KELBROOK ROAD
OPENSHAW

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

Job Number: LKC 21 1095
Date: September 2021
Client: G. H. Sheldon Wholesale Bakers Ltd



INCREASING LAND VALUE

LK GROUP

LK Consult Document Verification			
Site Address	Land at Kelbrook Road, Openshaw, Manchester, M11 2GW		
Report Title	Phase 2 Geo-Environmental Investigation, Risk Assessment and Remediation Strategy		
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Revision Record			
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EXECUTIVE SUMMARY

Site Details

Site Location:	Land to the west of Kelbrook Road, Openshaw, Manchester. Centred at approximate National Grid Reference 387678E, 397725N.
Site Area:	2.15ha.
Current Land Use:	Vacant, partly heavily vegetated land.
Proposed Development:	Commercial building (bakery) with car parking and soft landscaping.
Purpose of Report:	Contamination and Geotechnical Assessment.

Preliminary Risk Assessment

PRA Details:	Undertaken by LKC in February 2021. Ref: LKC 21 1095.
History:	Dye works, brick works, terraced housing, railway lines, engineering works.
Geology / Hydrogeology:	Glacial Till (Secondary A Aquifer) over Chester Formation Sandstone (Principal Aquifer).
Relevant Environmental Setting:	Clayton Brook, culverted through the site. Nearest groundwater abstraction 67m NE for manufacturing, licence now revoked. Not within Source Protection Zone.
Preliminary Conceptual Model: PL=Pollutant Linkage	PL1 Direct Contact (Human Health): Moderate Risk (ACMs, metals, PAHs, petroleum hydrocarbons). PL2 Inhalation of Vapours: Moderate Risk (volatile contaminants). PL3 Gas: High Risk (hazardous and ground gas). PL4 Controlled waters: Moderate Risk (mobile contaminants). PL5 Sulphate Attack: Moderate/Low Risk (sulphate). PL6 Water Pipelines: Moderate Risk (organic contaminants). PL7 Phytotoxic: Low Risk (metals).
Recommendations:	Site Investigation was recommended to further assess all the above pollutant linkages.

Ground Investigation Work Undertaken

Date of Investigation:	Two phases of investigation: Preliminary trial pits: March 2021 Window sample boreholes and cable percussive boreholes: 12-13th August 2021.
Intrusive Investigation Work Undertaken:	9no. window sample boreholes (WS101-WS109). 3no. cable percussive boreholes (CP101-CP103)
Monitoring Wells:	Installed in all boreholes.
Soil Sampling:	6no. samples tested for metals, speciated PAHs, pH, sulphate, asbestos and SOM. 3no. samples tested for metals, speciated PAHs, cyanide, pH, sulphate, asbestos, phenol, TPHCWG, BTEX and SOM. 1no. sample for TPHCWG, BTEX & MTBE. 4no. samples tested for pH and sulphate.
Groundwater Sampling:	3no samples tested for metals, speciated PAHs, cyanide, pH, sulphate, hardness, phenol, TPHCWG, BTEX, VOCs, SVOCs.
Monitoring:	4no. gas monitoring visits over 2 months.
Insitu and Laboratory Geotechnical Testing:	SPTs, shear vanes, plasticity, single stage triaxials, oedometer tests..

Ground Conditions and Geotechnical Assessment

Proposed Development	- Industrial bakery unit with yard and parking areas.
General Ground conditions / Geotechnical Testing	- Based on CP101-CP103, WS101A-WS109B, TP101-TP110. - Maximum investigation depth 13.00bgl. - Made Ground up to 4.6mbgl. - Glacial Till (Diamicton) comprising stiff to very stiff variably sandy gravelly CLAY to the completion depths of the exploratory holes. - No bedrock encountered. - Groundwater encountered at depths of between 1.8m and 9.0mbgl within several of the exploratory holes.
Existing Foundations / Obstructions	- The site has previously been developed and as such obstructions within near surface soils can be anticipated. - Live services are known to cross the southern section of the site (6-6.6kV cable). - A 1200mm culvert is marked on United Utilities plans to cross the site.
Undrained Shear Strength (s_u)	- Natural CLAY encountered beneath the Made Ground returned undrained shear strengths of 50kPa up to 3.0mbgl, increasing to 100kPa from 3.00mbgl.
Anticipated Foundation Type	- Ground conditions below the proposed structure are variable with varying depths of made ground (0.7-4.6mbgl), comprising silt, sand and gravel. - Traditional shallow foundations are not expected to be suitable for the proposed development given the ground conditions encountered. - It is recommended that the structure is piled to competent strata. Sleeving should be used at shallow depth to ensure the piles are not affected by negative skin friction from the significant thickness of Made Ground. -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.
Shallow Groundwater	- Shallow groundwater identified on the site which may present a constraint to the development. - Suitable drainage should be considered in the proposed development layout.
Concrete Requirements	- Based on BRE Digest 2005[1] – DS-2 AC-3z recommended.
Services	- Services – consideration to the presence of services running through the site. Services may need to re-routed.
Culvert	- The United Utilities service plans show a 1200mm culvert crossing the site. The location and depth of the culvert should be accurately determined before finalising any development plans.
Temporary support of excavations	- Will be required; trial pits were generally recorded as unstable in granular Made Ground.
Plasticity	- Consideration will need to be given to the shrink / swell of the clay strata if it is to be used as founding strata, particularly where trees/hedges are present. Foundations may need to be deepened. A medium volume change potential has been calculated for the site.
Road / Pavement Design	- Topsoil and untreated Made Ground is considered unsuitable as a sub-grade material. It should be removed to a depth of 0.5m below formation level and sorted to remove any unsuitable or deleterious materials. The sub formation should be rolled and suitable excavated material can then be replaced, up to formation level, in fully compacted thin layers. Any deficit should be made up with suitable imported fill compacted as above. Following this treatment an overall design CBR of 2-5% should be available, although this will require confirmation at a later date through in-situ CBR tests.

Contamination Risk Assessment

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

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	Recommendations
1	Contaminants posing a risk to site users via dermal contact, ingestion and inhalation (of soil, dust, fibres and vegetables).	**Low** (ACM, heavy metals, PAHs, hydrocarbons)	No remediation required.
2	Volatile contaminants posing a risk to site users via the inhalation of vapours.	**Low**	No remediation required.
3	Gas posing a risk to buildings and site users via the migration of gas into building causing explosion and asphyxiation.	Moderate / **Low**	No gas protection measures required.
4	Mobile contamination posing a risk to controlled waters via the migration through permeable strata.	**Low**	No remediation required.
5	Sulphate posing a risk to building via direct contact (sulphate attack).	**Moderate /** Low	Sulphate resistant concrete (DS-2 AC-3z) required.
6	Organic contaminants posing a risk to water pipes.	**Moderate**	UU risk assessment to be completed. The site will may require barrier pipe dependent on route and depth of potable water pipes.
7	Phytotoxic metals posing a risk to flora via root uptake.	**Low**	No remediation required.

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	Remediation Requirements	Validation Requirements
ALL	<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. Should further asbestos be identified during groundworks, precautions should be taken to ensure the safety of the construction workers and nearby land users. It would be advisable to introduce an asbestos management strategy in line with CIRIA C733[2].	Log of work undertaken including photographs. Details of any sampling undertaken and validation of any potential additional remedial work.
5	<u>Sulphate Resistant Concrete</u> Sulphate Resistant Concrete in line with DS-2 AC-3z.recommended.	N/A

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

6	Potable Water Pipes It is recommended that a United Utilities Risk Assessment is undertaken once the location and depth of potable water pipes are known.	If barrier pipe is required: Delivery Notes of Pipe Material. Photographs of the Installed Pipe.
Grubbing Out of In-Ground Structures It is recommended that in-ground structures are grubbed out as part of the groundworks.		
Re-use of site won 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 [3]): 5,000 tonnes (*c.* 2,500m^3) treatment of crushed concrete / stone. 1,000 tonnes (*c.* 500^3) use of non-hazardous soil 5,000 tonnes (*c.* 2,500m^3) use of clays, sand, gravel, brick, concrete, stone etc. 50,000 tonnes (*c.* 25,000m^3) use of bitumous 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 9-2.		
Topsoil Growing Medium Although no contamination was identified in the soils on site, the existing made ground is not expected to be a suitable growing medium given the nature of the soil and the undesirable material present (abundant glass, brick fragments, clinker and ceramics). A topsoil cover of approximately 150mm is recommended in soft landscaping areas.		
Asbestos Management Plan Due to the presence of asbestos containing material, it is recommended that additional precautions are taken during site clearance, earthworks and construction in the area of concern. The presence of asbestos in the made ground at the site presents a potential risk of generation of airborne fibres if this material is disturbed, such as for excavations to construct new foundations. This may include asbestos awareness training for all site staff, provision of suitable personal and respiratory protective equipment and air monitoring. 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)[4]. 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.		
Health and Safety Considerations In working with, removing or treating any contaminating material it is important that any potential risks associated with the actual site works are mitigated by good environmental management of the site during the remedial phases. Standard health and safety precautions (as per HSE guidance[5]) should be adopted by all workers involved with site enabling and construction works.		
Piling in Contaminated Land		

[3] https://www.gov.uk/guidance/waste-exemptions-using-waste
[4] HSE (2012). "Removing Asbestos Cement (AC) Debris)." A11 Asbestos Essential – Non-licenced Tasks.
[5] HSE (1991). "Protection of Workers and the General Public During Development of Contaminated Land" London HMSO.

It is understood that the building may be piled. This may provide a preferential pathway for contaminants to the underlying aquifer. 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 Agency[6].

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.

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

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1 Introduction

1.1 Background

LK Consult Ltd (LKC) has been commissioned by GH Sheldon Wholesale Bakers Ltd to carry out a Phase 2 Geo-Environmental Investigation, Risk Assessment and Remediation Strategy for land at Kelbrook Road, Openshaw. The investigation was undertaken in support of a planning application to develop the site for commercial use.

The following work has previously been undertaken:

- Preliminary Risk Assessment (PRA) report, undertaken by LKC (Ref: LKC 21 1095, dated March 2021.
- Preliminary Site Investigation Report, undertaken by LKC (Ref: LKC 21 1095, dated April 2021.

This investigation has been undertaken to further assess the ground conditions below the site and to allow a more detailed contamination and geotechnical assessment to be undertaken.

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

1.2 Site Details

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

Site Location	Land to the west of Kelbrook Road, Openshaw, Manchester. Centred at approximate National Grid Reference 387678E, 397725N.
Approximate Area	2.15 Ha.
Topography	60 metres Above Ordnance Datum (AOD). Site undulates, with gypsy bunds and vegetated mounded areas.
Current Site Use	Vacant, partly heavily vegetated land.
Purpose of Report	Planning.
Proposed Development	Commercial building with soft landscaping.

Table 1-1. Summary of site details.

2 Previous Work

2.1 Summary of Existing Information

A PRA report (Ref: CL-602-LKC 21 1095-01, dated February 2021) has previously been undertaken by LKC and is summarised in Section 2.2-2.7.

This also includes a summary of a previous intrusive investigation undertaken by LKC (Section 2.4).

The conceptual model (Section 2.7) has been updated to be in line with LKC current risk assessment methodology.

2.2 Site History

The site history is summarised in Table 2-1.

Site Features	Location on Site	Dates Present		Comments
		From	To	
Clayton Brook	Centre	1848	2021	Running south west to north east. Appears culverted from the late 1970s.
Clayton Dye Works	NE	1848	1987	Dye works including part of main building is present in the NE of site and extending offsite. Annotated as 'disused' on 1893 mapping. Dye works has expanded by 1908 mapping with chimneys and tanks annotated on site. No longer present by 1990 mapping.
Clayton Brick Works	E	1891	1894	With associated excavation to the east. No longer present by 1908 mapping.
Terraced Housing	SW	1908	1968	No longer present by 1974 mapping.
Works Buildings	E	1922	1974	Associated with wider North Street Engineering Works to the east and north east.
Railway Lines/Travelling Crane	SE	1938	1952	Associated with wider North Street Engineering Works to the east and north east.
Reservoirs/Tanks	N	1948	1950	Associated with Clayton Dye Works.
Tanks	N	1953	1987	Associated with Clayton Dye Works.
Landscaping	S	1992	2021	Evidence of landscaping in south of site. Indicates a slope is present along the southern and eastern boundaries.

Table 2-1: Summary of significant onsite historical features.

2.3 Environmental Setting

The environmental setting is summarised in Table 2-2.

Categories(data sources)			Details
Geology	Artificial		- No artificial ground recorded on BGS mapping.
	Superficial		- Till (diamicton).
	Bedrock		- Chester Formation Sandstone.
	BGS Logs (<50m)		- BGS records include trial pit logs onsite. Ground conditions are indicated as topsoil and made ground with ash and cinders to 0.95->2.7mbgl. Firm to stiff silty and sandy CLAY was encountered below the made ground.
Hydro-geology	Aquifer Designation	- Superficial	- Secondary A Aquifer.
		- Bedrock	- Principal Aquifer.
	Source Protection Zone (SPZ)		- Site not within an SPZ.
	Groundwater Abstractions (100m)		- 67m NE, abstraction for manufacturing, licence now revoked.
Hydrology	Surface Water Courses (100m)		- Clayton Brook, culverted through the site.
	Flooding risk		- Flood Zone 1.
	Surface Water Abstractions (100m)		- None.
	Discharge Consents (100m)		- None.
	Pollution Incidents		- Year: 1994. - Pollutant: Crude sewage. - Severity: Category 3 Minor Incident. - Receiving water: Clayton Brook.
Minerals & Mining	Coal Mining		- Within a Coal Reporting Area. - Not within a Development High Risk Area.
	Surface Mineral Extractions (250m)		- 46m SE, North Street Brick Works, opencast extraction of clay, now ceased.
	Cheshire Brine Compensation District		- Not within Compensation District. - Within Consultation Area.
	Non-Coal Mining Area		- Not within an area of conclusive metalliferous mining.
Ground Stability	Collapsible Ground		- Very low hazard.
	Compressible Ground		- No hazard.
	Ground Dissolution		- No hazard.
	Landslide		- Very low hazard.
	Running Sand		- Very low hazard.
	Shrinking / Swelling Clay		- Very low hazard.
Landfill Sites (250m)	Known / Registered		- None.
	Potentially Infilled Land based on Envirocheck Report		- 10no. features: on site and 58m-206m distance.
	Potentially infilled sites, based on LKC historical review		- 8no. features: See Table 2-1.
Radon Potential			- <1% of homes above Action Level. No protective measures are necessary in the construction of new dwellings or extensions.
Designated Sites (50m)			- None.
Contemporary Trade Directory (50m)			- 13no. within 100m. Nearest is 15m N, Door Manufacturers – Domestic.
Fuel Station Entries (50m)			- None.
Unexploded Ordnance Risk (UXO)	Zetica Risk Map		- Moderate from risk mapping - Zetica PDSA concludes that detailed UXO risk assessment, whilst prudent to undertake, is not necessary.

Table 2-2: Summary of the environmental setting.

2.4 Previous Investigations

A preliminary intrusive investigation was carried out by LKC in March 2021. The investigation included:

- 10no. machine excavated trial pits to between 1.5mbgl and 3mbgl.
- Soil sampling and analysis.

Ground conditions comprised:

- Made Ground to 1.2mbgl to greater than 3mbgl and comprised gravelly sand or clay with ash, clinker, brick and other anthropogenic inclusions. (slightly silty gravelly sand with ash, clinker, brick, occasional metal, cloth, ceramics).
- Natural superficial deposits of sandy CLAY encountered at between 0.2mbgl and 1.9mbgl.
- Visual / olfactory evidence of oil identified in TP103 at 0.5-0.9mbgl.

Groundwater strikes were only encountered in TP105 at 3.00mbgl and in TP109 at 1.80mbgl. All other trial pits were recorded as dry.

No elevated concentrations of contaminants above commercial use generic assessment criteria were recorded. However, asbestos was identified in two locations. The highest asbestos quantification was amosite fibres or clumps at 0.14% in TP102 at 0.0-1.0m.

The results of the preliminary investigation will be used in the generic risk assessment in Section 6.

2.5 Site Reconnaissance

A site reconnaissance was carried out on 26 February 2021.

Relevant features identified on site are summarised below:

- The site was accessed off Kelbrook Road via an opening excavated through the bund surrounding the site.
- The site is heavily vegetated with small trees (predominantly alder and birch but occasional willow present) and brambles. The presence of alders and willows suggests that the ground is waterlogged.
- An open area is present in the north and in the far south of the site. Cycle tracks are present in these areas.
- A ridge is present along the south of the site with a row of large mature trees along it. The open, less vegetated, area is just to the south of this.
- Electric cables were detected within this ridge and at the southern foot of the ridge.
- A small entrance onto the site is present in the north adjacent to the residential properties.
- A lamp post was noted amongst the trees in the centre of the site.
- Fly tipped domestic waste, mattresses and discarded hydroponics equipment were noted around the site. A small shelter including a tent and some tarps and boards is present in the centre of the site.
- One small area of Japanese Knotweed was observed in the southwest of the site.
- Limited vehicular access due to the vegetation and the bund surrounding the site.
- Demolition rubble was observed in the ground across the site.

2.6 Contamination Sources / Pathways and Receptors

Potential contamination sources are detailed in Table 2-3.

Potential Source	Contaminants
On Site	
Deep Made Ground below some or all of the site (e.g. infilled excavation from brick works, reservoirs, former cellars)	- Demolition rubble, ash and clinker: Asbestos, heavy metals, sulphates, PAHs[7]. - Other fill material sources: Unknown organic / inorganic compounds. - If organic / putrescible material: Hazardous gas (principally carbon dioxide and methane).
Demolished buildings	- Asbestos Containing Material (ACM).
Dye Works	- Metals, other inorganic compounds (e.g. cyanides, sodium compounds, sulphide compounds, chloride compounds, mineral acids, alkalis), chlorinated organic solvents, sizing agents, other organic compounds (e.g. formaldehydes, polyvinyl chloride), water repellents (organo silicon, oxazoline), fire / flame retardants (e.g. borax, ammonium phosphate, brominated organic compounds with metals oxides), soaps and detergents. - Other ancillary activities could include coal fired boilers producing large quantities of boiler ash (heavy metals, sulphates and PAHs), if powered by gas or oil there may historically have been fuel storage tanks. Asbestos may have been used within the building as insulation and lagging or as roofing and cladding[8].
Works	- Potential contaminants from engineering and brick works include fuels, oils, solvents, heavy metals and PAHs. - Asbestos may have been used within the building as insulation and lagging or as roofing and cladding.
Railway sidings.	- Fuels, oils, PAHs, ethylene glycol (antifreeze), creosote, solvents, herbicides (including atrazine and simazine), heavy metals (such as vanadium), sulphate, phenols and asbestos[9].
Surrounding Area	
Adjacent works	- Possible organic and inorganic contamination.
Current electricity substation (post 1980s)	- Assuming ongoing maintenance, hardstood ground and no Polychlorinated biphenyl (PCBs) use: No significant contamination anticipated.
Offsite potentially infilled features within 250m	- Potential source of hazardous gas (carbon dioxide and methane).

Table 2-3: Potential contamination sources

Potential receptors are detailed in Table 2-4.

[7] Defra (2002). "Potential Contaminants for the Assessment of Land". R&D Publication CLR 8.
[8] Department of the Environment. Industry Profile. Textile Works and Dye Works. 1995.
[9] Department of the Environment Industry Profile – Railway Land (1995).

Receptors	
Human Health	- Future site users (including visitors and site workers). - Offsite land users. - As the proposed development is for commercial use, the most sensitive receptors (children) have not been included in this assessment.
Controlled Waters	- Culverted Clayton Brook. - Principal and Secondary A Aquifers.
Buildings and structures.	
Potable water pipes.	
Flora within future landscaping.	

Table 2-4: Potential receptors

Potential pathways are detailed in Table 2-5.

Pathways		
Soil	Human Health[10] (commercial land use with soft landscaping)	- Ingestion of soil. - Ingestion of soil-derived indoor dust. - Dermal contact with soil. - Dermal contact with soil-derived indoor dust. - Inhalation of soil-derived outdoor dust. - Inhalation of soil-derived indoor dust. - Inhalation of vapours outside. - Inhalation of vapours inside. - Omitted: ingestion of contaminated vegetables and ingestion of soil attached to vegetables.
	- Windblown dust and fibres to adjacent receptors.	
	- Direct contact with receptors (building foundations, services).	
Water	- Surface run-off over impermeable surface.	
	- Infiltration into the ground, through potentially contaminated material (contamination possibly going into solution).	
Water and Gas	- Migration through potentially permeable strata and preferential pathways. - Superficial (Till) likely to be low permeability. - Bedrock (sandstone) likely to be relatively permeable. - Preferential pathways: culvert, services, granular made ground.	
Gas	- Migration into buildings (e.g. via services) and accumulation of gases in confined spaces (potentially causing explosion if methane is present).	

Table 2-5: Potential pathways

2.7 LKC Preliminary Contamination Conceptual Model

The preliminary contamination conceptual model using contaminant-pathway-receptor linkages based on guidance in LCRM[11] has been summarised in Table 2-6.

The aim of the conceptual model is to provide a preliminary assessment of the likelihood of a pollutant linkage for each potential combination of contaminant, pathway and receptor. A conceptual model can be used to make an informed decision on the contamination risks associated with the site and determine what site investigation work is required.

[10] EA (2008). "Updated Technical Background to the CLEA Model". Science Report – SC050021/SR3.
[11] Land Contamination Risk Management (LCRM) https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm

The preliminary contamination conceptual model has identified seven generic potential pollutant linkages. Each linkage is described along with an assessment of the risk based upon guidance on probabilities and consequences outlined in CIRIA C552[12].

In order to assess the potential risk for each pollutant linkage, an assessment of the magnitude of the potential consequence (severity) of the risk occurring and the magnitude of the probability (likelihood) of the risk occurring has been considered and classified. This is based on the guidance provided in CIRIA C552 and further details including a risk matrix is provided in Appendix A.

Where LKC identified a low to very low risk, limited intrusive investigation work, a watching brief (during construction work) or no investigation work will be recommended. This will be dependent on the nature of the site and the proposed development.

Where the risk falls into the moderate/low risk, LKC will undertake an assessment to establish what category the pollutant linkage will fall into (i.e. moderate or low risk will be chosen).

Where LKC identifies a moderate or higher risk, intrusive work or precautionary remedial measures will be recommended.

The conceptual model is based on the future use of the site (post development), in line with proposed development scheme.

It should be noted that there may be risk from short term exposure from contaminated soil to site workers during development work. The Preliminary Contamination Conceptual Model deals with long term exposure to key receptors associated with the future use of the site. Acute risks can be easily mitigated by good environmental management of the site during site works. Standard health and safety precautions (as per HSE guidance[13]) should be adopted by all workers involved with site enabling and construction works. Therefore, this receptor is not considered in the contamination conceptual model.

2.8 Recommendations

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

[12] CIRIA (2001). "Contaminated land risk assessment: A guide to good practice". C552.
[13] HSE (1991). "Protection of Workers and the General Public During Development of Contaminated Land" London HMSO.

PL	Pathway	Receptor	Contaminants of Concern (CoC)	Probability	Consequence	Risk	Recommendations
1	- Dermal contact. - Inhalation of soil, fibres and dust. - Ingestion of soils, dust. - Windblown dust.	- Future site users. - Offsite receptors.	- ACM. - Heavy metals. - PAHs.	Low Likelihood (Presence of contaminants likely based on site history and BGS records but potential exposure is less due to commercial end use.)	Medium	**Moderate** / Low (moderate assumed until ground conditions confirmed)	Intrusive investigation required. Soil analysis of CoC.
			- Petroleum hydrocarbons.		Medium		
2	- Inhalation of vapours. - Migration via permeable strata and preferential pathways.	- Future site users. - Offsite receptors.	- Volatile contaminants (TPHCWG, SVOC, VOCs).	Likely (given site history, site conditions and proposed end use)	Medium	**Moderate**	Intrusive investigation required, to include PID testing. Soil analysis of CoC, subject to ground conditions encountered and PID testing.
3	- Inhalation of gas. - Migration via permeable strata and preferential pathways. - Explosion in confined spaces. - Exposure to radon.	- Future site users. - Buildings. - Offsite land users.	- Ground / hazardous gas (carbon dioxide, methane).	Likely (given viable gas sources and viable pathways)	Severe	**High**	Gas monitoring required.
			- Radon	Unlikely (as <1% of homes above action level)	Medium	**Low**	(<1%) No protective measures are necessary in the construction of new buildings or extensions.
4	- Surface run-off. - Migration via permeable strata and preferential pathways. - Perched waters migration.	- Groundwater (Principal Aquifer). - Surface water (Clayton Brook).	- Mobile contaminants such as metals, PAHs, hydrocarbons, volatile compounds.	Likely (mobile contamination anticipated with possible pathway)	Medium	**Moderate**	Intrusive investigation required. Groundwater and surface water sampling, subject to ground conditions encountered. Analysis of CoC.
5	- Sulphate attack on concrete.	- Building structure.	- Sulphate.	Likely (given site history, site conditions, geology and direct contact / pathway)	Mild	**Moderate** / Low (moderate assumed until ground conditions confirmed)	Intrusive investigation required. - Soil analysis of CoC.
6	- Ingestion of tainted water supply.	- Future site users. - Water pipes.	- Organic contaminants such as petroleum hydrocarbons, naphthalene, volatile compounds.	Likely (given site history, site conditions and direct contact / pathway)	Medium	**Moderate**	Intrusive investigation required. - Soil analysis of CoC.
7	- Direct contact (plant uptake).	- Flora.	- Phytotoxic contaminants such as heavy metals.	Low Likelihood (only small areas of soft landscaping proposed)	Minor	**Low**	Intrusive investigation required. Soil analysis of CoC.

Table 2-6. Preliminary Contamination Conceptual Model.

3 Ground Investigation

3.1 Site Investigation Design and Methodology

In order to further 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.

The investigation was carried out on 12th-13th August 2021 and comprised the following:

- 9no. window sample boreholes drilled to 2.34-3.45 metres below ground level (mbgl) (ref. WS101 to WS109).
- 3no. cable percussion boreholes drilled to 10.5-13mbgl (ref. CP101 to CP103).

