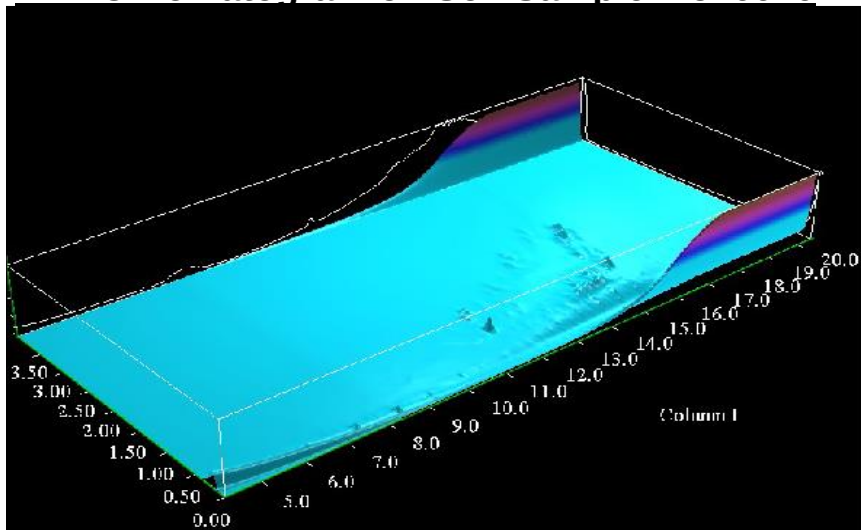
Project: LKC 20 1301 Pollard Street, Manchester

Client: LK Consult	Chemtest Job No.:				22-37523	22-37523	22-37523	22-37523	22-37523
Quotation No.:	Chemtest Sample ID.:				1516618	1516621	1516622	1516624	1516626
Order No.: LKC 20 1301/PD	Client Sample Ref.:				ES	ES	ES	ES	ES
	Client Sample ID.:				BH2	TP8	TP8	TP9	TP15
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.4	0.2	2.2	1.0	0.1
	Bottom Depth (m):				1.3	1.2	3.2	2.0	1
	Date Sampled:				30-Sep-2022	28-Sep-2022	28-Sep-2022	28-Sep-2022	29-Sep-2022
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD					
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0			< 1.0		< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0			< 5.0		210
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0			< 1.0		< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0			< 1.0		< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0			< 1.0		< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0			< 1.0		< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0			< 1.0		< 1.0
Aromatic TPH >C16-C21	N	2680	mg/kg	1.0			< 1.0		40
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0			< 1.0		2000
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0			< 1.0		600
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0			< 5.0		2600
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0			< 10		2800
Benzene	U	2760	µg/kg	1.0			< 1.0		< 1.0
Toluene	U	2760	µg/kg	1.0			< 1.0		< 1.0
Ethylbenzene	U	2760	µg/kg	1.0			< 1.0		< 1.0
m & p-Xylene	U	2760	µg/kg	1.0			< 1.0		< 1.0
o-Xylene	U	2760	µg/kg	1.0			< 1.0		< 1.0
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0			< 1.0		< 1.0
Naphthalene	U	2800	mg/kg	0.10	5.1	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	1.2	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2800	mg/kg	0.10	9.3	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2800	mg/kg	0.10	7.5	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	2800	mg/kg	0.10	46	< 0.10	< 0.10	0.98	11
Anthracene	U	2800	mg/kg	0.10	12	< 0.10	< 0.10	0.24	1.9
Fluoranthene	U	2800	mg/kg	0.10	70	0.29	< 0.10	1.6	14
Pyrene	U	2800	mg/kg	0.10	63	0.25	< 0.10	1.6	12
Benzo[a]anthracene	U	2800	mg/kg	0.10	37	< 0.10	< 0.10	1.1	6.1
Chrysene	U	2800	mg/kg	0.10	38	< 0.10	< 0.10	1.1	6.0
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	46	< 0.10	< 0.10	1.3	7.7
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	19	< 0.10	< 0.10	0.64	2.7
Benzo[a]pyrene	U	2800	mg/kg	0.10	41	< 0.10	< 0.10	1.4	7.8
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10	26	< 0.10	< 0.10	0.87	4.9
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	5.9	< 0.10	< 0.10	0.41	0.90
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10	23	< 0.10	< 0.10	0.88	4.5
Total Of 16 PAH's	N	2800	mg/kg	2.0	450	< 2.0	< 2.0	12	80
Total Phenols	U	2920	mg/kg	0.10			< 0.10		< 0.10

TPH Chromatogram on Soil Sample: 1516622



TPH Chromatogram on Soil Sample: 1516626



TPH Interpretation

Job	Sample	Matrix	Location	Sample Ref	Sample ID	Sample Depth (m)	Gasoline / Diesel Present	TPH Interpretation
22-37523	1516622	S		ES	TP8	2.2	No	N/A
22-37523	1516626	S		ES	TP15	0.1	No	PAH

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenzo[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
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>	"greater than"
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LOD	Limit of detection

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The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

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

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

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

Sample Deviation Codes

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

Sample Retention and Disposal

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

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

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com

Final Report

Report No.: 22-37199-1

Initial Date of Issue: 13-Oct-2022

Client LK Consult

Client Address: Unit 29 Eton Business Park
Eton Hill Road
Radcliffe
Manchester
Lancashire
M26 2ZS

Contact(s): Contaminated Land
Peter Dunn

Project LKC 20 1301 Pollard Street,
Manchester

Quotation No.:		Date Received:	29-Sep-2022
Order No.:	LKC 20 1301/PD	Date Instructed:	05-Oct-2022
No. of Samples:	4		
Turnaround (Wkdays):	5	Results Due:	11-Oct-2022
Date Approved:	13-Oct-2022		

Approved By:



Details: Stuart Henderson, Technical
Manager

Results - Soil

Project: LKC 20 1301 Pollard Street, Manchester

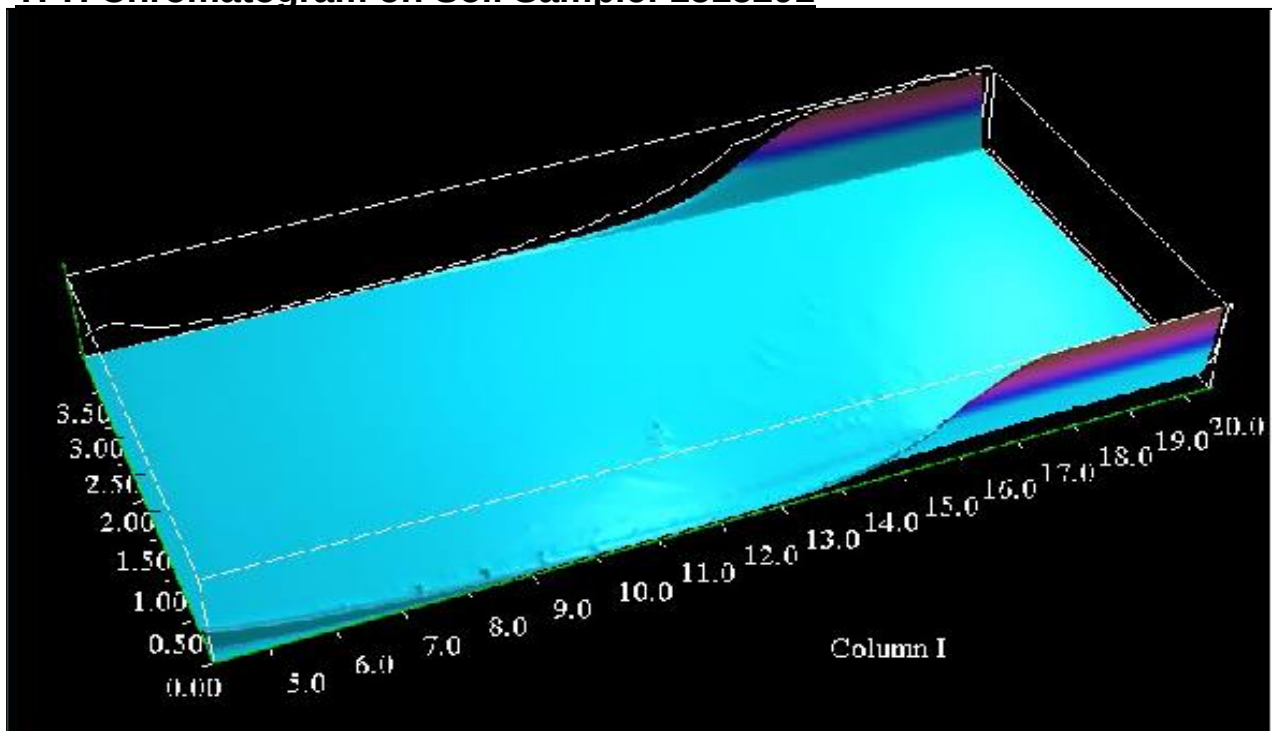
Client: LK Consult	Chemtest Job No.:				22-37199	22-37199	22-37199	22-37199
Quotation No.:	Chemtest Sample ID.:				1515291	1515292	1515293	1515294
Order No.: LKC 20 1301/PD	Client Sample Ref.:				es	es	es	es
	Sample Location:				BH6	BH6	TP7	BH3
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.50	2.00	0.00	0.00
	Bottom Depth (m):				1.20	2.45	0.50	1.20
	Date Sampled:				26-Sep-2022	26-Sep-2022	26-Sep-2022	28-Sep-2022
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD				
ACM Type	U	2192		N/A	-	-	Fibres/Clumps	Fibres/Clumps
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	Amosite Chrysotile	Chrysotile
Asbestos by Gravimetry	U	2192	%	0.001			0.075	0.002
Total Asbestos	U	2192	%	0.001			0.075	0.002
Moisture	N	2030	%	0.020	11	16	13	12
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones and Roots	Stones and Roots	Stones, Roots and Wood	Stones and Roots
Soil Texture	N	2040		N/A	Sand	Sand	Sand	Sand
Chromatogram (TPH)	N			N/A	See Attached			See Attached
pH	U	2010		4.0	9.3	8.2	8.4	9.2
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	1.3			2.3
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.62	0.38	< 0.010	0.47
Cyanide (Free)	U	2300	mg/kg	0.50	< 0.50			< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50			0.50
Arsenic	U	2455	mg/kg	0.5	6.8	12	10	14
Cadmium	U	2455	mg/kg	0.10	2.2	0.45	0.46	0.50
Chromium	U	2455	mg/kg	0.5	13	15	22	15
Copper	U	2455	mg/kg	0.50	40	120	55	98
Mercury	U	2455	mg/kg	0.05	0.15	0.16	0.23	0.25
Nickel	U	2455	mg/kg	0.50	10	17	15	14
Lead	U	2455	mg/kg	0.50	440	520	130	230
Selenium	U	2455	mg/kg	0.25	0.41	0.68	0.48	0.52
Vanadium	U	2455	mg/kg	0.5	16	21	19	17
Zinc	U	2455	mg/kg	0.50	210	230	86	140
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	3.2	41	4.3	7.4
Diesel Present	N	2670		N/A	False			False
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0			< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0			< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0			< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0			11
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0			82
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0			100
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0			36
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0			< 1.0

Results - Soil

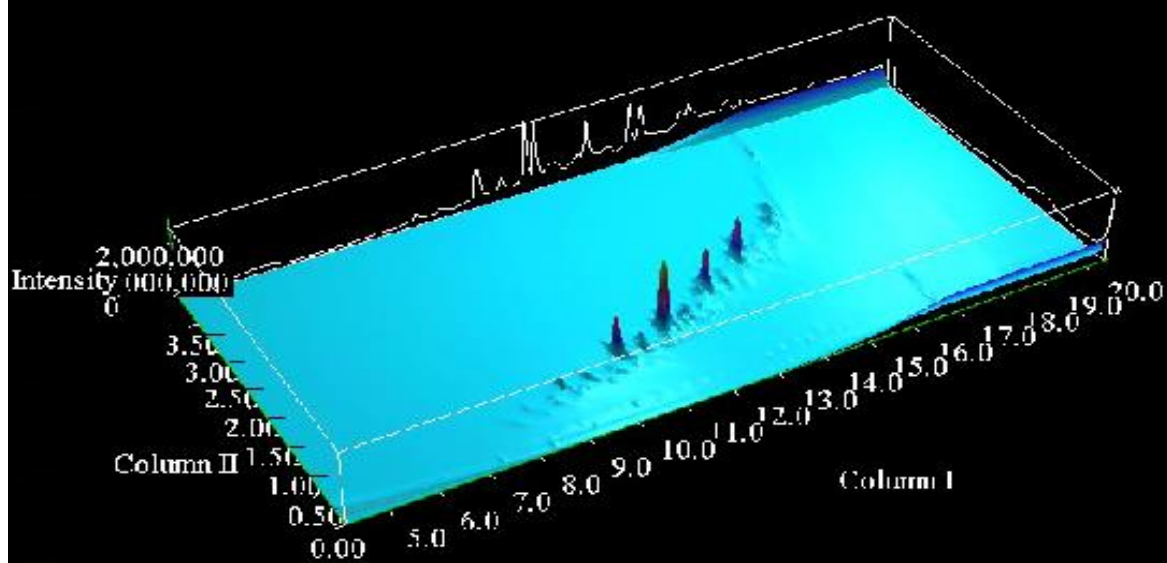
Project: LKC 20 1301 Pollard Street, Manchester

Client: LK Consult	Chemtest Job No.:		22-37199	22-37199	22-37199	22-37199
Quotation No.:	Chemtest Sample ID.:		1515291	1515292	1515293	1515294
Order No.: LKC 20 1301/PD	Client Sample Ref.:		es	es	es	es
	Sample Location:		BH6	BH6	TP7	BH3
	Sample Type:		SOIL	SOIL	SOIL	SOIL
	Top Depth (m):		0.50	2.00	0.00	0.00
	Bottom Depth (m):		1.20	2.45	0.50	1.20
	Date Sampled:		26-Sep-2022	26-Sep-2022	26-Sep-2022	28-Sep-2022
	Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD		
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	230
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	320
Aromatic TPH >C16-C21	N	2680	mg/kg	1.0	< 1.0	1400
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	3100
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	200
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	5000
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	5200
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	2.3
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	3.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	4.6
o-Xylene	U	2760	µg/kg	1.0	< 1.0	4.2
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0	< 1.0	< 1.0
Naphthalene	U	2800	mg/kg	0.10	< 0.10	2.2 0.36 11
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	1.1 0.10 1.6
Acenaphthene	U	2800	mg/kg	0.10	< 0.10	1.7 0.29 24
Fluorene	U	2800	mg/kg	0.10	< 0.10	3.2 0.32 22
Phenanthrene	U	2800	mg/kg	0.10	6.4	25 2.9 160
Anthracene	U	2800	mg/kg	0.10	1.2	4.8 0.63 46
Fluoranthene	U	2800	mg/kg	0.10	8.7	32 4.2 200
Pyrene	U	2800	mg/kg	0.10	7.7	33 3.8 180
Benzo[a]anthracene	U	2800	mg/kg	0.10	3.8	17 1.7 110
Chrysene	U	2800	mg/kg	0.10	3.8	17 1.7 110
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	4.6	18 2.5 120
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	1.6	6.4 0.75 57
Benzo[a]pyrene	U	2800	mg/kg	0.10	4.7	20 2.3 110
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10	2.9	9.4 1.6 75
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	0.41	1.8 0.35 20
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10	2.7	9.4 1.5 70
Total Of 16 PAH's	N	2800	mg/kg	2.0	49	200 25 1300
Total Phenols	U	2920	mg/kg	0.10	< 0.10	0.60

TPH Chromatogram on Soil Sample: 1515291



TPH Chromatogram on Soil Sample: 1515294



TPH Interpretation

Job	Sample	Matrix	Location	Sample Ref	Sample ID	Sample Depth (m)	Gasoline / Diesel Present	TPH Interpretation
22-37199	1515291	S	BH6	es		0.50	No	N/A
22-37199	1515294	S	BH3	es		0.00	No	PAH

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenzo[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

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

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

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

Sample Deviation Codes

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

Sample Retention and Disposal

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

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

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com

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 20 1301 -
Pollard Street, Manchester

Job Number MRN 4310/147
Date of Issue 01 November 2022
Page 1 of 29

Approved Signatories

S J Hutchings, O P Davies

Notes

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



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

Also at: London: 020 8523 1999

Murray Rix is the trading name of Murray Rix (Northern) Limited. Registered in England 2878361

TEST CERTIFICATE
PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

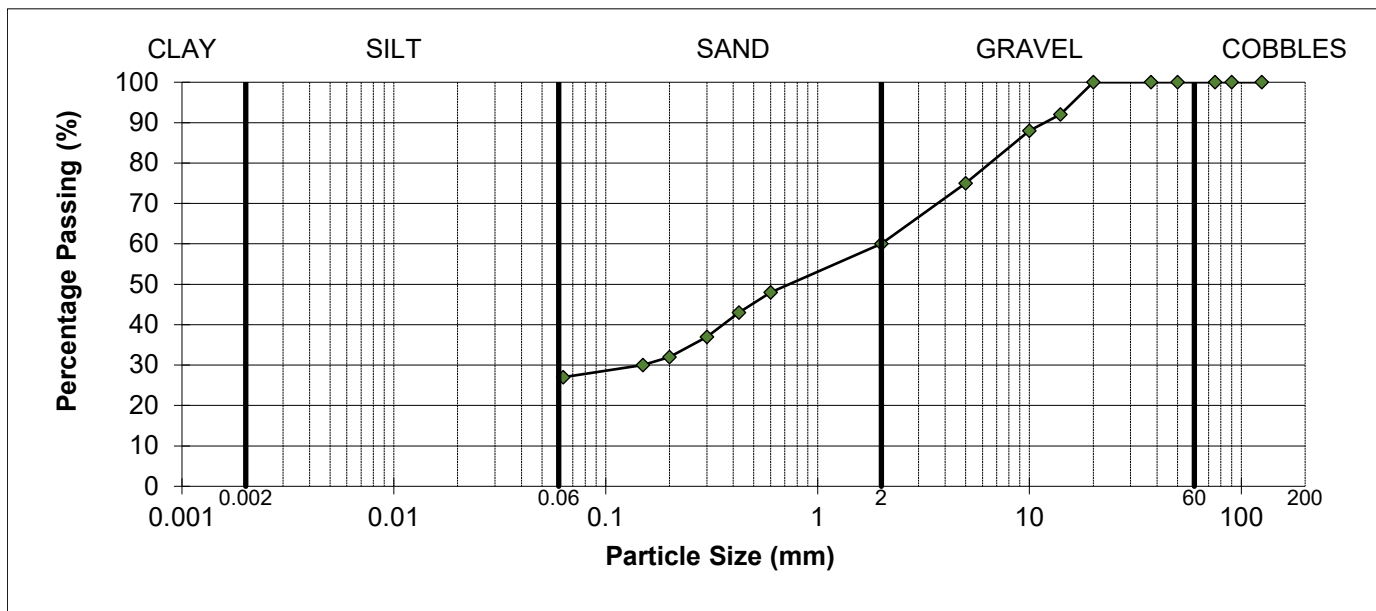
Determination of Water Content in accordance with BS EN ISO 17892-1:2014 (Oven Dry)

CLIENT	LK Consult Ltd
SITE	LKC 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE LABEL	BH1 B 1.20-1.65m	DATE SAMPLED	Not advised
LAB SAMPLE No	117783	DATE RECEIVED	17-Oct-22
DATE TESTED	18-Oct-22	SAMPLED BY	Client

MATERIAL	Dark grey silty SAND & GRAVEL
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	75	
90	100		2	60	
75	100		0.6	48	
50	100		0.425	43	
37.5	100		0.3	37	
20	100		0.2	32	
14	92		0.15	30	
10	88		0.063	27	



REMARKS

As received water content = 19.1%

SIGNED



NAME

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

DATE

01-Nov-22

TEST CERTIFICATE
PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

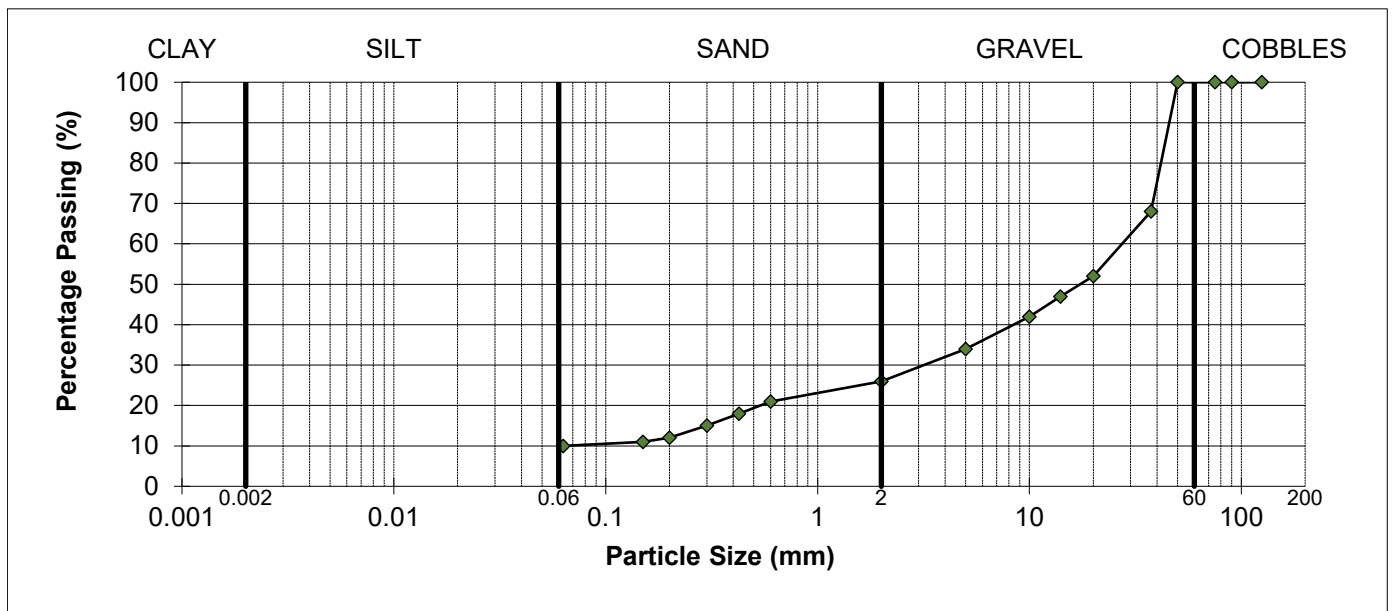
Determination of Water Content in accordance with BS EN ISO 17892-1:2014 (Oven Dry)

CLIENT	LK Consult Ltd
SITE	LKC 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE LABEL	BH2 B 1.20-1.65m	DATE SAMPLED	Not advised
LAB SAMPLE No	117784	DATE RECEIVED	17-Oct-22
DATE TESTED	18-Oct-22	SAMPLED BY	Client

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

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	34	
90	100		2	26	
75	100		0.6	21	
50	100		0.425	18	
37.5	68		0.3	15	
20	52		0.2	12	
14	47		0.15	11	
10	42		0.063	10	