This investigation work was in addition to the preliminary trial pits undertaken in March 2021.

Due to the likelihood that piling would the most feasible foundation solution, cable percussion boreholes were carried out to allow an assessment of the deeper ground conditions for contamination / geotechnical purposes.

All site investigation locations are shown in Figure 3.

The number of site investigation points corresponds to approximately one location per 15m square centres. This is considered to be a conservative sampling density and is in line with BS10175[14] for a 'main investigation'.

All profile logs are provided in Appendix B and are in line with BS14688-1[15] and BS5930[16].

3.2 Well Installations

A total of 6no of the window sample boreholes and all of the cable percussive boreholes were installed with monitoring wells for gas and groundwater monitoring and groundwater sampling. Monitoring wells were installed in accordance with BS10175 and CIRIA C665[17].

The installation in the window sample boreholes 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. The deeper installations in the cable percussive boreholes were screened off through the made ground with the response zones in the underlying natural strata.

Well installation details are provided in profile logs in Appendix B.

[14] British Standard (2017). "Investigation of Potentially Contaminated Sites – Code of Practice." BS10175:2017.
[15] British Standards (2002) Geotechnical investigation and testing – Identification and Classification of Soil. Part 1: Identification and description. BS EN ISO 14688-1:2002.
[16] British Standard (2015). "Code of Practice for Ground Investigations". BS5930:2015.
[17] CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665.

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 investigation[18].

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 PhoCheck Tiger 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 C665[19] 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 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 3-1 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.	6	WS102b 0.0-0.5m WS104 0.0-0.6m WS106 0.0-0.7m WS107 0.0-0.5m WS108 0.0-0.5m WS109 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 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.	3	WS101 0.0-0.6m WS103 0.0-1.0m CP101 0.0-1.0m	Strong hydrocarbon odour noted in WS103 0.0-1.1m. For WS101 & CP101: No visual/olfactory evidence of contamination was identified (with the exception of some ash) but detailed suite undertaken to confirm the absence of significant hydrocarbon contamination from historic land use.
TPHCWG, BTEX, MTBE and SOM.	1	WS103 1.8-2.0m	Tested to confirm the extent of hydrocarbon contamination observed in nearby locations.

Table 3-1. Summary of soil sample testing undertaken.

Notes:
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.

[18] EA (2000). "Technical Aspects of Site Investigation. Volumes 1 & 2 Text Supplements Research and Development Technical Report." P5-065/Tr.
[19] CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665.

3.3.2 Water Sampling

To establish the condition of shallow and deep groundwater LKC undertook 3no. groundwater samples.

The groundwater samples were collected a minimum of 1 week after drilling had finished and following well development. Sample collection was undertaken using a low flow sampling pump using thin walled tubing to encourage laminar flow and minimise the potential loss of volatiles during sampling. The borehole was purged of all standing water and the sample collected from the recharged water. The sample was collected in glass and plastic bottles and a glass vial. A water meter was used to test the pH, temperature and conductivity before sampling until equilibrium conditions were met, as per BS10175[20] guidelines.

WS101 had limited groundwater present at the time of sampling. Therefore, only limited purging was possible and only one vial and a partially filled glass bottle of groundwater was collected.

All water samples were placed in glass bottles, plastic bottles and septum topped vials and stored in ice packed cool boxes. The samples were sent to Chemtest on the same day for analysis.

Sampling was carried out in accordance with BS5930[21] and BS5667-11[22].

Many of the tests are UKAS or MCERTS accredited and further details are given in the Certificate of Analysis presented in Appendix E. Table 3-2 shows the groundwater / leachate testing undertaken.

Suites and Contaminants	No. Samples	Location	Justification
Metals / metalloids, pH, sulphate, cyanide suite, TPHCWG, BTEX, MTBE, speciated PAHs, phenol, VOCs, SVOCs and hardness.	3	CP101 CP102 WS103	Detailed suite undertaken based on former industrial site use to assess risk to groundwater.

Table 3-2. Summary of groundwater sampling tests undertaken.
Notes:
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, VOC=Volatile organic Compounds, SVOC= Semi Volatile Organic Compounds.

3.4 Gas Monitoring

All the installed boreholes have been monitored for gas with four visits undertaken over two months.

Monitoring was undertaken using a Geotechnical Instruments GA2000 plus / GA5000 in accordance with the monitoring protocol outlined in CIRIA C665[23] (flow rate measured first). The monitoring was undertaken over a range of weather conditions

[20] British Standard (2017). "Investigation of Potentially Contaminated Sites – Code of Practice." BS10175:2017.
[21] British Standard (2015). "Code of Practice for Ground Investigations". BS5930:2015.
[22] British Standard (2009). "Water Quality – Sampling. Part 11: Guidance on Sampling of Groundwaters". BS ISO 5667-11:2009.
[23] CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665.

(including low and falling barometric pressure and heavy rain) to demonstrate worst-case conditions.

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

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.
- Pocket Penetrometer tests (giving undrained shear strength) were performed in the window sample boreholes (to a maximum depth of 3mbgl).

The SPT and pocket penetrometer are provided within the profile logs (Appendix B).

3.5.2 Laboratory Geotechnical Testing

Soil samples taken during the investigation were collected in tubs, 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	Location	Justification
Atterberg Limits (plasticity testing)	4	WS102B 2.6-3.0 WS103 2.6-2.7 WS106 2.0 WS107 3.0	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	5	CP101 6.8-7.25 CP101 7.8-8.25 CP102 8.5-8.95 CP103 6.5-6.95 CP103 10.9-11.35	Undertaken to confirm the immediate bearing capacity and strength of the clay strata.
Oedometer	2	CP101 5.3-5.75 CP103 6.5-6.95	Undertaken to assess the rate and amount of settlement of cohesive material.

Table 3-3. Summary of geotechnical testing undertaken.

4 Ground Conditions

4.1 Geology – Generalised Sequence

The ground conditions beneath the site comprised Made Ground underlain by natural variably sandy gravelly CLAY (Diamicton). A summary section of the logs is provided in Plate 4-1, with additional comments below.

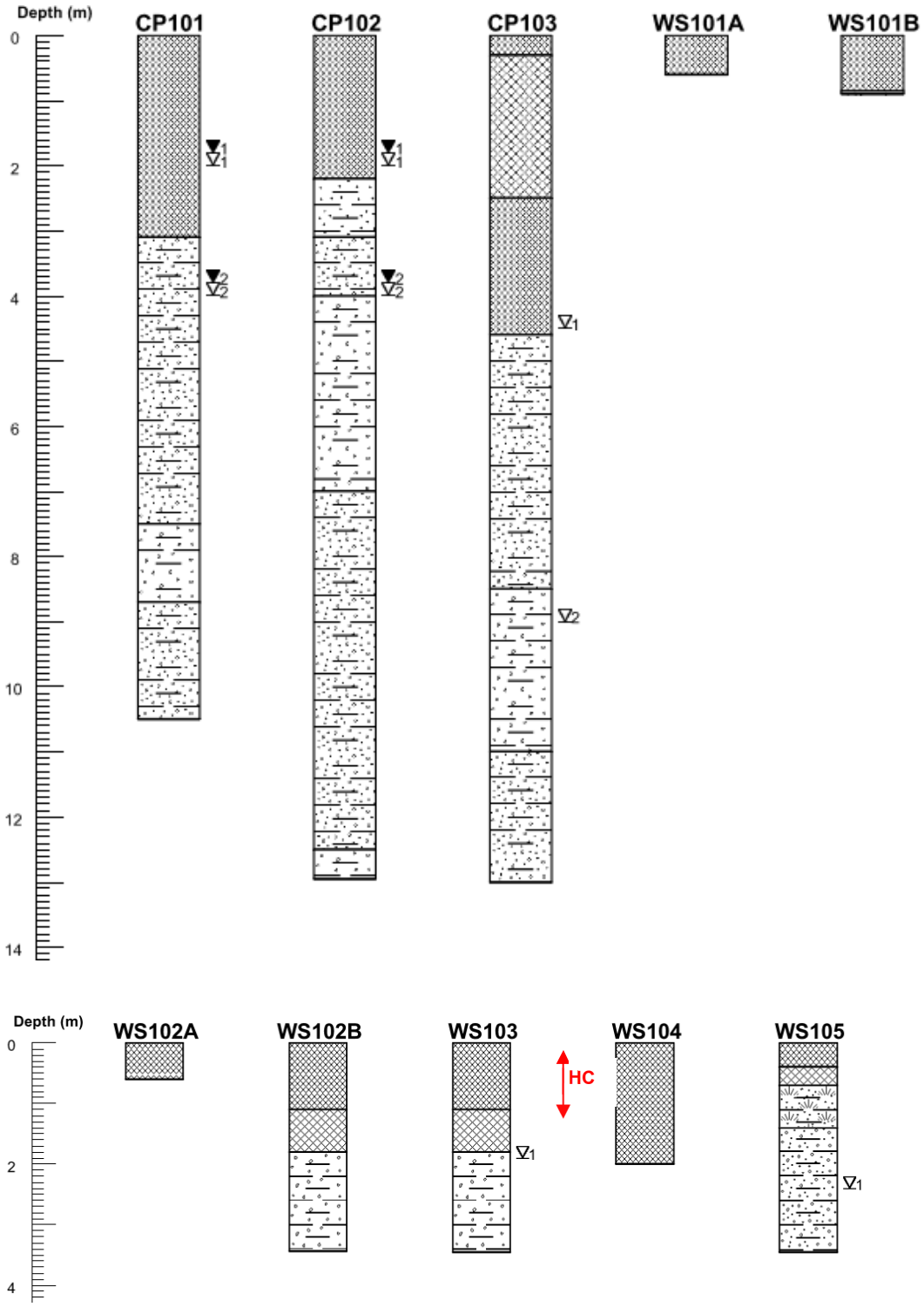


Plate 4-1: Summary of ground conditions.

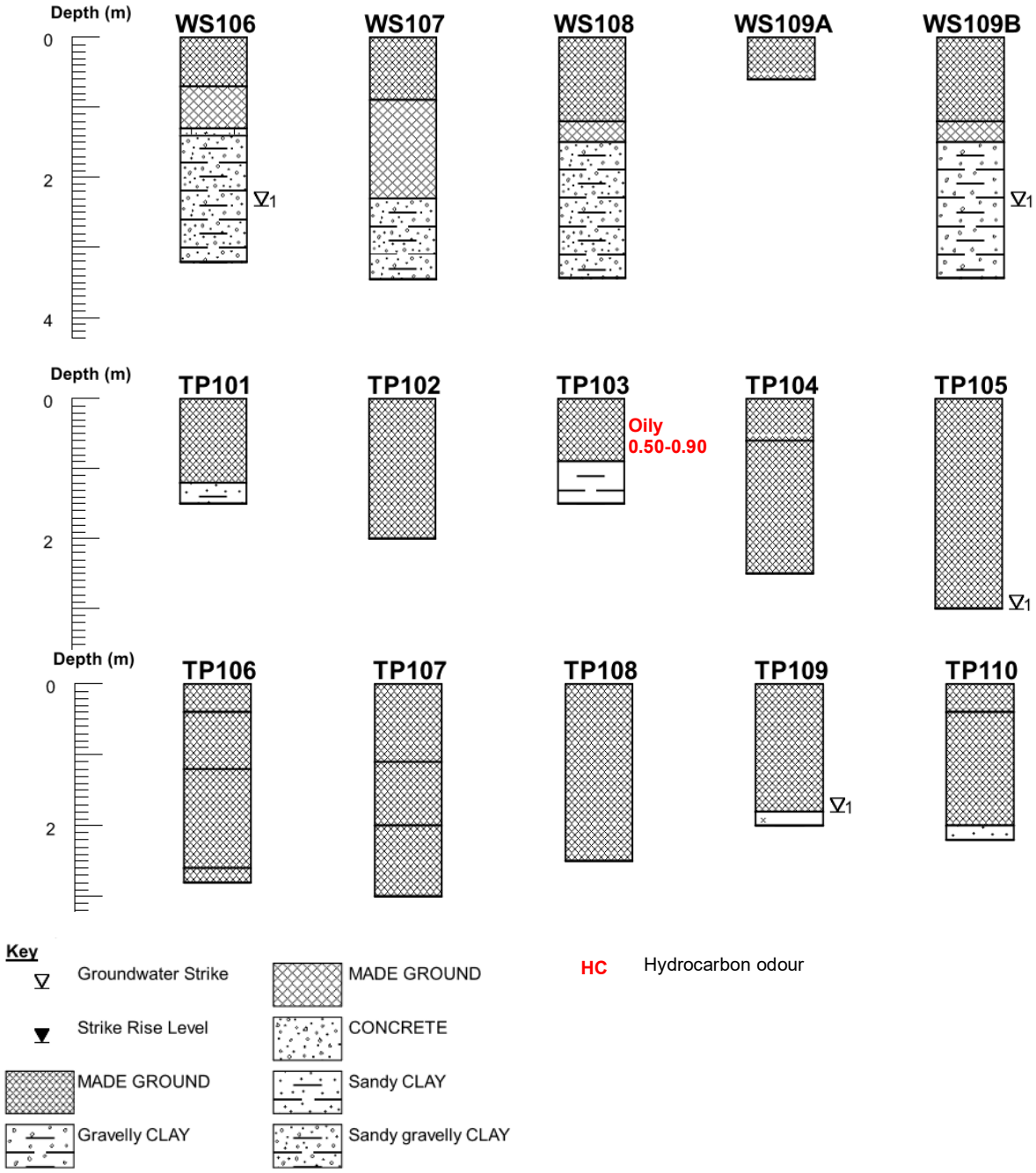


Plate 4-1 (cont.): Summary of ground conditions.

Additional information on ground conditions:

- Made ground was recorded to depths of up to 4.6mbgl (CP103) and generally consisted of silt / sand / gravel, with brick, ash, clinker, plastic, concrete.
- Strong olfactory evidence of hydrocarbon identified in WS103 from ground level to 1.10mbgl.
- Black oily patch of gravel encountered between 0.50-0.90mbgl within TP103.
- In-ground structures were identified in:
  - WS101A, WS102A, WS109A (tarmacadam at 0.6m).
  - WS101B (tarmacadam at 0.90).
  - WS104 (concrete at 2.34m).
  - TP110 (brick wall between 1.20-2.20m).

-

Similar structures may be present across the site where former roads and buildings were present.

Several of the exploratory holes were described as unstable / collapsing (WS107, TP101, TP102, TP108 and TP109).

TP104 was located above the route of the suspected culvert and advanced to 2.50mbgl before encountering a refusal on Made Ground boulders. No evidence of a culvert was observed during the advancing of this location.

The extent of the Made Ground was not proven at locations WS101A, WS101B, WS102A, WS104, WS109A, TP102, TP104, TP105, TP106, TP107 and TP108.

Organic clay was recorded between 0.70-1.40m in TP105 and 1.30-1.40mbgl in TP106 in the north of the site.

Superficial deposits comprised firm becoming stiff and very stiff with depth, variably sandy gravelly CLAY (Glacial Till – Diamicton) to the completion depths of the exploratory holes where natural strata was encountered.

Soft and soft to firm CLAY was encountered within trial pits TP109 & TP110 at the base of the pits.

Bedrock was not encountered within any of the exploratory holes.

4.2 Groundwater

4.2.1 Groundwater Levels

Groundwater strikes were recorded during the investigation in the exploratory holes. In addition, groundwater monitoring within the borehole wells has been undertaken on six occasions. An oil-water interface probe (approximately 1cm detection limit) was used to detect the presence of free phase hydrocarbons within each borehole.

Results are summarised in Table 4-1.

BH/TP	Water Strike Depths (mbgl)	Well Response Zone (mbgl)	No. of Monitoring Visits	Monitoring Depths (mbgl)			Sample Taken?	Evidence of Contam?
				Min	Max	Base		
CP101	2.0, 4.0	4.0-10 (C)	4	2.1	2.21	8.3	Y	N
CP102	2.0, 4.0	3.5-12.5 (C)	4	Dry	Dry	11.6	N	Y
CP103	4.6, 9.0	5.0-12.5 (C)	4	3.65	4.50	11.5	Y	N
WS101A	Dry	Not installed.					N	N
WS101B	Dry	Not installed.					N	N
WS102A	Dry	Not installed.					N	N
WS102B	Dry	0.5-2.5 (MG/C)	4	Dry	Dry	2.41	N	N
WS103	1.9	0.5-2.0 (MG)	4	1.1	1.8	1.9	Y	Y
WS104	Dry	Not installed.					N	N
WS105	2.4	0.9-2.8 (C)	4	Dry	Dry	2.8	N	N
WS106	2.4	0.5-2.5 (MG/C)	4	Dry	Dry	2.5	N	N
WS107	Dry	0.5-2.5 (MG/C)	4	Dry	Dry	2.5	N	N
WS108	Dry	1.0-3.0 (C)	4	Dry	Dry	2.85	N	N
WS109A	Dry	Not installed.					N	N
WS109B	2.4	Not installed.					N	N
TP101	-	Not installed.					N	N
TP102	-	Not installed.					N	N
TP103	-	Not installed.					N	Y
TP104	-	Not installed.					N	N
TP105	3.0	Not installed.					N	N
TP106	-	Not installed.					N	N
TP107	-	Not installed.					N	N
TP108	-	Not installed.					N	N
TP109	1.8	Not installed.					N	N
TP110	-	Not installed.					N	N

Table 4-1: Summary of water strike depths within boreholes and trial pits.
Response Zones:
MG=Made Ground; C=Clay.

4.3 In-Situ Geotechnical Testing

4.3.1 Standard Penetration Tests

In-situ standard penetration tests (SPTs) were undertaken. The results are summarised in Table 4-2 and provided within the profile logs in Appendix B.

Approximate Depth (mbgl)	SPT 'N' Values					
	CP101	CP102	CP103	WS102B	WS103	WS104
1-2	50* (MG)	5 (MG)	4 (MG)	16 (MG)	6 (MG)	17 (MG)
2-3	12 (MG)	6 (MG)	4 (MG)	16 (MG)	21 (C)	50* (MG)
3-4	23 (C)	18 (C)	3 (MG)	50* (C)	50 (C)	-
4-5	22 (C)	44 (C)	9 (MG)	-	-	-
5-6	-	44 (C)	26 (C)	-	-	-
6-7	25 (C)	-	-	-	-	-
7-8		18 (C)	-	-	-	-
8-9	50* (C)	-	-	-	-	-
9-10	-	-	22 (C)	-	-	-
10-11	50* (C)	26 (C)	-	-	-	-
11-12	-	30 (C)	50* (C)	-	-	-
12-13	-	50* (C)	50* (C)	-	-	-
GW Level	2.0-4.0	2.0-4.0	4.5-9.0	-	1.9	-
	SPT 'N' Values					

Approximate Depth (mbgl)	WS105	WS106	WS108	WS109B
1-2	9 (C)	3 (C)	18 (C)	3 (MG)
2-3	17 (C)	19 (C)	3 (C)	3 (C)
3-4	50 (C)	50 (C)	50 (C)	41 (C)
4-5		-	-	50 (C)
GW Level	2.4	-	-	2.4

Table 4-2: Summary of SPT (N) values.
Notes:
MG=Made Ground; C=Clay.
* N value reached 50 before full test penetration of 300mm.
Groundwater level based on strikes during investigation.

4.3.2 Shear Vanes

Two hand shear vane readings, recording undrained shear strength (s_u), were taken within the natural clay strata encountered within the trial pits. The results are summarised in Table 4-3 and provided within the profile logs in Appendix B.

Approximate Depth (mbgl)	Average Undrained Shear Strength (kN/m²)	
	TP101	TP103
0-1		
1-2	60	70
GW Level	-	-

Table 4-3: Summary of average hand shear vane readings.
Notes:
Groundwater level based on strikes during investigation.

4.3.3 Pocket Penetrometers

Pocket penetrometer readings, recording undrained shear strength (s_u), were taken within the clay strata encountered within the window sample holes. The results are summarised in Table 4-4 and provided within the profile logs in Appendix B.

Approximate Depth (mbgl)	Average Undrained Shear Strength (kN/m²)			
	WS102B	WS103	WS105	WS106
1-2	85.84	53.95	36.78, 61.31	24.53, 110.36
2-3	110.36	110.36	98.10	
GW Level	-	1.90	2.40	2.40
	WS107	**WS108**	**WS109B**	
1-2		122.63	110.53	
2-3	110.53	122.63	122.63	
GW Level	-	-	2.40	

Table 4-4: Summary of average pocket penetrometer readings.
Notes:
Groundwater level based on strikes during investigation.

4.4 Geotechnical Laboratory Testing

4.4.1 Single Stage Triaxial Test

Single stage triaxial testing has been undertaken on four samples of the natural clay strata. The results are presented in Appendix D and summarised in Table 4-5.

Location	Depth (mbgl)	Material Description	Undrained Shear strength (kPa)
CP101	6.8-7.25	Stiff brown silty sandy CLAY	257
CP101	7.8-8.25	Stiff brown silty sandy CLAY	155
CP102	8.5-8.95	Stiff brown silty sandy CLAY	96
CP103	6.5-6.95	Stiff brown silty sandy CLAY	103
CP103	10.9-11.35	Stiff brown silty sandy CLAY	66

Table 4-5: Summary of single stage triaxial results.

4.4.2 Oedometer

The coefficient of compressibility (m_v) results indicate that the m_v of the CLAY tested is typically of medium compressibility, ranging between 0.08 m^2/MN and 0.34m^2/MN.

Location	Depth (mbgl)	Initial Moisture Content (%)	Pressure (kN/m2)	Mv Value (m^2/MN)	Description of Compressibility
CP101	53-5.75	14	55	0.12	Medium
			11	0.12	Medium
			220	0.10	Medium
			440	0.08	Low
			55	0.05	
CP103	6.5-6.95	16	65	0.34	High
			135	0.17	Medium
			270	0.13	Medium
			540	0.08	Low
			65	0.04	

Table 4-6: Summary of consolidation (Oedometer) test results.

4.4.3 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 4-7.

Table 4-7 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 (%)
WS102b	2.6-3.0	17	34	11	23	CL	98%	22.5
WS103	2.6-2.7	36	35	13	22	CL/CI	100%	22
WS106	2.0	18	36	13	23	CI	98%	22.5
WS107	3.0	19	34	14	20	CL	100%	20

Table 4-7: Summary of plasticity index testing.

The modified plasticity index is between 20% and 23%. This characterises the clay as low to intermediate plasticity and having a medium volume change potential.

4.4.4 Sulphate and pH

Water soluble sulphate and pH tests were carried out on soil and groundwater samples. Full results are presented in Appendix C (soils) and Appendix E (groundwater) and summarised in Table 4-8.

Strata	pH	Sulphate

	Soil	Groundwater	Soil (g/l)	Groundwater (mg/l)
Made Ground	7.2-10.4	6.4-6.7	<0.010-0.23	460-490
Natural	8.0-8.5		0.015-0.067	

Table 4-8: Summary of pH and sulphate results.

5 Geotechnical Assessment

5.1 Proposed Development

It is understood that the proposed development will comprise an industrial unit associated with GH Sheldon Wholesale Bakers Ltd, with a footprint of 7,425m^2, incorporating an upper floor space of 370m^2. The proposed structure includes hardstanding yard and parking areas and some soft landscaping around the southern and western boundary to the site.

The finished ground levels have not been provided and given the noted topography of the site from the walkover and siteworks, will require limited earthworks to provide a developable platform.

The depths of any underground engineering works (sewers 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 or ground stability.

A 6-6.6kV crosses the site, running from the substation adjacent to the western boundary, heading southeast then west-east across the southern section of the site.

A 1200mm culvert is shown to cross the site from the northeast to southwest on the United Utilities sewer records. A review of the website Hidden Manchester indicates that the culvert runs east – west across the site. Ground Probing Radar (GPR) was undertaken on site to try and locate the culvert without success. The exact route and depth of the culvert should be established prior to the start of the development.

Given the nature of the proposed development it is considered that the structure meets the criteria of Geotechnical Category 1 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 up to 4.6mbgl over natural cohesive superficial deposits of CLAY (Glacial Till – Diamicton) to the completion depths investigated.

5.3 Site Preparation

The site in its current state is undulating with elevated vegetated areas along with bunding to prevent unauthorised access onto the site. Limited earthworks will be required in order to create a level, developable platform.

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 have been encountered on site. These should be excavated from below the proposed development foot print with the resulting void backfilled.

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

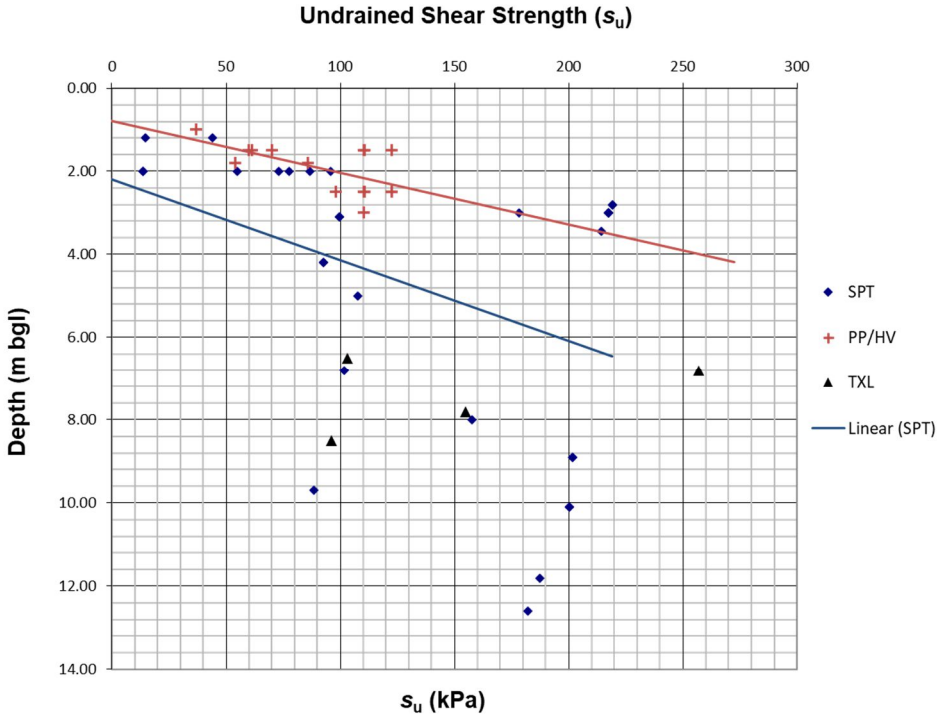
5.4 Foundation Conditions and Bearing Capacity

5.4.1 General

It is considered that the Made Ground is not suitable for a founding material due to the inherent variability of the material. Foundation options are therefore:

- Deep strip foundations in to the underlying Glacial Till CLAY;
- Conventional strip footings on vibro granular columns;
- Deeper pile foundations.

Strength of the natural cohesive material has been assessed using in-situ testing by SPT, Pocket Penetrometer (PP) and Hand Shear Vane (HV). The results of the testing have been plotted against depth as is shown in Graph 5-1 below:



Graph 5-1: Summary of s_u vs depth from in-situ SPT, PP and HV and laboratory TXL testing.

From Graph 5-1 it can be seen that the strength of the cohesive deposits typically increase with depth.

A conservative s_u of 50kPa is assigned to the natural cohesive material from a depth of *c*. 1mbgl for the natural superficial deposits, increasing to 100kPa from c.3.00mbgl. This will return an allowable bearing capacity (ABC) of 103kN/m^2 for strip/trench fill foundations at 1mbgl and 205kN/m^2 for deeper trench foundations.

5.4.2 Strip Foundations

Strip foundations should be constructed at least 150mm in to the underlying natural stiff CLAY. An allowable bearing capacity of 103kN/m² has been calculated for the natural CLAY at c.1.00mbgl, using a Factor of safety of 3 and an undrained shear strength of 50kN/m² taken from Graph 5-1.

Where deeper Made Ground is encountered then deep strip foundations should be constructed at least 150mm in to the underlying natural stiff CLAY. At a depth of circa 3.00m an allowable bearing capacity of 205kN/m² has been calculated using a Factor of safety of 3 and an undrained shear strength of 100kN/m² taken from Graph 5-1.

Foundations deeper than 2.5mbgl will require specialist structural engineer design. It is recommended that foundation options and depths are reassessed once earthworks have been completed to allow for changes in thickness of the Made Ground.

Atterberg limits determinations, summarised in Table 4-7 show the clay to be of low to intermediate plasticity and as such the sides of the foundations may require protection using clay board or similar. Foundation depths should take account of the presence of existing and proposed trees with foundations deepened locally in accordance for a clay of medium plasticity. It is recommended that at working drawing stage a foundation schedule is prepared for the development taking account of the soil plasticity and the locations of trees.

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

5.4.4 Pad Foundations

Based upon the s_u obtained from the in-situ and laboratory testing of the Glacial Till material, an assessment has been made on a pad foundation supporting column loads. For preliminary assessment purposes, two sizes of pad (1m^2 and 2m^2) have been considered at depths of 1m and 3mbgl. The bearing capacity assessment has been made in line with combination 1 (partial factors on Actions) and Combination 2 (partial factors on materials), results are shown in Table 5-1.

Pad Size	Pad Depth (mbgl)	Allowable Load (kN)
1m^2 (1.00m x 1.00m)	1.00	366
	3.00	871
2m^2 (1.42m x 1.42m)	1.00	658
	3.00	845

Table 5-1: Summary of pad Allowable Load.

The pads show an ABC of 366kN for a 1m^2 pad and 658kN for a 2m^2 pad foundation placed at a depth of 1mbgl in the target stratum of stiff and very stiff natural CLAY (Glacial Till). Strip foundations supporting cladding walls should be able to support loadings of 100kN/m^2.

The above is for assessment purposes only, foundation design should be undertaken by a specialist contractor.

5.4.5 Piled Foundations

Due to the significant depths of Made Ground encountered, consideration should be given to the use of piled foundations. For preliminary purposes the following initial pile carrying capacities have been calculated. When undertaking these preliminary calculations the following parameters have been used:

- Undrained shear strength values from Graph 5-1;
- Adhesion Factor of 0.45 based on CFA piles;
- Factors of safety of 1.5 on side resistance and 3 on base resistance; and,
- Global Factor of safety of 2.5.

Depth	Pile Carrying Capacity (kN)		
	300mm dia	450mm dia	600mm dia
6	55	102	161
8	95	162	242
10	140	229	331

Table 5-2: Preliminary Pile Carrying Capacity.

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.

Given the significant depths of Made Ground, consideration must be given to the potential for negative skin friction which may affect the piles and sleeving may be required.

Recommendation

Deep strip foundations below 2.5m depth are generally not economic and whilst a ground improvement solution is viable it is considered that piling will provide the most reliable and cost effective option for the site.

5.5 Ground Floor Slabs

Due to the presence of substantial thickness' of Made Ground across the site it is considered that ground bearing floor slabs, whilst viable, will require detailed design to accommodate variability of the formation and account for differential settlement. It is recommended that a suspended or piled floor is selected to reduce the potential for differential settlement between the floor and shell of the structure.

5.6 Pavement Construction

It is considered that the topsoil is not suitable for use as a sub-grade. Untreated Made Ground is considered unsuitable as a sub-grade due to its potential variability and potentially low strength/high compressibility. It should be removed to a depth of 0.5m below formation level and sorted to remove any unsuitable or deleterious materials. The sub formation should be rolled and suitable excavated material can then be

replaced, up to formation level, in fully compacted thin layers. Any deficit should be made up with suitable imported fill compacted as above. Following this treatment an overall design CBR of 2-5% should be available, although this will require confirmation at a later date through in-situ CBR tests.

Based on the plasticity index the soils are not considered frost susceptible.

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

5.7 Drainage

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

5.8 Concrete Durability

Based upon the results of the chemical analyses, summarised in Table 4-8, it is considered that subsurface concrete can be designed in accordance with Design Sulphate Class DS-2, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-3z in accordance with the recommendations provided in BRE Special Digest 1 (2005).

5.9 Excavations

Some of the exploratory holes were observed to be unstable during the excavation/drilling and the Made Ground and natural deposits included granular strata containing 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 R97[24]. Groundwater seepages were noted in several exploratory holes.

5.10 Further Works

It is recommended that the culvert shown to cross the site is accurately located for both position and depth before finalising design.

A 6-6.6kV electric Cable is shown to cross the southern section of the site. This should be accurately located to allow any easements between the service and proposed structure to be maintained.

It may be possible to implement soakaway drainage for disposing of surface water runoff in the north and south of the site. Once proposed development plans and ground levels are finalised soakaway tests, in accordance with BRE 365 should be undertaken to establish the viability of Sustainable Urban Drainage (SUDs).

5.11 Construction Activity and Inspection

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

[24] CIRIA Report 97 – Trenching Practice – Second Edition (2001 revision)

- Due to the variability of the soils at the site it is recommended that sufficient allowance is made for the inspection of formation and sub formations to foundations and pavement construction;
- Excavations where access is required should be subject to a risk assessment from a competent person and where appropriate mitigation measures such as benching back the sides or use of support systems in accordance with CIRIA R97 utilised;
- It is considered that de-watering may be required, especially following periods of heavy rainfall. Removal of surface water and water within trenches should be possible with conventional sump pumping. Discharge of any water should be agreed with the relevant regulatory body and be undertaken under a trade effluent discharge, where required. Measures to remove silt and suspended solids may be required and consideration should be given to provision of space for settling tanks or an attenuation pond;
- Based on the groundwater monitoring results it is possible that groundwater pumped from trenches may require treatment using a water/oil interceptor. Discharge limits and treatment should be agreed as part of the trade effluent discharge;
- Where access to confined spaces is required appropriate mitigation measures should be addressed within the Construction Stage Health and Safety Plan. Particular account should be taken of the gas results;
- The presence of potential contamination and mitigation measures should be addressed as part of the Construction Stage Health and Safety Plan and should include measures to design out the risks, reduce their impact and finally the use of Personnel Protective Equipment (PPE).

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 (LCRM[25]). 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).
- ATRISK Soil Screening Values (SSVs) and CL:AIRE Generic Assessment Criteria (GACs).

C4SLs were published in 2013[26,27]. The recent change to the contaminated land guidance has changed the evaluation of risk from 'minimal' (referred to as Health Criteria values (HCVs))[28] 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 S4ULs[29]. 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[30,31,32,33].

If contaminants are not present as C4SLs and S4ULs then LKC will use ATRISK SSVs or CL:AIRE GACs[34]. These follow the 'minimal' risk principle and more stringent exposure parameters and will be conservative.

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

[25] Land Contamination Risk Management (LCRM) https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm
[26] Defra (2014). "SP1010: Development of Category 4 Screening Levels and Assessment of Land Affected by Contamination – Policy Companion Document."
[27] CL:AIRE (2013). "SP1010: Development of Category 4 Screening Levels and Assessment of Land Affected by Contamination – Final project Report."
[28] EA (2008). "Human Health Toxicological Assessment of Contaminants in Soils." Science Report – SC050021/SR2.
[29] LQM (2014). "The LQM/CIEH S4ULs for Human Health Risk Assessment."
[30] EA (2008). "Updated Technical Background to the CLEA Model." Science Report – SC050021/SR3.
[31] EA (2008). "Human Health Toxicological Assessment of Contaminants in Soils." Science Report – SC050021/SR2.
[32] EA (2008). "A Review of Body Weight and Height Data used within the Contaminated Land Exposure Assessment Model (CLEA)." Project SC050021/Technical Review 1.
[33] EA (2009). "Compilation of Data for Priority Organic Pollutants for Derivation of Soil Guideline Values." Science report SC050021/SR7.
[34] CL:AIRE (2009). "The Soil Generic Assessment Criteria for Human Health Risk Assessment."

PAHs[35,36] and naphthalene the most volatile and soluble[37]. 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 negligible[38]. For B(a)P to be used as a surrogate marker it should follow the profile described by the HPA (2008)[39] and CL:AIRE (2013). Naphthalene will be treated separately using the LQM S4ULs.

The proposed development is for a new bakery building, therefore the assessment criteria for commercial end use has been used.

All criteria have been generated using the CLEA V1.06 model[40] based either on 1%, 2.5% and 6% Soil Organic matter (SOM). Results will be compared to the nearest appropriate SOM.

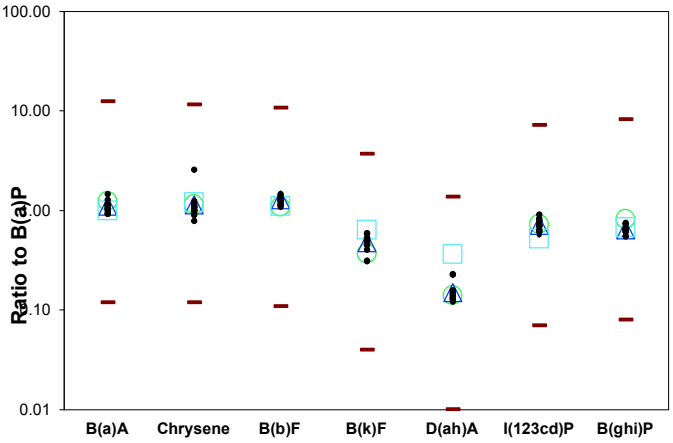
A summary of the generic assessment criteria is provided in Appendix G. ATRISK SSVs and CL:AIRE GACs were not required for this dataset and have not been included.

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*[41], 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.

[35] EA (2002). "Contaminants in Soils: Collation of Toxicological Data and Intake Values for Humans. Benzo[a]pyrene." R&D Publication TOX2.
[36] USEPA (1984). "Health Effects Assessment of Polycyclic Aromatic Hydrocarbons (PAHs). EPA 540/1-86-013."
[37] EA (2003). "Review of the Fate and Transport of Selected Contaminants in the Soil Environment." Draft technical report P5- 079/TR1.
[38] CL:AIRE (2013). "SP1010: Development of Category 4 Screening Levels and Assessment of Land Affected by Contamination – Final project Report."
[39] HPA (2010). "HPA Contaminated Land Information Sheet: Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs)." Version 3.
[40] EA (2008). "CLEA Software (Version 1.05) Handbook." Science Report – SC050021/SR4.
[41] 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.



Graph 6-1: The ratio of PAH to B(a)P in soil for all available data at the site based on 19no. 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)

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

Results have been compared to the relevant assessment criteria and no elevated contaminants were identified.

Asbestos was identified, as detailed in Table 6-1.

Sample Location	ID	Type	Total Asbestos (%)
TP102 (0-1.0m)	Amosite	Fibres/Clumps	0.14
TP103 (0.5-0.9m)	Amosite	Fibres/Clumps	<0.001

Table 6-1: Details of asbestos identified.

All analysis sheets are presented in Appendix C.

To examine the potential additivity of toxicological effects between the petroleum hydrocarbon fractions, a Hazard Index (HI) as described by the Environment Agency[42] technical report was calculated for the samples. This should be undertaken when there are no elevated petroleum hydrocarbons, when compared to assessment criteria of individual fractions. A HI was calculated for TP103 0.5-0.9m (See Appendix H). A HI was not calculated for the remaining samples as no or minimal petroleum hydrocarbons fractions were present.

The HI for TP103 0.5-0.9m was given as 1.49 and as this is above 1 then further risk assessment is required. The predominant TPH fractions in sample from TP103 0.5-

[42] EA (2005). "The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils." Science report P5-080/TR3.

0.9m are heavy end (>C16) and if these are removed from the HI assessment, the result is less than 1 (no further assessment required). Therefore, the risk from the contamination identified in this location would be via direct contact rather than from vapours.

The sample tested from TP103 with detectable levels of TPH was from made ground at 0.5-0.9m described as black oily gravel and was underlain by clean natural clay. No evidence of the oily gravel was identified in WS104 or CP101, boreholes done in proximity to TP103. Therefore, this is likely to be localised contamination and at a depth of 0.5m, it is unlikely to pose a direct contact risk to the proposed development and future site users.

6.2.1 Direct Contact Risk – Pollutant Linkage 1

No elevated metals, PAHs or petroleum hydrocarbons were identified, therefore the probability of these contaminants posing a risk to site users is considered unlikely. With a medium consequence, the risk is considered to be moderate and no remediation is recommended.

Asbestos

Asbestos (amosite) was identified in TP102 0.0-1.0m (0.14%) and TP103 0.5-0.9m (<0.001%). The asbestos was identified as free fibres/clumps for both samples and the source of the asbestos is likely to be from demolished buildings.

Given the small number of samples containing asbestos (2 out of 20 samples), the asbestos is expected to be relatively limited / localised. In addition, TP102, where the highest quantity of asbestos was identified is below future proposed hardstanding.

Asbestos may affect site users in soft landscaping areas of the site, via the inhalation of fibres. The probability is considered to be unlikely. With a medium consequence the risk as assumed to be low and no specific remediation is recommended.

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

6.2.2 Risk from Inhalation of Vapours – Pollutant Linkage 2

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

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.

6.3 Gas Risk Assessment

Four gas monitoring visits have been undertaken on the study site. Gas monitoring results in full are presented in Appendix F. Following guidance set out in CIRIA C665[43] and BS8485[44] peak methane and carbon dioxide concentrations have been used in

[43] CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665.
[44] 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.

the gas risk assessment. In addition, and as per guidance, flow rates were measured first. All gas concentrations, flow, pressure and groundwater levels are shown on Table 6-2.

Boreholes	Visit	CH_4 (%v/v)	CO_2 (%v/v)	O_2 (%v/v)	H_2S (ppm)	CO (ppm)	Flow (l/h)	Groundwater (mbgl)	Pressure (mb)
WS102	1	<0.1	2.7	17	<1	1	0.3	Dry	1010 (r)
	2	<0.1	**6.6**	14.7	<1	1	0.2	Dry	1008 (r)
	3	<0.1	0.9	20.6	<1	<1	<0.1	Dry	1020 (v)
	4	<0.1	**0.7**	20.9	<1	<1	<0.1	Dry	1015 (f)
WS103	1	<0.1	**6.8**	11.1	<1	6	0.2	1.1	1010 (r)
	2	<0.1	**5.8**	15.3	<1	3	0.1	1.18	1008 (r)
	3	<0.1	1.0	20.7	<1	<1	<0.1	1.8	1020 (v)
	4	<0.1	3.5	18.0	<1	<1	<0.1	1.75	1015 (f)
WS105	1	<0.1	**5.1**	15	<1	2	<0.1	Dry	1009 (r)
	2	<0.1	4.5	16.7	<1	1	<0.1	Dry	1008 (r)
	3	<0.1	4.0	17.8	<1	<1	<0.1	Dry	1020 (v)
	4	<0.1	4.6	16.9	<1	<1	<0.1	2.73	1015 (f)
WS106	1	<0.1	4.1	14.8	<1	1	<0.1	Dry	1009 (r)
	2	<0.1	4.8	15.4	<1	1	<0.1	Dry	1007 (r)
	3	<0.1	3.3	18.6	<1	<1	<0.1	Dry	1020 (v)
	4	<0.1	3.9	17.1	<1	<1	<0.1	1.35	1015 (f)
WS107	1	Borehole not monitored.							
	2	<0.1	2.1	19.1	<1	1	<0.1	Dry	1010 (s)
	3	<0.1	2.3	19.3	<1	<1	<0.1	Dry	1020 (v)
	4	<0.1	2.8	18.5	<1	<1	<0.1	Dry	1016 (f)
WS108	1	Borehole not monitored.							
	2	<0.1	**5.3**	16.6	<1	1	<0.1	Dry	1010 (s)
	3	<0.1	**6.4**	16.0	<1	<1	<0.1	Dry	1020 (v)
	4	<0.1	**6.7**	15.4	<1	<1	<0.1	Dry	1015 (f)
CP101	1	<0.1	2.7	16.6	<1	1	0.1	2.1	1009 (r)
	2	<0.1	2.2	18	<1	2	<0.1	2.13	1007 (r)
	3	<0.1	1.9	18.9	<1	2	<0.1	2.21	1018 (v)
	4	<0.1	2.4	18.6	<1	1	-1.3	2.2	1014 (f)
CP102	1	<0.1	0.3	17	<1	49	<0.1	Dry	1008 (r)
	2	<0.1	0.5	18.1	<1	<1	<0.1	Dry	1006 (r)
	3	<0.1	0.5	19.0	<1	<1	<0.1	Dry	1019 (v)
	4	<0.1	0.6	18.9	<1	<1	<0.1	11.7	1015 (f)
CP103	1	<0.1	3.1	15.4	<1	28	0.3	3.55	1009 (r)
	2	<0.1	2.1	18.1	<1	2	<0.1	4.51	1008 (r)
	3	<0.1	3.2	16.7	<1	<1	<0.1	4.50	1019 (v)
	4	<0.1	2.7	18.0	<1	<1	<0.1	4.51	1015 (f)

Table 6-2: Summary of gas monitoring.

Notes:
If concentrations / flow is zero, then equipment detection limits are assumed.
Table shows peak concentrations of CH_4, CO_2, O_2, H_2S and CO.
Bold where CO_2 exceeds 5%v/v and CH_4 exceeds 1%v/v.
Atmospheric pressure (over past 24hrs): r=rising, f=falling, s=steady

Carbon monoxide was >1ppm in boreholes CP101, CP102, CP103 and WS103. The maximum concentration was recorded as 49ppm (CP102). This did not appear to correlate with significant oxygen depletion in any of these locations.

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

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 C665[45], a Gas Screening Value (GSV) may be calculated. Assuming worst-case scenario maximum gas concentrations and flow for each borehole have been used to calculate the GSV. The GSV can be used to determine the characteristic situation (CS).

Table 6-3 shows the maximum GSV for each borehole and the appropriate characteristic situation (based on GSV only). An overall site assessment (WS101-WS106) has also been included (worst case values across the site).

Boreholes	Max GSV (l/hr)	CS
WS102	0.019	CS1
WS103	0.014	CS1
WS105	0.0051	CS1
WS106	0.0048	CS1
WS107	0.0006	CS1
WS108	0.0009	CS1
CP101	0.0027	CS1
CP102	0.0006	CS1
CP103	0.0009	CS1
All boreholes	0.0204	CS1

Table 6-3: Summary of worst-case Gas Screening Values (GSV).
Notes:
CS – Characteristic Situation; TL= Traffic Light.

In addition, in accordance with CIRIA C665, if carbon dioxide and methane are recorded above 5%v/v and 1%v/v respectively, you should consider upgrading the characteristic situation from CS1 to CS2.

Carbon dioxide was recorded above 5% in a number of locations over several monitoring visits with a maximum concentration of 6.8%v/v in WS103. The levels are only marginally elevated and were not accompanied by high flow rates (maximum flow rate of 0.3l/hr). Taking this into account and the less sensitive commercial development proposed, LKC consider that CS1 would be appropriate for the site.

LKC consider the probability of carbon dioxide or 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

LKC considers the Principal Aquifer and the culverted brook as the primary receptors.

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

LKC have compared results above Limits of Detection (LOD). Where relevant the review of priority substances takes precedence considering threshold values for groundwater cannot be used '*as part of site-specific investigations*'. The hierarchy is as follows:

- River Basin District Standards[46] and updated Water Framework Directive[47] for Annual Average / Maximum Allowable Concentration Environmental Quality Standards (AA-MAC-EQS) for priority substances (surface water risk).
- 2016 private water supply standards (UKDWS potable)[48].
- 2001 Environment Agency Values for Environmental Quality Standards (EQS) and UK Drinking Water Standard (UKDWS)[49].
- Resource Protection Values (RPVs)[50].
- Minimal Reporting Values (MRVs).

With regards to hydrocarbon mixtures (TPHCWG) for UKDWS, LKC will use the CL:AIRE guidance on petroleum hydrocarbons in groundwater[51] based on WHO guidelines.

No criteria values have been presented for surface waters (EQS) except the odour, visual evidence and taste test for fish[52]. However, criteria for each banding has been presented by WHO within the CL:AIRE report for drinking water and will be used in the assessment.

No elevated contaminants above detection limits were identified in any water samples. Analysis sheets are presented in Appendix E.

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, LKC considers the probability of contaminants on site affecting the Principal Aquifer and Clayton Brook as unlikely. Given the medium consequence, a low risk is anticipated (Pollutant Linkage 4) and no remediation is required.

6.5 Additional Risk Assessments

6.5.1 Concrete (Pollutant Linkage 5)

As stated in Section 5, sulphate resistant concrete will be required at the site. The site was classified as DS-2 AC-3z.

Based on the above, the probability of sulphate concentrations affecting buildings is likely. Given the consequence is considered to be mild, the risk (pollutant linkage 5) is anticipated to be low / moderate and remediation (sulphate resistant concrete) is required. This should be confirmed with the structural engineer.

[46] Defra (2010). "The River Basin Districts Typology, Standards and Groundwater Threshold Values". Water Framework Directive (England and Wales) Directions 2010.
[47] Defra (2015). " Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015".
[48] Statutory Instruments (2016). "The Private Water Supplies Regulation 2016." No. 614
[49] EA (2002). "Environment Agency technical advice to third parties on Pollution of Controlled Waters for Part IIA of the Environment Protection Act 1990."
[50] SEPA (2010). "Assigning Groundwater Assessment Criteria for Pollutant Inputs." WAT-PS-10-01.
[51] CL:AIRE (2017). "Petroleum Hydrocarbons in Groundwater: Guidance on Assessing Petroleum Hydrocarbons Using Existing Hydrological Risk Assessment Methodologies."
[52] EA (2009). "Petroleum Hydrocarbons in Groundwater: Supplementary Guidance for Hydrological Risk Assessment."

6.5.2 Potable Water Supply (Pollutant Linkage 6)

Soil results were compared to United Utilities (UU) guidelines for the selection of potable water pipes in land potentially affected by contamination[53]. Only contaminants of concern, based on the preliminary conceptual model and ground conditions encountered, were analysed.

The following elevated contaminants were identified:

- Elevated petroleum hydrocarbons in the north west of the site.
- Elevated TVOCs (inc. naphthalene) in made ground across the site.

It is likely that barrier pipe will be required in the north west of the site and may be required across the site 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 6) is anticipated to be moderate risk and remediation (i.e. barrier pipe) is likely to be required (subject to further risk assessment).

6.5.3 Phytotoxicity (Pollutant Linkage 7

Soil results were compared to phytotoxic guideline values as outlined in BS3882[54].

Elevated zinc (maximum concentration 3,200 mg/kg) and copper (maximum concentration 300mg/kg) were identified. The probability of phytotoxic contaminants affecting vegetation is considered to be allow likelihood due to only small areas of soft landscaping proposed. With a minor consequence, the risk (pollutant linkage 7) is anticipated to be low. As only small areas of soft landscaping are proposed, a nominal clean topsoil layer of 150mm as a growing medium will be sufficient to minimise the risk to flora.

6.6 Revised Contamination Conceptual Model

The preliminary contamination conceptual model (Table 2-6) 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.

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.

[53] UU(2011). "United Utilities Water Supplementary Guidance for the Selection of Water Pipes in Land Potentially Affected by Contamination."
[54] BS (2015). "Specifications for Topsoil and Requirements for Use." BS3882:2015.

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.