REMARKS

As received water content = 10.8%

SIGNED



NAME

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

DATE

01-Nov-22

TEST CERTIFICATE
PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

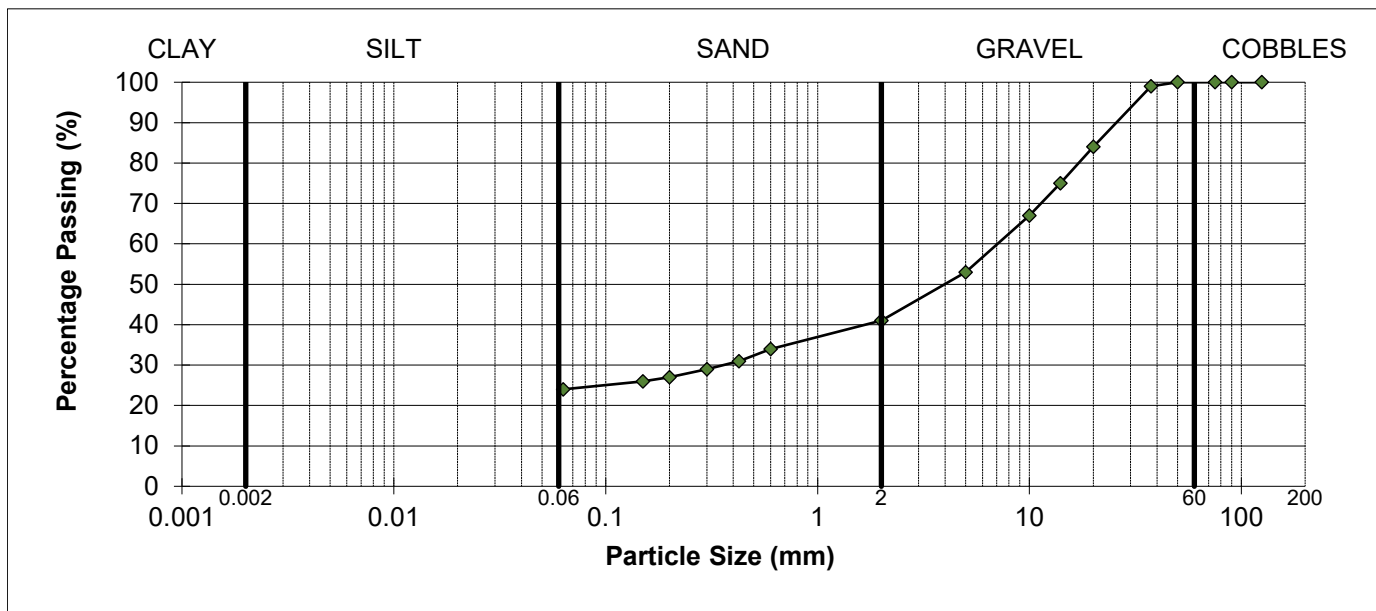
Determination of Water Content in accordance with BS EN ISO 17892-1:2014 (Oven Dry)

CLIENT	LK Consult Ltd
SITE	LKC 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE LABEL	BH3 B 3.00-3.45m	DATE SAMPLED	Not advised
LAB SAMPLE No	117785	DATE RECEIVED	17-Oct-22
DATE TESTED	18-Oct-22	SAMPLED BY	Client

MATERIAL	Dark grey silty slightly sandy GRAVEL
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	53	
90	100		2	41	
75	100		0.6	34	
50	100		0.425	31	
37.5	99		0.3	29	
20	84		0.2	27	
14	75		0.15	26	
10	67		0.063	24	



REMARKS

As received water content = 25.9%

SIGNED



NAME

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

DATE

01-Nov-22

TEST CERTIFICATE
PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

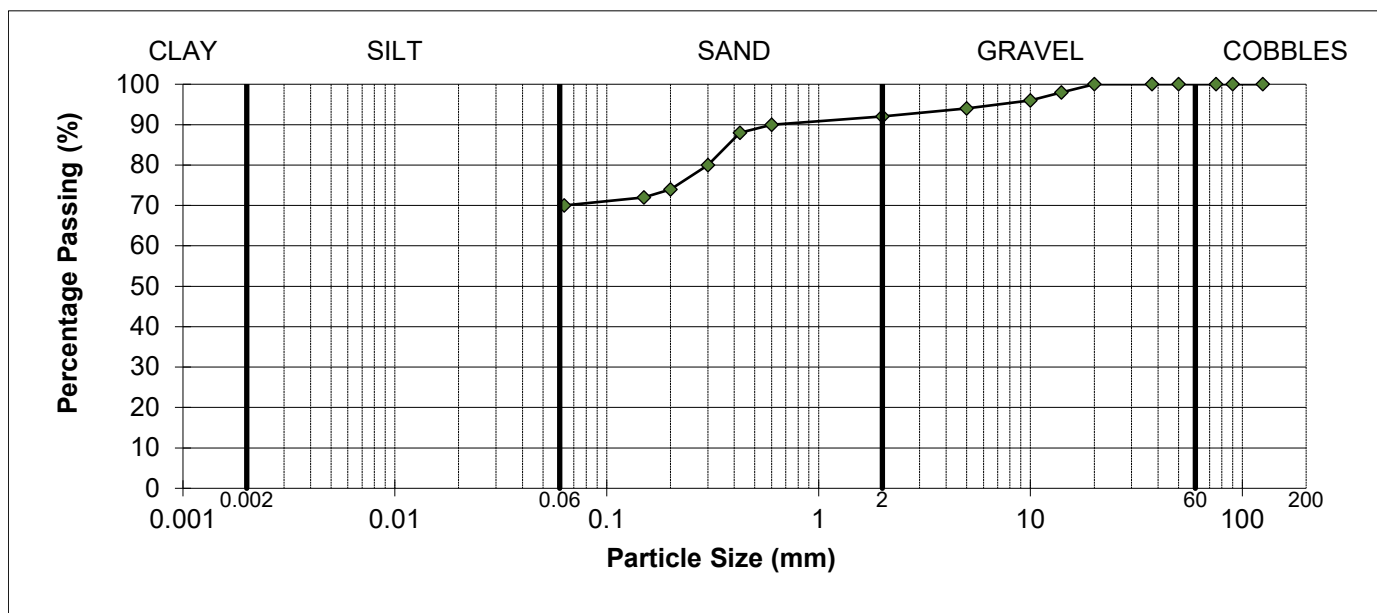
Determination of Water Content in accordance with BS EN ISO 17892-1:2014 (Oven Dry)

CLIENT	LK Consult Ltd
SITE	LKC 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE LABEL	BH3 B 18.00-18.45m	DATE SAMPLED	Not advised
LAB SAMPLE No	117786	DATE RECEIVED	17-Oct-22
DATE TESTED	18-Oct-22	SAMPLED BY	Client

MATERIAL	Stiff brown silty slightly sandy slightly gravelly CLAY
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	94	
90	100		2	92	
75	100		0.6	90	
50	100		0.425	88	
37.5	100		0.3	80	
20	100		0.2	74	
14	98		0.15	72	
10	96		0.063	70	



REMARKS

As received water content = 19.1%

SIGNED

NAME


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

DATE

01-Nov-22

TEST CERTIFICATE
PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

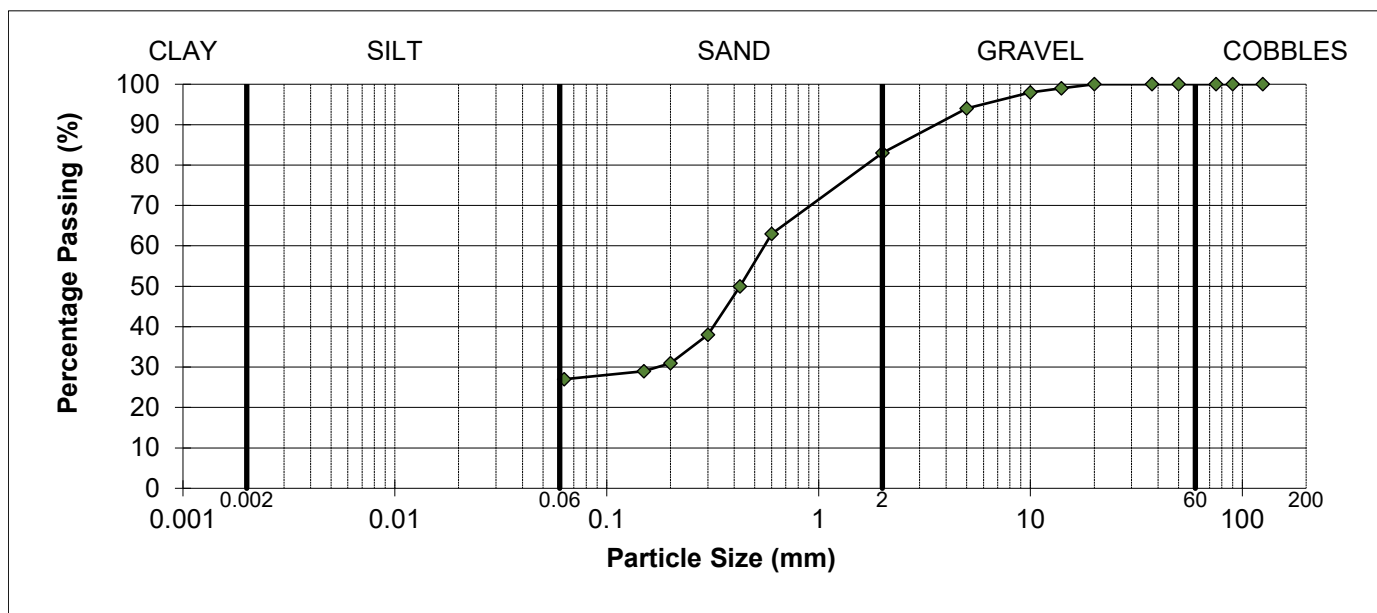
Determination of Water Content in accordance with BS EN ISO 17892-1:2014 (Oven Dry)

CLIENT	LK Consult Ltd
SITE	LKC 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE LABEL	BH5 B 15.00-15.45m	DATE SAMPLED	Not advised
LAB SAMPLE No	117787	DATE RECEIVED	17-Oct-22
DATE TESTED	18-Oct-22	SAMPLED BY	Client

MATERIAL	Grey brown silty slightly gravelly SAND
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	94	
90	100		2	83	
75	100		0.6	63	
50	100		0.425	50	
37.5	100		0.3	38	
20	100		0.2	31	
14	99		0.15	29	
10	98		0.063	27	



REMARKS

As received water content = 7.0%

SIGNED



NAME

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

DATE

01-Nov-22

TEST CERTIFICATE
PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

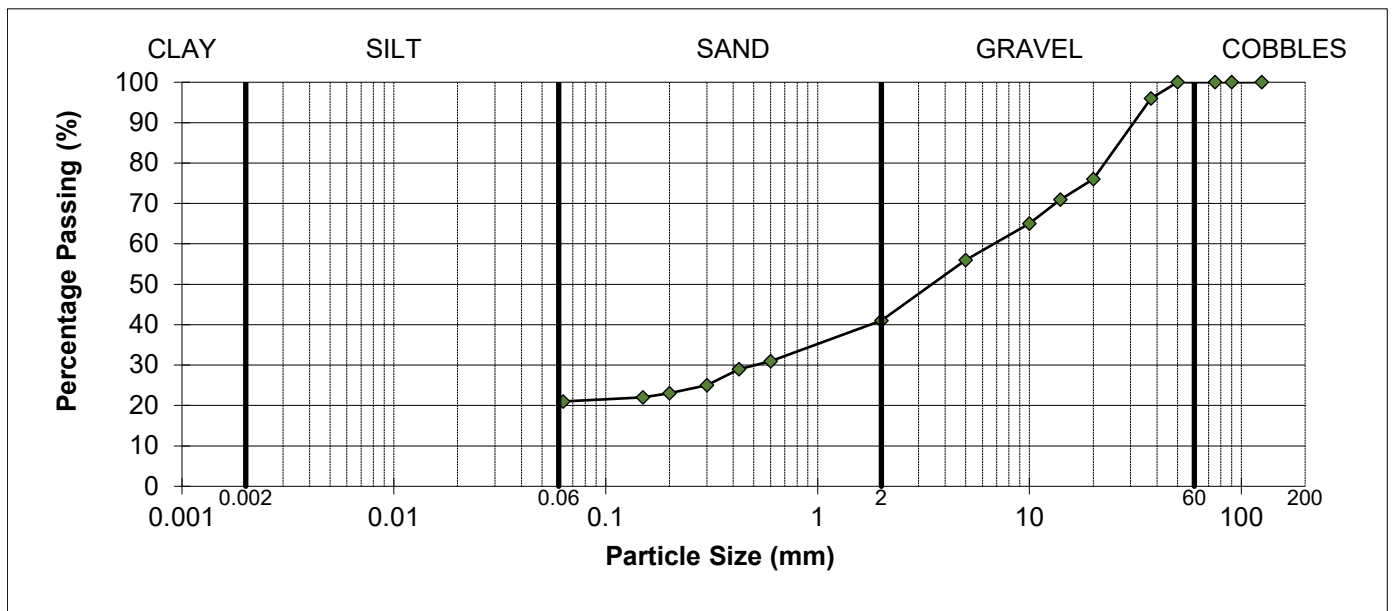
Determination of Water Content in accordance with BS EN ISO 17892-1:2014 (Oven Dry)

CLIENT	LK Consult Ltd
SITE	LKC 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE LABEL	BH6 B 0.50-1.20m	DATE SAMPLED	Not advised
LAB SAMPLE No	117788	DATE RECEIVED	17-Oct-22
DATE TESTED	18-Oct-22	SAMPLED BY	Client

MATERIAL	Brown silty slightly sandy GRAVEL
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	56	
90	100		2	41	
75	100		0.6	31	
50	100		0.425	29	
37.5	96		0.3	25	
20	76		0.2	23	
14	71		0.15	22	
10	65		0.063	21	



REMARKS

As received water content = 14.5%

SIGNED



NAME

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

DATE

01-Nov-22

TEST CERTIFICATE
PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

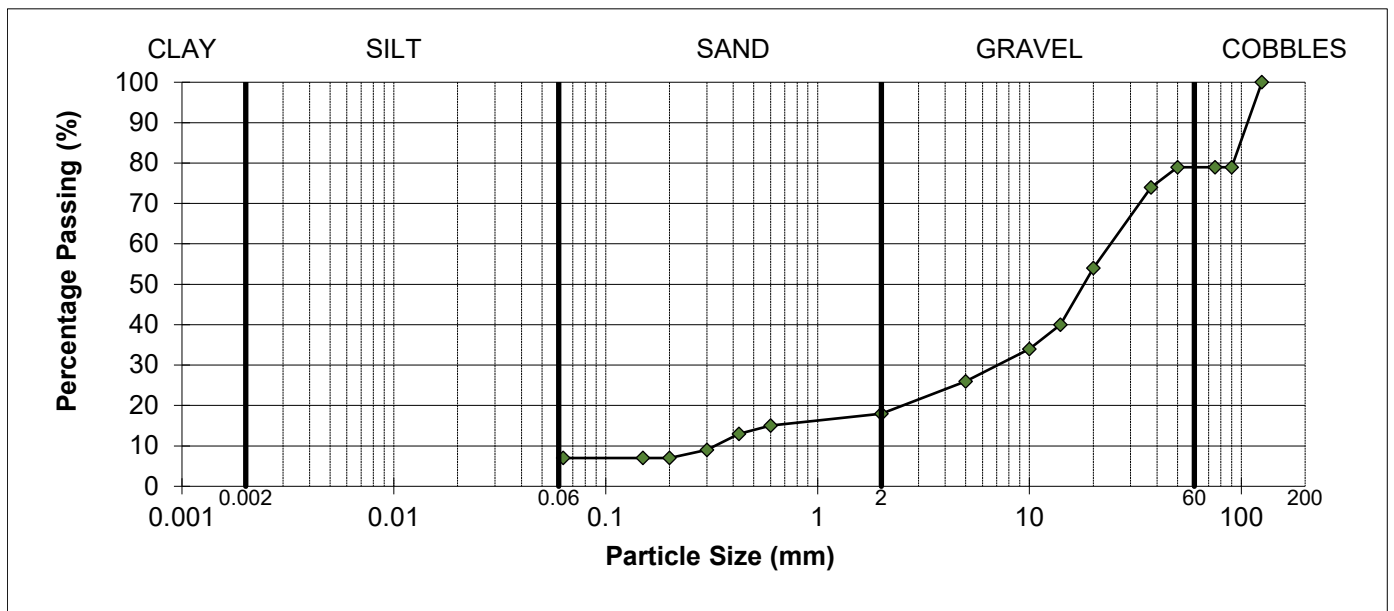
Determination of Water Content in accordance with BS EN ISO 17892-1:2014 (Oven Dry)

CLIENT	LK Consult Ltd
SITE	LKC 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE LABEL	BH6 B 18.00-18.45m	DATE SAMPLED	Not advised
LAB SAMPLE No	117789	DATE RECEIVED	17-Oct-22
DATE TESTED	18-Oct-22	SAMPLED BY	Client

MATERIAL	Brown silty slightly sandy GRAVEL with occasional cobbles
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	26	
90	79		2	18	
75	79		0.6	15	
50	79		0.425	13	
37.5	74		0.3	9	
20	54		0.2	7	
14	40		0.15	7	
10	34		0.063	7	



REMARKS

As received water content = 7.1%

SIGNED



NAME

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

DATE

01-Nov-22

TEST CERTIFICATE
PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

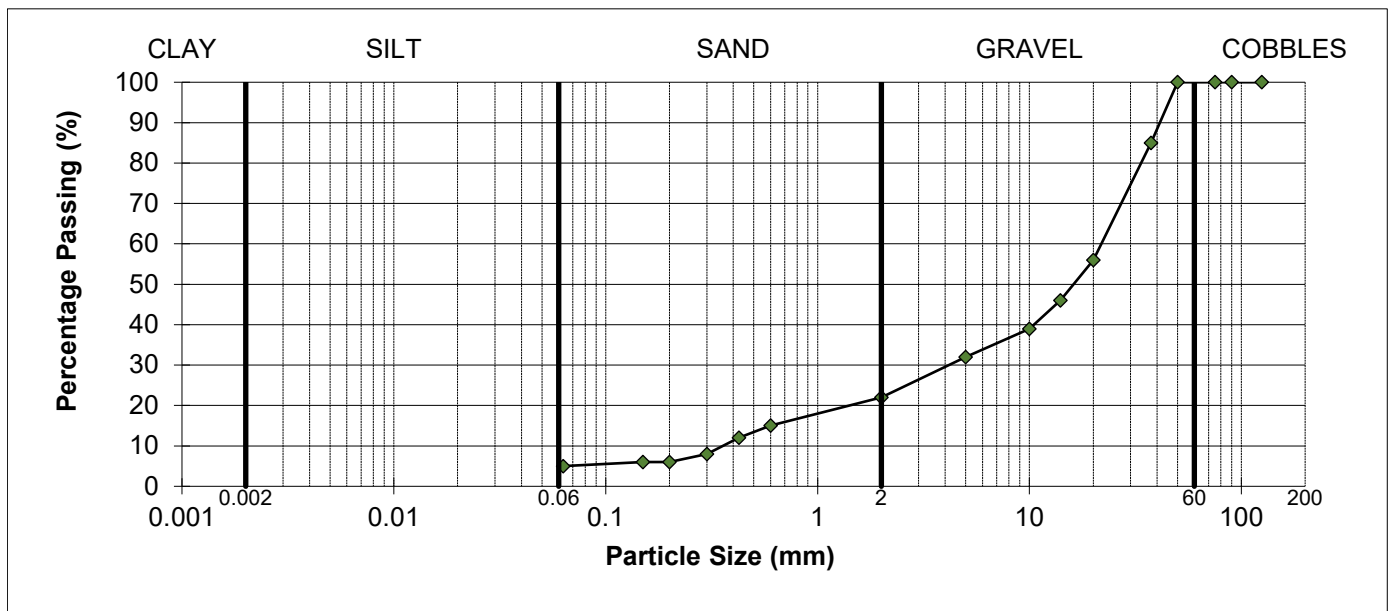
Determination of Water Content in accordance with BS EN ISO 17892-1:2014 (Oven Dry)

CLIENT	LK Consult Ltd
SITE	LKC 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE LABEL	BH6 B 21.00-21.45m	DATE SAMPLED	Not advised
LAB SAMPLE No	117790	DATE RECEIVED	17-Oct-22
DATE TESTED	18-Oct-22	SAMPLED BY	Client

MATERIAL	Brown silty slightly sandy GRAVEL
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	32	
90	100		2	22	
75	100		0.6	15	
50	100		0.425	12	
37.5	85		0.3	8	
20	56		0.2	6	
14	46		0.15	6	
10	39		0.063	5	



REMARKS

As received water content = 7.1%

SIGNED



NAME

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

DATE

01-Nov-22

MURRAY RIX

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



TEST CERTIFICATE

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

PLASTIC LIMIT BS EN ISO 17892-12:2018+A1:2021 Clause 5.5

WATER CONTENT METHOD BS EN ISO 17892-1:2014

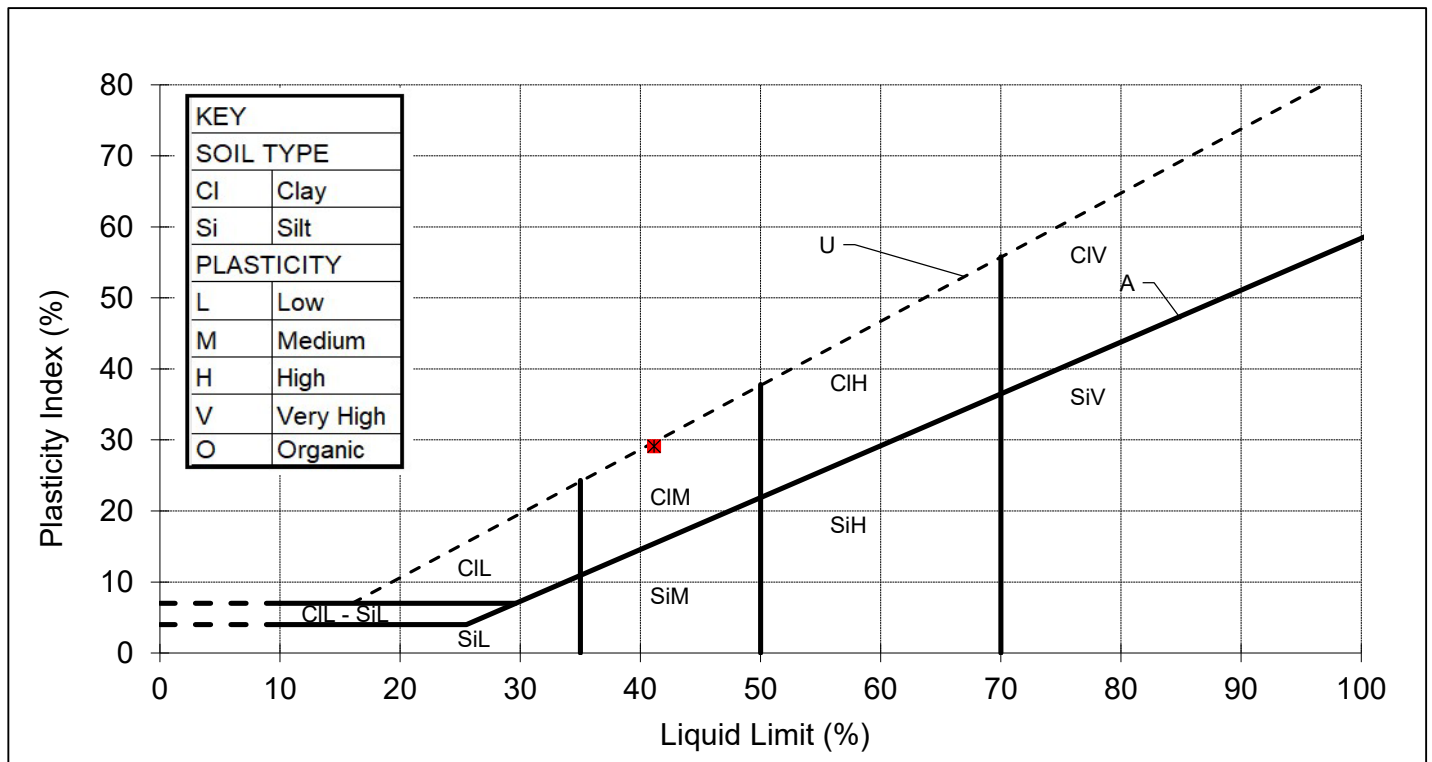
CLIENT	LK Consult Ltd
SITE	LKC 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE LABEL	WS104 D 2.50-3.00m	DATE SAMPLED	Not advised
SAMPLE No.	117775	DATE RECEIVED	17-Oct-22
DATE TESTED	28-Oct-22	SAMPLED BY	Client

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

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	19.5	40.7	1.008	
Determination 2 (avg)	19.7	40.9		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
14.5	41	12	29	100