PL	Pathway	Receptor	Contaminants of Concern (CoC)	Probability	Consequence	Risk	Recommendations
1	- Dermal contact. - Inhalation of soil, fibres and dust. - Ingestion of soils, dust. - Windblown dust.	- Future site users. - Offsite receptors.	- ACM. - Heavy metals. - PAHs.	Unlikely (no elevated concentrations of contaminants identified and only isolated ACM, small areas of soft landscaping proposed)	Medium	**Low**	No remediation required.
			- Petroleum hydrocarbons.		Medium		
2	- Inhalation of vapours. - Migration via permeable strata and preferential pathways.	- Future site users. - Offsite receptors.	- Volatile contaminants (TPHCWG, SVOC, VOCs).	Low (no evidence of significant volatile contamination)	Medium	**Low**	No remediation required.
3	- Inhalation of gas. - Migration via permeable strata and preferential pathways. - Explosion in confined spaces. - Exposure to radon.	- Future site users. - Buildings. - Offsite land users.	- Ground / hazardous gas (carbon dioxide, methane).	Unlikely (only marginally elevated CO_2 and low flow rates)	Severe	Moderate / **Low**	Gas protection measures not required.
			- Radon	Unlikely (as <1% of homes above action level)	Medium	**Low**	(<1%) No protective measures are necessary in the construction of new buildings or extensions.
4	- Surface run-off. - Migration via permeable strata and preferential pathways. - Perched waters migration.	- Groundwater (Principal Aquifer). - Surface water (Clayton Brook).	- Mobile contaminants such as metals, PAHs, hydrocarbons, volatile compounds.	Unlikely (no evidence of significant mobile contamination)	Medium	**Low**	No remediation required.
5	- Sulphate attack on concrete.	- Building structure.	- Sulphate.	Likely	Mild	**Moderate** / Low	- Concrete classification of DS-2 AC-3z.
6	- Ingestion of tainted water supply.	- Future site users. - Water pipes.	- Organic contaminants such as petroleum hydrocarbons, naphthalene, volatile compounds.	Likely (given site history, site conditions and direct contact / pathway)	Medium	**Moderate**	- Completion of United Utilities Risk Assessment. Barrier pipe may be required dependent on route and depth of potable water pipes.
7	- Direct contact (plant uptake).	- Flora.	- Phytotoxic contaminants such as heavy metals.	Low Likelihood (only small areas of soft landscaping proposed)	Minor	**Low**	No remediation required.

Table 6-4: Revised Contamination Conceptual Model.

7 Waste Disposal Assessment

The soil contamination results as presented in Appendix B 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[55, 56 ,57,58 ,59 ,60, 61, 62, 63].

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).

The output sheet is presented in Appendix I and summarised in Table 7-1.

Sampling Location	Hazardous Waste Y/N	LoW Code	Hazard (Risk Phrase)	Contaminants
TP101	N	17 05 03	N/A	N/A
TP102	N	17-05-03	N/A	N/A
TP103	Y	17-05-04	HP3(i) (flammable), HP7 (Carcinogenic), HP10 (Toxic for reproduction), HP11 (Mutagenic), HP14 (Ecotoxic)	TPH C6-C40
TP104	N	17-05-03	N/A	N/A
TP105	N	17 05 03	N/A	N/A
TP106	N	17 05 03	N/A	N/A
TP107	N	17-05-03	N/A	N/A
TP108	Y	17 05 04	HP14 (Ecotoxic)	Zinc
TP109	N	17 05 03	N/A	N/A
TP110	N	17-05-03	N/A	N/A
WS101	N	17-05-03	N/A	N/A
WS102b	N	17-05-03	N/A	N/A
WS103	N	17-05-03	N/A	N/A
WS104	N	17-05-03	N/A	N/A
WS105	N	17-05-03	N/A	N/A
WS106	N	17-05-03	N/A	N/A
WS107	N	17-05-03	N/A	N/A
WS108	N	17-05-03	N/A	N/A
CP101	N	17-05-03	N/A	N/A

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

[55] EA (2018). "Guidance on the Classification and Assessment of Waste (1st Edition v1.1)". Technical Guidance WM3.
[56] CLP Regulation - Regulation 1272/2008/EC of 16 December 2008.
[57] 1st ATP - Regulation 790/2009/EC of 10 August 2009
[58] Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
[59] WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
[60] Revised List of Wastes 2014 - Decision 2014/955/EU of 18 December 2014
[61] 13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
[62] POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004
[63] 2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010

The majority of soil tested onsite during the preliminary investigation indicate the made ground would be classified as non-hazardous waste. However, soil which would be classified as hazardous waste if excavated for removal from site was identified in two locations, TP103 and TP108.

Asbestos was recorded in TP102 at a quantity of 0.14% which would also constitute hazardous waste if this were to be excavated for disposal offsite.

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.

The WAC limits cannot be used to make an assessment of 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.

The samples tested indicated the made ground tested would not be suitable for disposal as inert waste due to elevated total organic carbon (TOC). Environment Agency[64] guidance includes a potential derogation to allow soils up to two times the TOC limits to be deposited at landfills for inert waste in certain circumstances.

Landfill operators wishing to pursue this approach will need to apply to vary their permit. The application must be waste-specific and must specify what limit of TOC is being applied for. It must include a risk assessment considering whether the landfill is designed such that it can cope with any gas and/or leachate that may be produced as a result of accepting this waste.

The producer will need to make a case for an increased TOC up to 2 x the WAC limit.

[64] EA 2010 “Waste Acceptance at Landfills” Guidance on Waste Acceptance Procedures and Criteria.

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	- Industrial bakery unit with yard and parking areas.
General Ground conditions / Geotechnical Testing	- Based on CP101-CP103, WS101A-WS109B, TP101-TP110. - Maximum investigation depth 13.00bgl. - Made Ground up to 4.6mbgl. - Glacial Till (Diamicton) comprising stiff to very stiff variably sandy gravelly CLAY to the completion depths of the exploratory holes. - No bedrock encountered. - Groundwater encountered at depths of between 1.8m and 9.0mbgl within several of the exploratory holes.
Existing Foundations / Obstructions	- The site has previously been developed and as such obstructions within near surface soils can be anticipated. - Live services are known to cross the southern section of the site (6-6.6kV cable). - A 1200mm culvert is marked on United Utilities plans to cross the site.
Undrained Shear Strength (s_u)	- Natural CLAY encountered beneath the Made Ground returned undrained shear strengths of 50kPa up to 3.0mbgl, increasing to 100kPa from 3.00mbgl.
Anticipated Foundation Type	- Ground conditions below the proposed structure are variable with varying depths of made ground (0.7-4.6mbgl), comprising silt, sand and gravel. - Traditional shallow foundations are not expected to be suitable for the proposed development given the ground conditions encountered. - It is recommended that the structure is piled to competent strata. Sleeving should be used at shallow depth to ensure the piles are not affected by negative skin friction from the significant thickness of Made Ground. -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.
Shallow Groundwater	- Shallow groundwater identified on the site which may present a constraint to the development. - Suitable drainage should be considered in the proposed development layout.
Concrete Requirements	- Based on BRE Digest 2005[65] – DS-2 AC-3z recommended.
Services	- Services – consideration to the presence of services running through the site. Services may need to re-routed.
Culvert	- The United Utilities service plans show a 1200mm culvert crossing the site. The location and depth of the culvert should be accurately determined before finalising any development plans.
Temporary support of excavations	- Will be required; trial pits were generally recorded as unstable in granular Made Ground.
Plasticity	- Consideration will need to be given to the shrink / swell of the clay strata if it is to be used as founding strata, particularly where trees/hedges are present. Foundations may need to be deepened. A medium volume change potential has been calculated for the site.
Road / Pavement Design	- Topsoil and untreated Made Ground is considered unsuitable as a sub-grade material. It should be removed to a depth of 0.5m below formation level and sorted to remove any unsuitable or deleterious materials. The sub formation

[65] BRE (2005)."Concrete in Aggressive Ground." Special Digest 1.

	should be rolled and suitable excavated material can then be replaced, up to formation level, in fully compacted thin layers. Any deficit should be made up with suitable imported fill compacted as above. Following this treatment an overall design CBR of 2-5% should be available, although this will require confirmation at a later date through in-situ CBR tests.

Table 8-1: Geotechnical Observations and Conclusions Table.

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, fibres and vegetables).	**Low** (ACM, heavy metals, PAHs, hydrocarbons)	No remediation required.
2	Volatile contaminants posing a risk to site users via the inhalation of vapours.	**Low**	No remediation required.
3	Gas posing a risk to buildings and site users via the migration of gas into building causing explosion and asphyxiation.	Moderate / **Low**	No gas protection measures required.
4	Mobile contamination posing a risk to controlled waters via the migration through permeable strata.	**Low**	No remediation required.
5	Sulphate posing a risk to building via direct contact (sulphate attack).	**Moderate** / Low	Sulphate resistant concrete (DS-2 AC-3z) required.
6	Organic contaminants posing a risk to water pipes.	**Moderate**	UU risk assessment to be completed. The site will may require barrier pipe dependent on route and depth of potable water pipes.
7	Phytotoxic metals posing a risk to flora via root uptake.	**Low**	No remediation required.

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

Table 9-1 details the further works and remedial recommendations / requirements.

PL	Remediation Requirements	Validation Requirements
ALL	Earthworks Inspections / Unexpected Contamination The relevant contractors should be briefed that during development works at the site should any unusual ground conditions and / or visual or olfactory evidence of contamination (including asbestos containing material) be encountered at the site, LKC and the Local Authority should be informed, and further assessment of the material may be required. Should further asbestos be identified during groundworks, precautions should be taken to ensure the safety of the construction workers and nearby land users. It would be advisable to introduce an asbestos management strategy in line with CIRIA C733[66].	Log of work undertaken including photographs. Details of any sampling undertaken and validation of any potential additional remedial work.
5	Sulphate Resistant Concrete Sulphate Resistant Concrete in line with DS-2 AC-3z.recommended.	N/A
6	Potable Water Pipes It is recommended that a United Utilities Risk Assessment is undertaken once the location and depth of potable water pipes are known.	If barrier pipe is required: Delivery Notes of Pipe Material. Photographs of the Installed Pipe.
Grubbing Out of In-Ground Structures It is recommended that in-ground structures are grubbed out as part of the groundworks.		
Re-use of site won 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 [67]): 5,000 tonnes (*c.* 2,500m^3) treatment of crushed concrete / stone. 1,000 tonnes (*c.* 500^3) use of non-hazardous soil 5,000 tonnes (*c.* 2,500m^3) use of clays, sand, gravel, brick, concrete, stone etc. 50,000 tonnes (*c.* 25,000m^3) use of bitumous 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'.		

[66] CIRIA (2014). "Asbestos in Soil and Made Ground: A Guide to Understanding and Managing Risks". C733.
[67] https://www.gov.uk/guidance/waste-exemptions-using-waste

For all the above material will need to be tested at the rate and analytical suites presented in Table 9-2.
Topsoil Growing Medium Although no contamination was identified in the soils on site, the existing made ground is not expected to be a suitable growing medium given the nature of the soil and the undesirable material present (abundant glass, brick fragments, clinker and ceramics). A topsoil cover of approximately 150mm is recommended in soft landscaping areas.
Asbestos Management Plan Due to the presence of asbestos containing material, it is recommended that additional precautions are taken during site clearance, earthworks and construction in the area of concern. The presence of asbestos in the made ground at the site presents a potential risk of generation of airborne fibres if this material is disturbed, such as for excavations to construct new foundations. This may include asbestos awareness training for all site staff, provision of suitable personal and respiratory protective equipment and air monitoring. 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)[68]. 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.
Health and Safety Considerations In working with, removing or treating any contaminating material it is important that any potential risks associated with the actual site works are mitigated by good environmental management of the site during the remedial phases. Standard health and safety precautions (as per HSE guidance[69]) should be adopted by all workers involved with site enabling and construction works.
Piling in Contaminated Land It is understood that the building may be piled. This may provide a preferential pathway for contaminants to the underlying aquifer. 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 Agency[70].

Table 9-1: Further work, remediation and validation requirements
Notes: See Table 6-4 for pollutant linkage (PL) details.

9.2 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 9-2. 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 soil type. Validation samples should be taken prior to placement in gardens to ensure suitability for use.

Material Type	Source	Suite of Analysis	Sampling Rate*

[68] HSE (2012). "Removing Asbestos Cement (AC) Debris)." A11 Asbestos Essential – Non-licenced Tasks.
[69] HSE (1991). "Protection of Workers and the General Public During Development of Contaminated Land" London HMSO.
[70]Environment Agency (2001) Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention.

Topsoil	Greenfield	Suite A	1 sample per 50m^3
	Brownfield / Unknown	Suite B	
Subsoil	Brownfield / Unknown	Suite B	1 sample per 150m^3
	Site won natural material / greenfield	Suite A	
Physical Stone Break Layer	First Generation i.e. quarried sand (subsoil) or stone (break layer)	No testing is required. Certification of material provenance is required.	
	Recycled Stone (6F2 / screened)	Suite B	1 sample per 500m^3

Table 9-2: 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.

*Minimum sampling rate of 3 samples per source.

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

In addition, it should be ensured that the matrix of the topsoil is suitable as a growing medium and no undesirable material is present (in line with BS3882[71]). LKC advise this information is provided by the supplier before material is imported onto site.

Imported material to be used in soft landscaping will be compared against commercial criteria (as used in the contamination risk assessment (Section 6-1)). Appropriate remedial target criteria are presented in Appendix G.

9.3 Site Completion Report

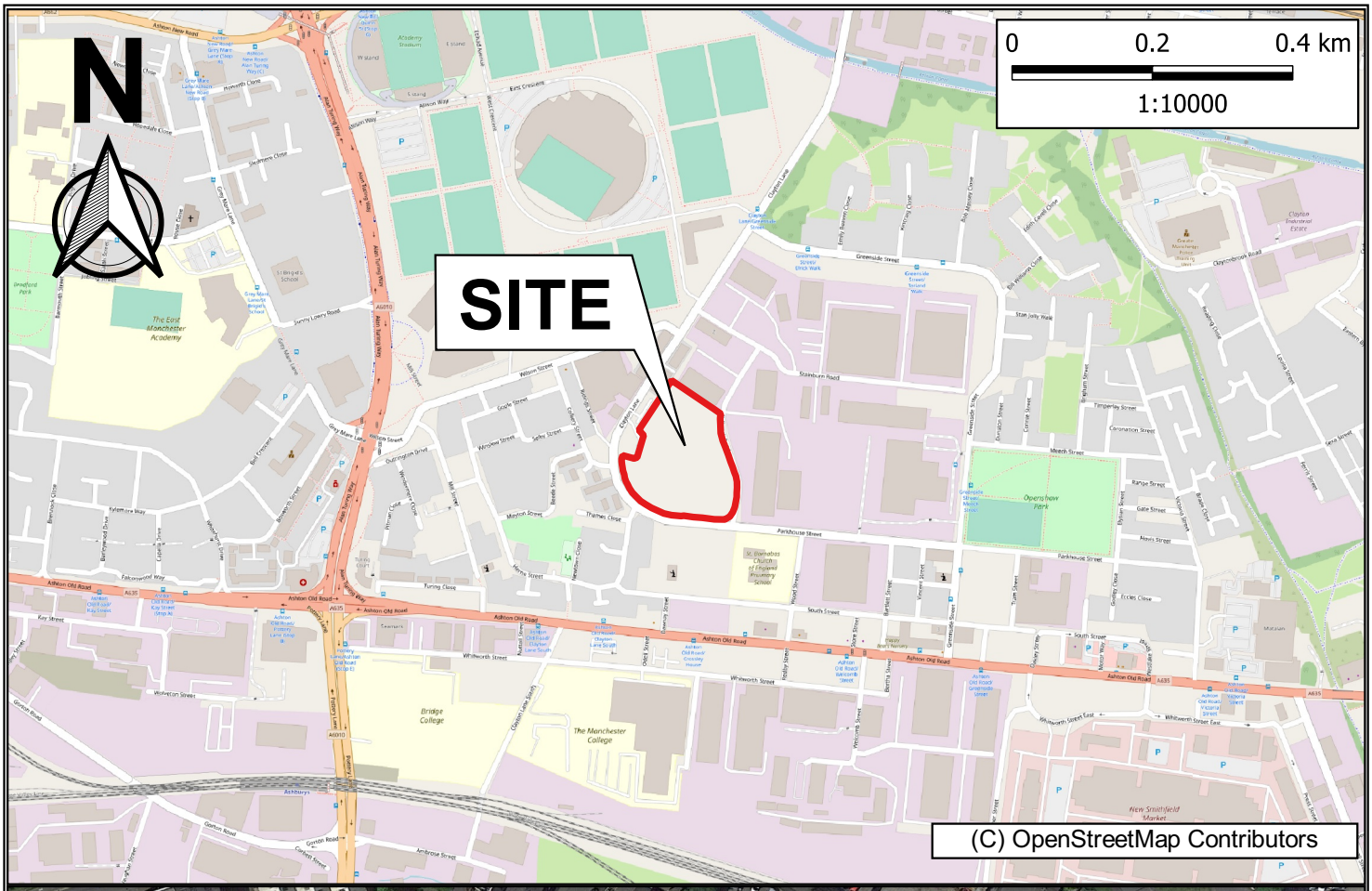
It is recommended that any remediation carried out on the site is validated by a third party and suitable documentary evidence provided in a Site Completion Report, such as photographs, consignment documents and analytical results. This should include as a minimum:

- Verification testing of all imported soil for soft landscaping areas.
- Information on the installation of protective pipes and / or sterile trenches, if required.
- Provision of waste transfer documents.
- Details of any unexpected contamination identified onsite, suitably risk assessed and / or validated.

The Site Completion Report will assist the Local Authority in the discharge of any future relevant planning condition and will also be of use to solicitors acting on behalf of any prospective conveyancer who may have concerns over the former use of the site.

[71] BS (2015). "Specifications for Topsoil and Requirements for use." BS3882:2015.

Figures





Client: GH Sheldon Wholesale Bakers Ltd				Title: Site Location & Boundary Plan	LK CONSULT
Site: Kelbrook Road, Openshaw				Scale (see scale bar): 1:10,000 & 1:2,000 @ A4	Figure: 1	Revision:
Job No.: LKC 21 1095	Drawn By: BR	Checked By: CH	Drawn: March 2021		



Extract from: Bowker Sadler Architecture
Drawing Ref: Indicative Unit Layout, No.0002 (January 2021)

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.

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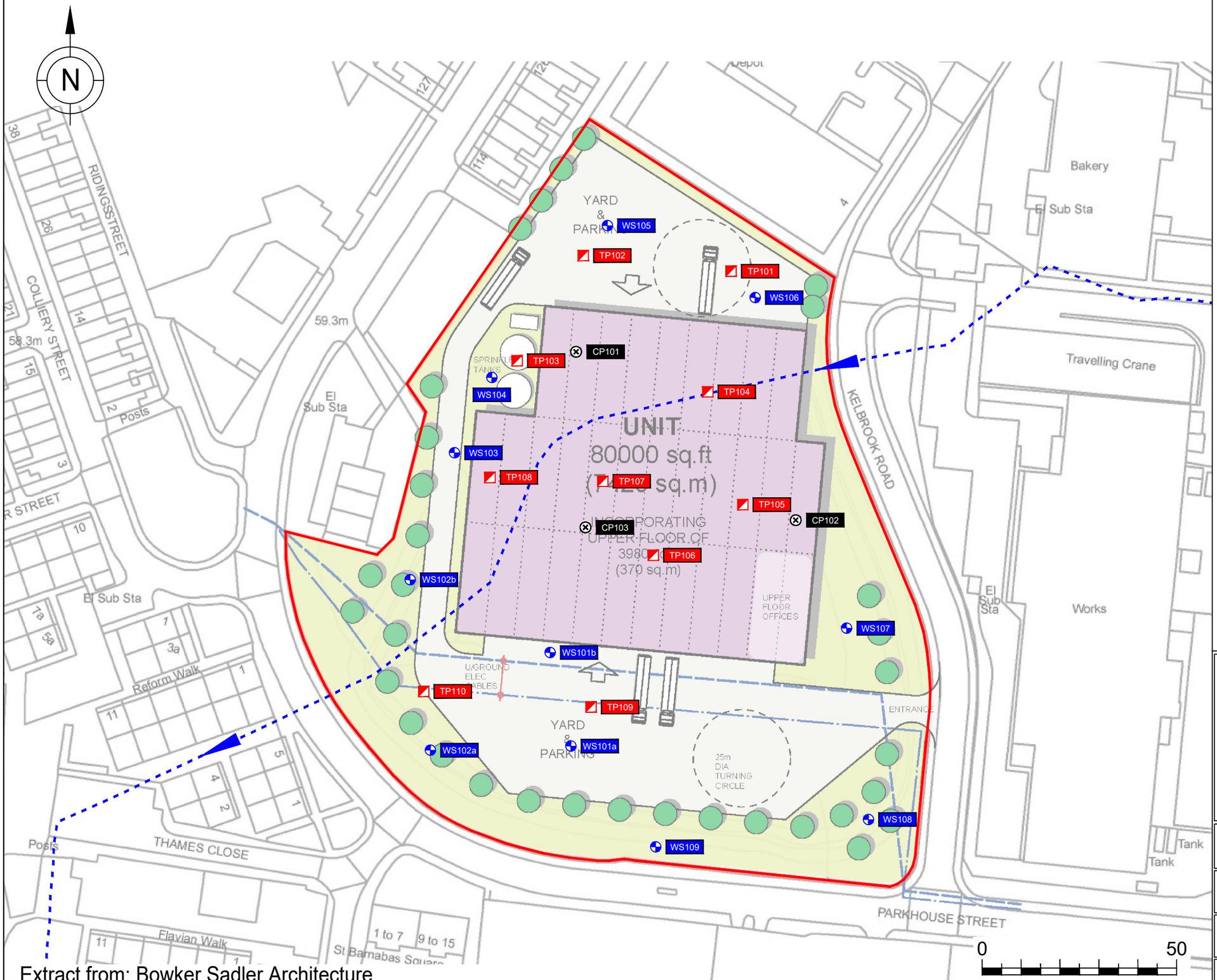
Client: GH Sheldon Wholesale Bakers Ltd

Site: Kelbrook Road, Openshaw

Title: Proposed Site Layout Plan

Job No.:	Scale (See Scale Bar):	Figure:	Revision:
LKC 21 1095	1:1000 @ A3	2	

Drawn By:	Checked By:	Drawn:
AC	CH	Apr 2021



Extract from: Bowker Sadler Architecture
Drawing Ref: Indicative Unit Layout, No.0002 (January 2021)

KEY

- Site Boundary
- Window Sample Borehole (WS)
- Trial Pit (TP)
- Cable Percussive Borehole (CP)
- Culvert (1200BR) (United Utilities, Sewer Records 15/03/2021)

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: GH Sheldon Wholesale Bakers Ltd

Site: Kelbrook Road, Openshaw

Title: Sampling Location Plan

Job No.:	Scale (See Scale Bar):	Figure:	Revision:
LKC 21 1095	1:1000 @ A3	3	B

Drawn By:	Checked By:	Drawn:
AC	BR	Aug 2021

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 552[72]. It involves the classification of the:

- Magnitude of the potential consequence (severity) of the risk occurring (Table A).
- Magnitude if 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.

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

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

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

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

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

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

Appendix B

Profile Logs

LK GROUP	**LK CONSULT LTD** Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS Tel: 0161 763 7200 web: www.thelkgroup.com	**Site** Kelbrook Road, Openshaw	**Trial Pit Number** **TP101**
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions**	**Ground Level (mOD)**	**Client** G. H. Sheldon Wholesale Bakers Ltd **Job Number** LKC 21 1095
	Location (Handheld GPS) 387709 E 397785 N	**Dates** 26/03/2021	**Engineer** LKGroup **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	ES1				(1.20)	MADE GROUND: Dark brown gravelly SAND with frequent brick whole and fragments, timber, rags, masonry, sandstone boulders and clayey inclusions. Sand is fine to coarse. Gravel is fine to coarse, subangular. Large cast iron plate present at 1.20mbgl.		
1.20-1.50	ES2				1.20 (0.30)	Firm consistency brown sandy CLAY. Sand is fine to coarse.		
1.50	SV 60kPa				1.50	Complete at 1.50m		



Remarks

Trial pit dry.
Trial pit unstable.

Scale (approx)	Logged By	Figure No.
1:25	PW	LKC 21 1095.TP101

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LK CONSULT LTD Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS Tel: 0161 763 7200 web: www.thelkgroup.com	**Site** Kelbrook Road, Openshaw	**Trial Pit Number** **TP102**
Machine : JCB 3CX **Method :**	**Dimensions**	**Ground Level (mOD)**	**Client** G. H. Sheldon Wholesale Bakers Ltd	**Job Number** LKC 21 1095
	Location (Handheld GPS) 387671 E 397789 N	**Dates** 26/03/2021	**Engineer** LKGroup	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	ES1				(2.00)	MADE GROUND: Dark brown gravelly SAND with frequent whole brick and fragments, occasional metal, concrete oversize and masonry. Sand is fine to coarse. Gravel is fine to coarse, subangular.		
					2.00	Complete at 2.00m		



Remarks

Trial pit dry.
Trial pit unstable.

Scale (approx)	Logged By	Figure No.
1:25	PW	LKC 21 1095.TP102

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Tel: 0161 763 7200 web: www.thelkgroup.com

Site Kelbrook Road, Openshaw			**Trial Pit Number** TP103
Machine : JCB 3CX **Method :**	**Dimensions**	**Ground Level (mOD)**	**Client** G. H. Sheldon Wholesale Bakers Ltd	**Job Number** LKC 21 1095
	Location (Handheld GPS) 387654 E 397762 N	**Dates** 26/03/2021	**Engineer** LKGroup	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.90	ES1				(0.90)	MADE GROUND: Grey to dark grey gravelly SAND with occasional whole brick and fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular of limestone.		
0.50-0.90	ES2					Patch of black oily medium to coarse GRAVEL from 0.50-0.90mbgl.		
0.90-0.90 0.90-1.50	ES3 B3				0.90 (0.60)	Firm consistency orange and grey CLAY.		
1.50	SV 70kPa				1.50	Complete at 1.50m		



Remarks

Trial pit dry.
Trial pit stable.

Scale (approx)	Logged By	Figure No.
1:25	PW	LKC 21 1095.TP103

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LK CONSULT LTD Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS Tel: 0161 763 7200 web: www.thelkgroup.com	**Site** Kelbrook Road, Openshaw	**Trial Pit Number** **TP104**
Machine : JCB 3CX **Method :**	**Dimensions**	**Ground Level (mOD)**	**Client** G. H. Sheldon Wholesale Bakers Ltd	**Job Number** LKC 21 1095
	Location (Handheld GPS) 387703 E 397754 N	**Dates** 26/03/2021	**Engineer** LKGroup	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.60	ES1				(0.60)	MADE GROUND: Dark brown gravelly SAND with frequent rootlets, occasional brick fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular.		
0.60-1.60	ES2				0.60 (1.90)	MADE GROUND: Black and light grey sandy GRAVEL with frequent boulders of clinker, ash and brick fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular.		
					2.50	Complete at 2.50m		



Remarks

Trial pit dry.
Trial pit stable.
Refusal at 2.50mbgl in made ground.