REMARKS

SIGNED

NAME

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

DATE

01-Nov-22

MURRAY RIX

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



TEST CERTIFICATE

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

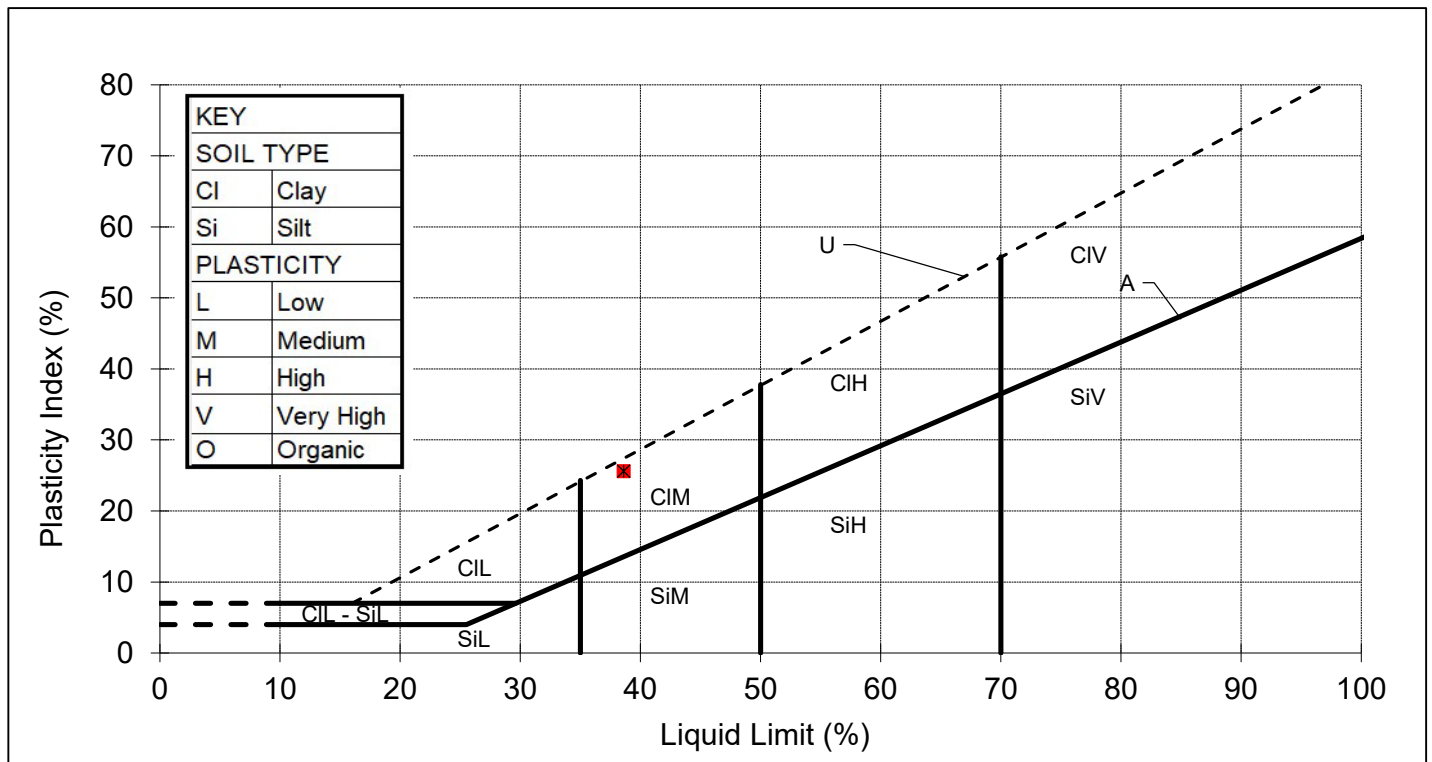
CLIENT	LK Consult Ltd
SITE	LKC 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE LABEL	WS105 D 3.50-4.00m	DATE SAMPLED	Not advised
SAMPLE No.	117776	DATE RECEIVED	17-Oct-22
DATE TESTED	28-Oct-22	SAMPLED BY	Client

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

Test Readings mm (average)	Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	20.1	38.5	
Determination 2 (avg)	20.8	39.2	

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
17.8	39	13	26	100



REMARKS

SIGNED

NAME

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

DATE

01-Nov-22

MURRAY RIX

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



TEST CERTIFICATE

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

PLASTIC LIMIT BS EN ISO 17892-12:2018+A1:2021 Clause 5.5

WATER CONTENT METHOD BS EN ISO 17892-1:2014

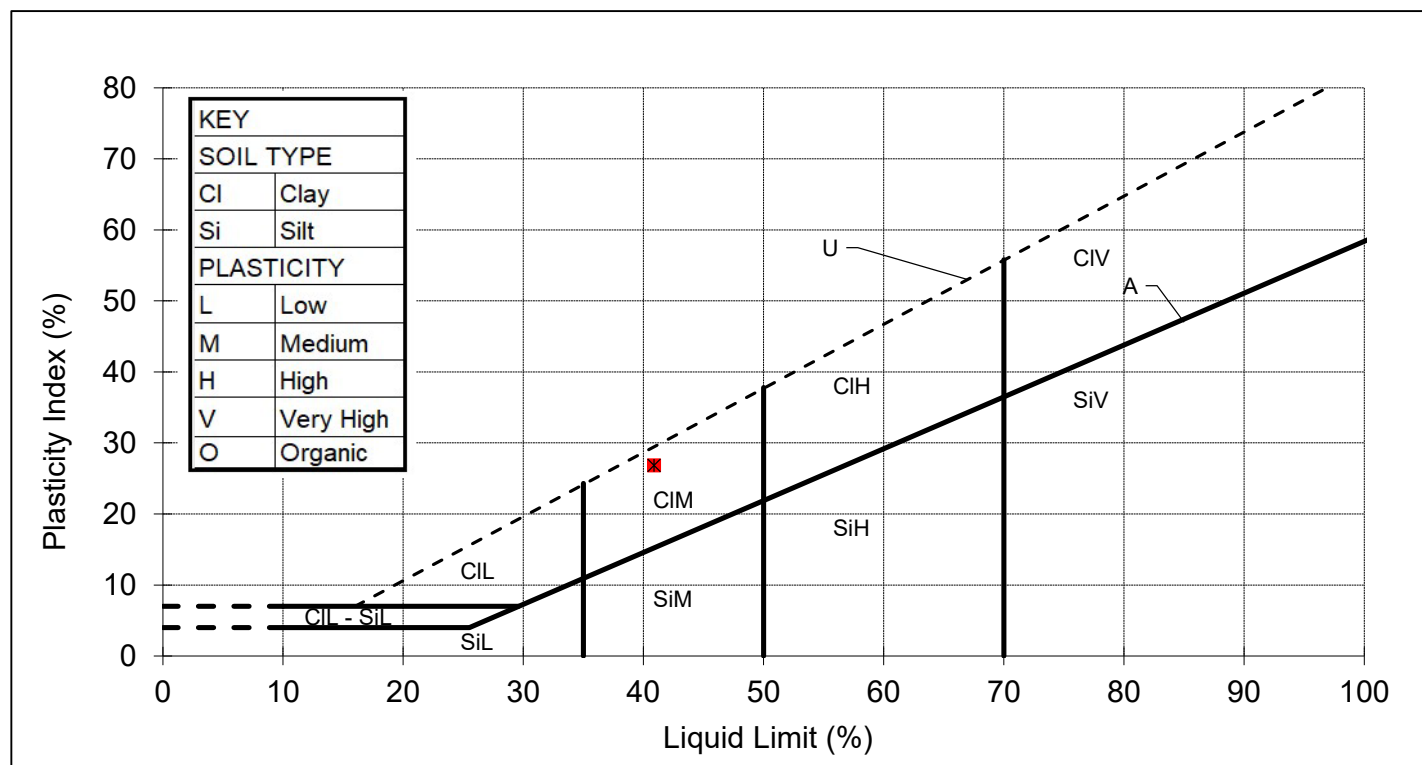
CLIENT	LK Consult Ltd
SITE	LKC 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE LABEL	WS107 D 2.00-2.45m	DATE SAMPLED	Not advised
SAMPLE No.	117777	DATE RECEIVED	17-Oct-22
DATE TESTED	28-Oct-22	SAMPLED BY	Client

MATERIAL	Soft brown silty slightly sandy CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Hand Picked

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	18.7	39.8	1.028	
Determination 2 (avg)	18.2	39.7		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
30.0	41	14	27	99



REMARKS

SIGNED

NAME

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

DATE

01-Nov-22

MURRAY RIX

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



TEST CERTIFICATE

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

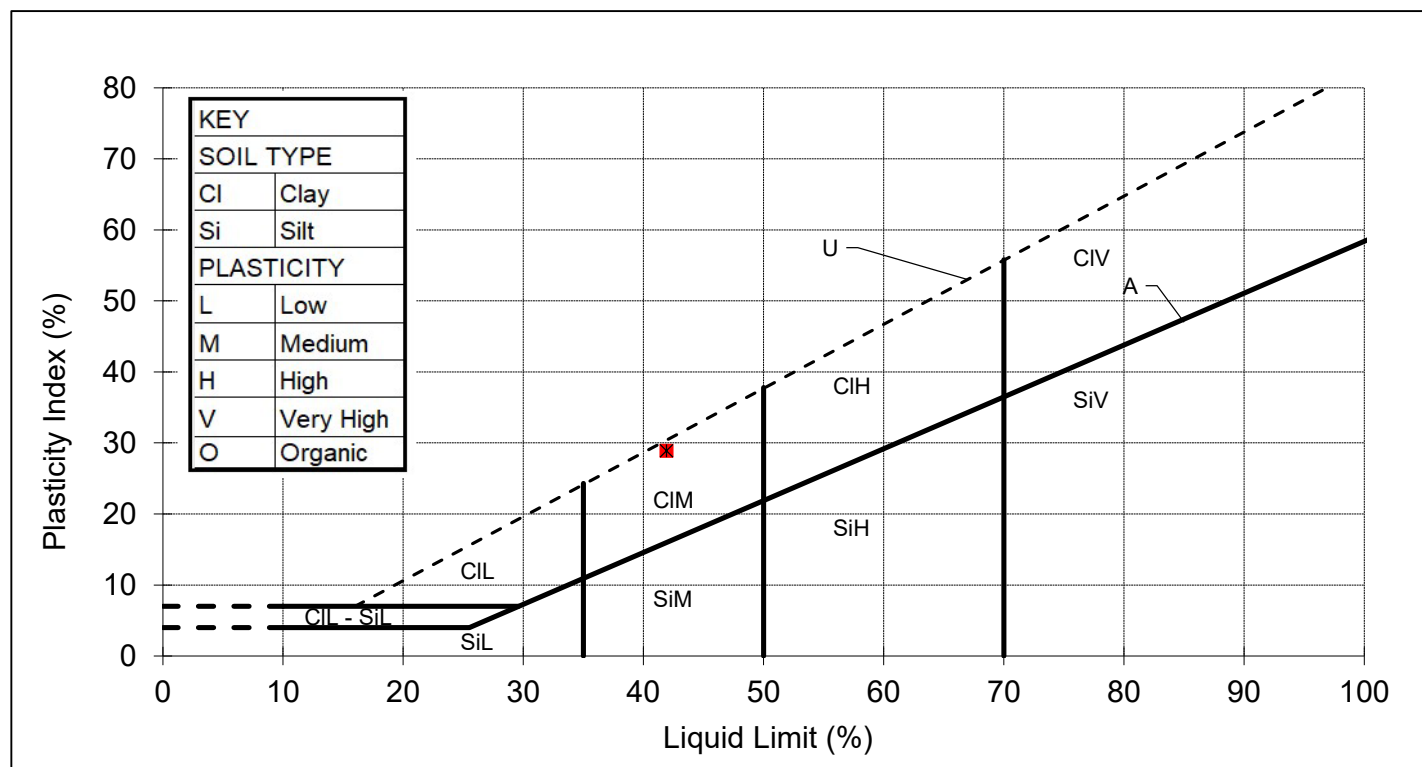
CLIENT	LK Consult Ltd
SITE	LKC 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE LABEL	BH1 B 3.00-3.45m	DATE SAMPLED	Not advised
SAMPLE No.	117778	DATE RECEIVED	17-Oct-22
DATE TESTED	28-Oct-22	SAMPLED BY	Client

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

Test Readings mm (average)	Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	19.2	41.1	
Determination 2 (avg)	19.3	41.5	

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
20.9	42	13	29	100



REMARKS

SIGNED

NAME

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

DATE

01-Nov-22

MURRAY RIX

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



TEST CERTIFICATE

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

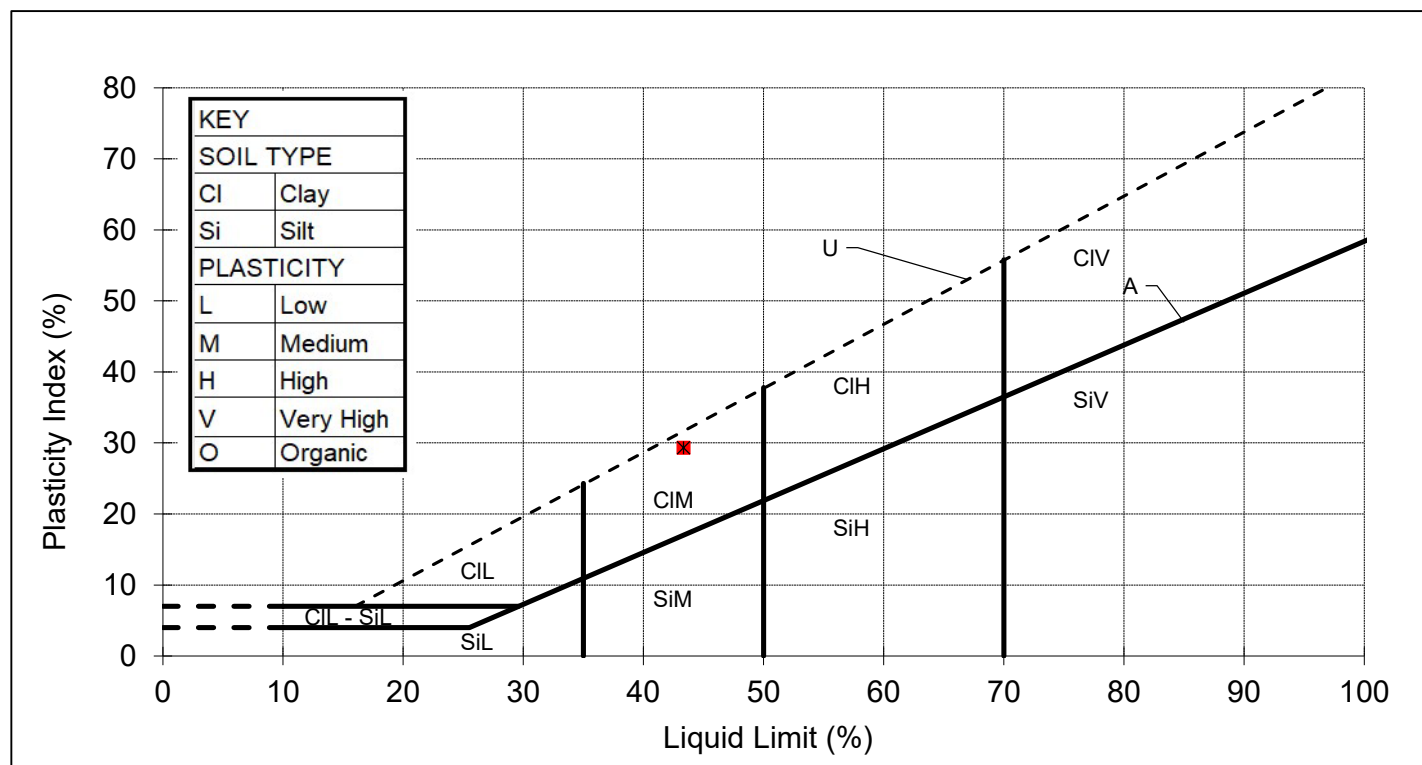
CLIENT	LK Consult Ltd
SITE	LKC 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE LABEL	BH5 B 3.00-3.45m	DATE SAMPLED	Not advised
SAMPLE No.	117779	DATE RECEIVED	17-Oct-22
DATE TESTED	28-Oct-22	SAMPLED BY	Client

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

Test Readings mm (average)	Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	18.8	42.8	
Determination 2 (avg)	19.1	42.5	

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
19.5	43	14	29	98



REMARKS

SIGNED

NAME

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

DATE

01-Nov-22

MURRAY RIX

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



TEST CERTIFICATE

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

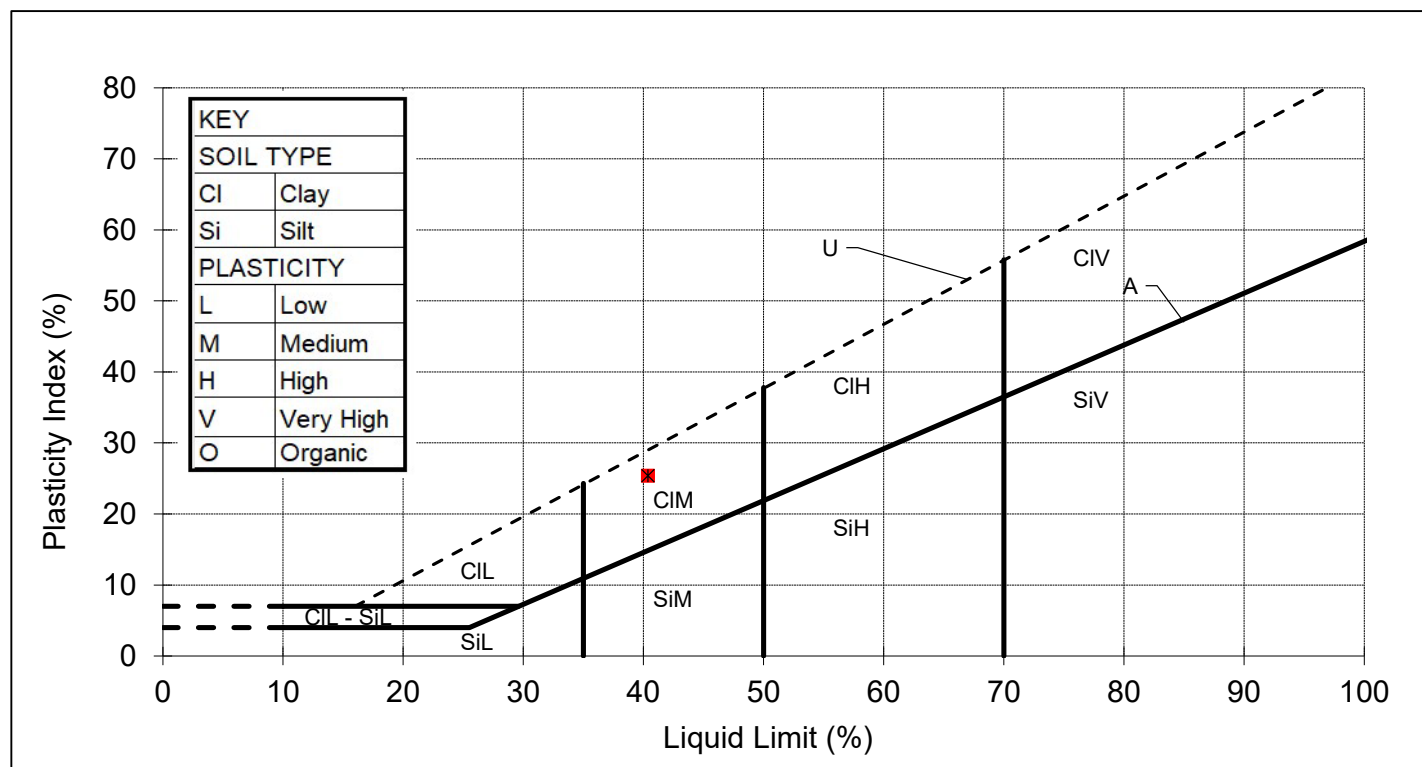
CLIENT	LK Consult Ltd
SITE	LKC 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE LABEL	BH6 B 3.00-3.45m	DATE SAMPLED	Not advised
SAMPLE No.	117780	DATE RECEIVED	17-Oct-22
DATE TESTED	28-Oct-22	SAMPLED BY	Client

MATERIAL	Firm brown silty slightly sandy CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Hand Picked

Test Readings mm (average)	Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	21.1	41.1	
Determination 2 (avg)	20.5	40.7	

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
24.7	40	15	25	100



REMARKS

SIGNED

NAME

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

DATE

01-Nov-22

MURRAY RIX

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



TEST CERTIFICATE

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

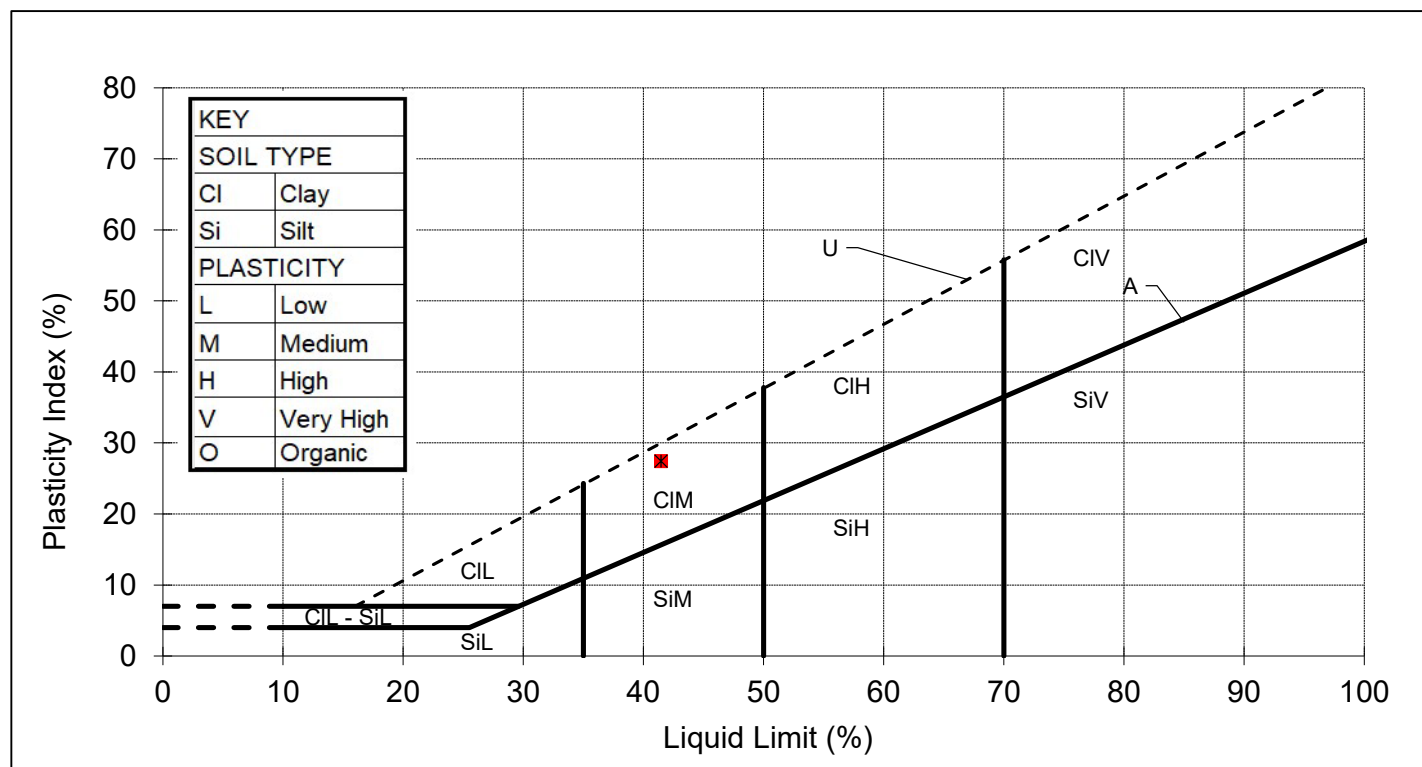
CLIENT	LK Consult Ltd
SITE	LKC 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE LABEL	BH8 B 3.00-3.60m	DATE SAMPLED	Not advised
SAMPLE No.	117781	DATE RECEIVED	17-Oct-22
DATE TESTED	28-Oct-22	SAMPLED BY	Client

MATERIAL	Firm brown silty slightly sandy CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Hand Picked

Test Readings mm (average)	Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	18.1	40.0	
Determination 2 (avg)	18.1	40.0	