Scale (approx)	Logged By	Figure No.
1:25	PW	LKC 21 1095.TP104

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LK CONSULT LTD

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

Site Kelbrook Road, Openshaw			**Trial Pit Number** TP105
Machine : JCB 3CX **Method :**	**Dimensions**	**Ground Level (mOD)**	**Client** G. H. Sheldon Wholesale Bakers Ltd **Job Number** LKC 21 1095
	Location (Handheld GPS) 387712 E 397725 N	**Dates** 26/03/2021	**Engineer** LKGroup **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	ES1					MADE GROUND: Brown gravelly SAND with occasional brick fragments and ash. Increasingly ashy and gravelly with depth. Sand is fine to coarse. Gravel is fine to coarse, subangular of sandstone and shale.		
1.50-2.50	ES2				(3.00)			
			Moderate(1) at 3.00m.		3.00	Complete at 3.00m		▽1



Remarks

Trial pit stable.

Scale (approx)	Logged By	Figure No.
1:25	PW	LKC 21 1095.TP105

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LK CONSULT LTD Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS Tel: 0161 763 7200 web: www.thelkgroup.com	**Site** Kelbrook Road, Openshaw	**Trial Pit Number** **TP106**
Machine : JCB 3CX **Method :**	**Dimensions**	**Ground Level (mOD)**	**Client** G. H. Sheldon Wholesale Bakers Ltd	**Job Number** LKC 21 1095
	Location 387689 E 397712 N	**Dates** 26/03/2021	**Engineer** LKGroup	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.40	ES1				(0.40) 0.40	MADE GROUND: Brown gravelly SAND with frequent rootlets, occasional brick fragments and slate. Sand is fine to coarse. Gravel is fine to coarse, subangular.		
					(0.80) 1.20	MADE GROUND: Firm consistency brown sandy CLAY with rare whole brick and fragments. Sand is fine to coarse.		
1.20-2.20	ES2				(1.40) 2.60	MADE GROUND: Brown gravelly SAND with occasional whole brick and fragments, ash and sandstone boulders. Sand is fine to coarse. Gravel is fine to coarse, subangular.		
					(0.20) 2.80	MADE GROUND: Bands of black and white ash with orange cooked clay.		
						Complete at 2.80m		



Remarks

Trial pit dry.
Trial pit stable.

Scale (approx)	Logged By	Figure No.
1:25	PW	LKC 21 1095.TP106

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LK GROUP	**LK CONSULT LTD** Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS Tel: 0161 763 7200 web: www.thelkgroup.com	**Site** Kelbrook Road, Openshaw	**Trial Pit Number** **TP107**
Machine : JCB 3CX **Method :**	**Dimensions**	**Ground Level (mOD)**	**Client** G. H. Sheldon Wholesale Bakers Ltd **Job Number** LKC 21 1095
	Location (Handheld GPS) 387676 E 397731 N	**Dates** 26/03/2021	**Engineer** LKGroup **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	ES1				(1.10)	MADE GROUND: Brown gravelly SAND with occasional brick fragments and ash. Sand is fine to coarse. Gravel is fine to coarse, subangular.		
1.10-2.00	ES2				1.10 (0.90)	MADE GROUND: Brown sandy CLAY with SAND inclusions, rare whole brick and fragments. Sand is fine to coarse.		
					2.00 (1.00)	MADE GROUND: Dark brown very gravelly SAND of predominantly ash and clinker with occasional whole brick and fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular.		
					3.00	Complete at 3.00m		



Remarks

Trial pit dry.
Trial pit stable.

Scale (approx)	Logged By	Figure No.
1:25	PW	LKC 21 1095.TP107

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LK CONSULT LTD Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS Tel: 0161 763 7200 web: www.thelkgroup.com	**Site** Kelbrook Road, Openshaw	**Trial Pit Number** **TP108**
Machine : JCB 3CX **Method :**	**Dimensions**	**Ground Level (mOD)**	**Client** G. H. Sheldon Wholesale Bakers Ltd	**Job Number** LKC 21 1095
	Location (Handheld GPS) 387647 E 397732 N	**Dates** 26/03/2021	**Engineer** LKGroup	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	ES1				(2.50)	MADE GROUND: Dark brown gravelly SAND with frequent ash, clinker, occasional whole brick and fragments and rare timber. Sand is fine to coarse. Gravel is fine to coarse, subangular.		
					2.50	Complete at 2.50m		



Remarks

Trial pit dry.
Trial pit unstable.

Scale (approx)	Logged By	Figure No.
1:25	PW	LKC 21 1095.TP108

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LK CONSULT LTD Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS Tel: 0161 763 7200 web: www.thelkgroup.com	**Site** Kelbrook Road, Openshaw	**Trial Pit Number** **TP109**
Machine : JCB 3CX **Method :**	**Dimensions**	**Ground Level (mOD)**	**Client** G. H. Sheldon Wholesale Bakers Ltd	**Job Number** LKC 21 1095
	Location (dGPS) 387673 E 397673 N	**Dates** 26/03/2021	**Engineer** LKGroup	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	ES1				(1.80)	MADE GROUND: Black gravelly SAND of predominantly ash and occasional clinker. Sand is fine to coarse. Gravel is fine to coarse, subangular.		
			Slow(1) at 1.80m.		1.80 (0.20) 2.00	Soft consistency dark grey silty CLAY. Possibly reworked. Complete at 2.00m		▽1



Remarks

Trial pit unstable.

Scale (approx)	Logged By	Figure No.
1:25	PW	LKC 21 1095.TP109

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LK CONSULT LTD Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS Tel: 0161 763 7200 web: www.thelkgroup.com	**Site** Kelbrook Road, Openshaw	**Trial Pit Number** **TP110**
Machine : JCB 3CX **Method :**	**Dimensions**	**Ground Level (mOD)**	**Client** G. H. Sheldon Wholesale Bakers Ltd	**Job Number** LKC 21 1095
	Location (Handheld GPS) 387630 E 397677 N	**Dates** 26/03/2021	**Engineer** LKGroup	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.40	ES1				(0.40)	MADE GROUND: Brown sandy gravelly CLAY with frequent rootlets and occasional brick fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular.		
0.40-1.40 0.40-1.40	B2 ES2				0.40 (1.60)	MADE GROUND: Black gravelly SAND of predominantly ash and clinker. Sand is fine to coarse. Gravel is fine to coarse, subangular. Brick wall present in the NE wall of the pit from 1.20-2.20mbgl.		
					2.00 (0.20) 2.20	Soft to firm consistency orange sandy CLAY. Sand is fine to coarse. Complete at 2.20m		



Remarks

Trial pit dry.
Trial pit stable.

Scale (approx)	Logged By	Figure No.
1:25	PW	LKC 21 1095.TP110

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LK GROUP	**LK CONSULT LTD** Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS Tel: 0161 763 7200 web: www.thelkgroup.com	**Site** Kelbrook Road, Openshaw	**Borehole Number** **CP101**
Boring Method Cable Percussion	**Casing Diameter** 150mm cased to 3.50m	**Ground Level (mOD)** <62.00 >60.00	**Client** G. H. Sheldon Wholesale Bakers Ltd	**Job Number** LKC 21 1095
	Location (Handheld GPS)	**Dates** 12/08/2021- 13/08/2021	**Engineer** LKGroup	**Sheet** 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-1.00	ES1 PID=0.2ppm						MADE GROUND: Brown sandy GRAVEL of brick fragments, occasional ash, clinker and plastic fragments. Sand is fine to coarse. Gravel is fine to medium and subangular.			
1.20-1.30	SPT 25*/60 50/40			25/50						
1.20-1.30	D2					(3.10)			▼1	
2.00-2.45	D3			Fast(1) at 2.00m, rose to 1.80m in 20 mins.					▽1	
2.00-2.45	SPT N=12			2,3/3,3,3,3						
					58.90	3.10				
3.10-3.55	SPT N=23			3,4/5,5,6,7			Stiff consistency greyish brown gravelly sandy CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular comprising mudstone and sandstone.			
3.10-3.55	D4									
3.60-3.90	B5								▼2	
				Fast(2) at 4.00m, rose to 3.80m in 20 mins.					▽2	
4.20-4.65	D6									
4.20-4.65	SPT N=22			3,4/5,5,6,6						
5.30-5.75	U7					(4.40)				
5.80	D8									
6.80-7.25	SPT N=25			3,4/5,6,7,7						
6.80-7.25	D9									
					54.50	7.50				
7.80-8.25	U10						Stiff light brown gravelly laminated CLAY with occasional coal fragments and rootlets. Gravel is fine to coarse, angular to subrounded comprising mudstone and sandstone.			
8.30	D11					(1.20)				
					53.30	8.70				
8.90-9.20	SPT 50/150			10,14/24,26			Very stiff consistency gravelly sandy CLAY. Sand is fine to coarse. Gravel is fine to medium, angular to subrounded comprising sandstone and mudstone.			
8.90-9.20	D12									
9.20-9.50	B13									
						(1.80)				

Remarks
Location and elevation from handheld GPS.
Groundwater encountered at 2.00mbgl and 4.00mbgl.
Borehole stable.
Sampler refusal at 10.10mbgl. SPT refusal at 10.50mbgl in probable sandstone bedrock.
Chiselling from 8.90m to 10.10m for 1 hour.

Scale (approx)	**Logged By**
1:50	BR

Figure No.
LKC 21 1095.CP101

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LK GROUP	**LK CONSULT LTD** Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS Tel: 0161 763 7200 web: www.thelkgroup.com	**Site** Kelbrook Road, Openshaw	**Borehole Number** **CP101**

Boring Method	**Casing Diameter**	**Ground Level (mOD)**	**Client**	**Job Number**
Cable Percussion	150mm cased to 3.50m	<62.00 >60.00	G. H. Sheldon Wholesale Bakers Ltd	LKC 21 1095
	Location (Handheld GPS)	**Dates** 12/08/2021- 13/08/2021	**Engineer** LKGroup	**Sheet** 2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
10.10-10.50 10.10-10.50	SPT 50/250 D14			8,10/10,15,20,5	51.50	10.50	Complete at 10.50m			

Remarks
Location and elevation from handheld GPS.
Groundwater encountered at 2.00mbgl and 4.00mbgl.
Borehole stable.
Sampler refusal at 10.10mbgl. SPT refusal at 10.50mbgl in probable sandstone bedrock.

Scale (approx)	**Logged By**
1:50	BR

Figure No.
LKC 21 1095.CP101

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LK GROUP	**LK CONSULT LTD** Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS Tel: 0161 763 7200 web: www.thelkgroup.com	**Site** Kelbrook Road, Openshaw	**Borehole Number** **CP102**

Boring Method	**Casing Diameter**	**Ground Level (mOD)**	**Client**	**Job Number**
Cable Percussion	150mm cased to 3.00m	<62.00 >60.00	G. H. Sheldon Wholesale Bakers Ltd	LKC 21 1095
	Location (Handheld GPS)	**Dates** 12/08/2021- 13/08/2021	**Engineer** LKGroup	**Sheet** 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.10-0.30	B1 PID=1.2ppm						MADE GROUND: Brown sandy GRAVEL of brick and mortar fragments, occasional ash, clinker, concrete fragments with clay inclusions and plastic fragments. Sand is fine to coarse. Gravel is fine to medium and subangular.			
0.50	D2									
1.00	D3					(2.20)				
1.20-1.65	SPT N=5			1,2/1,2,1,1						
1.20-1.65	D4									
2.00-2.45	SPT N=6			1,0/1,2,2,1						
2.00-2.45	D5				59.80	2.20	Firm consistency yellowish brown sandy CLAY with occasional rootlets and iron staining. Sand is fine to coarse.			
2.70-3.10	D6 PID=0.1ppm					(0.90)				
3.20-3.65	SPT N=18			2,2/4,3,5,6	58.90	3.10	Stiff consistency greyish brown gravelly sandy CLAY with occasional rootlets. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular comprising			
3.20-3.55	D7					(0.90)				
4.00-4.40	U8				58.00	4.00	Very stiff consistency light brown gravelly CLAY with occasional rootlets. Gravel is fine to coarse, angular to subrounded comprising mudstone and sandstone.			
4.50-4.95	SPT N=44			8,9/10,10,12,12						
4.50-4.95	D9 PID=0.3ppm									
5.50-5.95	SPT N=44			5,6/8,10,12,14		(3.00)				
5.50-5.95	D10									
7.00-7.45	SPT N=18			2,2/4,3,5,6	55.00	7.00	Stiff consistency gravelly sandy CLAY. Sand is fine to coarse. Gravel is fine to medium, angular to subrounded comprising sandstone to mudstone.			
7.00-7.45	D11									
8.50-8.95	U12									
9.00	D13									
9.80-10.20	B14 PID=11.70ppm					(5.50)	Possible creosote like odour noted between			
10.00-10.45	SPT N=26			4,5/5,7,7,7						

Remarks
Location and elevation from handheld GPS.
No groundwater encountered.
Borehole stable.
Sampler refusal at 12.50mbgl. SPT refusal at 12.95mbgl in probable sandstone bedrock.
No chiselling undertaken from 12.95mbgl.
Hydrocarbon odour noted between 9.80-10.0mbgl.
Chiselling from 8.90m to 10.10m for 1 hour.

Scale (approx)	**Logged By**
1:50	BR

Figure No.
LKC 21 1095.CP102

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LK GROUP	**LK CONSULT LTD** Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS Tel: 0161 763 7200 web: www.thelkgroup.com	**Site** Kelbrook Road, Openshaw	**Borehole Number** **CP102**
Boring Method Cable Percussion	**Casing Diameter** 150mm cased to 3.00m	**Ground Level (mOD)** <62.00 >60.00	**Client** G. H. Sheldon Wholesale Bakers Ltd	**Job Number** LKC 21 1095
	Location (Handheld GPS)	**Dates** 12/08/2021- 13/08/2021	**Engineer** LKGroup	**Sheet** 2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
10.00-10.45	D15						9.80-10.0mbgl.			
11.50-11.95	SPT N=30			3,6/6,7,8,9						
11.50-11.95	D16									
12.50-12.85	SPT 50/200			7,9/16,16,18	49.50	12.50	Very stiff brown gravelly CLAY. Gravel is fine to medium, angular comprising sandstone.			
12.50-12.95	D17 PID=<0.1ppm					(0.45)				
					49.05	12.95	Complete at 12.95m			

Remarks
Location and elevation from handheld GPS.
No groundwater encountered.
Borehole stable.
Sampler refusal at 12.50mbgl. SPT refusal at 12.95mbgl in probable sandstone bedrock.
No chiselling undertaken from 12.95mbgl.
Hydrocarbon odour noted between 9.80-10.0mbgl.

Scale (approx)	**Logged By**
1:50	BR

Figure No.
LKC 21 1095.CP102

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LK GROUP	**LK CONSULT LTD** Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS Tel: 0161 763 7200 web: www.thelkgroup.com	**Site** Kelbrook Road, Openshaw	**Borehole Number** **CP103**

Boring Method	**Casing Diameter**	**Ground Level (mOD)**	**Client**	**Job Number**
Cable Percussion	150mm cased to 7.80m	<62.00 >60.00	G. H. Sheldon Wholesale Bakers Ltd	LKC 21 1095
	Location (Handheld GPS)	**Dates** 12/08/2021- 13/08/2021	**Engineer** LKGroup	**Sheet** 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.10-0.30	B1 PID=0.1ppm					(0.30)	MADE GROUND: Brown sandy GRAVEL with silt inclusions, frequent brick and mortar fragments. Sand is fine to coarse. Gravel is fine to medium and subangular, comprising limestone and sandstone.			
0.30	D2				61.70	0.30				
0.40-0.60	B3									
0.60	D4						MADE GROUND: Blackish brown gravelly silty SAND with clay inclusions, frequent brick fragments and ash. Sand is fine to coarse. Gravel is fine to medium and subangular.			
1.20-1.65	SPT N=4			1,2/1,1,1,1		(2.20)				
1.20-1.65	D5									
2.00-2.45	SPT N=4			1,1/0,1,1,2						
2.00-2.45	D6									
2.50-3.00	B7				59.50	2.50	MADE GROUND: Brown gravelly sandy CLAY with frequent ash. Sand is fine to coarse. Gravel is fine to coarse, angular comprising mudstone and siltstone.			
3.00-3.45	SPT N=3			1,0/1,0,1,1						
3.00-3.45	B8					(2.10)				
4.00-4.45	SPT N=9			1,2/2,2,2,3						
4.00-4.45	D9								▽1	
				Water strike(1) at 4.50m, sealed at 6.30m.	57.40	4.60	Stiff consistency greyish brown gravelly CLAY with occasional rootlets. Gravel is fine to coarse, angular to subangular comprising mudstone, sandstone and			
5.00-5.45	SPT N=26			3,4/5,6,7,8						
5.00-5.45	D10									
5.50-6.00	D11									
6.50-6.95	U12					(3.90)				
7.00	D13									
8.00-8.45	SPT N=39			5,5/7,11,11,10						
8.00-8.45	D14									
					53.50	8.50	Stiff consistency light brown gravelly sandy CLAY with occasional sand lenses and rootlets. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded comprising mudstone and sandstone.			
				Water strike(2) at 9.00m, sealed at 11.20m.					▽2	
9.70-10.15	SPT N=22			4,4/5,5,5,7		(2.50)				
9.70-10.15	D15									

Remarks
Location and elevation from handheld GPS.
Groundwater encountered at 4.50mbgl and 9.00mbgl.
Borehole stable.
Sampler refusal at 12.60mbgl. SPT refusal at 13.00mbgl in probable sandstone bedrock.
No chiselling undertaken from 13.00mbgl.

Scale (approx)	**Logged By**
1:50	BR

Figure No.
LKC 21 1095.CP103

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LK GROUP

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

Site	Borehole Number
Kelbrook Road, Openshaw	CP103

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	150mm cased to 7.80m	<62.00 >60.00	G. H. Sheldon Wholesale Bakers Ltd	LKC 21 1095
	Location (Handheld GPS)	**Dates** 12/08/2021-13/08/2021	**Engineer** LKGroup	**Sheet** 2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
10.90-11.35	U16				51.00	11.00	Stiff consistency sandy CLAY. Sand is fine to coarse.			
11.40	D17									
11.80-12.25	SPT N=50			7,8/12,14,13,11		(2.00)				
11.80-12.25	D18									
12.60-13.00	SPT 50/250			9,13/17,18,15						
12.60-13.00	D19				49.00	13.00	Complete at 13.00m			

Remarks
Location and elevation from handheld GPS.
Groundwater encountered at 4.50mbgl and 9.00mbgl.
Borehole stable.
Sampler refusal at 12.60mbgl. SPT refusal at 13.00mbgl in probable sandstone bedrock.
No chiselling undertaken from 13.00mbgl.

Scale (approx)	Logged By
1:50	BR

Figure No. LKC 21 1095.CP103

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LK GROUP	**LK CONSULT LTD** Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS Tel: 0161 763 7200 web: www.thelkgroup.com	**Site** Kelbrook Road, Openshaw	**Number** **WS101A**

Excavation Method	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number**
Drive-in Windowless Sampler		<62.00 >60.00	G. H. Sheldon Wholesale Bakers Ltd	LKC 21 1095
	Location (Handheld GPS) 387672 E 397673 N	**Dates** 12/08/2021- 13/08/2021	**Engineer** LKGroup	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.60	ES1 PID=0.3ppm			61.40	(0.60) 0.60	MADE GROUND: Dark brown gravelly sandy SILT with abundant rootlets, frequent brick fragments, occasional ash, glass and plastic pieces. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular comprising sandstone, coal, and limestone. Hand tool refusal at 0.60mbgl in tarmacadam. Complete at 0.60m		

Remarks
Location and elevation from handheld GPS.
No groundwater encountered.
Hand tool refusal at 0.60mbgl in tarmacadam. CPT unable to penetrate tarmacadam, refusal at 0.60mbgl.
Borehole repositioned due to shallow refusal. Relocated borehole ref. 101b.
Borehole stable.

Scale (approx)	**Logged By**
1:50	BR

Figure No.
LKC 21 1095.WS101A

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LK GROUP	**LK CONSULT LTD** Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS Tel: 0161 763 7200 web: www.thelkgroup.com	**Site** Kelbrook Road, Openshaw	**Number** **WS101B**
Excavation Method Drive-in Windowless Sampler	**Dimensions**	**Ground Level (mOD)** <62.00 >60.00	**Client** G. H. Sheldon Wholesale Bakers Ltd	**Job Number** LKC 21 1095
	Location (Handheld GPS) 387672 E 397672 N	**Dates** 12/08/2021- 13/08/2021	**Engineer** LKGroup	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.85)	MADE GROUND: Brownish grey sandy silty GRAVEL with abundant rootlets, frequent brick fragments, occasional ash, glass, plant matter and plastic pieces. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular comprising sandstone, coal, and limestone.		
				61.15 61.10	0.85 0.90	MADE GROUND: Tarmacadam. Sampler refusal at 0.90mbgl in tarmacadam.		
						Complete at 0.90m		

Remarks
Location and elevation from handheld GPS.
No groundwater encountered.
Sampler refusal at 0.90mbgl in tarmacadam.
Borehole terminated due to shallow refusal at 0.90mbgl.
Borehole stable.
No samples taken at this location.

Scale (approx)	**Logged By**
1:50	BR

Figure No.
LKC 21 1095.WS101B

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LK GROUP	**LK CONSULT LTD** Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS Tel: 0161 763 7200 web: www.thelkgroup.com	**Site** Kelbrook Road, Openshaw	**Number** **WS102A**

Excavation Method	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number**
Drive-in Windowless Sampler		<62.00 >60.00	G. H. Sheldon Wholesale Bakers Ltd	LKC 21 1095
	Location (Handheld GPS) 387644 E 397663 N	**Dates** 12/08/2021- 13/08/2021	**Engineer** LKGroup	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				61.40	(0.60) 0.60	MADE GROUND: Dark brown gravelly sandy SILT with frequent rootlets, occasional glass fragments, brick fragments and plastic pieces. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded comprising limestone and mudstone. Hand tool refusal at 0.60mbgl in possible tarmacadam. Location of former access road on site. Complete at 0.60m		

Remarks
Location and elevation from handheld GPS.
No groundwater encountered.
Borehole stable.
Hand tool refusal at 0.60mbgl on possible tarmacadam.
Borehole terminated at 0.60mbgl.
No samples taken from this location.

Scale (approx)	**Logged By**
1:50	BR

Figure No.
LKC 21 1095.WS102A

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Excavation Method	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number**
Drive-in Windowless Sampler	101mm to 2.00m	<62.00 >60.00	G. H. Sheldon Wholesale Bakers Ltd	LKC 21 1095
	Location (Handheld GPS) 387637 E 397698 N	**Dates** 12/08/2021- 13/08/2021	**Engineer** LKGroup	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.50	ES1 PID=0.1ppm					MADE GROUND: Dark brown gravelly sandy SILT with low angular brick and concrete cobble content, occasional rootlets, glass fragments and pottery fragments. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded comprising limestone and sandstone.			
0.50-1.00	D2				(1.10)				
				60.90	1.10				
1.20-1.65	SPT N=16		7,5/4,4,4,4			MADE GROUND: Blackish brown sandy GRAVEL with frequent ash, clinker and coal fragments. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular comprising limestone, sandstone and mudstone.			
1.50-1.80	ES3 PID=<0.1ppm				(0.70)				
1.80-2.00	PP 85.84 kPa			60.20	1.80				
2.00-2.45	SPT N=16		2,2/3,4,4,5			Stiff to very stiff consistency high strength brown mottled grey gravelly CLAY with occasional rootlets. Gravel is fine to medium, subangular comprising sandstone and coal.			
2.50-2.60	ES4 PID=<0.1ppm				(1.64)				
2.50-3.00	PP 110.36 kPa								
2.60-3.00	D5								
3.00-3.44	SPT 50/285		7,11/13,13,14,10						
3.00-3.44	D6								
				58.56	3.44	Complete at 3.44m			

Remarks
Location and elevation from handheld GPS.
No groundwater encountered.
Borehole stable.
Sampler refusal at 3.00mbgl. SPT refusal at 3.44mbgl in very stiff clay.
Borehole complete at 3.44mbgl.
Hyperdermic needles noted at surface within close proximity to borehole.
Monitoring well installed to 2.70mbgl.

Scale (approx)	**Logged By**
1:50	BR

Figure No.
LKC 21 1095.WS102B

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LK GROUP	**LK CONSULT LTD** Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS Tel: 0161 763 7200 web: www.thelkgroup.com	**Site** Kelbrook Road, Openshaw	**Number** **WS103**

Excavation Method	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number**
Drive-in Windowless Sampler	101mm to 2.00m	<62.00 >60.00	G. H. Sheldon Wholesale Bakers Ltd	LKC 21 1095
	Location (Handheld GPS) 387633 E 397737 N	**Dates** 12/08/2021- 13/08/2021	**Engineer** LKGroup	**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	ES1 PID=36.2ppm				(1.10)	MADE GROUND: Blackish brown sandy silty GRAVEL with frequent ash, clinker, occasional coal fragments, plastic pieces, timber pieces and metal fragments. Sand is fine to coarse. Gravel is fine to medium, angular to subangular comprising limestone and mudstone. Strong hydrocarbon odour noted.			
				60.90	1.10				
1.20-1.65 1.20-1.65 1.50-1.80	SPT N=6 D2 PP 53.95 kPa		1,0/1,1,2,2		(0.70)	MADE GROUND: Soft to firm consistency medium strength grey sandy organic CLAY. Sand is fine to coarse. Organic odour noted. Possible reworked natural.			
1.80-2.00	ES3 PID=0.3ppm		Water strike(1) at 1.90m.	60.20	1.80				
2.00-2.45	SPT N=21		2,3/4,5,6,6			Stiff to very stiff consistency high strength brown mottled grey gravelly CLAY with occasional rootlets and coal fragments. Gravel is fine to medium, angular comprising sandstone.		▽1	
2.20-2.40	ES4 PID=<0.1ppm								
2.50-3.00 2.60-2.70	PP 110.36 kPa D5				(1.65)				
3.00-3.45 3.00-3.45	SPT N=50 D6		6,9/11,13,14,12						
				58.55	3.45	Complete at 3.45m			

Remarks
Location and elevation from handheld GPS.
Groundwater encountered at 1.90mbgl.
Borehole stable.
Sampler refusal at 3.00mbgl. SPT refusal at 3.45mbgl in very stiff clay.
Borehole complete at 3.45mbgl.
Monitoring well installed to 2.00mbgl.
Limited recovered between 1.00-2.00mbgl.

Scale (approx)	**Logged By**
1:50	BR

Figure No.
LKC 21 1095.WS103

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Excavation Method	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number**
Drive-in Windowless Sampler	101mm to 1.00m	<62.00 >60.00	G. H. Sheldon Wholesale Bakers Ltd	LKC 21 1095
	Location (Handheld GPS) 387657 E 397770 N	**Dates** 12/08/2021- 13/08/2021	**Engineer** LKGroup	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.60	ES1 PID=0.3ppm					MADE GROUND: Greyish brown sandy clayey GRAVEL with moderate angular brick and concrete cobble content, occasional ash, clinker, glass fragments, brick fragments, polystyrene pieces and slag. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular comprising limestone and mudstone.		
1.00-2.00	D2				(2.00)			
1.20-1.65	SPT N=17		2,3/4,5,4,4					
2.00-2.34	SPT 50/190		13,12/50	60.00	2.00	Refusal at 2.00mbgl. Concrete identified in SPT sampler. Complete at 2.34m		

Remarks
Location and elevation from handheld GPS.
No groundwater encountered.
Borehole stable.
Sampler refusal at 2.00mbgl. SPT refusal at 2.34mbgl. Concrete identified in SPT sampler.
Borehole terminated at 2.34mbgl.

Scale (approx)	**Logged By**
1:50	BR

Figure No.
LKC 21 1095.WS104

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LK GROUP	**LK CONSULT LTD** Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS Tel: 0161 763 7200 web: www.thelkgroup.com	**Site** Kelbrook Road, Openshaw	**Number** **WS105**

Excavation Method	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number**
Drive-in Windowless Sampler	101mm to 1.00m	<62.00 >60.00	G. H. Sheldon Wholesale Bakers Ltd	LKC 21 1095
	Location (Handheld GPS) 387671 E 397802 N	**Dates** 12/08/2021- 13/08/2021	**Engineer** LKGroup	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.40	ES1 PID=<0.1ppm				(0.40)	MADE GROUND: Soft consistency grey sandy CLAY. Sand is fine to coarse.			
0.40-0.60	ES2 PID=<0.1ppm			61.60	0.40				
					(0.30)	MADE GROUND: Blackish brown sandy GRAVEL of ash and clinker with occasional brick fragments and plastic fragments. Sand is fine to coarse. Gravel is fine to medium and subangular.			
0.70-1.00	ES3 PID=<0.1ppm			61.30	0.70				
1.00-1.40	PP 36.78 kPa				(0.70)	Soft consistency low strength grey sandy organic CLAY with occasional rootlets and plant matter. Sand is fine to coarse.			
1.20-1.65	SPT N=9		1,2/2,2,2,3	60.60	1.40				
1.20-1.65	D4					Firm to very stiff consistency medium to high strength greyish brown gravelly sandy CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular comprising			
1.50-2.00	PP 61.31 kPa								
2.00-2.45	SPT N=17		2,3/3,4,5,5						
2.00-2.45	D5							▽1	
			Water strike(1) at 2.40m.		(2.05)				
2.50-3.00	PP 98.10 kPa								
3.00-3.45	SPT 50/295		7,10/12,13,13,12						
3.00-3.45	D6								
				58.55	3.45	Complete at 3.45m			

Remarks
Location and elevation from handheld GPS.
Groundwater encountered at 2.40mbgl.
Borehole stable.
Sampler refusal at 3.00mbgl. SPT refusal at 3.445mbgl in very stiff clay.
Borehole complete at 3.45mbgl.

Scale (approx)	**Logged By**
1:50	BR

Figure No.
LKC 21 1095.WS105

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Excavation Method	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number**
Drive-in Windowless Sampler	101mm to 1.00m	<62.00 >60.00	G. H. Sheldon Wholesale Bakers Ltd	LKC 21 1095
	Location (Handheld GPS) 387705 E 397788 N	**Dates** 12/08/2021- 13/08/2021	**Engineer** LKGroup	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.70	ES1 PID=0.3ppm				(0.70)	MADE GROUND: Soft consistency brown gravelly sandy CLAY with low brick cobble content, occasional brick fragments, glass fragments and rootlets. Sand is fine to coarse. Gravel is fine to coarse, angular comprising limestone and sandstone.			
				61.30	0.70				
0.70-1.00	ES2 PID=<0.1ppm				(0.60)	MADE GROUND: Soft consistency low strength grey sandy organic CLAY with occasional rootlets, plant matter and brick fragments. Sand is fine to coarse.			
1.00-1.30	PP 24.53 kPa								
1.20-1.65	SPT N=3		1,1/1,1,0,1	60.70	1.30				
				60.60	1.40	Soft consistency low strength grey sandy organic CLAY with occasional rootlets and plant matter. Sand is fine to coarse.			
1.50-1.60	ES3 PID=<0.1ppm								
1.50-2.00	PP 110.36 kPa								
1.60-2.00	D4								
2.00-2.45	SPT N=19		3,4/5,4,5,5			Stiff to very stiff consistency high strength greyish brown gravelly sandy CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular comprising mudstone.		▽1	
2.00-2.45	D5				(1.81)				
			Water strike(1) at 2.40m.						
2.80-3.21	SPT 50/255		10,10/12,13,12,13						
2.80-3.21	D6								
				58.79	3.21	Complete at 3.21m			

Remarks
Location and elevation from handheld GPS.
No groundwater encountered.
Borehole stable.
Sampler refusal at 2.80mbgl. SPT refusal at 3.205mbgl in very stiff clay.
Borehole complete at 3.205mbgl.
Monitoring well installed to 2.50mbgl.

Scale (approx)	**Logged By**
1:50	BR

Figure No.
LKC 21 1095.WS106

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Excavation Method	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number**
Drive-in Windowless Sampler	101mm to 1.00m	<62.00 >60.00	G. H. Sheldon Wholesale Bakers Ltd	LKC 21 1095
	Location (Handheld GPS) 387733 E 397687 N	**Dates** 12/08/2021- 13/08/2021	**Engineer** LKGroup	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.50	ES1 PID=0.1ppm				(0.90)	MADE GROUND: Brown gravelly clayey SAND with low angular brick and concrete cobble content, occasional brick fragments, glass fragments and rootlets. Sand is fine to coarse. Gravel is fine to coarse, angular comprising limestone and mudstone.			
				61.10	0.90				
1.20-1.65 1.20-1.50	SPT N=7 ES2 PID=<0.1ppm		2,2/1,2,2,2		(1.40)	MADE GROUND: Blackish brown sandy GRAVEL of ash and clinker, with abundant glass fragments, frequent ash, clinker and metal pieces. Sand is fine to coarse. Gravel is fine to coare, angular to subrounded.			
1.70-2.00	D3								
2.00-2.45	SPT N=13		3,3/3,3,3,4						
				59.70	2.30				
2.50-3.00	PP 110.53 kPa					Stiff to very stiff consistency high strength orangeish brown gravelly sandy CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular comprising sandstone and quartz.			
2.80-3.45	SPT 50/495		6,7/10,11,15,14		(1.15)				
3.00-3.45	D4								
				58.55	3.45	Complete at 3.45m			

Remarks
Location and elevation from handheld GPS.
No groundwater encountered.
Borehole collapsed to 2.60mbgl.
Sampler refusal at 3.00mbgl. SPT refusal at 3.445mbgl in very stiff clay.
Borehole complete at 3.445bgl.
Monitoring well installed to 2.50mbgl.
No recovery in SPT at 2.00mbgl.

Scale (approx)	**Logged By**
1:50	BR

Figure No.
LKC 21 1095.WS107

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Excavation Method	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number**
Drive-in Windowless Sampler	101mm to 1.00m	<62.00 >60.00	G. H. Sheldon Wholesale Bakers Ltd	LKC 21 1095
	Location (Handheld GPS) 387722 E 397648 N	**Dates** 12/08/2021- 13/08/2021	**Engineer** LKGroup	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.50	ES1 PID=0.1ppm				(1.20)	MADE GROUND: Brown gravelly sandy SILT with low angular brick cobble content, occasional brick fragments and rootlets. Sand is fine to coarse. Gravel is fine to coarse, angular comprising limestone and mudstone.			
				60.80	1.20				
1.20-1.65	SPT N=18		3,3/4,4,4,6		(0.30)	MADE GROUND: Blackish brown sandy silty GRAVEL with occasional glass fragments and pottery fragments. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded comprising limestone and sandstone.			
1.20-1.50	ES2 PID=<0.1ppm			60.50	1.50				
1.20-1.65	D3								
1.50-2.00	D4								
1.50-2.00	PP 122.63 kPa								
2.00-2.45	SPT N=3		1,0/0,1,1,1			Stiff to very stiff consistency high strength orangeish brown gravelly CLAY. Gravel is fine to coarse, angular to subangular comprising sandstone, mudstone and coal.			
2.00-2.45	D5								
2.40-2.60	ES6 PID=<0.1ppm				(1.93)				
2.50-3.00	PP 122.63 kPa								
3.00-3.44	SPT 50/285		6,9/11,13,14,12						
3.00-3.44	D7								
				58.57	3.43	Complete at 3.43m			

Remarks
Location and elevation from handheld GPS.
No groundwater encountered.
Sampler refusal at 3.00mbgl. SPT refusal at 3.435mbgl in very stiff clay.
Borehole complete at 3.435bgl.
Monitoring well installed to 3.00mbgl.

Scale (approx)	**Logged By**
1:50	BR

Figure No.
LKC 21 1095.WS108

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Excavation Method	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number**
Drive-in Windowless Sampler		<62.00 >60.00	G. H. Sheldon Wholesale Bakers Ltd	LKC 21 1095
	Location (Handheld GPS) 387714 E 397666 N	**Dates** 12/08/2021- 13/08/2021	**Engineer** LKGroup	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				61.40	(0.60) 0.60	MADE GROUND: Dark brown gravelly sandy SILT with abundant rootlets, frequent brick fragments, occasional ash and glass fragments. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular comprising sandstone, coal, and limestone. Hand tool refusal at 0.60mbgl in tarmacadam. Complete at 0.60m		

Remarks
Location and elevation from handheld GPS.
No groundwater encountered.
Hand tool refusal at 0.60mbgl in tarmacadam. CPT unable to penetrate tarmacadam, refusal at 0.60mbgl.
Borehole repositioned due to shallow refusal (ref.WS109bb).
Borehole stable.
No samples taken from location.

Scale (approx)	**Logged By**
1:50	BR

Figure No.
LKC 21 1095.WS109A

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Excavation Method	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number**
Drive-in Windowless Sampler	101mm to 1.00m	<62.00 >60.00	G. H. Sheldon Wholesale Bakers Ltd	LKC 21 1095
	Location (Handheld GPS) 387682 E 397641 N	**Dates** 12/08/2021- 13/08/2021	**Engineer** LKGroup	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	ES1 PID=0.1ppm				(1.20)	MADE GROUND: Brown gravelly sandy SILT with low angular brick cobble content, occasional brick fragments and rootlets. Sand is fine to coarse. Gravel is fine to coarse, angular comprising limestone and mudstone.		
				60.80	1.20			
1.20-1.65	SPT N=3		1,0/0,1,1,1		(0.30)	MADE GROUND: Blackish brown sandy silty GRAVEL with occasional ash, clinker and pottery fragments. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded comprising limestone and sandstone.		
1.50-2.00	PP 110.53 kPa			60.50	1.50			
1.60-1.80	ES2 PID=<0.1ppm					Stiff to very stiff consistency high strength orangeish brown gravelly CLAY. Gravel is fine to coarse, angular to subangular comprising sandstone, mudstone and coal.		
2.00-2.45	SPT N=3		1,0/1,0,1,1					
2.00-2.45	D3							
			Water strike(1) at 2.40m.		(1.94)			▽1
2.50-3.00	PP 122.63 kPa							
3.00-3.45	SPT N=41		4,5/8,11,11,11					
				58.56	3.44			
3.45-3.88	SPT 50/275		11,12/13,14,14,9			Complete at 3.88m		
3.45-3.88	D4							

Remarks
Location and elevation from handheld GPS.
Groundwater encountered at 2.40mbgl.
Sampler refusal at 3.00mbgl. SPT refusal at 3.435mbgl in very stiff clay.
Borehole complete at 3.435bgl.

Scale (approx)	**Logged By**
1:50	BR

Figure No.
LKC 21 1095.WS109B

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Appendix C

Certificates of Analysis – Soil

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	21-28689-1
Initial Date of Issue:	26-Aug-2021
Client	LK Consult
Client Address:	Unit 29 Eton Business Park Eton Hill Road Radcliffe Manchester Lancashire M26 2ZS
Contact(s):	Chris Hughes Contaminated Land
Project	LKC 21 1095 Kelbrook Road, Openshaw

Quotation No.:		**Date Received:**	18-Aug-2021
Order No.:	739932	**Date Instructed:**	18-Aug-2021
No. of Samples:	2		
Turnaround (Wkdays):	7	**Results Due:**	26-Aug-2021
Date Approved:	26-Aug-2021		

Approved By:



Details: Glynn Harvey, Technical Manager

Results - 2 Stage WAC

Project: LKC 21 1095 Kelbrook Road, Openshaw

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-28689								
Chemtest Sample ID:	1262964								
Sample Ref:							**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample ID:									
Sample Location:	WS101								
Top Depth(m):	0.00								
Bottom Depth(m):	0.60								
Sampling Date:	12-Aug-2021								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	M	%			3.4	3	5	6
Loss On Ignition	2610	M	%			8.3	--	--	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			31	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			14	100	--	--
pH	2010	M				7.6	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0060	--	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	0.0013	0.0013	0.0025	0.013	0.5	2	25
Barium	1455	U	0.042	0.014	0.084	0.16	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	0.0077	0.0034	0.015	0.0056	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0085	0.0034	0.017	0.037	0.5	10	30
Nickel	1455	U	0.0017	0.0005	0.0034	0.0059	0.4	10	40
Lead	1455	U	< 0.0005	0.0014	< 0.0005	0.013	0.5	10	50
Antimony	1455	U	0.0013	< 0.0005	0.0026	0.0009	0.06	0.7	5
Selenium	1455	U	0.0010	< 0.0005	0.0020	0.0007	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	< 0.003	< 0.003	4	50	200
Chloride	1220	U	4.0	< 1.0	< 10	< 10	800	15000	25000
Fluoride	1220	U	0.76	0.60	1.5	6.1	10	150	500
Sulphate	1220	U	18	< 1.0	36	13	1000	20000	50000
Total Dissolved Solids	1020	N	210	91	410	990	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	19	8.8	< 50	95	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	15

Leachate Test Information	
Leachant volume 1st extract/l	0.320
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.126

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 21 1095 Kelbrook Road, Openshaw

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-28689								
Chemtest Sample ID:	1262965								
Sample Ref:									
Sample ID:									
Sample Location:	CP101								
Top Depth(m):	0.00								
Bottom Depth(m):	1.00								
Sampling Date:	12-Aug-2021								
Determinand	**SOP**	**Accred.**	**Units**				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%			4.0	3	5	6
Loss On Ignition	2610	M	%			7.0	--	--	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			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			38	100	--	--
pH	2010	M				9.1	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0040	--	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	0.0069	0.0019	0.014	0.026	0.5	2	25
Barium	1455	U	0.11	0.048	0.21	0.56	20	100	300
Cadmium	1455	U	0.00028	< 0.00011	0.00056	0.00038	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	0.0030	0.0017	0.0060	0.0041	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0046	0.0045	0.0090	0.045	0.5	10	30
Nickel	1455	U	0.0099	0.0019	0.020	0.030	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0015	0.0011	0.0030	0.012	0.06	0.7	5
Selenium	1455	U	0.0020	< 0.0005	0.0039	0.0027	0.1	0.5	7
Zinc	1455	U	0.029	< 0.003	0.057	0.039	4	50	200
Chloride	1220	U	20	1.2	40	37	800	15000	25000
Fluoride	1220	U	0.79	0.90	1.6	8.8	10	150	500
Sulphate	1220	U	240	33	470	600	1000	20000	50000
Total Dissolved Solids	1020	N	420	100	820	1500	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	4.5	5.4	< 50	53	500	800	1000

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

Leachate Test Information	
Leachant volume 1st extract/l	0.323
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.237

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

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	21-10084-1
Initial Date of Issue:	07-Apr-2021
Client	LK Consult
Client Address:	Unit 29 Eton Business Park Eton Hill Road Radcliffe Manchester Lancashire M26 2ZS
Contact(s):	Contaminated Land Chris Hughes
Project	LKC 21 1095 Kelbrook Road Openshaw

Quotation No.:		**Date Received:**	30-Mar-2021
Order No.:	738514	**Date Instructed:**	30-Mar-2021
No. of Samples:	10		
Turnaround (Wkdays):	5	**Results Due:**	07-Apr-2021
Date Approved:	07-Apr-2021		

Approved By:



Details: Glynn Harvey, Technical Manager

Results - Soil

Project: LKC 21 1095 Kelbrook Road Openshaw

Client: LK Consult			**Chemtest Job No.:**		21-10084	21-10084	21-10084	21-10084	21-10084	21-10084	21-10084	21-10084
Quotation No.:			**Chemtest Sample ID.:**		1169071	1169073	1169075	1169078	1169079	1169081	1169083	1169085
Order No.: 738514			Client Sample Ref.:		ES1	ES1	ES2	ES2	ES1	ES1	ES1	ES1
			Sample Location:		TP101	TP102	TP103	TP104	TP105	TP106	TP107	TP108
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0	0	0.50	0.60	0	0	0	0
			Bottom Depth (m):		1.00	1.00	0.90	1.60	1.00	0.40	1.00	1.00
			Date Sampled:		26-Mar-2021	26-Mar-2021	26-Mar-2021	26-Mar-2021	26-Mar-2021	26-Mar-2021	26-Mar-2021	26-Mar-2021
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY	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	Amosite	Amosite	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	Stereo Microscopy	Stereo Microscopy	-	-	-	-	-
Asbestos by Gravimetry	U	2192	%	0.001		0.14	<0.001					
Total Asbestos	U	2192	%	0.001		0.14	<0.001					
Moisture	N	2030	%	0.020	18	1.9	18	15	21	16	16	21
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Black	Black	Black	Black
Other Material	N	2040		N/A	Stones and Roots	None	Stones	Stones	Stones and Roots	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand
Chromatogram (TPH)	N			N/A			See Attached	See Attached			See Attached	
pH	M	2010		4.0	10.4	9.2	8.1	9.8	8.8	8.7	9.9	9.0
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40			0.64	1.5			6.5	
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.16	0.022	0.041	0.053	< 0.010	0.019	0.23	0.065
Cyanide (Free)	M	2300	mg/kg	0.50			< 0.50	< 0.50			< 0.50	
Cyanide (Total)	M	2300	mg/kg	0.50			< 0.50	< 0.50			< 0.50	
Arsenic	M	2450	mg/kg	1.0	23	44	27	32	54	57	38	31
Cadmium	M	2450	mg/kg	0.10	2.1	8.4	1.9	1.9	1.5	0.76	1.2	18
Chromium	M	2450	mg/kg	1.0	29	36	27	1200	200	130	510	35
Copper	M	2450	mg/kg	0.50	130	120	100	130	220	240	210	110
Mercury	M	2450	mg/kg	0.10	0.33	0.75	0.21	26	17	5.4	17	1.2
Nickel	M	2450	mg/kg	0.50	29	93	68	660	340	190	390	58
Lead	M	2450	mg/kg	0.50	720	310	110	140	240	200	370	210
Selenium	M	2450	mg/kg	0.20	0.28	0.69	0.28	0.56	0.91	0.43	0.26	0.56
Vanadium	U	2450	mg/kg	5.0	39	250	89	900	120	56	130	65
Zinc	M	2450	mg/kg	0.50	560	1100	390	250	230	200	190	3200
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	0.83	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	6.6	7.9	31	4.7	13	9.1	13	16
Diesel Present	N	2670		N/A			False	False			False	
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0			< 1.0	< 1.0			< 1.0	
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0			< 1.0	< 1.0			< 1.0	
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0			190	< 1.0			< 1.0	
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0			390	< 1.0			< 1.0	
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0			890	< 1.0			< 1.0	
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0			2100	< 1.0			< 1.0	

Results - Soil

Project: LKC 21 1095 Kelbrook Road Openshaw

Client: LK Consult			**Chemtest Job No.:**		21-10084	21-10084	21-10084	21-10084	21-10084	21-10084	21-10084	21-10084
Quotation No.:			**Chemtest Sample ID.:**		1169071	1169073	1169075	1169078	1169079	1169081	1169083	1169085
Order No.: 738514			Client Sample Ref.:		ES1	ES1	ES2	ES2	ES1	ES1	ES1	ES1
			Sample Location:		TP101	TP102	TP103	TP104	TP105	TP106	TP107	TP108
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0	0	0.50	0.60	0	0	0	0
			Bottom Depth (m):		1.00	1.00	0.90	1.60	1.00	0.40	1.00	1.00
			Date Sampled:		26-Mar-2021	26-Mar-2021	26-Mar-2021	26-Mar-2021	26-Mar-2021	26-Mar-2021	26-Mar-2021	26-Mar-2021
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0			16000	110			28	
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0			2700	< 1.0			< 1.0	
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0			22000	110			28	
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0			< 1.0	< 1.0			< 1.0	
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0			< 1.0	< 1.0			< 1.0	
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0			74	< 1.0			< 1.0	
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0			280	< 1.0			< 1.0	
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0			1500	< 1.0			< 1.0	
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0			3500	< 1.0			< 1.0	
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0			28000	560			180	
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0			7500	< 1.0			< 1.0	
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0			41000	560			180	
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0			63000	670			200	
Benzene	M	2760	µg/kg	1.0			< 1.0	< 1.0			< 1.0	
Toluene	M	2760	µg/kg	1.0			< 1.0	< 1.0			< 1.0	
Ethylbenzene	M	2760	µg/kg	1.0			< 1.0	< 1.0			< 1.0	
m & p-Xylene	M	2760	µg/kg	1.0			< 1.0	< 1.0			< 1.0	
o-Xylene	M	2760	µg/kg	1.0			< 1.0	< 1.0			< 1.0	
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0			< 1.0	< 1.0			< 1.0	
Naphthalene	M	2800	mg/kg	0.10	1.5	2.6	< 0.10	0.55	< 0.10	0.97	3.5	2.2
Acenaphthylene	N	2800	mg/kg	0.10	0.22	0.23	< 0.10	0.16	< 0.10	0.90	0.10	0.11
Acenaphthene	M	2800	mg/kg	0.10	0.34	1.0	< 0.10	0.14	< 0.10	0.39	0.16	0.32
Fluorene	M	2800	mg/kg	0.10	0.32	0.70	< 0.10	0.19	< 0.10	1.3	0.24	0.24
Phenanthrene	M	2800	mg/kg	0.10	5.5	9.9	6.3	3.4	0.44	8.0	1.9	2.8
Anthracene	M	2800	mg/kg	0.10	1.1	3.1	1.7	0.63	0.11	2.2	0.50	0.51
Fluoranthene	M	2800	mg/kg	0.10	8.3	25	1.9	6.6	0.69	11	2.7	3.9
Pyrene	M	2800	mg/kg	0.10	7.8	23	2.3	5.6	0.55	9.1	2.3	3.5
Benzo[a]anthracene	M	2800	mg/kg	0.10	4.3	13	1.6	3.4	0.35	4.4	1.2	2.5
Chrysene	M	2800	mg/kg	0.10	3.9	11	2.8	3.6	0.30	4.0	1.3	2.4
Benzo[b]fluoranthene	M	2800	mg/kg	0.10	4.9	16	1.2	4.7	0.35	5.0	1.6	3.7
Benzo[k]fluoranthene	M	2800	mg/kg	0.10	1.9	6.4	0.34	1.9	0.16	2.0	0.54	1.3
Benzo[a]pyrene	M	2800	mg/kg	0.10	3.8	14	1.1	3.2	0.30	3.9	1.2	2.7
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10	2.7	10	< 0.10	2.9	< 0.10	3.1	1.0	2.1
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	0.59	1.7	< 0.10	0.45	< 0.10	0.57	0.17	0.62
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10	2.8	8.5	< 0.10	2.4	< 0.10	2.5	0.79	1.7
Total Of 16 PAH's	N	2800	mg/kg	2.0	50	150	19	40	3.3	59	19	31
Total Phenols	M	2920	mg/kg	0.30			< 0.30	< 0.30			< 0.30	

Results - Soil

Project: LKC 21 1095 Kelbrook Road Openshaw

Client: LK Consult		**Chemtest Job No.:**			21-10084	21-10084
Quotation No.:		**Chemtest Sample ID.:**			1169086	1169087
Order No.: 738514		Client Sample Ref.:			ES1	ES1
		Sample Location:			TP109	TP110
		Sample Type:			SOIL	SOIL
		Top Depth (m):			0	0
		Bottom Depth (m):			1.00	0.40
		Date Sampled:			26-Mar-2021	26-Mar-2021
		Asbestos Lab:			COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
ACM Type	U	2192		N/A	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	-
Asbestos by Gravimetry	U	2192	%	0.001		
Total Asbestos	U	2192	%	0.001		
Moisture	N	2030	%	0.020	23	32
Soil Colour	N	2040		N/A	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Clay
Chromatogram (TPH)	N			N/A	See Attached	
pH	M	2010		4.0	8.5	7.2
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	2.3	
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.063	< 0.010
Cyanide (Free)	M	2300	mg/kg	0.50	< 0.50	
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	
Arsenic	M	2450	mg/kg	1.0	86	17
Cadmium	M	2450	mg/kg	0.10	0.77	0.35
Chromium	M	2450	mg/kg	1.0	30	19
Copper	M	2450	mg/kg	0.50	260	40
Mercury	M	2450	mg/kg	0.10	1.6	0.31
Nickel	M	2450	mg/kg	0.50	56	19
Lead	M	2450	mg/kg	0.50	740	73
Selenium	M	2450	mg/kg	0.20	1.4	0.63
Vanadium	U	2450	mg/kg	5.0	80	34
Zinc	M	2450	mg/kg	0.50	220	75
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	19	6.6
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	M	2680	mg/kg	1.0	< 1.0	
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	< 1.0	