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
24.6	41	14	27	99



REMARKS

SIGNED

NAME

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

DATE

01-Nov-22

MURRAY RIX

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



TEST CERTIFICATE

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

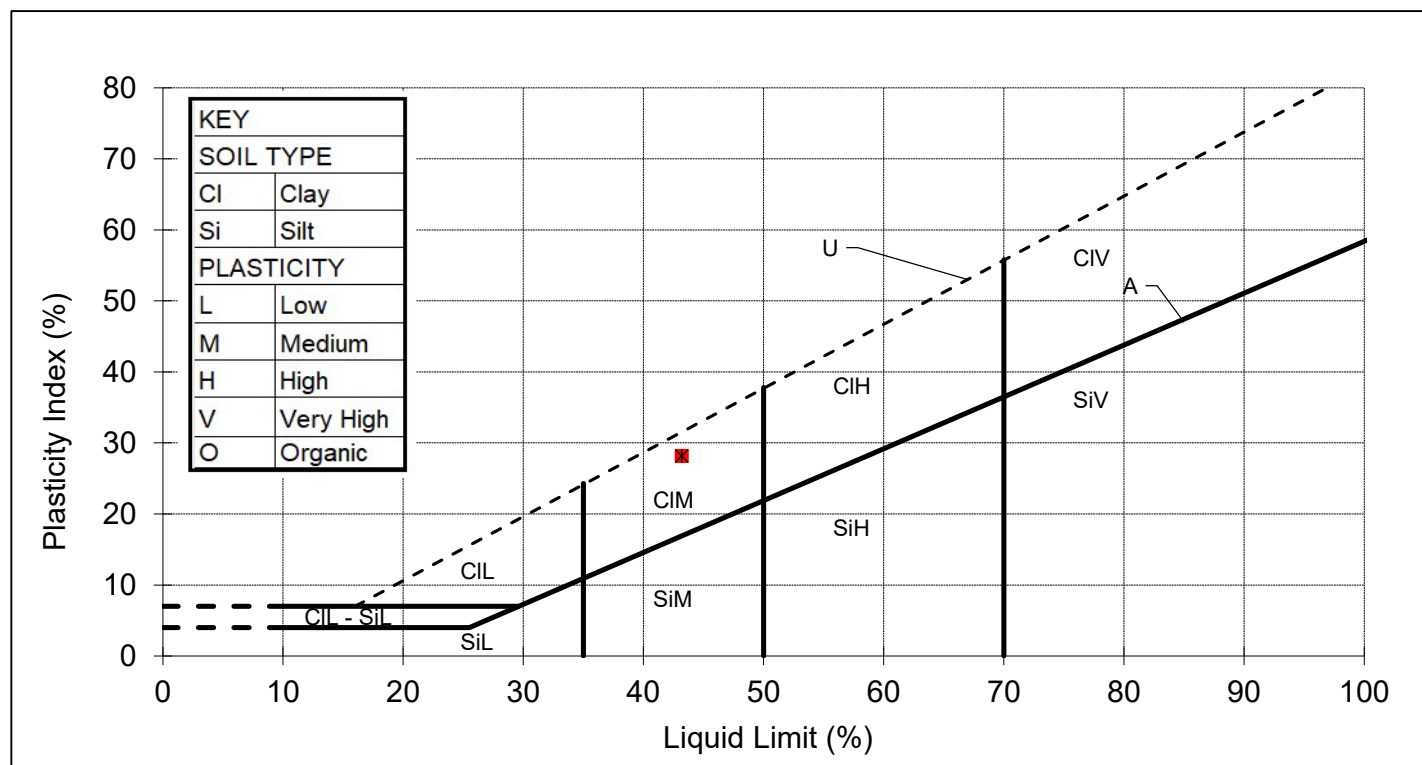
CLIENT	LK Consult Ltd
SITE	LKC 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE LABEL	BH8 B 4.00-4.45m	DATE SAMPLED	Not advised
SAMPLE No.	117782	DATE RECEIVED	17-Oct-22
DATE TESTED	28-Oct-22	SAMPLED BY	Client

MATERIAL	Firm to stiff brown silty slightly sandy CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Hand Picked

Test Readings mm (average)	Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	19.5	42.8	
Determination 2 (avg)	19.5	42.7	

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
23.1	43	15	28	95



REMARKS

SIGNED

NAME

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

DATE

01-Nov-22

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

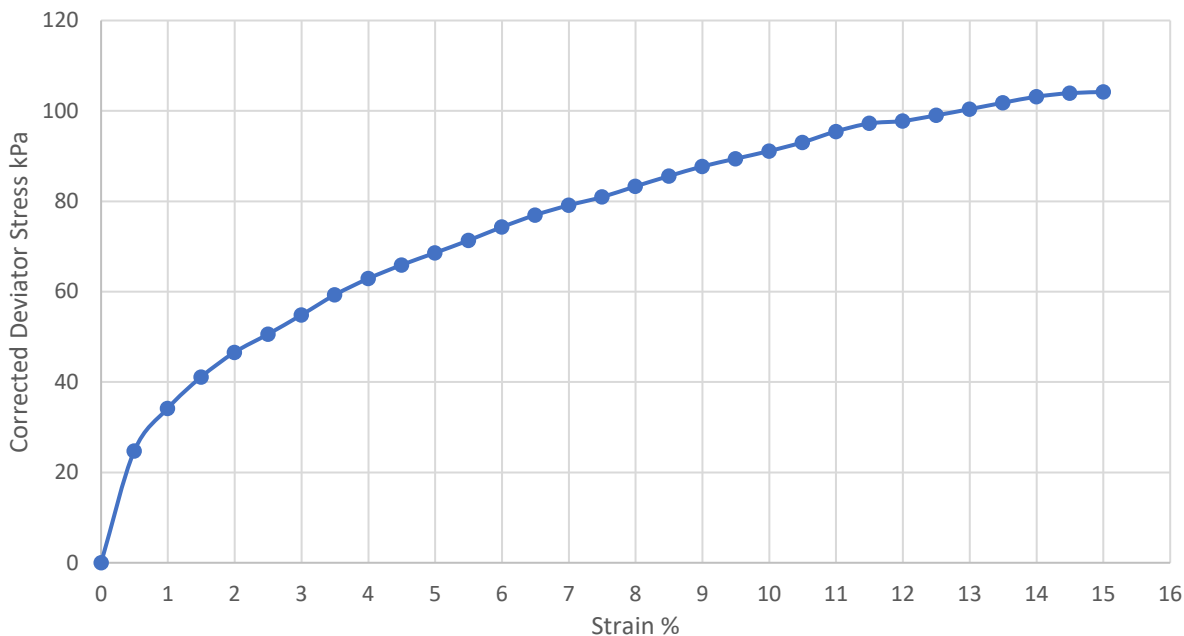
CLIENT	LK Consult Ltd
SITE	LKC 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE LABEL	BH1 U 0.50-13.95m	DATE SAMPLED	Not advised
LAB SAMPLE No.	117765	DATE RECEIVED	17-Oct-22
DATE TESTED	19-Oct-22	SAMPLED BY	Client
MATERIAL	Firm brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample		

INITIAL CONDITIONS

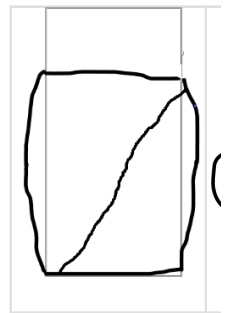
Specimen Location		Sample Length (mm)	400	Specimen depth from top of Sample (mm)	100
		Sample Orientation	Vertical	Specimen Condition	Undisturbed
		Specimen Length (mm)	202	Specimen Water Content (%)	22.4
		Specimen Diameter (mm)	100	Specimen Bulk Density (Mg/m3)	2.30
		Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	1.88
		Membrane Correction	3.39		

CORRECTED DEVIATOR STRESS vs AXIAL STRAIN



TEST TYPE
SINGLE STAGE

SKETCH OF SPECIMEN AT FAILURE



COMBINED

Cell Pressure (kPa)	Failure Strain (%)	Rate of Strain (%/min)	Corrected Deviator Stress (kPa)	Shear Strength Cu (kPa)
275	15.0	2.0	104	52

Remarks/Abnormalities

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

Signed



Date 01 November 2022

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

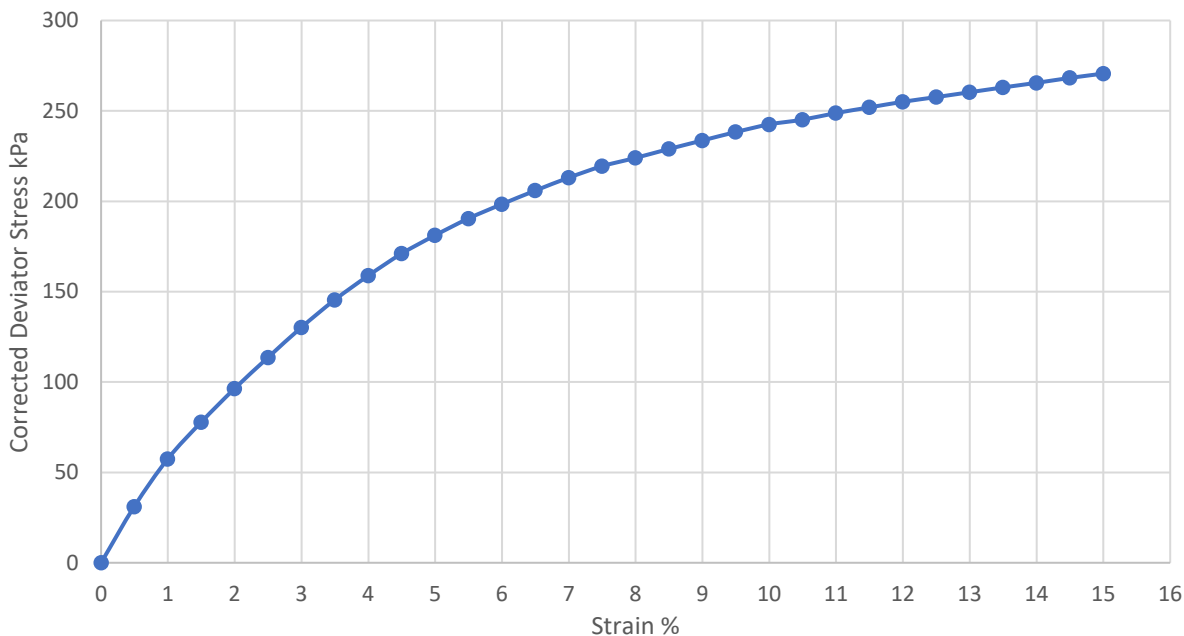
CLIENT	LK Consult Ltd
SITE	LKC 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE LABEL	BH2 U 12.00-12.45m	DATE SAMPLED	Not advised
LAB SAMPLE No.	117766	DATE RECEIVED	17-Oct-22
DATE TESTED	24-Oct-22	SAMPLED BY	Client
MATERIAL	Stiff brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample		

INITIAL CONDITIONS

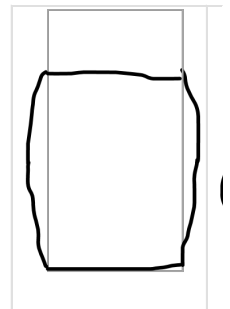
Specimen Location		Sample Length (mm)	385	Specimen depth from top of Sample (mm)	95
		Sample Orientation	Vertical	Specimen Condition	Undisturbed
		Specimen Length (mm)	201	Specimen Water Content (%)	12.9
		Specimen Diameter (mm)	101	Specimen Bulk Density (Mg/m3)	2.30
		Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	2.04
		Membrane Correction	3.40		

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)
245	15.0	2.0	271	135

Remarks/Abnormalities

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

Signed



Date 01 November 2022

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

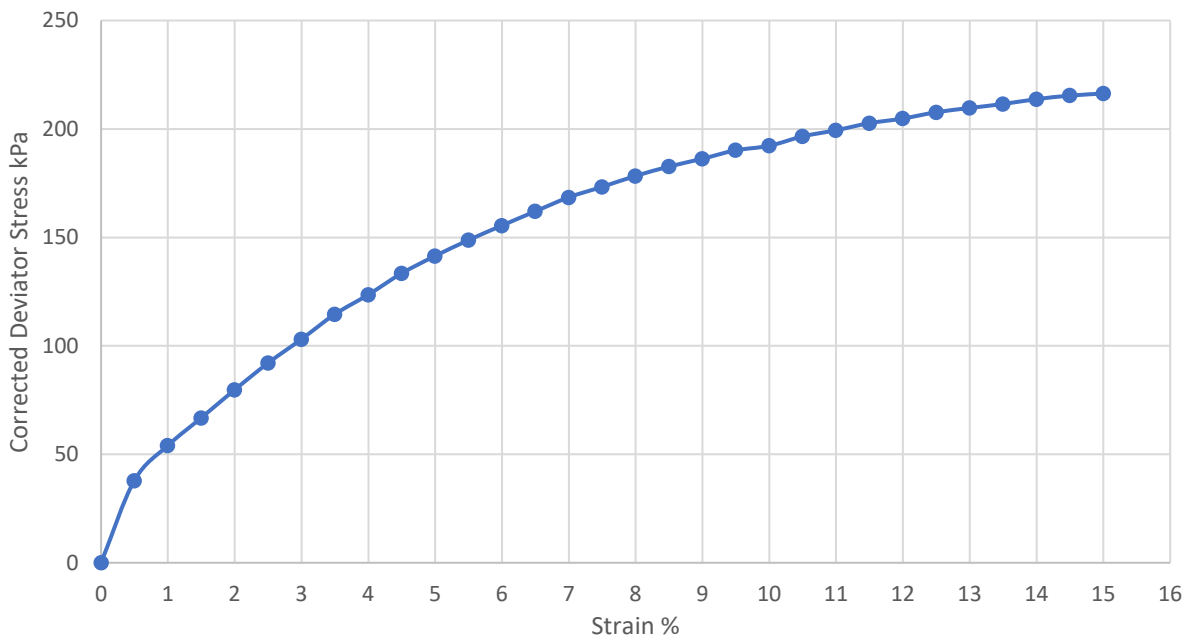
CLIENT	LK Consult Ltd
SITE	LKC 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE LABEL	BH3 U 5.00-5.45m	DATE SAMPLED	Not advised
LAB SAMPLE No.	117767	DATE RECEIVED	17-Oct-22
DATE TESTED	24-Oct-22	SAMPLED BY	Client
MATERIAL	Stiff brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample		

INITIAL CONDITIONS

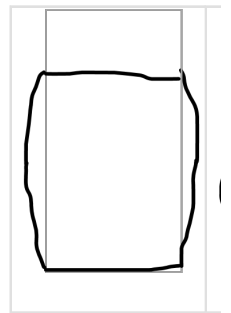
Specimen Location		Sample Length (mm)	385	Specimen depth from top of Sample (mm)	95
		Sample Orientation	Vertical	Specimen Condition	Undisturbed
		Specimen Length (mm)	204	Specimen Water Content (%)	16.4
		Specimen Diameter (mm)	102	Specimen Bulk Density (Mg/m3)	2.09
		Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	1.80
		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)
105	15.0	2.0	216	108

Remarks/Abnormalities

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

Signed



Date 01 November 2022

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

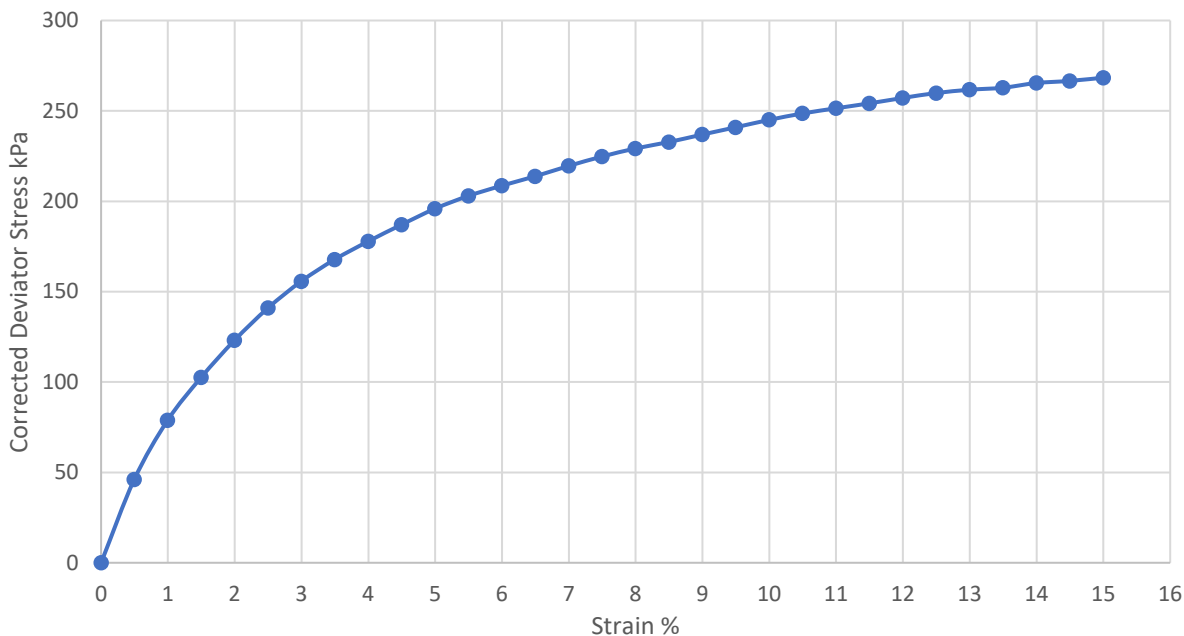
CLIENT	LK Consult Ltd
SITE	LKC 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE LABEL	BH3 U 19.50-19.95m	DATE SAMPLED	Not advised
LAB SAMPLE No.	117768	DATE RECEIVED	17-Oct-22
DATE TESTED	24-Oct-22	SAMPLED BY	Client
MATERIAL	Stiff brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample		

INITIAL CONDITIONS

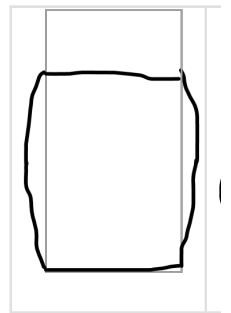
Specimen Location		Sample Length (mm)	350	Specimen depth from top of Sample (mm)	50
		Sample Orientation	Vertical	Specimen Condition	Undisturbed
		Specimen Length (mm)	203	Specimen Water Content (%)	17.3
		Specimen Diameter (mm)	101	Specimen Bulk Density (Mg/m3)	2.11
		Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	1.80
		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)
395	15.0	2.0	268	134

Remarks/Abnormalities

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

Signed



Date 01 November 2022

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

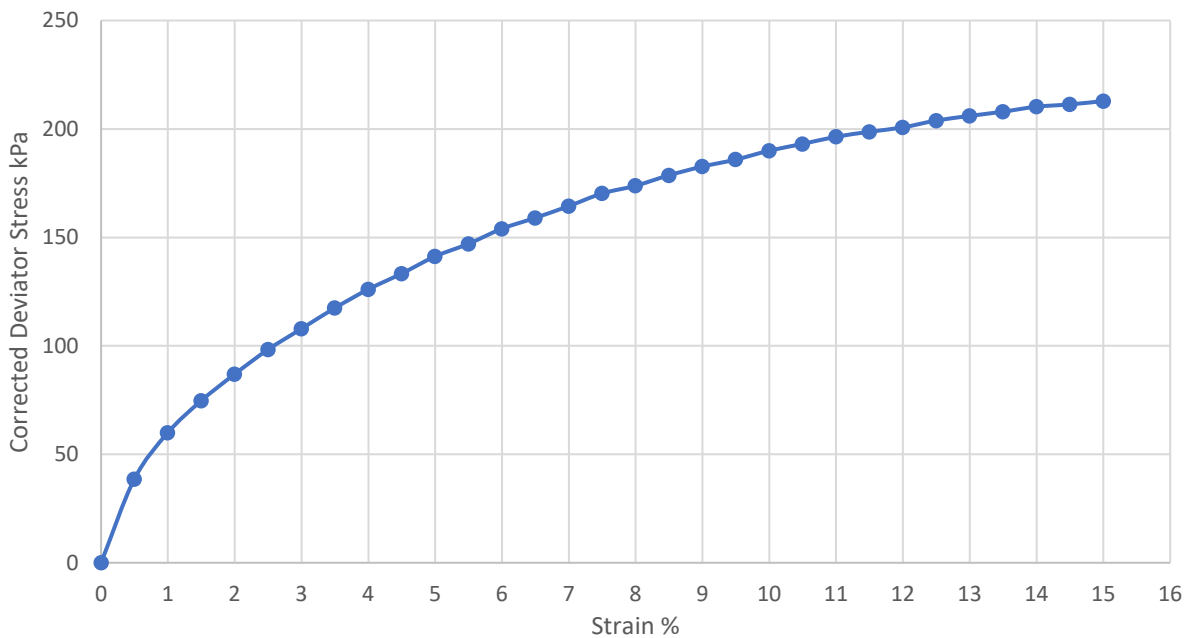
CLIENT	LK Consult Ltd
SITE	LKC 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE LABEL	BH5 U 9.00-9.45m	DATE SAMPLED	Not advised
LAB SAMPLE No.	117769	DATE RECEIVED	17-Oct-22
DATE TESTED	24-Oct-22	SAMPLED BY	Client
MATERIAL	Stiff brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample		

INITIAL CONDITIONS

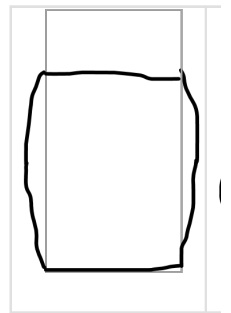
Specimen Location		Sample Length (mm)	375	Specimen depth from top of Sample (mm)	115
		Sample Orientation	Vertical	Specimen Condition	Undisturbed
		Specimen Length (mm)	200	Specimen Water Content (%)	13.6
		Specimen Diameter (mm)	100	Specimen Bulk Density (Mg/m3)	2.22
		Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	1.95
		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)
185	15.0	2.0	213	106

Remarks/Abnormalities

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

Signed



Date 01 November 2022

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

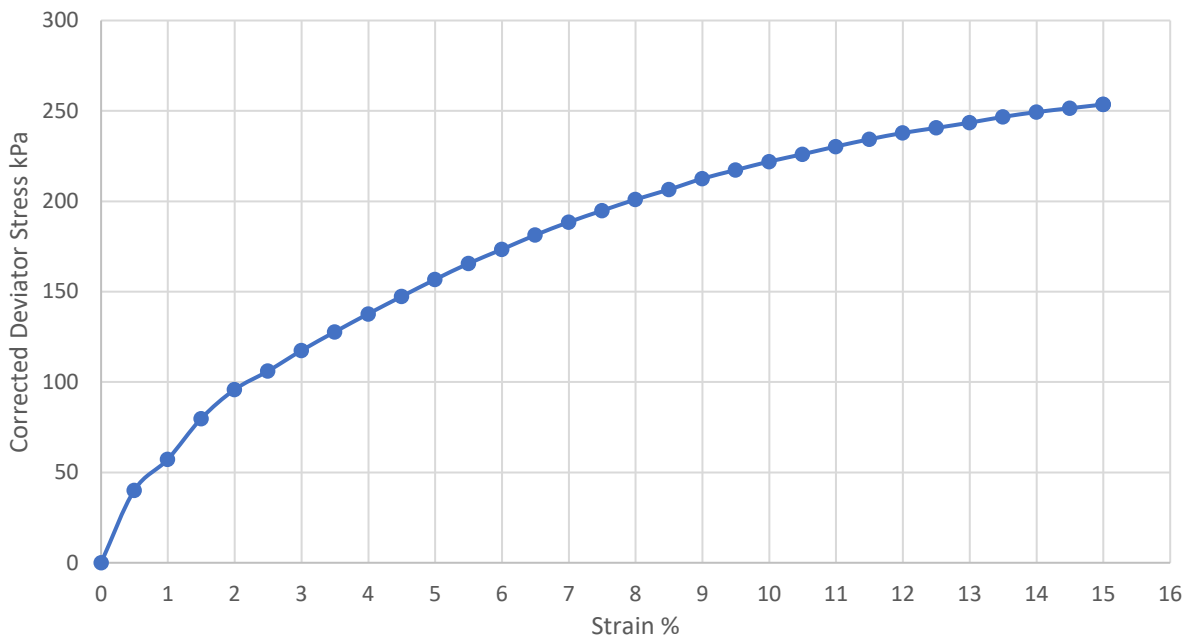
CLIENT	LK Consult Ltd
SITE	LKC 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE LABEL	BH5 U 13.50-13.95m	DATE SAMPLED	Not advised
LAB SAMPLE No.	117770	DATE RECEIVED	17-Oct-22
DATE TESTED	24-Oct-22	SAMPLED BY	Client
MATERIAL	Stiff brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample		