Results - Soil

Project: LKC 21 1095 Kelbrook Road Openshaw

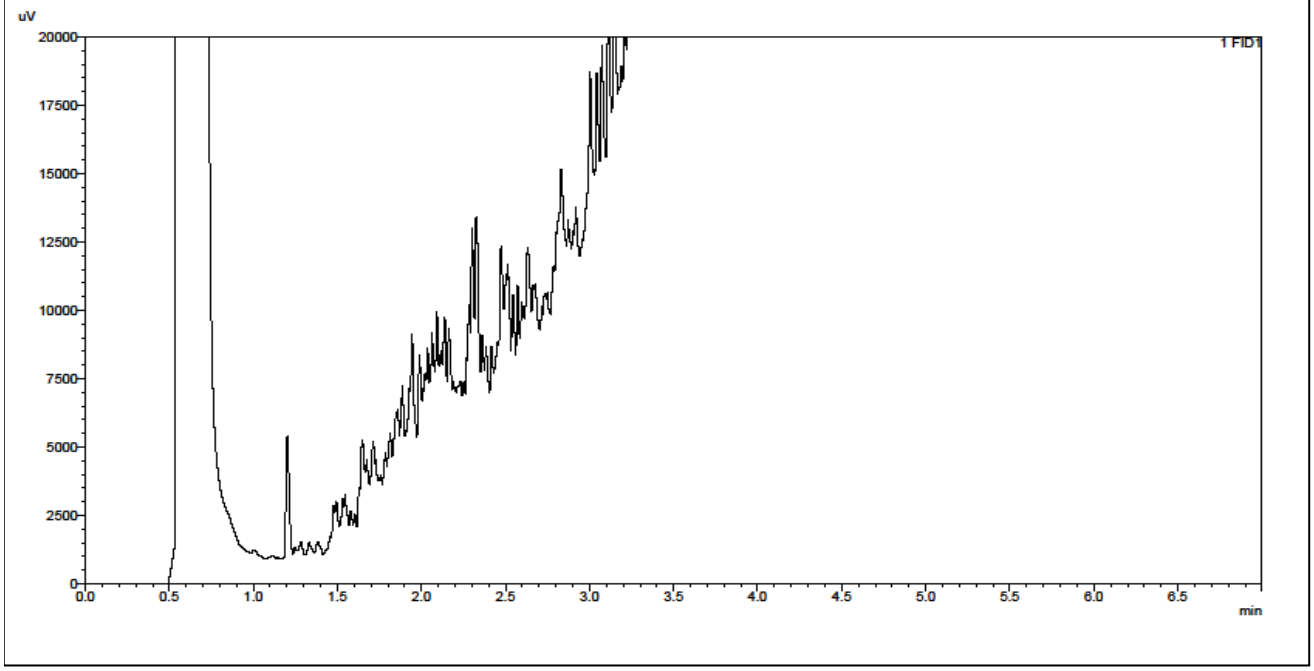
Client: LK Consult		**Chemtest Job No.:**			21-10084	21-10084
Quotation No.:		**Chemtest Sample ID.:**			1169086	1169087
Order No.: 738514		Client Sample Ref.:			ES1	ES1
		Sample Location:			TP109	TP110
		Sample Type:			SOIL	SOIL
		Top Depth (m):			0	0
		Bottom Depth (m):			1.00	0.40
		Date Sampled:			26-Mar-2021	26-Mar-2021
		Asbestos Lab:			COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	98	
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	98	
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	M	2680	mg/kg	1.0	< 1.0	
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	53	
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	510	
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	560	
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	660	
Benzene	M	2760	µg/kg	1.0	< 1.0	
Toluene	M	2760	µg/kg	1.0	< 1.0	
Ethylbenzene	M	2760	µg/kg	1.0	< 1.0	
m & p-Xylene	M	2760	µg/kg	1.0	< 1.0	
o-Xylene	M	2760	µg/kg	1.0	< 1.0	
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	< 1.0	
Naphthalene	M	2800	mg/kg	0.10	2.1	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	0.20	< 0.10
Acenaphthene	M	2800	mg/kg	0.10	1.1	< 0.10
Fluorene	M	2800	mg/kg	0.10	0.68	< 0.10
Phenanthrene	M	2800	mg/kg	0.10	8.0	1.1
Anthracene	M	2800	mg/kg	0.10	1.6	0.31
Fluoranthene	M	2800	mg/kg	0.10	12	1.7
Pyrene	M	2800	mg/kg	0.10	11	1.7
Benzo[a]anthracene	M	2800	mg/kg	0.10	6.2	1.0
Chrysene	M	2800	mg/kg	0.10	6.0	0.83
Benzo[b]fluoranthene	M	2800	mg/kg	0.10	6.8	1.1
Benzo[k]fluoranthene	M	2800	mg/kg	0.10	2.4	0.28
Benzo[a]pyrene	M	2800	mg/kg	0.10	6.0	0.89
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10	3.7	0.57
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	0.81	0.20
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10	3.3	0.54
Total Of 16 PAH's	N	2800	mg/kg	2.0	72	10
Total Phenols	M	2920	mg/kg	0.30	< 0.30	

TPH Chromatogram on Soil Sample: 1169075

<Sample Information>

Sample Name : 1169075 21-10084
Data Filename : 31 March 2021_31032021_1169075 21-10084_031.gcd
Method Filename : TPH 12m Fast OSv2.gcm
Sample # : 16
Date Acquired : 31/03/2021 18:42:52
Date Processed : 31/03/2021

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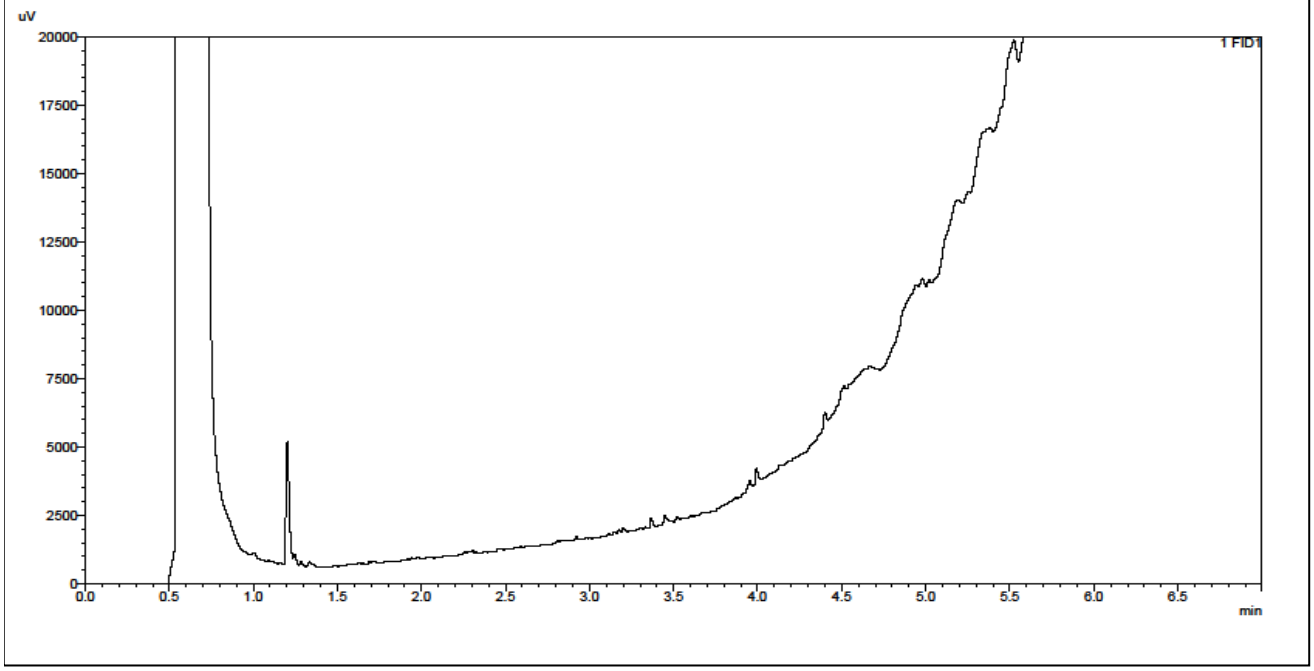


TPH Chromatogram on Soil Sample: 1169078

<Sample Information>

Sample Name : 1169078 21-10084
Data Filename : 31 March 2021_31032021_1169078 21-10084_033.gcd
Method Filename : TPH 12m Fast OSv2.gcm
Sample # : 17
Date Acquired : 31/03/2021 18:55:40
Date Processed : 31/03/2021

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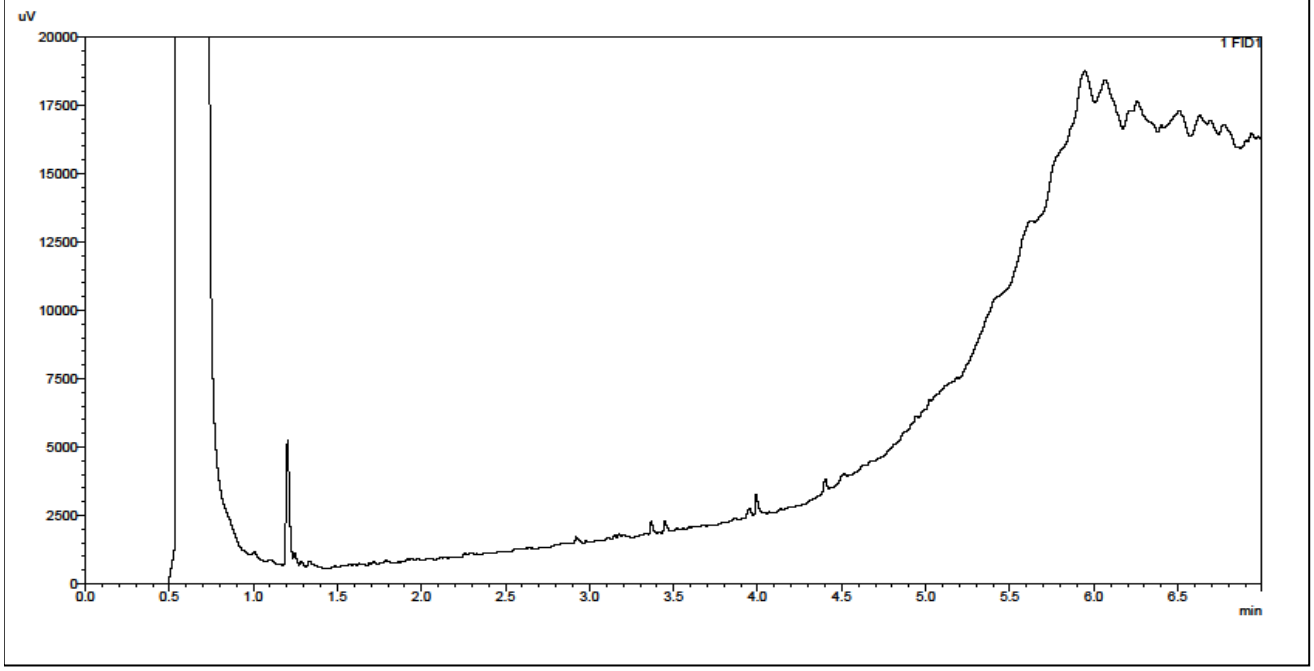


TPH Chromatogram on Soil Sample: 1169083

<Sample Information>

Sample Name : 1169083 21-10084
Data Filename : 31 March 2021_31032021_1169083 21-10084_035.gcd
Method Filename : TPH 12m Fast OSv2.gcm
Sample # : 18
Date Acquired : 31/03/2021 19:08:23
Date Processed : 31/03/2021

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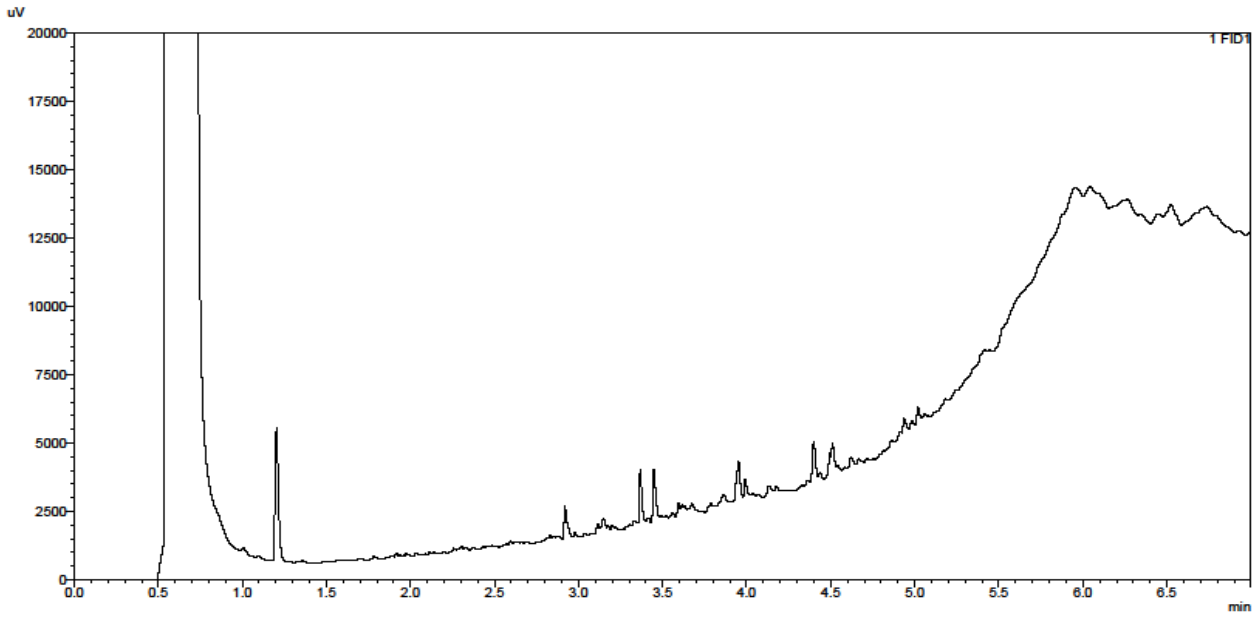


TPH Chromatogram on Soil Sample: 1169086

<Sample Information>

Sample Name : 1169086 21-10084
Data Filename : 31 March 2021_31032021_1169086 21-10084_037.gcd
Method Filename : TPH 12m Fast OSv2.gcm
Sample # : 19
Date Acquired : 31/03/2021 19:21:09
Date Processed : 31/03/2021

<Chromatogram>



TPH Interpretation

Job	Sample	Matrix	Location	Sample Ref	Sample ID	Sample Depth (m)	Gasoline / Diesel Present	TPH Interpretation
21-10084	1169075	S	TP103	ES2		0.50	No	Weathered Kerosene and Heavy Oil
21-10084	1169078	S	TP104	ES2		0.60	No	Heavy Oil
21-10084	1169083	S	TP107	ES1		0	No	Heavy Oil and PAH
21-10084	1169086	S	TP109	ES1		0	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	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2450	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*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

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

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 45 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

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	21-28395-1
Initial Date of Issue:	25-Aug-2021
Client	LK Consult
Client Address:	Unit 29 Eton Business Park Eton Hill Road Radcliffe Manchester Lancashire M26 2ZS
Contact(s):	Chris Hughes Contaminated Land
Project	LKC 21 1095 Kellbrook Road, Openshaw

Quotation No.:		**Date Received:**	17-Aug-2021
Order No.:	739932	**Date Instructed:**	18-Aug-2021
No. of Samples:	13		
Turnaround (Wkdays):	5	**Results Due:**	24-Aug-2021
Date Approved:	25-Aug-2021		

Approved By:



Details: Glynn Harvey, Technical Manager

Results - Soil

Project: LKC 21 1095 Kellbrook Road, Openshaw

Client: LK Consult		**Chemtest Job No.:**			21-28395	21-28395	21-28395	21-28395	21-28395	21-28395	21-28395	21-28395
Quotation No.:		**Chemtest Sample ID.:**			1261688	1261689	1261691	1261692	1261693	1261694	1261697	1261698
		Client Sample ID.:			WS101	WS102B	WS102B	WS103	WS103	WS104	WS105	WS106
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0	0	2.5	0	1.8	0.0	1.4	0.0
		Bottom Depth (m):			0.6	0.5	2.6	1	2.0	0.6	1.5	0.7
		Date Sampled:			12-Aug-2021	12-Aug-2021	12-Aug-2021	12-Aug-2021	12-Aug-2021	12-Aug-2021	12-Aug-2021	13-Aug-2021
		Asbestos Lab:			DURHAM	DURHAM		DURHAM	DURHAM	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		No Asbestos Detected	No Asbestos Detected	No Asbestos Detected		No Asbestos Detected
Moisture	N	2030	%	0.020	12	13	13	11	16	13	16	12
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones and Roots	None	Stones	None	Stones	None	Stones
Soil Texture	N	2040		N/A	Sand	Sand	Clay	Sand	Clay	Sand	Clay	Sand
Chromatogram (TPH)	N			N/A	See Attached			See Attached				
pH	M	2010		4.0	7.7	8.1	8.5	7.8		8.3	8.0	8.7
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	0.46			0.53				
Magnesium (Water Soluble)	N	2120	g/l	0.010			< 0.010				0.010	
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	< 0.010	< 0.010	0.015	0.045		0.024	0.067	0.11
Chloride (Water Soluble)	M	2220	g/l	0.010			< 0.010				0.010	
Nitrate (Water Soluble)	N	2220	g/l	0.010			< 0.010				< 0.010	
Cyanide (Free)	M	2300	mg/kg	0.50	0.70			< 0.50				
Cyanide (Total)	M	2300	mg/kg	0.50	0.70			< 0.50				
Arsenic	M	2450	mg/kg	1.0	13	22		34		56		22
Cadmium	M	2450	mg/kg	0.10	0.15	2.1		2.8		4.9		4.3
Chromium	M	2450	mg/kg	1.0	15	36		28		49		31
Copper	M	2450	mg/kg	0.50	30	130		300		320		270
Mercury	M	2450	mg/kg	0.10	0.16	0.58		0.54		1.3		0.35
Nickel	M	2450	mg/kg	0.50	14	44		53		79		23
Lead	M	2450	mg/kg	0.50	93	160		300		810		1200
Selenium	M	2450	mg/kg	0.20	0.37	0.50		0.69		0.55		< 0.20
Vanadium	U	2450	mg/kg	5.0	34	44		78		73		30
Zinc	M	2450	mg/kg	0.50	62	320		530		880		860
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50		< 0.50		< 0.50		< 0.50
Organic Matter	M	2625	%	0.40	6.2	7.1		29	7.2	11		6.9
Diesel Present	N	2670		N/A	False			False	False			
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0			< 1.0	< 1.0			
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0			< 1.0	< 1.0			
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0			5.0	< 1.0			
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0			< 1.0	< 1.0			
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0			< 1.0	< 1.0			
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	< 1.0			< 1.0	< 1.0			
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	< 1.0			71	< 1.0			
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0			< 1.0	< 1.0			

Results - Soil

Project: LKC 21 1095 Kellbrook Road, Openshaw

Client: LK Consult		**Chemtest Job No.:**			21-28395	21-28395	21-28395	21-28395	21-28395	21-28395	21-28395	21-28395
Quotation No.:		**Chemtest Sample ID.:**			1261688	1261689	1261691	1261692	1261693	1261694	1261697	1261698
		Client Sample ID.:			WS101	WS102B	WS102B	WS103	WS103	WS104	WS105	WS106
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0	0	2.5	0	1.8	0.0	1.4	0.0
		Bottom Depth (m):			0.6	0.5	2.6	1	2.0	0.6	1.5	0.7
		Date Sampled:			12-Aug-2021	12-Aug-2021	12-Aug-2021	12-Aug-2021	12-Aug-2021	12-Aug-2021	12-Aug-2021	13-Aug-2021
		Asbestos Lab:			DURHAM	DURHAM		DURHAM	DURHAM	DURHAM		DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0			76	< 5.0			
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0			< 1.0	< 1.0			
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0			< 1.0	< 1.0			
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0			< 1.0	< 1.0			
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0			< 1.0	< 1.0			
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0			< 1.0	< 1.0			
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0			7.2	< 1.0			
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	< 1.0			110	< 1.0			
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0			< 1.0	< 1.0			
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0			120	< 5.0			
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10			200	< 10			
Benzene	M	2760	µg/kg	1.0	< 1.0			< 1.0	< 1.0			
Toluene	M	2760	µg/kg	1.0	< 1.0			< 1.0	< 1.0			
Ethylbenzene	M	2760	µg/kg	1.0	< 1.0			< 1.0	< 1.0			
m & p-Xylene	M	2760	µg/kg	1.0	< 1.0			< 1.0	< 1.0			
o-Xylene	M	2760	µg/kg	1.0	< 1.0			< 1.0	< 1.0			
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	< 1.0			< 1.0	< 1.0			
Naphthalene	M	2800	mg/kg	0.10	< 0.10	0.35		1.2		0.28		0.37
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	0.16		0.10		0.10		0.12
Acenaphthene	M	2800	mg/kg	0.10	< 0.10	0.94		1.2		0.53		0.26
Fluorene	M	2800	mg/kg	0.10	< 0.10	0.69		0.78		0.33		0.18
Phenanthrene	M	2800	mg/kg	0.10	0.73	8.0		11		3.5		2.2
Anthracene	M	2800	mg/kg	0.10	0.19	1.8		2.2		1.1		0.49
Fluoranthene	M	2800	mg/kg	0.10	0.89	10		17		5.7		3.5
Pyrene	M	2800	mg/kg	0.10	0.81	9.3		16		5.2		3.3
Benzo[a]anthracene	M	2800	mg/kg	0.10	0.35	4.6		8.0		2.7		1.7
Chrysene	M	2800	mg/kg	0.10	0.38	4.7		8.3		2.8		1.8
Benzo[b]fluoranthene	M	2800	mg/kg	0.10	0.43	5.6		9.6		3.4		2.4
Benzo[k]fluoranthene	M	2800	mg/kg	0.10	0.18	2.1		3.6		1.3		0.94
Benzo[a]pyrene	M	2800	mg/kg	0.10	0.31	4.2		7.7		2.6		1.8
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10	< 0.10	3.0		5.3		1.8		1.4
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	0.66		0.99		0.39		0.24
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10	< 0.10	2.7		5.0		1.7		1.3
Total Of 16 PAH's	N	2800	mg/kg	2.0	4.3	59		98		33		22
Total Phenols	M	2920	mg/kg	0.10	< 0.10			< 0.10				

Results - Soil

Project: LKC 21 1095 Kellbrook Road, Openshaw

Client: LK Consult		**Chemtest Job No.:**			21-28395	21-28395	21-28395	21-28395	21-28395
Quotation No.:		**Chemtest Sample ID.:**			1261700	1261701	1261703	1261706	1261708
		Client Sample ID.:			WS106	WS107	WS108	WS109	CP101
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			1.5	0.0	0.0	0.0	0.0
		Bottom Depth (m):			1.6	0.5	0.5	1.0	1.0
		Date Sampled:			13-Aug-2021	13-Aug-2021	13-Aug-2021	13-Aug-2021	12-Aug-2021
		Asbestos Lab:				DURHAM	DURHAM	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	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	13	6.4	13	20	10
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Clay	Sand	Clay	Sand	Sand
Chromatogram (TPH)	N			N/A					See Attached
pH	M	2010		4.0	8.6	8.2	8.3	8.0	8.5
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40					< 0.40
Magnesium (Water Soluble)	N	2120	g/l	0.010	< 0.010				
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.16
Chloride (Water Soluble)	M	2220	g/l	0.010	< 0.010				
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010				
Cyanide (Free)	M	2300	mg/kg	0.50					< 0.50
Cyanide (Total)	M	2300	mg/kg	0.50					< 0.50
Arsenic	M	2450	mg/kg	1.0		17	18	80	22
Cadmium	M	2450	mg/kg	0.10		0.35	0.46	0.54	2.9
Chromium	M	2450	mg/kg	1.0		20	27	27	21
Copper	M	2450	mg/kg	0.50		72	68	190	140
Mercury	M	2450	mg/kg	0.10		0.56	0.50	2.2	0.46
Nickel	M	2450	mg/kg	0.50		30	28	56	36
Lead	M	2450	mg/kg	0.50		140	310	470	220
Selenium	M	2450	mg/kg	0.20		0.38	0.37	0.78	< 0.20
Vanadium	U	2450	mg/kg	5.0		27	35	78	46
Zinc	M	2450	mg/kg	0.50		130	110	320	340
Chromium (Hexavalent)	N	2490	mg/kg	0.50		< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40		11	6.9	38	5.9
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	M	2680	mg/kg	1.0					< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0					< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0					< 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0					< 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0					76
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0					< 1.0