INITIAL CONDITIONS

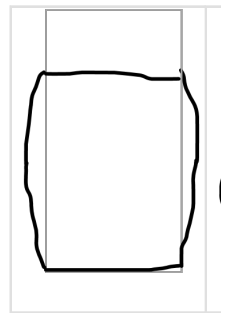
Specimen Location		Sample Length (mm)	450	Specimen depth from top of Sample (mm)	45
		Sample Orientation	Vertical	Specimen Condition	Undisturbed
		Specimen Length (mm)	204	Specimen Water Content (%)	13.6
		Specimen Diameter (mm)	101	Specimen Bulk Density (Mg/m3)	2.16
		Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	1.90
		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)
275	15.0	2.0	254	127

Remarks/Abnormalities

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

Signed



Date 01 November 2022

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

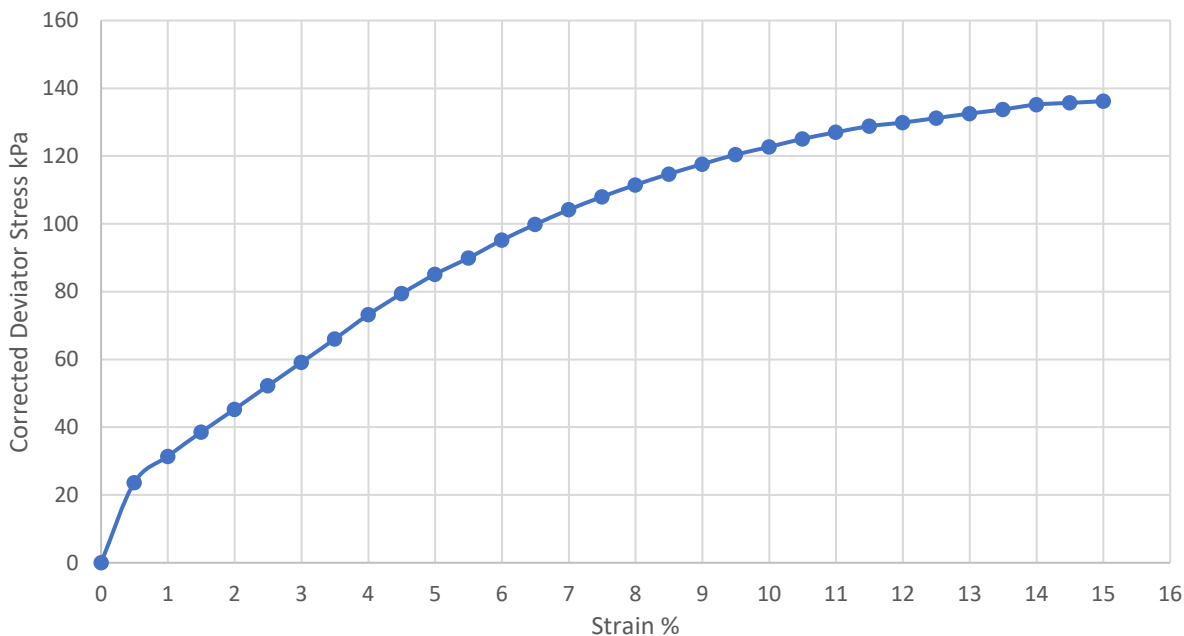
CLIENT	LK Consult Ltd
SITE	LKC 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE LABEL	BH8 U 13.50-13.95m	DATE SAMPLED	Not advised
LAB SAMPLE No.	117771	DATE RECEIVED	17-Oct-22
DATE TESTED	24-Oct-22	SAMPLED BY	Client
MATERIAL	Stiff brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample		

INITIAL CONDITIONS

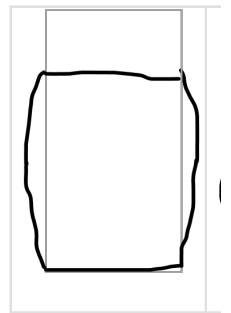
Specimen Location		Sample Length (mm)	450	Specimen depth from top of Sample (mm)	25
		Sample Orientation	Vertical	Specimen Condition	Undisturbed
		Specimen Length (mm)	203	Specimen Water Content (%)	15.5
		Specimen Diameter (mm)	101	Specimen Bulk Density (Mg/m3)	2.22
		Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	1.92
		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)
275	15.0	2.0	136	68

Remarks/Abnormalities

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

Signed



Date 01 November 2022

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

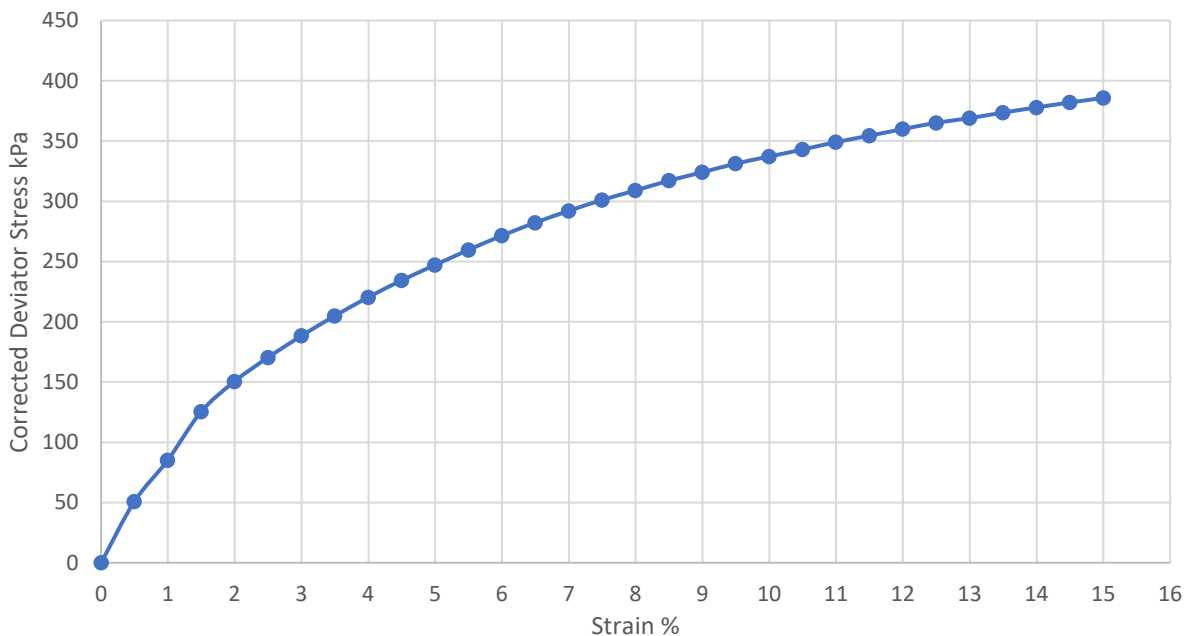
CLIENT	LK Consult Ltd
SITE	LKC 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE LABEL	BH8 U 16.50-16.95m	DATE SAMPLED	Not advised
LAB SAMPLE No.	117772	DATE RECEIVED	17-Oct-22
DATE TESTED	24-Oct-22	SAMPLED BY	Client
MATERIAL	Stiff brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample		

INITIAL CONDITIONS

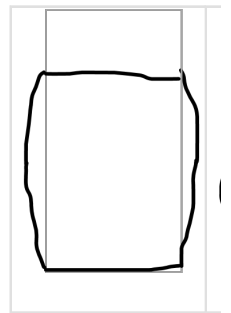
Specimen Location		Sample Length (mm)	370	Specimen depth from top of Sample (mm)	10
		Sample Orientation	Vertical	Specimen Condition	Undisturbed
		Specimen Length (mm)	202	Specimen Water Content (%)	12.7
		Specimen Diameter (mm)	102	Specimen Bulk Density (Mg/m3)	2.23
		Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	1.98
		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)
335	15.0	2.0	386	193

Remarks/Abnormalities

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

Signed



Date 01 November 2022

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
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 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE REFERENCE	BH6 31.25	DATE RECEIVED	17-Oct-22
SAMPLE NUMBER	117773A	DATE SAMPLED	Not advised
DATE TESTED	24-Oct-22	SAMPLED BY	Client

DIMENSIONS

TESTED BY	MR	DIAMETER (mm)	90
LENGTH AFTER PREPARATION (mm)	180	LENGTH/DIAMETER RATIO	2.00

METHOD OF END PREPARATION	Saw / Grinding	TIME IN WATER PRIOR TO TEST	0 Hours
DATE OF DRILLING	Not advised	DRILLED BY	Others
MATERIAL	Rock Core	SAMPLE LOCATION	Not advised

DESCRIPTION OF CORE AFTER TEST	Split vertically from top to bottom, with no visible end effects
--------------------------------	--

COMPRESSIVE STRENGTH

LOAD AT FAILURE (kN)	6.0	MEASURED COMPRESSIVE STRENGTH (N/mm ²)	0.9
----------------------	-----	--	-----

COMPRESSIVE STRENGTH (MPa)	0.9
----------------------------	-----

Comments / Deviation from standard method / Abnormalities noted during visual inspection.
None

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

SIGNED



DATE 01-Nov-22

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
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 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE REFERENCE	BH6 32.50	DATE RECEIVED	17-Oct-22
SAMPLE NUMBER	117773B	DATE SAMPLED	Not advised
DATE TESTED	24-Oct-22	SAMPLED BY	Client

DIMENSIONS

TESTED BY	MR	DIAMETER (mm)	90
LENGTH AFTER PREPARATION (mm)	180	LENGTH/DIAMETER RATIO	2.00

METHOD OF END PREPARATION	Saw / Grinding	TIME IN WATER PRIOR TO TEST	0 Hours
DATE OF DRILLING	Not advised	DRILLED BY	Others
MATERIAL	Rock Core	SAMPLE LOCATION	Not advised

DESCRIPTION OF CORE AFTER TEST	Split vertically from top to bottom, with no visible end effects
--------------------------------	--

COMPRESSIVE STRENGTH

LOAD AT FAILURE (kN)	177.8	MEASURED COMPRESSIVE STRENGTH (N/mm ²)	27.9
----------------------	-------	--	------

COMPRESSIVE STRENGTH (MPa)	27.9
----------------------------	------

Comments / Deviation from standard method / Abnormalities noted during visual inspection.
None

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

SIGNED



DATE 01-Nov-22

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
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 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE REFERENCE	BH6 34.30	DATE RECEIVED	17-Oct-22
SAMPLE NUMBER	117774A	DATE SAMPLED	Not advised
DATE TESTED	24-Oct-22	SAMPLED BY	Client

DIMENSIONS

TESTED BY	MR	DIAMETER (mm)	90
LENGTH AFTER PREPARATION (mm)	180	LENGTH/DIAMETER RATIO	2.00

METHOD OF END PREPARATION	Saw / Grinding	TIME IN WATER PRIOR TO TEST	0 Hours
DATE OF DRILLING	Not advised	DRILLED BY	Others
MATERIAL	Rock Core	SAMPLE LOCATION	Not advised

DESCRIPTION OF CORE AFTER TEST	Split vertically from top to bottom, with no visible end effects
--------------------------------	--

COMPRESSIVE STRENGTH

LOAD AT FAILURE (kN)	31.4	MEASURED COMPRESSIVE STRENGTH (N/mm ²)	4.9
----------------------	------	--	-----

COMPRESSIVE STRENGTH (MPa)	4.9
----------------------------	-----

Comments / Deviation from standard method / Abnormalities noted during visual inspection.
None

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

SIGNED



DATE 01-Nov-22

MURRAY RIX

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

TEST CERTIFICATE

DETERMINATION OF POINT LOAD STRENGTH INDEX OF ROCK
METHOD IN ACCORDANCE WITH ASTM STANDARD D 5731

CLIENT	LK Consult Ltd
SITE	LKC 20 1301 - Pollard Street, Manchester
JOB NUMBER	MRN 4310/147

SAMPLE LABEL	BH6	DATE SAMPLED	Not advised
LAB SAMPLE No	117773C-E, 117774B-D	DATE RECEIVED	17-Oct-22
DATE TESTED	24-Oct-22	SAMPLED BY	Client

MATERIAL	Rock Core
ADVISED SOURCE	Site Investigation Sample

Depth (m)	Test Type*	D (mm)	W** (mm)	Load (P) (kN)	D_e^2 (mm ²)	D_e (mm)	I_s (MPa)	F	$I_{s(50)}$ (MPa)
30.75	D	90.0		0.4	8100.00	90.00	0.05	1.30	0.06
30.75	A	90.0	48.0	0.4	5500.39	74.16	0.07	1.19	0.09
30.75	A	90.0	68.0	0.4	7792.23	88.27	0.05	1.29	0.07
31.50	D	90.0		0.5	8100.00	90.00	0.06	1.30	0.08
31.50	A	90.0	76.0	15.5	8708.96	93.32	1.78	1.32	2.36
31.50	A	90.0	44.0	22.0	5042.03	71.01	4.36	1.17	5.11
32.25	D	90.0		3.4	8100.00	90.00	0.42	1.30	0.55
32.25	A	90.0	52.0	4.4	5958.76	77.19	0.74	1.22	0.90
32.25	A	90.0	66.0	2.7	7563.04	86.97	0.36	1.28	0.46
33.75	D	90.0		1.8	8100.00	90.00	0.22	1.30	0.29
33.75	A	90.0	71.0	3.2	8136.00	90.20	0.39	1.30	0.51
33.75	A	90.0	79.0	2.8	9052.73	95.15	0.31	1.34	0.41
34.50	D	90.0		1.4	8100.00	90.00	0.17	1.30	0.23
34.50	A	90.0	80.0	1.8	9167.32	95.75	0.20	1.34	0.26
34.50	A	90.0	61.0	1.6	6990.09	83.61	0.23	1.26	0.29
35.25	D	90.0		2	8100.00	90.00	0.25	1.30	0.32
35.25	A	90.0	41.0	2.8	4698.25	68.54	0.60	1.15	0.69
35.25	A	90.0	64.0	1.9	7333.86	85.64	0.26	1.27	0.33
35.75	D	90.0		0.2	8100.00	90.00	0.02	1.30	0.03
35.75	A	90.0	48.0	0.1	5500.39	74.16	0.02	1.19	0.02
35.75	A	90.0	54.0	1.6	6187.94	78.66	0.26	1.23	0.32

Test Type * *W Entry required if test type is not Diametral

A Axial Test D Diametral Test

B Block Test I Irregular Lump Test

REMARKS

SIGNED



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

DATE 01-Nov-22

Appendix E

Gas Monitoring Results



Site	Pollard Street, Manchester
Job Number	LKC 20 1301
Date	12/10/2022
Engineer	RW
Visit	1 of 6

Equipment ¹		
Instrument	Serial Number	Comments
Gas Analyser GA5000	G502417	Serviced, calibrated, gas checked.
HydroTechnik	HT-01	Operating normally.
Pho-Check Tiger	T-106802	Serviced, calibrated.

Atmospheric / Ground Conditions	
Atmospheric pressure trend onsite	Variable
Atmospheric pressure (prev 24hrs)	Falling
Weather Conditions	Dry, still, cold
Ground Conditions	Wet

[illegible]

ABBREVIATIONS	
ND	Not detected
NR	Not recorded
UR	Unable to record
OS	Off recordable scale
N/A	Not applicable
ppm	Parts per million
mb	Millibars
l/hr	Litres per hour
mbgl	Metres below ground level
LEL	Lower explosive limit in air

NOTES	
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 a 1 minute average value where flow is detected (equipment range of +/- 12 ltr/hr).	

Site	Pollard Street, Manchester
Job Number	LKC 20 1301
Date	28/10/2022
Engineer	CK
Visit	2 of 6

Equipment ¹		
Instrument	Serial Number	Comments
Gas Analyser GA5000	G507783	Serviced, calibrated, gas checked.
HydroTechnik	HT-04	Operating normally.
	#N/A	Serviced, calibrated.

Atmospheric / Ground Conditions	
Atmospheric pressure trend onsite	Rising
Atmospheric pressure (prev 24hrs)	Falling
Weather Conditions	Sunny, moderate breeze, mild
Ground Conditions	Boaav

[illegible]

ABBREVIATIONS	
ND	Not detected
NR	Not recorded
UR	Unable to record
OS	Off recordable scale
N/A	Not applicable
ppm	Parts per million
mb	Millibars
l/hr	Litres per hour
mbgl	Metres below ground level
LEL	Lower explosive limit in air

NOTES	
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 a 1 minute average value where flow is detected (equipment range of +/- 12 ltr/hr).	



Equipment ¹		
Instrument	Serial Number	Comments
Gas Analyser GA5000	G502417	Serviced, calibrated, gas checked.
HydroTechnik	HT-04	Operating normally.
-	-	Serviced, calibrated.

Atmospheric / Ground Conditions	
Atmospheric pressure trend onsite	Steady
Atmospheric pressure (prev 24hrs)	Steady
Weather Conditions	Overcast, Steady, Mild
Ground Conditions	Damp

[illegible]

ABBREVIATIONS	
ND	Not detected
NR	Not recorded
UR	Unable to record
OS	Off recordable scale
N/A	Not applicable
ppm	Parts per million
mb	Millibars
l/hr	Litres per hour
mbgl	Metres below ground level
LEL	Lower explosive limit in air

NOTES
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 a 1 minute average value where flow is detected (equipment range of +/- 12 ltr/hr).

Site	Pollard Street, Manchester
Job Number	LKC 20 1301
Date	24/11/2022
Engineer	JW
Visit	4 of 6

Equipment ¹		
Instrument	Serial Number	Comments
Gas Analyser GA5000	G507783	Serviced, calibrated, gas checked.
HydroTechnik	HT-04	Operating normally.
-	-	Serviced, calibrated.

Atmospheric / Ground Conditions	
Atmospheric pressure trend onsite	Steady
Atmospheric pressure (prev 24hrs)	Variable
Weather Conditions	Cold, Drizzling, slight breeze
Ground Conditions	Wet

[illegible]

ABBREVIATIONS	
ND	Not detected
NR	Not recorded
UR	Unable to record
OS	Off recordable scale
N/A	Not applicable
ppm	Parts per million
mb	Millibars
l/hr	Litres per hour
mbgl	Metres below ground level
LEL	Lower explosive limit in air

NOTES	
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 a 1 minute average value where flow is detected (equipment range of +/- 12 ltr/hr).	

Site	Pollard Street, Manchester
Job Number	LKC 20 1301
Date	07/12/2022
Engineer	CK
Visit	4 of 6

Equipment ¹		
Instrument	Serial Number	Comments
Gas Analyser GA5000	G507783	Serviced, calibrated, gas checked.
HydroTechnik	HT-04	Operating normally.
-	-	Serviced, calibrated.

Atmospheric / Ground Conditions	
Atmospheric pressure trend onsite	Steady
Atmospheric pressure (prev 24hrs)	Variable
Weather Conditions	Very cold, sunny, gentle breeze
Ground Conditions	Frostv

[illegible]

ABBREVIATIONS	
ND	Not detected
NR	Not recorded
UR	Unable to record
OS	Off recordable scale
N/A	Not applicable
ppm	Parts per million
mb	Millibars
l/hr	Litres per hour
mbgl	Metres below ground level
LEL	Lower explosive limit in air

NOTES	
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 a 1 minute average value where flow is detected (equipment range of +/- 12 ltr/hr).	

Site	Pollard Street, Manchester
Job Number	LKC 20 1301
Date	19/12/2022
Engineer	CK
Visit	6 of 6

Equipment ¹		
Instrument	Serial Number	Comments
Gas Analyser GA5000	G507783	Serviced, calibrated, gas checked.
HydroTechnik	HT-01	Operating normally.
-	-	Serviced, calibrated.

Atmospheric / Ground Conditions	
Atmospheric pressure trend onsite	Rising
Atmospheric pressure (prev 24hrs)	Falling
Weather Conditions	Raining, Moderate Breeze, Mild
Ground Conditions	Wet and Boogay

[illegible]

ABBREVIATIONS	
ND	Not detected
NR	Not recorded
UR	Unable to record
OS	Off recordable scale
N/A	Not applicable
ppm	Parts per million
mb	Millibars
l/hr	Litres per hour
mbgl	Metres below ground level
LEL	Lower explosive limit in air

NOTES
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 a 1 minute average value where flow is detected (equipment range of +/- 12 ltr/hr).

Appendix F

Generic Assessment Criteria Values

Category 4 Screening Levels (C4SL)

Substance	Residential (with home- grown produce)	Residential (without home- grown produce)	Allotments	Commercial	Public Open Space 1	Public Open Space 2
Arsenic	37 mg/kg	40 mg/kg	49 mg/kg	640 mg/kg	79 mg/kg	168 mg/kg
Benzene	0.87 mg/kg	3.3 mg/kg	0.18 mg/kg	98 mg/kg	140 mg/kg	230 mg/kg
Benzo(a)pyrene	5 mg/kg	5.3 mg/kg	5.7 mg/kg	76 mg/kg	10 mg/kg	21 mg/kg
Cadmium	26 mg/kg	149 mg/kg	4.9 mg/kg	410 mg/kg	220 mg/kg	880 mg/kg
Chromium VI	21 mg/kg	21 mg/kg	170 mg/kg	49 mg/kg	23 mg/kg	250 mg/kg
Lead	200 mg/kg	310 mg/kg	80 mg/kg	2330 mg/kg	630 mg/kg	1300 mg/kg

Summary Table for the Generic Assessment Criteria for Human Health Risk Assessment Land Quality Management (LQM) S4ULs.

All GAC are based on sandy loam soils with a pH 7.

		LQM Generic Assessment Criteria (mg/kg) Dry weight soil						
Contaminant		SOM	Res +	Res -	Allot.	Comm.	POS _{resi}	POS _{park}
Metals	Inorganic Arsenic	6%	37	40	43	640	79	170
	Beryllium	6%	1.7	1.7	35	12	2.2	63
	Boron	6%	290	11,000	45	240,000	21,000	46,000
	Cadmium	6%	11	85	1.9	190	120	532
	Chromium (III)	6%	910	910	18,000	8,600	1,500	33,000
	Chromium (VI)	6%	6.0	6.0	1.8	33	7.7	220
	Copper	6%	2,400	7,100	520	68,000	12,000	44,000
	Elemental Mercury	6%	1.2	1.2	21	58 (25.8) ^{vap}	16	30 (25.8) ^{vap}
	Inorganic Mercury	6%	40	56	19	1,100	120	240
	Methylmercury	6%	11	15	6.0	320	40	68
	Nickel	6%	180	180	230	980	230	3,400
	Selenium	6%	250	430	88	12,000	1,100	1,800
	Vanadium	6%	410	1,200	91	9,000	2,000	5,000
	Zinc	6%	3,700	40,000	620	730,000	81,000	170,000
BTEX Compounds	Benzene	1%	0.087	0.38	0.017	27	72	90
		2.5%	0.17	0.70	0.034	47	72	100
		6%	0.37	1.4	0.075	90	73	110
	Toluene	1%	130	880 (869) ^{vap}	22	56,000 (869) ^{vap}	56,000	87,000 (869) ^{vap}
		2.5%	290	1,900	51	110,000 (1,920) ^{vap}	56,000	95,000 (1,920) ^{vap}
		6%	660	3,900	120	180,000 (4,360) ^{vap}	56,000	100,000 (4,360) ^{vap}
	Ethylbenzene	1%	47	83	16	5,700 (518) ^{vap}	24,000	17,000 (518) ^{vap}
		2.5%	110	190	39	13,000 (1,220) ^{vap}	24,000	22,000 (1,220) ^{vap}
		6%	260	440	91	27,000 (2,840) ^{vap}	25,000	27,000 (2,840) ^{vap}
	o-xylene	1%	60	88	28	6,600 (478) ^{sol}	41,000	17,000 (478) ^{sol}
		2.5%	140	210	67	15,000 (1,120) ^{sol}	42,000	24,000 (1,120) ^{sol}
		6%	330	480	160	33,000 (2,620) ^{sol}	43,000	33,000 (2,620) ^{sol}
	m-xylene	1%	59	82	31	6,200 (625) ^{vap}	41,000	17,000 (625) ^{vap}
		2.5%	140	190	74	14,000 (1,470) ^{vap}	42,000	24,000 (1,470) ^{vap}
		6%	320	450	170	31,000 (3,460) ^{vap}	43,000	32,000 (3,460) ^{vap}
	p-xylene	1%	56	79	29	5,900 (576) ^{sol}	41,000	17,000 (576) ^{sol}
		2.5%	130	180	69	14,000 (1,350) ^{sol}	42,000	23,000 (1,350) ^{sol}
		6%	310	430	160	30,000 (3,170) ^{sol}	43,000	31,000 (3,170) ^{sol}

NOTES

^{sol/vap} = solubility / vapour limit (potentially use if free product identified, although highly conservative).

f = oral, dermal and inhalation exposures compared to oral HCV.

All GAC are based on sandy loam soils with a pH 7.

All GAC are based on sandy loam soils with a pH 7.			LQM Generic Assessment Criteria (mg/kg) Dry weight soil					
Contaminant		SOM	Res +	Res -	Allot.	Comm.	POS _{resi}	POS _{park}
Polycyclic Aromatic Hydrocarbons (PAHs)	Acenaphthene	1%	210	3,000 (57.1) ^{sol}	34	84,000 (57.0) ^{sol}	15,000	29,000
		2.5%	510	4,700 (141) ^{sol}	85	97,000 (141) ^{sol}	15,000	30,000
		6%	1,100	6,000 (336) ^{sol}	200	100,000	15,000	30,000
	Acenaphthylene	1%	170	2,900 (86.1) ^{sol}	28	83,000 (86.1) ^{sol}	15,000	29,000
		2.5%	420	4,600 (212) ^{sol}	69	97,000 (212) ^{sol}	15,000	30,000
		6%	920	6,000 (506) ^{sol}	160	100,000	15,000	30,000
	Anthracene	1%	2,400	31,000 (1.17) ^{vap}	380	520,000	74,000	150,000
		2.5%	5,400	35,000	950	540,000	74,000	150,000
		6%	11,000	37,000	2,200	540,000	74,000	150,000
	Benz(a)anthracene	1%	7.2	11	2.9	170	29	49
		2.5%	11	14	6.5	170	29	56
		6%	13	15	13	180	29	62
	Benzo(a)pyrene (only)	1%	2.2	3.2	0.97	35	5.7	11
		2.5%	2.7	3.2	2.0	35	5.7	12
		6%	3.0	3.2	3.5	36	5.7	13
	Benzo(b)fluoranthene	1%	2.6	3.9	0.99	44	7.1	13
		2.5%	3.3	4.0	2.1	44	7.2	15
		6%	3.7	4.0	3.9	45	7.2	16
	Benzo(ghi)perylene	1%	320	360	290	3,900	640	1,400
		2.5%	340	360	470	4,000	640	1,500
		6%	350	360	640	4,000	640	1,600
	Benzo(k)fluoranthene	1%	77	110	37	1,200	190	370
		2.5%	93	110	75	1,200	190	410
		6%	100	110	130	1,200	190	440
	Chrysene	1%	15	30	4.1	350	57	93
		2.5%	22	31	9.4	350	57	110
		6%	27	32	19	350	57	120
	Dibenzo(ah)anthracene	1%	0.24	0.31	0.14	3.5	0.57	1.1
		2.5%	0.28	0.32	0.27	3.6	0.58	1.3
		6%	0.3	0.32	0.43	3.6	0.58	1.4
	Fluoranthene	1%	280	1,500	52	23,000	3,100	6,300
		2.5%	560	1,600	130	23,000	3,100	6,300
		6%	890	1,600	290	23,000	3,100	6,400
	Fluorene	1%	170	2,800 (36.0) ^{sol}	27	63,000 (30.9) ^{sol}	9,900	20,000
		2.5%	400	3,800 (76.5) ^{sol}	67	68,000	9,900	20,000
		6%	860	4,500 (183) ^{sol}	160	71,000	9,900	20,000
	Indeno(123-cd)pyrene	1%	27	45	9.5	500	82	150
		2.5%	36	46	21	510	82	170
		6%	41	46	39	510	82	180
	Naphthalene	1%	2.3 ^f	2.3 ^f	4.1 ^f	190 ^f (76.4) ^{sol}	4,900 ^f	1,200 ^f (76.4) ^{sol}
		2.5%	5.6 ^f	5.6 ^f	10 ^f	460 ^f (183) ^{sol}	4,900 ^f	1,900 ^f (183) ^{sol}
		6%	13 ^f	13 ^f	24 ^f	1,100 ^f (432) ^{sol}	4,900 ^f	3,000
	Phenanthrene	1%	95	1,300 (36.0) ^{sol}	15	22,000	3,100	6,200
		2.5%	220	1,500	38	22,000	3,100	6,200
		6%	440	1,500	90	22,000	3,100	6,300
	Pyrene	1%	620	3,700	110	54,000	7,400	15,000
		2.5%	1,200	3,800	270	54,000	7,400	15,000
		6%	2,000	3,800	620	54,000	7,400	15,000
Coal Tar (B(a)P as surrogate marker)	1%	0.79	1.2	0.32	15	2.2	4.4	
	2.5%	0.98	1.2	0.67	15	2.2	4.7	
	6%	1.1	1.2	1.2	15	2.2	4.8	

NOTES

^{sol} / ^{vap} = solubility / vapour limit (potentially use if free product identified, although highly conservative).

^f = naphthalene is based on comparison of inhalation exposure with TDI_{inhal} for localised effect.

All GAC are based on sandy loam soils with a pH 7.

LQM Generic Assessment Criteria (mg/kg) Dry weight soil

Contaminant	SOM	Res +	Res -	Allot.	Comm.	POS _{resi}	POS _{park}
Aliphatic							
EC 5-6	1%	42	42	730	3,200 (304) ^{sol}	570,000(304) ^{sol}	95,000 (304) ^{sol}
EC>6-8	1%	100	100	2,300	7,800 (144) ^{sol}	600,000	150,000 (144) ^{sol}
EC>8-10	1%	27	27	320	2,000 (78) ^{sol}	13,000	14,000 (78) ^{vap}
EC>10-12	1%	130 (48) ^{vap}	130 (48) ^{vap}	2,200	9,700 (48) ^{sol}	13,000	21,000 (48) ^{vap}
EC>12-16	1%	1,100 (24) ^{sol}	1,100 (24) ^{sol}	11,000	59,000 (24) ^{sol}	13,000	25,000 (24) ^{sol}
EC>16-35	1%	65,000 (8.48) ^{f, sol}	65,000 (8.48) ^{f, sol}	260,000 ^f	160,000 ^f	250,000 ^f	450,000 ^f
EC>35-44	1%	65,000 (8.48) ^{f, sol}	65,000 (8.48) ^{f, sol}	260,000 ^f	160,000 ^f	250,000 ^f	450,000 ^f
Aliphatic							
EC 5-6	2.5%	78	78	1,700	5,900 (558) ^{sol}	590,000	130,000 (558) ^{sol}
EC>6-8	2.5%	230	230	5,600	17,000 (322) ^{sol}	610,000	220,000 (322) ^{sol}
EC>8-10	2.5%	65	65	770	4,800 (190) ^{vap}	13,000	18,000 (190) ^{vap}
EC>10-12	2.5%	330 (118) ^{vap}	330 (118) ^{vap}	4,400	23,000 (118) ^{vap}	13,000	23,000 (118) ^{vap}
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}
EC>16-35	2.5%	92,000 (21) ^{f, sol}	92,000 (21) ^{f, sol}	270,000 ^f	1,700,000 ^f	250,000 ^f	480,000 ^f
EC>35-44	2.5%	92,000 (21) ^{f, sol}	92,000 (21) ^{f, sol}	270,000 ^f	1,700,000 ^f	250,000 ^f	480,000 ^f
Aliphatic							
EC 5-6	6%	160	160	3,900	12,000 (1,150) ^{sol}	600,000	180,000 (1,150) ^{sol}
EC>6-8	6%	530	530	13,000	40,000 (736) ^{sol}	620,000	320,000 (736) ^{sol}
EC>8-10	6%	150	150	1,700	11,000 (451) ^{vap}	13,000	21,000 (451) ^{vap}
EC>10-12	6%	760 (283) ^{vap}	760 (283) ^{vap}	7,300	47,000 (283) ^{vap}	13,000	24,000 (283) ^{vap}
EC>12-16	6%	4,300 (142) ^{sol}	4,400 (142) ^{sol}	13,000	90,000 (142) ^{sol}	13,000	26,000 (142) ^{sol}
EC>16-35	6%	110,000 ^f	110,000 ^f	270,000 ^f	1,800,000 ^f	250,000 ^f	490,000 ^f
EC>35-44	6%	110,000 ^f	110,000 ^f	270,000 ^f	1,800,000 ^f	250,000 ^f	490,000 ^f
Aromatic							
EC5-7(benzene as non-threshold)	1%	70	370	13	26,000 (1,220) ^{sol}	56,000	76,000 (1,220) ^{sol}
EC>7-8(toluene)	1%	130	860	22	56,000 (869) ^{vap}	56,000	87,000 (869) ^{vap}
EC>8-10	1%	34	47	8.6	3,500 (613) ^{vap}	5,000	7,200 (613) ^{vap}
EC>10-12	1%	74	250	13	16,000 (364) ^{sol}	5,000	9,200 (364) ^{sol}
EC>12-16	1%	140	1,800	23	36,000 (169) ^{sol}	5,100	10,000
EC>16-21	1%	260 ^f	1,900 ^f	46 ^f	28,000 ^f	3,800 ^f	7,600 ^f
EC>21-35	1%	1,100 ^f	1,900 ^f	370 ^f	28,000 ^f	3,800 ^f	7,800 ^f
EC>35-44	1%	1,100 ^f	1,900 ^f	370 ^f	28,000 ^f	3,800 ^f	7,800 ^f
Aromatic							
EC5-7(benzene as non-threshold)	2.5%	140	690	27	46,000 (2,260) ^{sol}	56,000	84,000 (2,260) ^{sol}
EC>7-8(toluene)	2.5%	290	1,800	51	110,000 (1,920) ^{sol}	56,000	95,000 (1,920) ^{sol}
EC>8-10	2.5%	83	110	21	8,100 (1,500) ^{vap}	5,000	8,500 (1,500) ^{vap}
EC>10-12	2.5%	180	590	31	28,000 (899) ^{sol}	5,000	9,700 (899) ^{sol}
EC>12-16	2.5%	330	2,300 (419) ^{sol}	57	37,000	5,100	10,000
EC>16-21	2.5%	540 ^f	1,900 ^f	110 ^f	28,000 ^f	3,800 ^f	7,700 ^f
EC>21-35	2.5%	1,500 ^f	1,900 ^f	820 ^f	28,000 ^f	3,800 ^f	7,800 ^f
EC>35-44	2.5%	1,500 ^f	1,900 ^f	820 ^f	28,000 ^f	3,800 ^f	7,800 ^f
Aromatic							
EC5-7(benzene as non-threshold)	6%	300	1,400	57	86,000 (4,710) ^{sol}	56,000	92,000 (4,710) ^{sol}
EC>7-8(toluene)	6%	660	3,900	120	180,000 (4,360) ^{vap}	56,000	100,000 (4,360) ^{vap}
EC>8-10	6%	190	270	51	17,000 (3,580) ^{vap}	5,000	9,300 (3,580) ^{vap}
EC>10-12	6%	380	1,200	4	34,000 (2,150) ^{sol}	5,000	10,000
EC>12-16	6%	660	2,500	130	38,000	5,100	10,000
EC>16-21	6%	930 ^f	1,900 ^f	260 ^f	28,000 ^f	3,800 ^f	7,800 ^f
EC>21-35	6%	1,700 ^f	1,900 ^f	1,600 ^f	28,000 ^f	3,800 ^f	7,900 ^f
EC>35-44	6%	1,700 ^f	1,900 ^f	1,600 ^f	28,000 ^f	3,800 ^f	7,900 ^f
Aliphatic	1%	1,600 ^f	1,900 ^f	1,200 ^f	28,000 ^f	3,800 ^f	7,800 ^f
+Aromatic	2.5%	1,800 ^f	1,900 ^f	2,100 ^f	28,000 ^f	3,800 ^f	7,800 ^f
>EC44	6%	1,900 ^f	1,900 ^f	3,000 ^f	28,000 ^f	3,800 ^f	7,900 ^f

NOTES

^{sol}/^{vap} = solubility / vapour limit (potentially use if free product identified, although highly conservative).

^f = oral, dermal and inhalation exposures compared to oral HCV.

All GAC are based on sandy loam soils with a pH 7.

		LQM Generic Assessment Criteria (mg/kg) Dry weight soil						
Contaminant		SOM	Res +	Res -	Allot.	Comm.	POS _{resi}	POS _{park}
Chloalkanes and Alkenes & Explosives	1,2 Dichloroethane (DCA)	1%	7.1E-03	9.2E-03	4.6E-03	0.67	29	21
		2.5%	1.1E-02	1.3E-02	8.3E-03	0.97	29	24
		6%	1.9E-02	2.3E-02	1.6E-02	1.7	29	28
	1,1,1 Trichloroethane (TCA)	1%	8.8	9.0	48	660	140,000	57,000 (1,425) ^{vap}
		2.5%	18	18	110	1,300	140,000	76,000 (2,915) ^{vap}
		6%	39	40	240	3,000	140,000	100,000 (6,392) ^{vap}
	1,1,2,2-Tetrachloroethanes (PCA)	1%	1.6	3.9	0.41	270	1,400	1,800
		2.5%	3.4	8.0	0.89	550	1,400	2,100
		6%	7.5	17	2.0	1,100	1,400	2,300
	1,1,1,2-Tetrachloroethanes (PCA)	1%	1.2	1.5	0.79	110	1,400	1,500
		2.5%	2.8	3.5	1.9	250	1,400	1,800
		6%	6.4	8.2	4.4	560	1,400	2,100
	Tetrachloroethene (PCE)	1%	0.18	0.18	0.65	19	1,400	810 (424) ^{sol}
		2.5%	0.39	0.40	1.5	42	1,400	1,100 (951) ^{sol}
		6%	0.90	0.92	3.6	95	1,400	1,500
	Tetrachloromethane (carbon tetrachloride)	1%	2.6E-02	2.6E-02	0.45	2.9	890	190
		2.5%	5.6E-02	5.6E-02	1.0	6.3	920	270
		6%	0.13	0.13	2.4	14	950	400
	Trichloroethene (TCE)	1%	1.6E-02	1.7E-02	4.1E-02	1.2	120	70
		2.5%	3.4E-02	3.6E-02	9.1E-02	2.6	120	91
		6%	7.5E-02	8.0E-02	0.21	5.7	120	120
	Trichloromethane (chloroform)	1%	0.91	1.2	0.42	99	2,500	2,600
		2.5%	1.7	2.1	0.83	170	2,500	2,800
		6%	3.4	4.2	1.7	350	2,500	3,100
	Chloroethene (vinyl chloride)	1%	6.4E-04	7.7E-04	5.5E-04	5.9E-02	3.5	4.8
		2.5%	8.7E-04	1.0E-03	1.0E-03	7.7E-02	3.5	5.0
		6%	1.4E-03	1.5E-03	1.8E-03	0.12	3.5	5.4
	2,4,6-Trinitrotoluene (TNT)	1%	1.6	65	0.24	1,000	130	260
		2.5%	3.7	66	0.58	1,000	130	270
		6%	8.1	66	1.4	1,000	130	270
	RDX	1%	120	13,000	17	210,000	26,000	49,000 (18.7) ^{sol}
		2.5%	250	13,000	38	210,000	26,000	51,000
		6%	540	13,000	85	210,000	27,000	53,000
	HMX	1%	5.7	6,700	0.86	110,000	13,000	23,000 (0.35) ^{vap}
		2.5%	13	6,700	1.9	110,000	13,000	23,000 (0.39) ^{vap}
		6%	26	6,700	3.9	110,000	13,000	24,000 (0.48) ^{vap}
Pesticides	Aldrin	1%	5.7	7.3	3.2	170	18	30
		2.5%	6.6	7.4	6.1	170	18	31
		6%	7.1	7.5	9.8	170	18	31
	Dieldrin	1%	0.97	7.0	0.17	170	18	30
		2.5%	2.0	7.3	0.41	170	18	30
		6%	3.5	7.4	0.96	170	18	31
	Atrazine	1%	3.3	610	0.5	9,300	1,200	2,300
		2.5%	7.8	620	1.2	9,400	1,200	2,400
		6%	17.4	620	2.7	9,400	1,200	2,400
	Dichlorvos	1%	3.2E-02	6.4	4.9E-03	140	16	26
		2.5%	6.6E-02	6.5	1.0E-02	140	16	26
		6%	0.14	6.6	2.2E-02	140	16	27
	Endosulfans (2 isomers)	1%	7.4	160 (3.0E-03) ^{vap}	1.2	5,600 (3.0E-03) ^{vap}	1,200	2,300
		2.5%	18	280 (7.0E-03) ^{vap}	2.9	7,400 (7.0E-03) ^{vap}	1,200	2,400
		6%	41	410 (1.6E-02) ^{vap}	6.8	8,400 (1.6E-02) ^{vap}	1,200	2,500
	Hexachlorocyclohexane (3 isomers), inc Lindane	1%	8.5E-02	3.7	1.3E-02	65	8.1	15
		2.5%	0.2	3.8	3.2E-02	65	8.1	15
		6%	0.46	3.8	7.7E-02	65	8.1	16

NOTES

^{sol} / ^{vap} = solubility / vapour limit (potentially use if free product identified, although highly conservative).

All GAC are based on
sandy loam soils with a pH
7.

All GAC are based on sandy loam soils with a pH 7.			LQM Generic Assessment Criteria (mg/kg) Dry weight soil					
Contaminant		SOM	Res +	Res -	Allot.	Comm.	POS _{resi}	POS _{park}
Chlorobenzenes	Chlorobenzene	1%	0.46	0.46	5.9	56	11,000	1,300 (675) ^{sol}
		2.5%	1.0	1.0	14	130	13,000	2,000 (1,520) ^{sol}
		6%	2.4	2.4	32	290	14,000	2,900
	Dichlorobenzenes (3 isomers)	1%	23	24	94	2,000 (571) ^{sol}	90,000	24,000 (571) ^{sol}
		2.5%	55	57	230	4,800 (1,370) ^{sol}	95,000	36,000 (1,370) ^{sol}
		6%	130	130	540	11,000 (3,240) ^{sol}	98,000	51,000 (3,270) ^{sol}
	Trichlorobenzenes (3 isomers)	1%	2.6	2.6	55	220	15,000	1,700 (318) ^{vap}
		2.5%	6.4	6.4	140	530	17,000	2,600 (786) ^{vap}
		6%	15	15	320	1,300	19,000	4,000 (1,880) ^{vap}
	Tetrachlorobenzenes (3 isomers)	1%	0.66	0.75	0.38	49 (39.4) ^{vap}	78	110 (39) ^{vap}
		2.5%	1.6	1.9	0.90	120 (98.1) ^{vap}	79	120
		6%	3.7	4.3	2.2	240 (235) ^{vap}	79	130
	Pentachlorobenzene	1%	5.8	19	1.2	640 (43.0) ^{sol}	100	190
		2.5%	12	30	3.1	770 (107) ^{sol}	100	190
		6%	22	38	7.0	830	100	190
	Hexachlorobenzene	1%	1.8 (0.20) ^{vap}	4.1 (0.20) ^{vap}	0.47	110 (0.20) ^{vap}	16	30
		2.5%	3.3 (0.50) ^{vap}	5.7 (0.50) ^{vap}	1.1	120	16	30
		6%	4.9	6.7 (1.2) ^{vap}	2.5	120	16	30
Chlorophenol	Chlorophenols (4 congeners)	1%	0.87 ^g	94	0.13 ^g	3,500	620	1,100
		2.5%	2.0	150	0.30	4,000	620	1,100
		6%	4.5	210	0.70	4,300	620	1,100
	Pentachlorophenol	1%	0.22	27 (16.4) ^{vap}	3.0E-02	400	60	110
		2.5%	0.52	29	8.0E-02	400	60	120
		6%	1.2	31	0.19	400	60	120
Others	Carbon Disulphide	1%	0.14	0.14	4.8	11	11,000	1,300
		2.5%	0.29	0.29	10	22	11,000	1,900
		6%	0.62	0.62	23	47	11,000	2,700
	Hexachlorobutadiene	1%	0.29	0.32	0.25	31	25	48
		2.5%	0.7	0.78	0.61	66	25	50
		6%	1.6	1.8	1.4	120	25	51
	Phenol	1%	280	750	66	760 ^{dir} (31,000)	760 ^{dir} (11,000)	760 ^{dir} (8,600)
		2.5%	550	1,300	140	1,500 ^{dir} (35,000)	1,500 ^{dir} (11,000)	1,500 ^{dir} (9,700)
		6%	1,100	2,300	280	3,200 ^{dir} (37,000)	3,200 ^{dir} (11,000)	3,200 ^{dir} (11,000)

NOTES

^{sol / vap} = solubility / vapour limit (potentially use if free product identified, although highly conservative).

^{dir} = S4uls based on threshold protective of direct skin contact with phenol (brackets long term exposure for illustration purposes).

^g = derived based on 2,3,4,6-tetrachlorophenol.

Appendix G

Joint Industry Working Group (JIWG) Decision Support Tool

Decision Support Tool for Receptor Risk Ranking

Stage 1		Score
Hazard Identification		
Select ACM type (run model for each type to generate 'Worst Case' output)	Free dispersed fibres/fibre bundles	2
Extent of degradation of ACMs	Degraded (Significant degradation in ACM; material has lost its basic integrity)	3
Friability and degree of bonding by matrix (ACM matrix, not ground materials)	Friable ACM or ACM with fibres not firmly linked in a matrix	2
Distribution of Visible Asbestos Across Affected Area	No visible ACMs/fibre bundles	0
Asbestos fibre type	Mainly chrysotile and trace amphibole (no crocidolite)	1
Sub-total		8
Hazard ranking		Low

No warranty, expressed or implied, or reliance, is provided in relation to the use of this tool.

It is contingent on users to satisfy themselves that the output from the tool is relevant and appropriate to the assessment being made.

Stage 2		Score
Emission Factors		
Amount of asbestos fibre in selected ACM/fibre type as % of host material	Large quantities - ≥ 0.1 %wt/wt	4
Respirable fibre index for ACM - RIVM report 711701034 (2003)	High	4
Activity type and effect on deterioration of ACMs	High disturbance, significant deterioration expected	4
Best description of primary host material matrix	Coarse to Fine Sand	2
Sub-total		14
Exposure ranking		Medium

Stage 3		Score	
Pathway and Receptor Sensitivity			
Receptor category	Public open space or building	No score required	
Age of Receptor	Infant (under 5)	4	
Duration of exposure/site occupancy	< 1 hour in any single day (e.g. frequent but short exposure event)	1	
Receptor ranking		5	Medium
Combined hazard, exposure and receptor ranking			Medium
Pathway: Distance of Receptor from Source	In or within 10m of area of disturbance	4	
Pathway: Depth to impacted material	Material buried at depth, unlikely to be disturbed except for deeper construction related excavation	B	
Pathway ranking		4B	Very Low
Overall ranking			Very Low

Project Reference	LKC 20 1301
Site Name	Pollard Street (Electric Park)
Client	General Projects
Run by	PD
Date	11-Nov-22
Reviewed by	
Characterisation of scenario being evaluated	ACM soils beneath clean cover soils in soft landscaping areas of POS.
Interpretation of scenario ranking by DST	Low risk when soils are placed beneath clean cover soils in areas of POS. No additional remediation with regards to ACMs fibres in soil is required.

Appendix H

Hazwaste Online TM Certificates

Waste Classification Report

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

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



EYSDO-456PR-5B6BV

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

Job name

LKC 20 1301

Description/Comments

Project

LKC 20 1301

Site

Pollard Street, Manchester (Electric Park)

Classified by

Name: **Peter Dunn**
Date: **02 Nov 2022 08:05 GMT**
Telephone: **0161 763 7200**

Company: **LK Group**

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

HazWasteOnline™ Certification:

CERTIFIED

Course

Hazardous Waste Classification
Most recent 3 year Refresher

Date

18 Sep 2019
02 Aug 2022

Next 3 year Refresher due by Aug 2025

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	BH2-30/09/2022-0.4	0.4-1.3	Non Hazardous		3
2	TP8-28/09/2022-0.2	0.2-1.2	Hazardous	HP 7	5
3	TP8-28/09/2022-2.2	2.2-3.2	Non Hazardous		7
4	TP9-28/09/2022-1.0	1.0-2.0	Non Hazardous		10
5	TP15-29/09/2022-0.1	0.1-1	Hazardous	HP 7, HP 11	12
6	WS101-06/10/2022-1	1-2	Non Hazardous		15
7	WS104-06/10/2022-1	1-2	Non Hazardous		17
8	WS104-06/10/2022-2.5	2.5-3	Non Hazardous		19
9	117400-24/10/2022-0.70	0.70-1.60	Non Hazardous		20
10	BH5-05/10/2022-0.00	0.00-1.20	Non Hazardous		22
11	WS105-06/10/2022-0	0-1	Non Hazardous		25
12	WS105-06/10/2022-3.5	3.5-4	Non Hazardous		27

Related documents

#	Name	Description
1	HWOL_22-37523-20221014 204232.hwol	Eurofins Chemtest .hwol file used to populate the Job
2	HWOL_22-38532-20221024 174752.hwol	Eurofins Chemtest .hwol file used to populate the Job
3	HWOL_22-38510-20221024 174710.hwol	Eurofins Chemtest .hwol file used to populate the Job
4	HWOL_22-38355-20221027 180618.hwol	Eurofins Chemtest .hwol file used to populate the Job
5	HWOL_22-38537-20221024 174833.hwol[2]	Eurofins Chemtest .hwol[2] file used to populate the Job
6	LK SUITE 1 - 5	waste stream template used to create this Job

Report

Created by: Peter Dunn

Created date: 02 Nov 2022 08:05 GMT

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Appendix B: Rationale for selection of metal species	29

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Appendix C: Version	30

Classification of sample: BH2-30/09/2022-0.4

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

Sample details

Sample name:	LoW Code:
BH2-30/09/2022-0.4	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.4-1.3 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
11%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 11% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				6.9 mg/kg	1.32	8.108 mg/kg	0.000811 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				0.46 mg/kg	1.142	0.468 mg/kg	0.0000468 %	✓	
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				11 mg/kg	1.462	14.309 mg/kg	0.00143 %	✓	
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				39 mg/kg	1.126	39.08 mg/kg	0.00391 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
5	mercury { mercury dichloride }				0.15 mg/kg	1.353	0.181 mg/kg	0.0000181 %	✓	
	080-010-00-X	231-299-8	7487-94-7							
6	nickel { nickel(II) oxide (nickel monoxide) }				9.7 mg/kg	1.273	10.986 mg/kg	0.0011 %	✓	
	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]							
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	120 mg/kg		106.8 mg/kg	0.0107 %	✓	
	082-001-00-6									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				0.35 mg/kg	1.405	0.438 mg/kg	0.0000438 %	✓	
	034-002-00-8									
9	vanadium { divanadium pentaoxide; vanadium pentoxide }				12 mg/kg	1.785	19.066 mg/kg	0.00191 %	✓	
	023-001-00-8	215-239-8	1314-62-1							
10	zinc { zinc oxide }				97 mg/kg	1.245	107.456 mg/kg	0.0107 %	✓	
	030-013-00-7	215-222-5	1314-13-2							
11	chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
12	pH		PH		8.3 pH		8.3 pH	8.3 pH		
13	naphthalene				5.1 mg/kg		4.539 mg/kg	0.000454 %	✓	
	601-052-00-2	202-049-5	91-20-3							
14	acenaphthylene				1.2 mg/kg		1.068 mg/kg	0.000107 %	✓	
		205-917-1	208-96-8							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	acenaphthene	201-469-6	83-32-9		9.3 mg/kg		8.277 mg/kg	0.000828 %	✓	
16	fluorene	201-695-5	86-73-7		7.5 mg/kg		6.675 mg/kg	0.000668 %	✓	
17	phenanthrene	201-581-5	85-01-8		46 mg/kg		40.94 mg/kg	0.00409 %	✓	
18	anthracene	204-371-1	120-12-7		12 mg/kg		10.68 mg/kg	0.00107 %	✓	
19	fluoranthene	205-912-4	206-44-0		70 mg/kg		62.3 mg/kg	0.00623 %	✓	
20	pyrene	204-927-3	129-00-0		63 mg/kg		56.07 mg/kg	0.00561 %	✓	
21	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	37 mg/kg		32.93 mg/kg	0.00329 %	✓	
22	chrysene	601-048-00-0	205-923-4	218-01-9	38 mg/kg		33.82 mg/kg	0.00338 %	✓	
23	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	46 mg/kg		40.94 mg/kg	0.00409 %	✓	
24	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	19 mg/kg		16.91 mg/kg	0.00169 %	✓	
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	41 mg/kg		36.49 mg/kg	0.00365 %	✓	
26	indeno[123-cd]pyrene	205-893-2	193-39-5		26 mg/kg		23.14 mg/kg	0.00231 %	✓	
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	5.9 mg/kg		5.251 mg/kg	0.000525 %	✓	
28	benzo[ghi]perylene	205-883-8	191-24-2		23 mg/kg		20.47 mg/kg	0.00205 %	✓	
Total:								0.0708 %		

Key

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

Classification of sample: TP8-28/09/2022-0.2

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

Sample details

Sample name:	LoW Code:
TP8-28/09/2022-0.2	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 03 * (Soil and stones containing hazardous substances)
0.2-1.2 m	
Moisture content:	
7.3%	
(wet weight correction)	

Hazard properties

HP 7: Carcinogenic "waste which induces cancer or increases its incidence"

Hazard Statements hit:

Carc. 1A; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

asbestos: (conc.: 0.102%)

Determinands

Moisture content: 7.3% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				4.7 mg/kg	1.32	5.753 mg/kg	0.000575 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				0.37 mg/kg	1.142	0.392 mg/kg	0.0000392 %	✓	
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				7.4 mg/kg	1.462	10.026 mg/kg	0.001 %	✓	
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				24 mg/kg	1.126	25.049 mg/kg	0.0025 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
5	mercury { mercury dichloride }				0.19 mg/kg	1.353	0.238 mg/kg	0.0000238 %	✓	
	080-010-00-X	231-299-8	7487-94-7							
6	nickel { nickel(II) oxide (nickel monoxide) }				8.4 mg/kg	1.273	9.909 mg/kg	0.000991 %	✓	
	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]							
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	120 mg/kg		111.24 mg/kg	0.0111 %	✓	
	082-001-00-6									
8	selenium { selenium compounds with the exception of cadmium selenide and those specified elsewhere in this Annex }				0.25 mg/kg	1.405	0.326 mg/kg	0.0000326 %	✓	
	034-002-00-8									
9	vanadium { divanadium pentaoxide; vanadium pentoxide }				10 mg/kg	1.785	16.549 mg/kg	0.00165 %	✓	
	023-001-00-8	215-239-8	1314-62-1							
10	zinc { zinc oxide }				130 mg/kg	1.245	150 mg/kg	0.015 %	✓	
	030-013-00-7	215-222-5	1314-13-2							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
11	chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %			<LOD
	024-001-00-0	215-607-8	1333-82-0								
12	pH				8.6 pH		8.6 pH	8.6 pH			
13	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	601-052-00-2	202-049-5	91-20-3								
14	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
		205-917-1	208-96-8								
15	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
		201-469-6	83-32-9								
16	fluorene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
		201-695-5	86-73-7								
17	phenanthrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
		201-581-5	85-01-8								
18	anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
		204-371-1	120-12-7								
19	fluoranthene				0.29 mg/kg		0.269 mg/kg	0.0000269 %		✓	
		205-912-4	206-44-0								
20	pyrene				0.25 mg/kg		0.232 mg/kg	0.0000232 %		✓	
		204-927-3	129-00-0								
21	benzo[a]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	601-033-00-9	200-280-6	56-55-3								
22	chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	601-048-00-0	205-923-4	218-01-9								
23	benzo[b]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	601-034-00-4	205-911-9	205-99-2								
24	benzo[k]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	601-036-00-5	205-916-6	207-08-9								
25	benzo[a]pyrene; benzo[def]chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	601-032-00-3	200-028-5	50-32-8								
26	indeno[123-cd]pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
		205-893-2	193-39-5								
27	dibenz[a,h]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	601-041-00-2	200-181-8	53-70-3								
28	benzo[ghi]perylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
		205-883-8	191-24-2								
29	asbestos				1100 mg/kg		1019.7 mg/kg	0.102 %		✓	
	650-013-00-6	-----	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5								
Total:									0.135 %		

Key

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

Classification of sample: TP8-28/09/2022-2.2

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

Sample details

Sample name:	LoW Code:
TP8-28/09/2022-2.2	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
2.2-3.2 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
11%	
(wet weight correction)	

Hazard properties

None identified

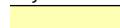
Determinands

Moisture content: 11% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				1.3 mg/kg	1.32	1.528 mg/kg	0.000153 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				3.8 mg/kg	1.462	4.943 mg/kg	0.000494 %	✓	
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				4.4 mg/kg	1.126	4.409 mg/kg	0.000441 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
5	mercury { mercury dichloride }				<0.05 mg/kg	1.353	<0.0677 mg/kg	<0.00000677 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
6	nickel { nickel(II) oxide (nickel monoxide) }				5.6 mg/kg	1.273	6.343 mg/kg	0.000634 %	✓	
	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]							
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	3.4 mg/kg		3.026 mg/kg	0.000303 %	✓	
	082-001-00-6									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.25 mg/kg	1.405	<0.351 mg/kg	<0.0000351 %		<LOD
	034-002-00-8									
9	vanadium { divanadium pentaoxide; vanadium pentoxide }				4 mg/kg	1.785	6.355 mg/kg	0.000636 %	✓	
	023-001-00-8	215-239-8	1314-62-1							
10	zinc { zinc oxide }				12 mg/kg	1.245	13.294 mg/kg	0.00133 %	✓	
	030-013-00-7	215-222-5	1314-13-2							
11	chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
12	boron { diboron trioxide; boric oxide }				1.2 mg/kg	3.22	3.439 mg/kg	0.000344 %	✓	
	005-008-00-8	215-125-8	1303-86-2							
13	TPH (C6 to C40) petroleum group				<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
			TPH							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
15	benzene				<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
16	toluene				<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
17	ethylbenzene				<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
18	xylene				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							
19	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.5 mg/kg	1.884	<0.942 mg/kg	<0.0000942 %		<LOD
	006-007-00-5									
20	pH				8.5 pH		8.5 pH	8.5 pH		
			PH							
21	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
22	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							
23	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9							
24	fluorene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-695-5	86-73-7							
25	phenanthrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-581-5	85-01-8							
26	anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-371-1	120-12-7							
27	fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-912-4	206-44-0							
28	pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-927-3	129-00-0							
29	benzo[a]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
30	chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-048-00-0	205-923-4	218-01-9							
31	benzo[b]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
32	benzo[k]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
33	benzo[a]pyrene; benzo[def]chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-032-00-3	200-028-5	50-32-8							
34	indeno[123-cd]pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-893-2	193-39-5							
35	dibenz[a,h]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
36	benzo[ghi]perylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-883-8	191-24-2							
37	monohydric phenols				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
			P1186							
Total:								0.00575 %		

Key

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

Classification of sample: TP9-28/09/2022-1.0

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

Sample details

Sample name:	LoW Code:
TP9-28/09/2022-1.0	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
1.0-2.0 m	
Moisture content:	
13%	
(wet weight correction)	

Hazard properties

None identified

Determinands

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

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	arsenic { arsenic trioxide }				12 mg/kg	1.32	13.784 mg/kg	0.00138 %	✓		
	033-003-00-0	215-481-4	1327-53-3								
2	cadmium { cadmium oxide }				0.57 mg/kg	1.142	0.566 mg/kg	0.0000566 %	✓		
	048-002-00-0	215-146-2	1306-19-0								
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				13 mg/kg	1.462	16.53 mg/kg	0.00165 %	✓		
		215-160-9	1308-38-9								
4	copper { dicopper oxide; copper (I) oxide }				62 mg/kg	1.126	60.73 mg/kg	0.00607 %	✓		
	029-002-00-X	215-270-7	1317-39-1								
5	mercury { mercury dichloride }				0.1 mg/kg	1.353	0.118 mg/kg	0.0000118 %	✓		
	080-010-00-X	231-299-8	7487-94-7								
6	nickel { nickel(II) oxide (nickel monoxide) }				14 mg/kg	1.273	15.5 mg/kg	0.00155 %	✓		
	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]								
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	140 mg/kg		121.8 mg/kg	0.0122 %	✓		
	082-001-00-6										
8	selenium { selenium compounds with the exception of cadmium selenosulfide and those specified elsewhere in this Annex }				0.5 mg/kg	1.405	0.611 mg/kg	0.0000611 %	✓		
	034-002-00-8										
9	vanadium { divanadium pentaoxide; vanadium pentoxide }				20 mg/kg	1.785	31.062 mg/kg	0.00311 %	✓		
	023-001-00-8	215-239-8	1314-62-1								
10	zinc { zinc oxide }				120 mg/kg	1.245	129.948 mg/kg	0.013 %	✓		
	030-013-00-7	215-222-5	1314-13-2								
11	chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %			<LOD
	024-001-00-0	215-607-8	1333-82-0								
12	pH				8.6 pH		8.6 pH	8.6 pH			
13	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	601-052-00-2	202-049-5	91-20-3								
14	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
		205-917-1	208-96-8								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	• acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	• fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	• phenanthrene	201-581-5	85-01-8		0.98 mg/kg		0.853 mg/kg	0.0000853 %	✓	
18	• anthracene	204-371-1	120-12-7		0.24 mg/kg		0.209 mg/kg	0.0000209 %	✓	
19	• fluoranthene	205-912-4	206-44-0		1.6 mg/kg		1.392 mg/kg	0.000139 %	✓	
20	• pyrene	204-927-3	129-00-0		1.6 mg/kg		1.392 mg/kg	0.000139 %	✓	
21	benzo[a]anthracene	601-033-00-9	200-280-6		1.1 mg/kg		0.957 mg/kg	0.0000957 %	✓	
22	chrysene	601-048-00-0	205-923-4		1.1 mg/kg		0.957 mg/kg	0.0000957 %	✓	
23	benzo[b]fluoranthene	601-034-00-4	205-911-9		1.3 mg/kg		1.131 mg/kg	0.000113 %	✓	
24	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.64 mg/kg		0.557 mg/kg	0.0000557 %	✓	
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		1.4 mg/kg		1.218 mg/kg	0.000122 %	✓	
26	• indeno[123-cd]pyrene	205-893-2	193-39-5		0.87 mg/kg		0.757 mg/kg	0.0000757 %	✓	
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.41 mg/kg		0.357 mg/kg	0.0000357 %	✓	
28	• benzo[ghi]perylene	205-883-8	191-24-2		0.88 mg/kg		0.766 mg/kg	0.0000766 %	✓	
Total:								0.0403 %		

Key

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

Classification of sample: TP15-29/09/2022-0.1

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

Sample details

Sample name:	LoW Code:
TP15-29/09/2022-0.1	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.1-1 m	Entry:
Moisture content:	17 05 03 * (Soil and stones containing hazardous substances)
11%	
(wet weight correction)	

Hazard properties

HP 7: Carcinogenic "waste which induces cancer or increases its incidence"

Hazard Statements hit:

Carc. 1B; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.249%)

HP 11: Mutagenic "waste which may cause a mutation, that is a permanent change in the amount or structure of the genetic material in a cell"

Hazard Statements hit:

Muta. 1B; H340 "May cause genetic defects [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.249%)

Determinands

Moisture content: 11% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	 arsenic { arsenic trioxide }				6.8	mg/kg	1.32	7.991	mg/kg	0.000799 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	 cadmium { cadmium oxide }				0.35	mg/kg	1.142	0.356	mg/kg	0.0000356 %	✓	
	048-002-00-0	215-146-2	1306-19-0									
3	 chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				10	mg/kg	1.462	13.008	mg/kg	0.0013 %	✓	
		215-160-9	1308-38-9									
4	 copper { dicopper oxide; copper (I) oxide }				39	mg/kg	1.126	39.08	mg/kg	0.00391 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
5	 mercury { mercury dichloride }				0.08	mg/kg	1.353	0.0964	mg/kg	0.00000964 %	✓	
	080-010-00-X	231-299-8	7487-94-7									
6	 nickel { nickel(II) oxide (nickel monoxide) }				12	mg/kg	1.273	13.591	mg/kg	0.00136 %	✓	
	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]									
7	 lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	140	mg/kg		124.6	mg/kg	0.0125 %	✓	
	082-001-00-6											

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				0.39 mg/kg	1.405	0.488 mg/kg	0.0000488 %	✓	
	034-002-00-8									
9	vanadium { divanadium pentaoxide; vanadium pentoxide }				14 mg/kg	1.785	22.243 mg/kg	0.00222 %	✓	
	023-001-00-8	215-239-8	1314-62-1							
10	zinc { zinc oxide }				110 mg/kg	1.245	121.857 mg/kg	0.0122 %	✓	
	030-013-00-7	215-222-5	1314-13-2							
11	chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
12	boron { diboron trioxide; boric oxide }				1.6 mg/kg	3.22	4.585 mg/kg	0.000459 %	✓	
	005-008-00-8	215-125-8	1303-86-2							
13	TPH (C6 to C40) petroleum group				2800 mg/kg		2492 mg/kg	0.249 %	✓	
			TPH							
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
15	benzene				<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
16	toluene				<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
17	ethylbenzene				<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
18	xylene				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							
19	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.5 mg/kg	1.884	<0.942 mg/kg	<0.0000942 %		<LOD
	006-007-00-5									
20	pH				8.1 pH		8.1 pH	8.1 pH		
			PH							
21	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
22	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							
23	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9							
24	fluorene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-695-5	86-73-7							
25	phenanthrene				11 mg/kg		9.79 mg/kg	0.000979 %	✓	
		201-581-5	85-01-8							
26	anthracene				1.9 mg/kg		1.691 mg/kg	0.000169 %	✓	
		204-371-1	120-12-7							
27	fluoranthene				14 mg/kg		12.46 mg/kg	0.00125 %	✓	
		205-912-4	206-44-0							
28	pyrene				12 mg/kg		10.68 mg/kg	0.00107 %	✓	
		204-927-3	129-00-0							
29	benzo[a]anthracene				6.1 mg/kg		5.429 mg/kg	0.000543 %	✓	
	601-033-00-9	200-280-6	56-55-3							
30	chrysene				6 mg/kg		5.34 mg/kg	0.000534 %	✓	
	601-048-00-0	205-923-4	218-01-9							
31	benzo[b]fluoranthene				7.7 mg/kg		6.853 mg/kg	0.000685 %	✓	
	601-034-00-4	205-911-9	205-99-2							
32	benzo[k]fluoranthene				2.7 mg/kg		2.403 mg/kg	0.00024 %	✓	
	601-036-00-5	205-916-6	207-08-9							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
33	benzo[a]pyrene; benzo[def]chrysene				7.8 mg/kg		6.942 mg/kg	0.000694 %	✓	
	601-032-00-3	200-028-5	50-32-8							
34	indeno[123-cd]pyrene				4.9 mg/kg		4.361 mg/kg	0.000436 %	✓	
		205-893-2	193-39-5							
35	dibenz[a,h]anthracene				0.9 mg/kg		0.801 mg/kg	0.000801 %	✓	
	601-041-00-2	200-181-8	53-70-3							
36	benzo[ghi]perylene				4.5 mg/kg		4.005 mg/kg	0.0004 %	✓	
		205-883-8	191-24-2							
37	monohydric phenols				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
			P1186							
Total:								0.291 %		

Key

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

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because No free draining liquid, no olfactory evidence, no anticipated sources identified and no other evidence of hydrocarbon contamination in samples. Flammability of soils is unlikely to result in a hazardous classification in soils (AGS Waste Classification – A Practitioner's Guide).

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.249%)

Classification of sample: WS101-06/10/2022-1

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

Sample details

Sample name:	LoW Code:
WS101-06/10/2022-1	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
1-2 m	
Moisture content:	
14%	
(wet weight correction)	

Hazard properties

None identified

Determinands

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

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				8.9	mg/kg	1.32	10.106	mg/kg	0.00101 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				0.4	mg/kg	1.142	0.393	mg/kg	0.0000393 %	✓	
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				9	mg/kg	1.462	11.312	mg/kg	0.00113 %	✓	
		215-160-9	1308-38-9									
4	copper { dicopper oxide; copper (I) oxide }				44	mg/kg	1.126	42.604	mg/kg	0.00426 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
5	mercury { mercury dichloride }				0.23	mg/kg	1.353	0.268	mg/kg	0.0000268 %	✓	
	080-010-00-X	231-299-8	7487-94-7									
6	nickel { nickel(II) oxide (nickel monoxide) }				9	mg/kg	1.273	9.85	mg/kg	0.000985 %	✓	
	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]									
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	160	mg/kg		137.6	mg/kg	0.0138 %	✓	
	082-001-00-6											
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				0.25	mg/kg	1.405	0.302	mg/kg	0.0000302 %	✓	
	034-002-00-8											
9	vanadium { divanadium pentaoxide; vanadium pentoxide }				12	mg/kg	1.785	18.423	mg/kg	0.00184 %	✓	
	023-001-00-8	215-239-8	1314-62-1									
10	zinc { zinc oxide }				100	mg/kg	1.245	107.045	mg/kg	0.0107 %	✓	
	030-013-00-7	215-222-5	1314-13-2									
11	chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
12	pH		PH		9	pH		9	pH	9pH		
13	naphthalene				5.3	mg/kg		4.558	mg/kg	0.000456 %	✓	
	601-052-00-2	202-049-5	91-20-3									
14	acenaphthylene				2.3	mg/kg		1.978	mg/kg	0.000198 %	✓	
		205-917-1	208-96-8									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	• acenaphthene	201-469-6	83-32-9		5.5 mg/kg		4.73 mg/kg	0.000473 %	✓	
16	• fluorene	201-695-5	86-73-7		6.4 mg/kg		5.504 mg/kg	0.00055 %	✓	
17	• phenanthrene	201-581-5	85-01-8		46 mg/kg		39.56 mg/kg	0.00396 %	✓	
18	• anthracene	204-371-1	120-12-7		10 mg/kg		8.6 mg/kg	0.00086 %	✓	
19	• fluoranthene	205-912-4	206-44-0		57 mg/kg		49.02 mg/kg	0.0049 %	✓	
20	• pyrene	204-927-3	129-00-0		54 mg/kg		46.44 mg/kg	0.00464 %	✓	
21	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	26 mg/kg		22.36 mg/kg	0.00224 %	✓	
22	chrysene	601-048-00-0	205-923-4	218-01-9	26 mg/kg		22.36 mg/kg	0.00224 %	✓	
23	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	30 mg/kg		25.8 mg/kg	0.00258 %	✓	
24	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	12 mg/kg		10.32 mg/kg	0.00103 %	✓	
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	29 mg/kg		24.94 mg/kg	0.00249 %	✓	
26	• indeno[123-cd]pyrene	205-893-2	193-39-5		15 mg/kg		12.9 mg/kg	0.00129 %	✓	
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	3.1 mg/kg		2.666 mg/kg	0.000267 %	✓	
28	• benzo[ghi]perylene	205-883-8	191-24-2		14 mg/kg		12.04 mg/kg	0.0012 %	✓	
Total:								0.0633 %		

Key

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

Classification of sample: WS104-06/10/2022-1

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

Sample details

Sample name:	LoW Code:
WS104-06/10/2022-1	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
1-2 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
21%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 21% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				6.6 mg/kg	1.32	6.884 mg/kg	0.000688 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				0.11 mg/kg	1.142	0.0993 mg/kg	0.00000993 %	✓	
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				7.7 mg/kg	1.462	8.891 mg/kg	0.000889 %	✓	
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				21 mg/kg	1.126	18.678 mg/kg	0.00187 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
5	mercury { mercury dichloride }				0.19 mg/kg	1.353	0.203 mg/kg	0.0000203 %	✓	
	080-010-00-X	231-299-8	7487-94-7							
6	nickel { nickel(II) oxide (nickel monoxide) }				6.3 mg/kg	1.273	6.334 mg/kg	0.000633 %	✓	
	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]							
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	64 mg/kg		50.56 mg/kg	0.00506 %	✓	
	082-001-00-6									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.25 mg/kg	1.405	<0.351 mg/kg	<0.0000351 %		<LOD
	034-002-00-8									
9	vanadium { divanadium pentaoxide; vanadium pentoxide }				12 mg/kg	1.785	16.924 mg/kg	0.00169 %	✓	
	023-001-00-8	215-239-8	1314-62-1							
10	zinc { zinc oxide }				24 mg/kg	1.245	23.6 mg/kg	0.00236 %	✓	
	030-013-00-7	215-222-5	1314-13-2							
11	chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
12	pH		PH		8.3 pH		8.3 pH	8.3 pH		
13	naphthalene				0.45 mg/kg		0.356 mg/kg	0.0000356 %	✓	
	601-052-00-2	202-049-5	91-20-3							
14	acenaphthylene				0.11 mg/kg		0.0869 mg/kg	0.00000869 %	✓	
		205-917-1	208-96-8							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	acenaphthene	201-469-6	83-32-9		0.21 mg/kg		0.166 mg/kg	0.0000166 %	✓	
16	fluorene	201-695-5	86-73-7		0.22 mg/kg		0.174 mg/kg	0.0000174 %	✓	
17	phenanthrene	201-581-5	85-01-8		1.4 mg/kg		1.106 mg/kg	0.000111 %	✓	
18	anthracene	204-371-1	120-12-7		0.33 mg/kg		0.261 mg/kg	0.0000261 %	✓	
19	fluoranthene	205-912-4	206-44-0		1.6 mg/kg		1.264 mg/kg	0.000126 %	✓	
20	pyrene	204-927-3	129-00-0		1.5 mg/kg		1.185 mg/kg	0.000119 %	✓	
21	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.77 mg/kg		0.608 mg/kg	0.0000608 %	✓	
22	chrysene	601-048-00-0	205-923-4	218-01-9	0.79 mg/kg		0.624 mg/kg	0.0000624 %	✓	
23	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.97 mg/kg		0.766 mg/kg	0.0000766 %	✓	
24	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.41 mg/kg		0.324 mg/kg	0.0000324 %	✓	
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.91 mg/kg		0.719 mg/kg	0.0000719 %	✓	
26	indeno[123-cd]pyrene	205-893-2	193-39-5		0.58 mg/kg		0.458 mg/kg	0.0000458 %	✓	
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	0.15 mg/kg		0.119 mg/kg	0.0000119 %	✓	
28	benzo[ghi]perylene	205-883-8	191-24-2		0.6 mg/kg		0.474 mg/kg	0.0000474 %	✓	
Total:								0.0142 %		

Key

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

Classification of sample: WS104-06/10/2022-2.5

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

Sample details

Sample name:	LoW Code:
WS104-06/10/2022-2.5	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
2.5-3 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
14%	
(wet weight correction)	

Hazard properties

None identified

Determinands

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

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	• pH				8.1 pH		8.1 pH	8.1 pH		
Total:								0%		

Key

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

Classification of sample: 117400-24/10/2022-0.70

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

Sample details

Sample name:	LoW Code:
117400-24/10/2022-0.70	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.70-1.60 m	
Moisture content:	
13%	
(wet weight correction)	

Hazard properties

None identified

Determinands

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

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				23	mg/kg	1.32	26.42	mg/kg	0.00264 %	✓	
		033-003-00-0	215-481-4	1327-53-3									
2		cadmium { cadmium oxide }				0.99	mg/kg	1.142	0.984	mg/kg	0.0000984 %	✓	
		048-002-00-0	215-146-2	1306-19-0									
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				20	mg/kg	1.462	25.431	mg/kg	0.00254 %	✓	
			215-160-9	1308-38-9									
4		copper { dicopper oxide; copper (I) oxide }				160	mg/kg	1.126	156.724	mg/kg	0.0157 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
5		mercury { mercury dichloride }				0.43	mg/kg	1.353	0.506	mg/kg	0.0000506 %	✓	
		080-010-00-X	231-299-8	7487-94-7									
6		nickel { nickel(II) oxide (nickel monoxide) }				26	mg/kg	1.273	28.786	mg/kg	0.00288 %	✓	
		028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]									
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	280	mg/kg		243.6	mg/kg	0.0244 %	✓	
		082-001-00-6											
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				0.69	mg/kg	1.405	0.843	mg/kg	0.0000843 %	✓	
		034-002-00-8											
9		vanadium { divanadium pentaoxide; vanadium pentoxide }				23	mg/kg	1.785	35.722	mg/kg	0.00357 %	✓	
		023-001-00-8	215-239-8	1314-62-1									
10		zinc { zinc oxide }				780	mg/kg	1.245	844.663	mg/kg	0.0845 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
11		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
12		pH				8.1	pH		8.1	pH	8.1 pH		
				pH									
13		naphthalene				7.3	mg/kg		6.351	mg/kg	0.000635 %	✓	
		601-052-00-2	202-049-5	91-20-3									
14		acenaphthylene				4.8	mg/kg		4.176	mg/kg	0.000418 %	✓	
			205-917-1	208-96-8									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	acenaphthene	201-469-6	83-32-9		7.6 mg/kg		6.612 mg/kg	0.000661 %	✓	
16	fluorene	201-695-5	86-73-7		9.6 mg/kg		8.352 mg/kg	0.000835 %	✓	
17	phenanthrene	201-581-5	85-01-8		81 mg/kg		70.47 mg/kg	0.00705 %	✓	
18	anthracene	204-371-1	120-12-7		16 mg/kg		13.92 mg/kg	0.00139 %	✓	
19	fluoranthene	205-912-4	206-44-0		91 mg/kg		79.17 mg/kg	0.00792 %	✓	
20	pyrene	204-927-3	129-00-0		93 mg/kg		80.91 mg/kg	0.00809 %	✓	
21	benzo[a]anthracene	601-033-00-9	200-280-6		42 mg/kg		36.54 mg/kg	0.00365 %	✓	
22	chrysene	601-048-00-0	205-923-4		49 mg/kg		42.63 mg/kg	0.00426 %	✓	
23	benzo[b]fluoranthene	601-034-00-4	205-911-9		51 mg/kg		44.37 mg/kg	0.00444 %	✓	
24	benzo[k]fluoranthene	601-036-00-5	205-916-6		21 mg/kg		18.27 mg/kg	0.00183 %	✓	
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		49 mg/kg		42.63 mg/kg	0.00426 %	✓	
26	indeno[123-cd]pyrene	205-893-2	193-39-5		26 mg/kg		22.62 mg/kg	0.00226 %	✓	
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8		5.8 mg/kg		5.046 mg/kg	0.000505 %	✓	
28	benzo[ghi]perylene	205-883-8	191-24-2		26 mg/kg		22.62 mg/kg	0.00226 %	✓	
29	asbestos	650-013-00-6	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5		750 mg/kg		652.5 mg/kg	0.0653 %	✓	
Total:								0.252 %		

Key

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

Classification of sample: BH5-05/10/2022-0.00

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

Sample details

Sample name:	LoW Code:
BH5-05/10/2022-0.00	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.00-1.20 m	
Moisture content:	
12%	
(wet weight correction)	

Hazard properties

None identified

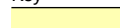
Determinands

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

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	arsenic { arsenic trioxide }				12 mg/kg	1.32	13.943	mg/kg	0.00139 %	✓	
	033-003-00-0	215-481-4	1327-53-3								
2	cadmium { cadmium oxide }				0.45 mg/kg	1.142	0.452	mg/kg	0.0000452 %	✓	
	048-002-00-0	215-146-2	1306-19-0								
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				8.9 mg/kg	1.462	11.447	mg/kg	0.00114 %	✓	
		215-160-9	1308-38-9								
4	copper { dicopper oxide; copper (I) oxide }				140 mg/kg	1.126	138.709	mg/kg	0.0139 %	✓	
	029-002-00-X	215-270-7	1317-39-1								
5	mercury { mercury dichloride }				0.21 mg/kg	1.353	0.25	mg/kg	0.000025 %	✓	
	080-010-00-X	231-299-8	7487-94-7								
6	nickel { nickel(II) oxide (nickel monoxide) }				15 mg/kg	1.273	16.798	mg/kg	0.00168 %	✓	
	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]								
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	270 mg/kg		237.6	mg/kg	0.0238 %	✓	
	082-001-00-6										
8	selenium { selenium compounds with the exception of cadmium selenosulfide and those specified elsewhere in this Annex }				0.4 mg/kg	1.405	0.495	mg/kg	0.0000495 %	✓	
	034-002-00-8										
9	vanadium { divanadium pentaoxide; vanadium pentoxide }				18 mg/kg	1.785	28.277	mg/kg	0.00283 %	✓	
	023-001-00-8	215-239-8	1314-62-1								
10	zinc { zinc oxide }				120 mg/kg	1.245	131.442	mg/kg	0.0131 %	✓	
	030-013-00-7	215-222-5	1314-13-2								
11	chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.5 mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		<LOD
	024-001-00-0	215-607-8	1333-82-0								
12	boron { diboron trioxide; boric oxide }				0.92 mg/kg	3.22	2.607	mg/kg	0.000261 %	✓	
	005-008-00-8	215-125-8	1303-86-2								
13	TPH (C6 to C40) petroleum group				<10 mg/kg		<10	mg/kg	<0.001 %		<LOD
			TPH								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
15	benzene				<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
16	toluene				<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
17	ethylbenzene				<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
18	xylene				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							
19	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				0.5 mg/kg	1.884	0.829 mg/kg	0.0000829 %	✓	
	006-007-00-5									
20	pH				8.4 pH		8.4 pH	8.4 pH		
			PH							
21	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
22	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							
23	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9							
24	fluorene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-695-5	86-73-7							
25	phenanthrene				1.5 mg/kg		1.32 mg/kg	0.000132 %	✓	
		201-581-5	85-01-8							
26	anthracene				0.29 mg/kg		0.255 mg/kg	0.0000255 %	✓	
		204-371-1	120-12-7							
27	fluoranthene				2.2 mg/kg		1.936 mg/kg	0.000194 %	✓	
		205-912-4	206-44-0							
28	pyrene				2 mg/kg		1.76 mg/kg	0.000176 %	✓	
		204-927-3	129-00-0							
29	benzo[a]anthracene				1.1 mg/kg		0.968 mg/kg	0.0000968 %	✓	
	601-033-00-9	200-280-6	56-55-3							
30	chrysene				0.81 mg/kg		0.713 mg/kg	0.0000713 %	✓	
	601-048-00-0	205-923-4	218-01-9							
31	benzo[b]fluoranthene				1 mg/kg		0.88 mg/kg	0.000088 %	✓	
	601-034-00-4	205-911-9	205-99-2							
32	benzo[k]fluoranthene				0.3 mg/kg		0.264 mg/kg	0.0000264 %	✓	
	601-036-00-5	205-916-6	207-08-9							
33	benzo[a]pyrene; benzo[def]chrysene				1 mg/kg		0.88 mg/kg	0.000088 %	✓	
	601-032-00-3	200-028-5	50-32-8							
34	indeno[123-cd]pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-893-2	193-39-5							
35	dibenz[a,h]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
36	benzo[ghi]perylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-883-8	191-24-2							
37	monohydric phenols				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
			P1186							
Total:								0.0604 %		

Key

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

Classification of sample: WS105-06/10/2022-0

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

Sample details

Sample name:	LoW Code:
WS105-06/10/2022-0	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0-1 m	
Moisture content:	
11%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 11% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				5.8	mg/kg	1.32	6.816	mg/kg	0.000682 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				0.21	mg/kg	1.142	0.214	mg/kg	0.0000214 %	✓	
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				7.7	mg/kg	1.462	10.016	mg/kg	0.001 %	✓	
		215-160-9	1308-38-9									
4	copper { dicopper oxide; copper (I) oxide }				29	mg/kg	1.126	29.059	mg/kg	0.00291 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
5	mercury { mercury dichloride }				0.17	mg/kg	1.353	0.205	mg/kg	0.0000205 %	✓	
	080-010-00-X	231-299-8	7487-94-7									
6	nickel { nickel(II) oxide (nickel monoxide) }				6.8	mg/kg	1.273	7.702	mg/kg	0.00077 %	✓	
	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]									
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	130	mg/kg		115.7	mg/kg	0.0116 %	✓	
	082-001-00-6											
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				0.27	mg/kg	1.405	0.338	mg/kg	0.0000338 %	✓	
	034-002-00-8											
9	vanadium { divanadium pentaoxide; vanadium pentoxide }				8.8	mg/kg	1.785	13.982	mg/kg	0.0014 %	✓	
	023-001-00-8	215-239-8	1314-62-1									
10	zinc { zinc oxide }				46	mg/kg	1.245	50.959	mg/kg	0.0051 %	✓	
	030-013-00-7	215-222-5	1314-13-2									
11	chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
12	pH		PH		9	pH		9	pH	9pH		
13	naphthalene				6.1	mg/kg		5.429	mg/kg	0.000543 %	✓	
	601-052-00-2	202-049-5	91-20-3									
14	acenaphthylene				2.8	mg/kg		2.492	mg/kg	0.000249 %	✓	
		205-917-1	208-96-8									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	acenaphthene	201-469-6	83-32-9		7.4 mg/kg		6.586 mg/kg	0.000659 %	✓	
16	fluorene	201-695-5	86-73-7		7.8 mg/kg		6.942 mg/kg	0.000694 %	✓	
17	phenanthrene	201-581-5	85-01-8		63 mg/kg		56.07 mg/kg	0.00561 %	✓	
18	anthracene	204-371-1	120-12-7		15 mg/kg		13.35 mg/kg	0.00134 %	✓	
19	fluoranthene	205-912-4	206-44-0		77 mg/kg		68.53 mg/kg	0.00685 %	✓	
20	pyrene	204-927-3	129-00-0		74 mg/kg		65.86 mg/kg	0.00659 %	✓	
21	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	36 mg/kg		32.04 mg/kg	0.0032 %	✓	
22	chrysene	601-048-00-0	205-923-4	218-01-9	37 mg/kg		32.93 mg/kg	0.00329 %	✓	
23	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	40 mg/kg		35.6 mg/kg	0.00356 %	✓	
24	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	15 mg/kg		13.35 mg/kg	0.00134 %	✓	
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	38 mg/kg		33.82 mg/kg	0.00338 %	✓	
26	indeno[123-cd]pyrene	205-893-2	193-39-5		20 mg/kg		17.8 mg/kg	0.00178 %	✓	
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	4 mg/kg		3.56 mg/kg	0.000356 %	✓	
28	benzo[ghi]perylene	205-883-8	191-24-2		20 mg/kg		17.8 mg/kg	0.00178 %	✓	
Total:								0.0648 %		

Key

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

Classification of sample: WS105-06/10/2022-3.5

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

Sample details

Sample name:	LoW Code:
WS105-06/10/2022-3.5	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
3.5-4 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
15%	
(wet weight correction)	

Hazard properties

None identified

Determinands

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

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	• pH				8.3 pH		8.3 pH	8.3 pH		
Total:								0%		

Key

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

Appendix A: Classifier defined and non GB MCL determinands

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

Description/Comments: Data from C&L Inventory Database

Data source: <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806>

Data source date: 17 Jul 2015

Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

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

GB MCL index number: 082-001-00-6

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

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

Reason for additional Hazards Statement(s):

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

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

■ divanadium pentaoxide; vanadium pentoxide (EC Number: 215-239-8, CAS Number: 1314-62-1)

GB MCL index number: 023-001-00-8

Description/Comments:

Additional Hazard Statement(s): Carc. 1B; H350 , Acute Tox. 3; H301 , Acute Tox. 2; H330

Reason for additional Hazards Statement(s):

20 Sep 2022 - Carc. 1B; H350 hazard statement sourced from: ATP 18 (Regulation (EU) 2022/692) considers vanadium pentoxide to be Carc. 1B; H350. The GB MCL Agency has reached the same opinion [but is yet to formerly make this change to the MCL List].

Substance has therefore been self-classified.

28 Sep 2022 - Acute Tox. 3; H301 hazard statement sourced from: ATP 18 (Regulation (EU) 2022/692) considers vanadium pentoxide to be "Acute tox 3; H301". The GB MCL Agency has reached the same opinion [but is yet to formerly make this change to the MCL List].

Substance has therefore been self-classified.

28 Sep 2022 - Acute Tox. 2; H330 hazard statement sourced from: ATP 18 (Regulation (EU) 2022/692) considers vanadium pentoxide to be "Acute tox 2; H330". The GB MCL Agency has reached the same opinion [but is yet to formerly make this change to the MCL List].

Substance has therefore been self-classified.

■ pH (CAS Number: PH)

Description/Comments: Appendix C4

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: None.

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

Description/Comments: Data from C&L Inventory Database

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

Data source date: 17 Jul 2015

Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

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

Description/Comments: Data from C&L Inventory Database

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

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

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

Description/Comments: Data from C&L Inventory Database

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

Data source date: 06 Aug 2015

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

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

Description/Comments: Data from C&L Inventory Database

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

Data source date: 06 Aug 2015

Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

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

Description/Comments: Data from C&L Inventory Database

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

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319, STOT SE 3; H335, Skin Irrit. 2; H315, Skin Sens. 1; H317, Aquatic Acute 1; H400, Aquatic Chronic 1; H410

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

Description/Comments: Data from C&L Inventory Database

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

Data source date: 21 Aug 2015

Hazard Statements: Acute Tox. 4; H302, Aquatic Acute 1; H400, Aquatic Chronic 1; H410

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

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014

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

Data source date: 21 Aug 2015

Hazard Statements: Skin Irrit. 2; H315, Eye Irrit. 2; H319, STOT SE 3; H335, Aquatic Acute 1; H400, Aquatic Chronic 1; H410

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

Description/Comments: Data from C&L Inventory Database

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

Data source date: 06 Aug 2015

Hazard Statements: Carc. 2; H351

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

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

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

Data source date: 23 Jul 2015

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

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

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: Flam. Liq. 3; H226, Asp. Tox. 1; H304, STOT RE 2; H373, Muta. 1B; H340, Carc. 1B; H350, Repr. 2; H361d, Aquatic Chronic 2; H411

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

GB MCL index number: 601-023-00-4

Description/Comments:

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

Reason for additional Hazards Statement(s):

20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

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

GB MCL index number: 006-007-00-5

Description/Comments: Conversion factor based on a worst case compound: sodium cyanide

Additional Hazard Statement(s): EUH032 >= 0.2 %

Reason for additional Hazards Statement(s):

20 Nov 2021 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

▪ **monohydric phenols** (CAS Number: P1186)

Description/Comments: Combined hazards statements from harmonised entries in CLP for phenol, cresols and xylenols (604-001-00-2, 604-004-00-9, 604-006-00-X)

Data source: CLP combined data

Data source date: 26 Mar 2019

Hazard Statements: Muta. 2; H341, Acute Tox. 3; H331, Acute Tox. 3; H311, Acute Tox. 3; H301, STOT RE 2; H373, Skin Corr. 1B; H314, Skin Corr. 1B; H314 >= 3 %, Skin Irrit. 2; H315 1 & conc. < 3 %, Eye Irrit. 2; H319 1 & conc. < 3 %, Aquatic Chronic 2; H411

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

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

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides.

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

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

copper {dicopper oxide; copper (I) oxide}

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

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight

nickel {nickel(II) oxide (nickel monoxide)}

Worst case compound based on absence of CrVI and assumed metal oxides from a combustion, ash based source.

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

Worst case compound based on absence of CrVI and assumed metal oxides from a combustion, ash based source.

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

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil.

vanadium {divanadium pentaoxide; vanadium pentoxide}

Most conservative species.

zinc {zinc oxide}

Worst case compound based on absence of CrVI and assumed metal oxides from a combustion, ash based source.

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

Worst case CLP species based on hazard statements/molecular weight. Industrial sources include: production stainless steel, electroplating, wood preservation, anti-corrosion agents or coatings, pigments

boron {diboron trioxide; boric oxide}

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

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

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

Appendix C: Version

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

HazWasteOnline Classification Engine Version: 2022.263.5340.9974 (20 Sep 2022)

HazWasteOnline Database: 2022.273.5362.10003 (03 Oct 2022)

This classification utilises the following guidance and legislation:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2020 No. 1540 of 16th December 2020

GB MCL List - version 1.1 of 09 June 2021

Appendix I

Permeability Tests

Site : Pollard Street, Manchester

Client : General Projects

Engineer : LKC

Job Number

LKC 20 1301

Sheet

1 / 2

Location	Date	Level	Location
TP1	12/10/2022	49.50 mOD	

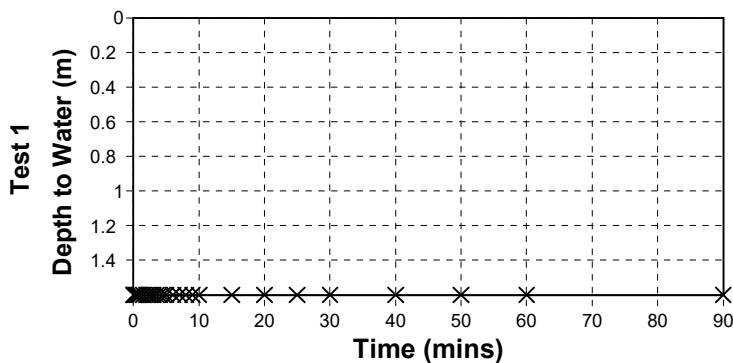
Pit Width (m)	0.60
Pit Depth (m)	1.60
Pit Length (m)	2.00

Soil type at test level	Made ground gravel
Groundwater	None
Drain discharge depth	None
Sidewall stability	Unstable
Stone filled or open pit	Open pit

	1
Effective depth (m)	0.00
Volume outflowing between 75% & 25% (m3)	0.00
Mean surface area through which outflow occurs (m2)	1.20
Time for outflow between 75% & 25% (min)	0.00
SOIL INFILTRATION RATE (ms ⁻¹), f	

Remarks

Elapsed time (hh:mm:ss)	Depth to Water Test 1
00:00:00	1.60
00:00:05	1.60
00:00:10	1.60
00:00:20	1.60
00:00:30	1.60
00:00:40	1.60
00:00:50	1.60
00:01:00	1.60
00:01:30	1.60
00:02:00	1.60
00:02:30	1.60
00:03:00	1.60
00:03:30	1.60
00:04:00	1.60
00:04:30	1.60
00:05:00	1.60
00:06:00	1.60
00:07:00	1.60
00:08:00	1.60
00:09:00	1.60
00:10:00	1.60
00:15:00	1.60
00:20:00	1.60
00:25:00	1.60
00:30:00	1.60
00:40:00	1.60
00:50:00	1.60
01:00:00	1.60
01:30:00	1.60



Site : Pollard Street, Manchester

Client : General Projects

Engineer : LKC

Job Number

LKC 20 1301

Sheet

2 / 2

Location	Date	Level	Location
TP8	04/10/2022		

Pit Width (m)	0.60
Pit Depth (m)	2.80
Pit Length (m)	2.00

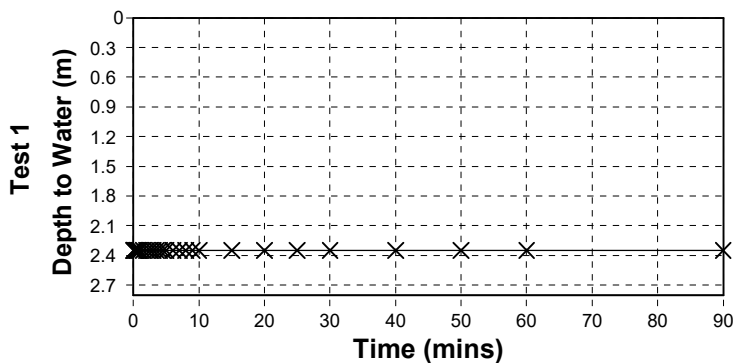
Soil type at test level	Clay
Groundwater	None
Drain discharge depth	None
Sidewall stability	Stable
Stone filled or open pit	Stone filled

	1
Effective depth (m)	0.45
Volume outflowing between 75% & 25% (m3)*	
Mean surface area through which outflow occurs (m2)	
Time for outflow between 75% & 25% (min)	
SOIL INFILTRATION RATE (ms-1), f	Test Failed

Remarks

* Volume outflowing reduced to account for granular backfill used during testing (30 % of free volume assumed).

Elapsed time (hh:mm:ss)	Depth to Water Test 1
00:00:00	2.35
00:00:05	2.35
00:00:10	2.35
00:00:20	2.35
00:00:30	2.35
00:00:40	2.35
00:00:50	2.35
00:01:00	2.35
00:01:30	2.35
00:02:00	2.35
00:02:30	2.35
00:03:00	2.35
00:03:30	2.35
00:04:00	2.35
00:04:30	2.35
00:05:00	2.35
00:06:00	2.35
00:07:00	2.35
00:08:00	2.35
00:09:00	2.35
00:10:00	2.35
00:15:00	2.35
00:20:00	2.35
00:25:00	2.35
00:30:00	2.35
00:40:00	2.35
00:50:00	2.35
01:00:00	2.35
01:30:00	2.35



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