Results - Soil

Project: LKC 21 1095 Kellbrook Road, Openshaw

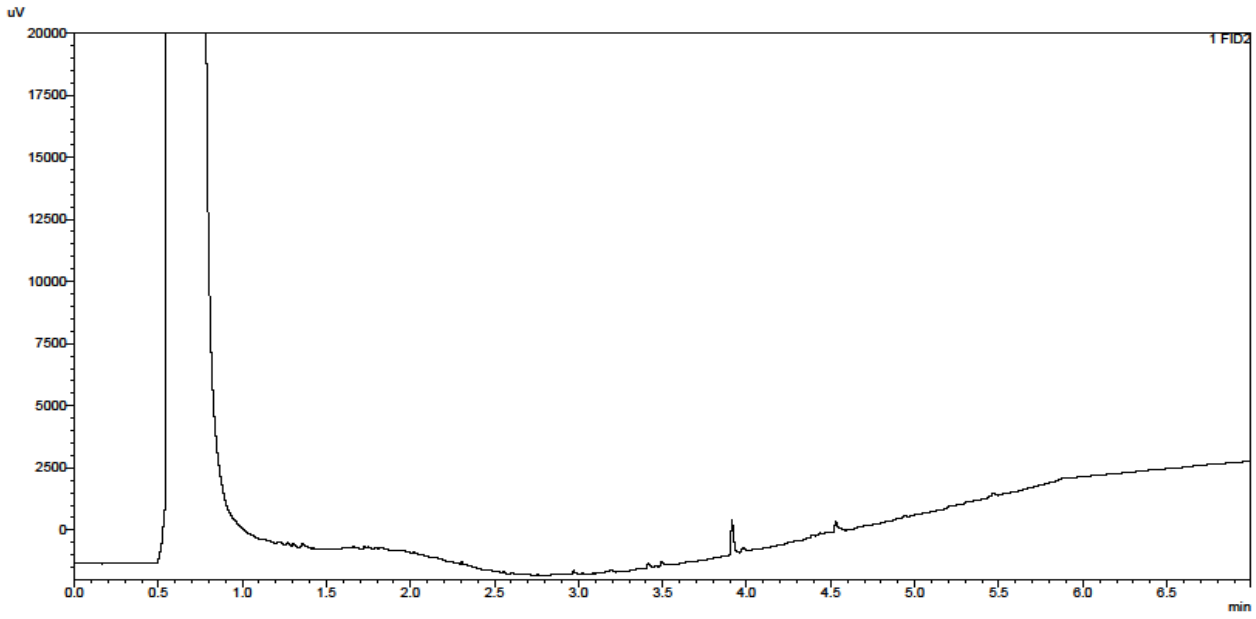
Client: LK Consult			**Chemtest Job No.:**		21-28395	21-28395	21-28395	21-28395	21-28395
Quotation No.:			**Chemtest Sample ID.:**		1261700	1261701	1261703	1261706	1261708
			Client Sample ID.:		WS106	WS107	WS108	WS109	CP101
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		1.5	0.0	0.0	0.0	0.0
			Bottom Depth (m):		1.6	0.5	0.5	1.0	1.0
			Date Sampled:		13-Aug-2021	13-Aug-2021	13-Aug-2021	13-Aug-2021	12-Aug-2021
			Asbestos Lab:			DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0					76
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	M	2680	mg/kg	1.0					< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0					< 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0					< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0					< 1.0
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0					110
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0					< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0					110
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0					190
Benzene	M	2760	µg/kg	1.0					< 1.0
Toluene	M	2760	µg/kg	1.0					< 1.0
Ethylbenzene	M	2760	µg/kg	1.0					< 1.0
m & p-Xylene	M	2760	µg/kg	1.0					< 1.0
o-Xylene	M	2760	µg/kg	1.0					< 1.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0					< 1.0
Naphthalene	M	2800	mg/kg	0.10		5.3	0.67	16	0.80
Acenaphthylene	N	2800	mg/kg	0.10		0.45	0.17	0.59	0.11
Acenaphthene	M	2800	mg/kg	0.10		4.6	1.5	36	1.2
Fluorene	M	2800	mg/kg	0.10		7.5	1.3	24	0.85
Phenanthrene	M	2800	mg/kg	0.10		46	7.9	170	6.2
Anthracene	M	2800	mg/kg	0.10		16	1.8	26	1.2
Fluoranthene	M	2800	mg/kg	0.10		55	7.3	180	7.0
Pyrene	M	2800	mg/kg	0.10		44	6.6	170	6.4
Benzo[a]anthracene	M	2800	mg/kg	0.10		23	3.2	81	3.2
Chrysene	M	2800	mg/kg	0.10		21	3.2	89	3.2
Benzo[b]fluoranthene	M	2800	mg/kg	0.10		23	3.5	87	3.8
Benzo[k]fluoranthene	M	2800	mg/kg	0.10		8.9	1.3	31	1.3
Benzo[a]pyrene	M	2800	mg/kg	0.10		18	2.9	71	3.0
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10		11	2.0	40	1.8
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10		2.3	0.39	9.5	0.43
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10		9.9	1.9	40	1.9
Total Of 16 PAH's	N	2800	mg/kg	2.0		300	46	1100	42
Total Phenols	M	2920	mg/kg	0.10					< 0.10

TPH Chromatogram on Soil Sample: 1261688

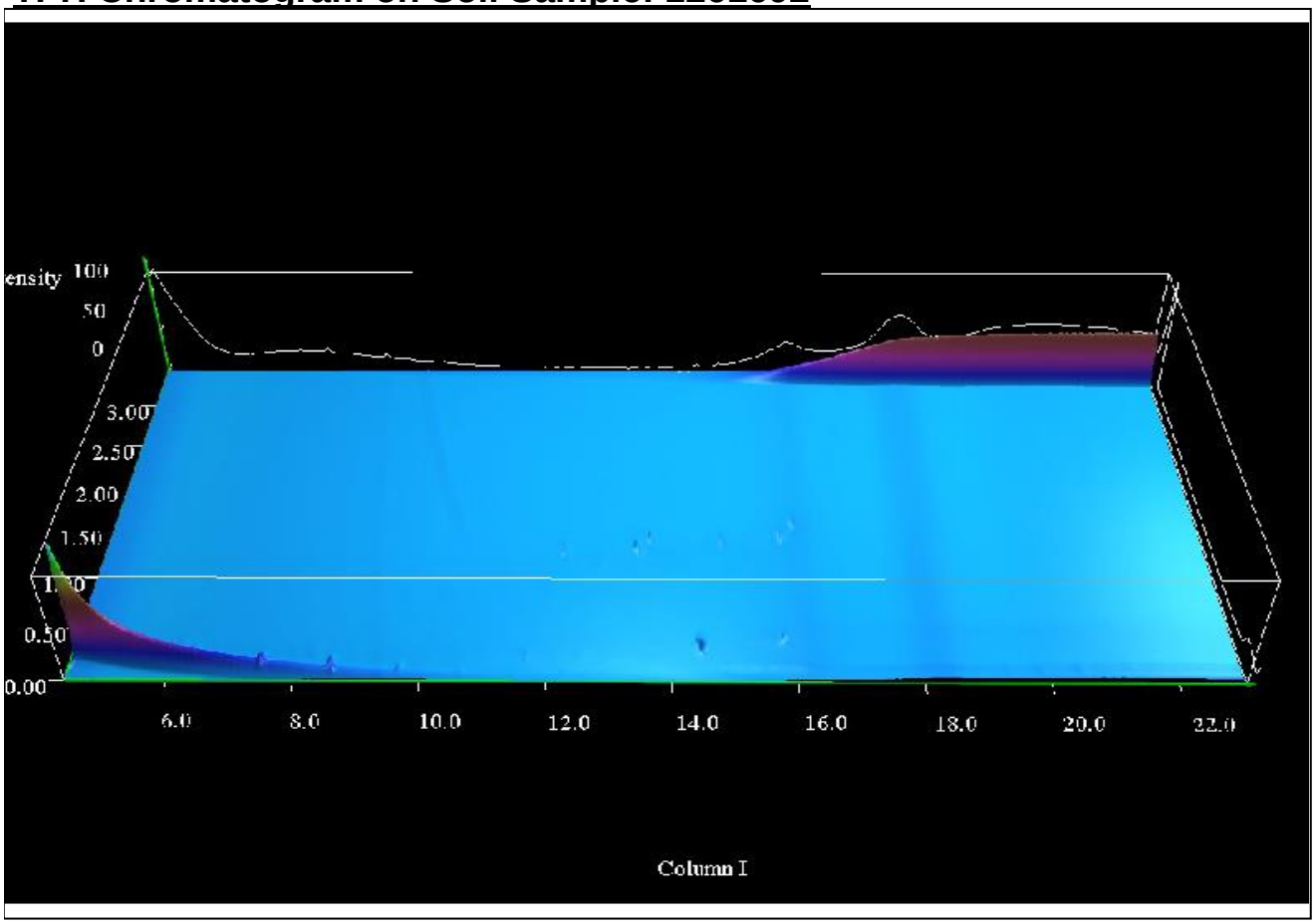
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Sample Name : 1261688 21-28395
Data Filename : 18 August 2021_18082021_1261688 21-28395_046.gcd
Method Filename : TPH 12m Fast OSv2.gcm
Sample # : 98
Date Acquired : 18/08/2021 21:43:03
Date Processed : 18/08/2021

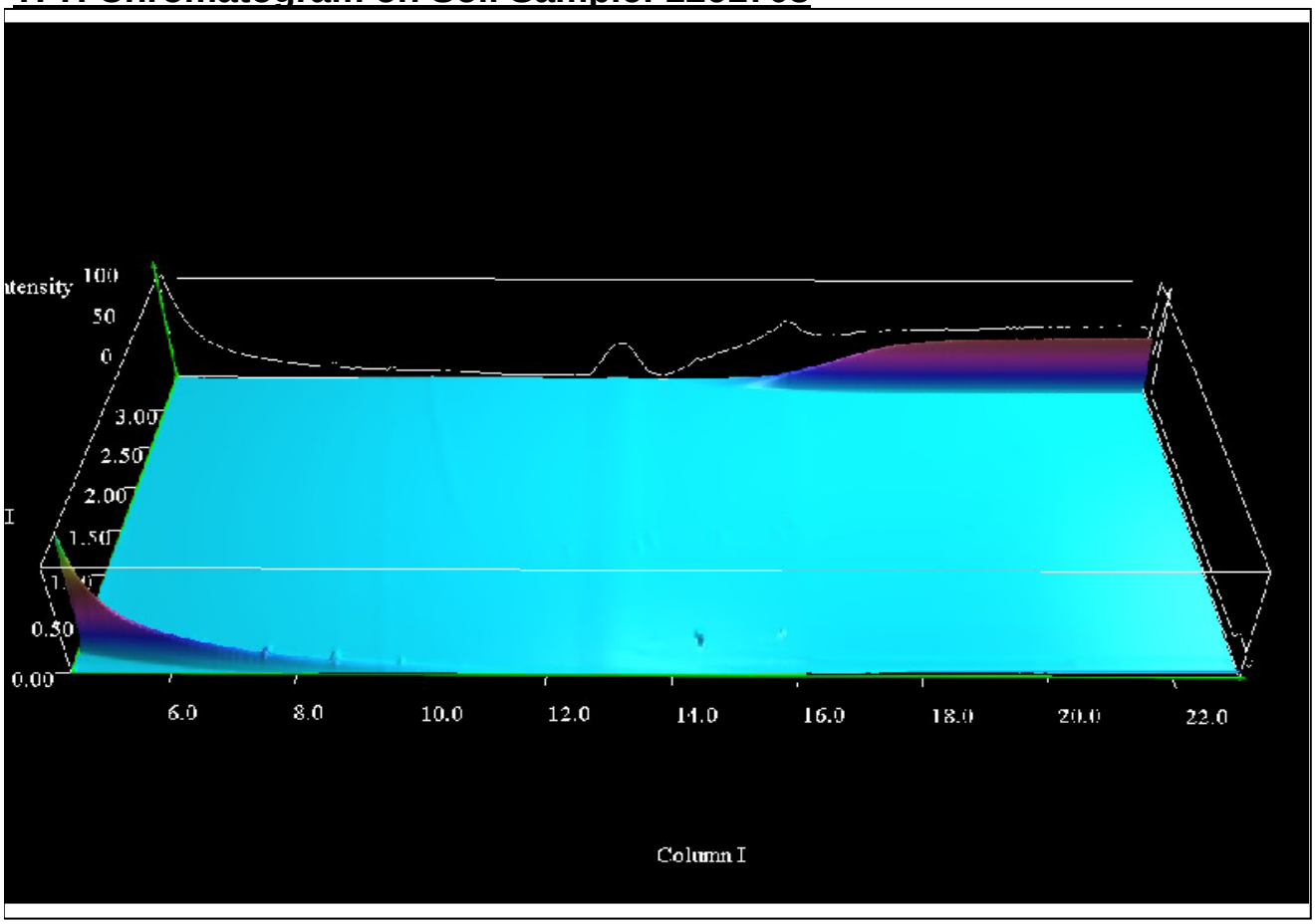
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TPH Chromatogram on Soil Sample: 1261692



TPH Chromatogram on Soil Sample: 1261708



TPH Interpretation

Job	Sample	Matrix	Location	Sample Ref	Sample ID	Sample Depth (m)	Gasoline / Diesel Present	TPH Interpretation
21-28395	1261688	S			WS101	0	No	N/A
21-28395	1261692	S			WS103	0	No	PAH
21-28395	1261693	S			WS103	1.8	No	N/A
21-28395	1261708	S			CP101	0.0	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
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measurememrnt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2450	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*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

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

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

MURRAY RIX
CONSULTANCY, SITE INVESTIGATION
CONSTRUCTION MATERIALS TESTING

TEST REPORT

Client LK Consult Ltd

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

Contract LKC 21 1095 -
Kelbrook Road, Openshaw

Job Number MRN 4066/169
Date of Issue 22 September 2021
Pages 1 of 12

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.

MURRAY RIX

Andrew House, Hadfield Street,
Dukinfield, Cheshire SK16 4QX
TEL 0161 475 0870

UKAS TESTING
1580

TEST CERTIFICATE

LIQUID AND PLASTIC LIMIT

BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3

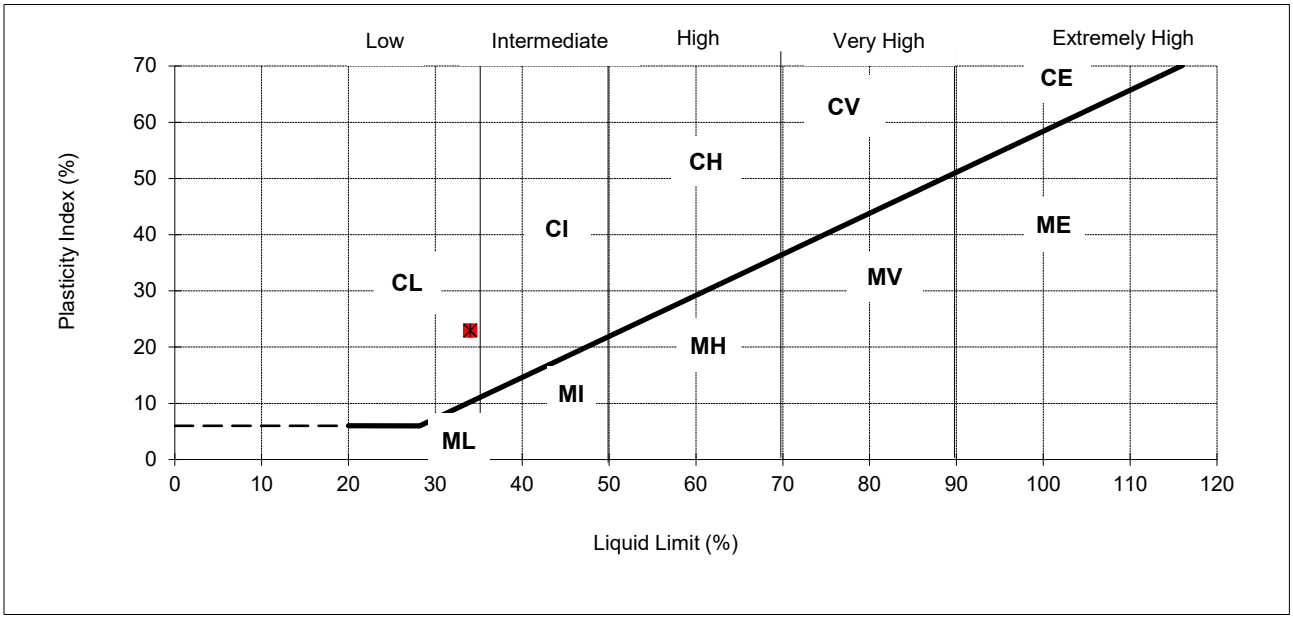
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	LK Consult Ltd
SITE	LKC 21 1095 - Kelbrook Road, Openshaw
JOB NUMBER	MRN 4066/169

SAMPLE LABEL	WS102b 2.6-3.0	DATE SAMPLED	Not advised
SAMPLE No.	103501	DATE RECEIVED	25-Aug-21
DATE TESTED	04-Sep-21	SAMPLED BY	Client

MATERIAL	Firm to stiff brown silty sandy CLAY with rare gravel
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
17	34	11	23	98



REMARKS
Sample tested in natural condition

SIGNED

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

DATE 22-Sep-21

MURRAY RIX

Andrew House, Hadfield Street,
Dukinfield, Cheshire SK16 4QX
TEL 0161 475 0870

UKAS TESTING 1580

TEST CERTIFICATE

LIQUID AND PLASTIC LIMIT

BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3

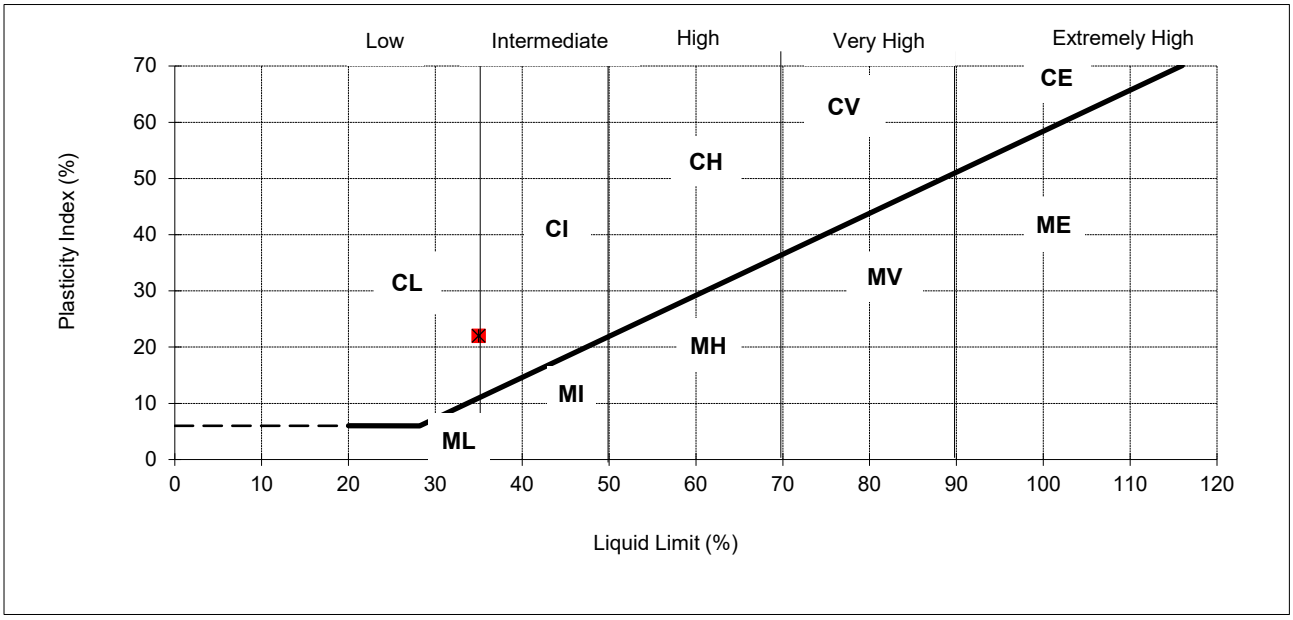
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	LK Consult Ltd
SITE	LKC 21 1095 - Kelbrook Road, Openshaw
JOB NUMBER	MRN 4066/169

SAMPLE LABEL	WS103 2.6-2.7	DATE SAMPLED	Not advised
SAMPLE No.	103502	DATE RECEIVED	25-Aug-21
DATE TESTED	04-Sep-21	SAMPLED BY	Client

MATERIAL	Soft brown silty sandy CLAY
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
36	35	13	22	100



REMARKS
Sample tested in natural condition

SIGNED

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

DATE 22-Sep-21

MURRAY RIX

Andrew House, Hadfield Street,
Dukinfield, Cheshire SK16 4QX
TEL 0161 475 0870

UKAS TESTING
1580

TEST CERTIFICATE

LIQUID AND PLASTIC LIMIT

BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3

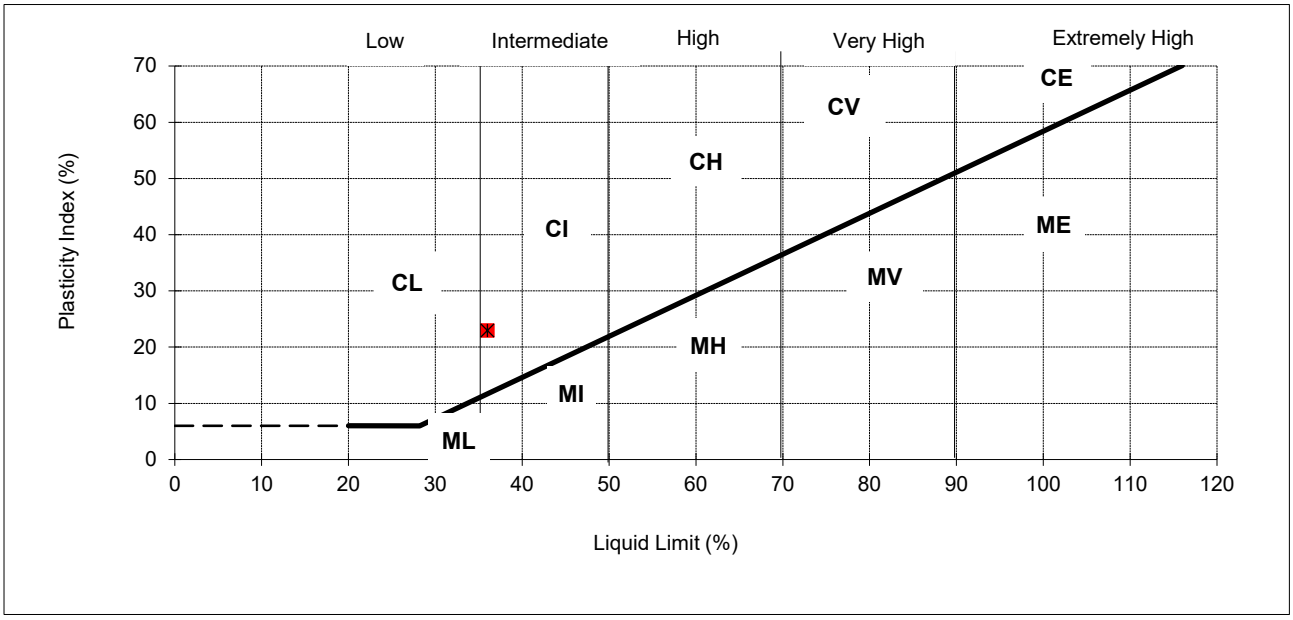
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	LK Consult Ltd
SITE	LKC 21 1095 - Kelbrook Road, Openshaw
JOB NUMBER	MRN 4066/169

SAMPLE LABEL	WS106 SPT 2.0	DATE SAMPLED	Not advised
SAMPLE No.	103503	DATE RECEIVED	25-Aug-21
DATE TESTED	04-Sep-21	SAMPLED BY	Client

MATERIAL	Firm brown silty sandy CLAY
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
18	36	13	23	98



REMARKS
Sample tested in natural condition

SIGNED

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

DATE 22-Sep-21

MURRAY RIX

Andrew House, Hadfield Street,
Dukinfield, Cheshire SK16 4QX
TEL 0161 475 0870

UKAS TESTING
1580

TEST CERTIFICATE

LIQUID AND PLASTIC LIMIT

BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3

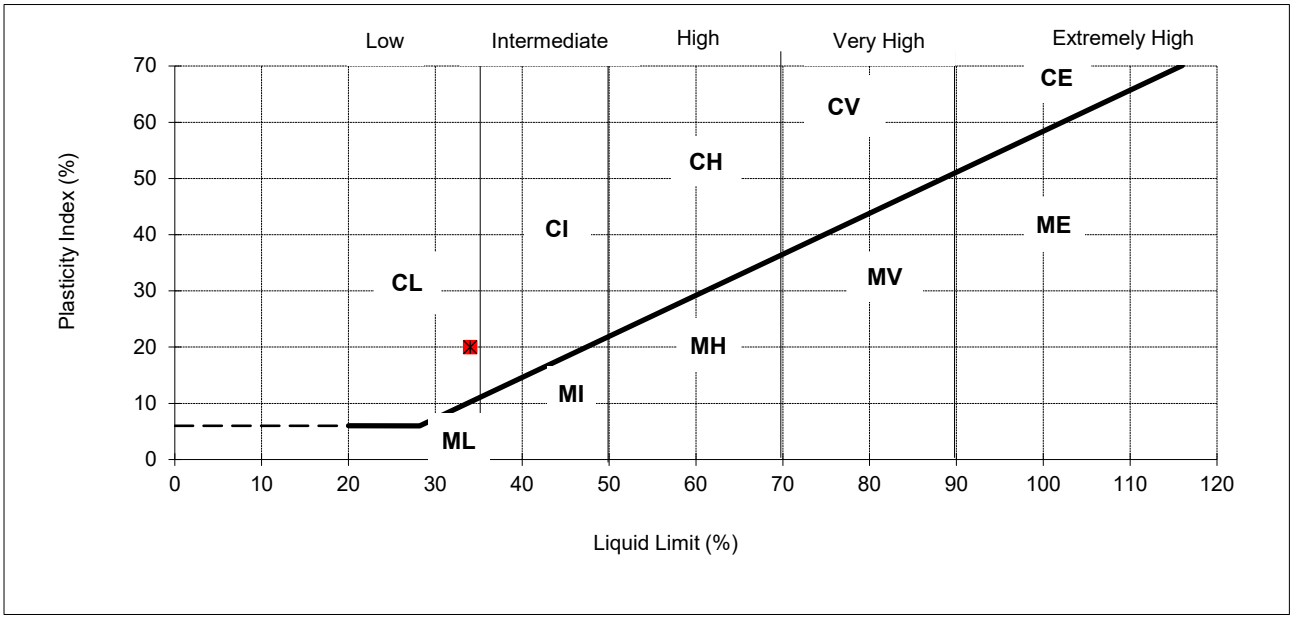
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	LK Consult Ltd
SITE	LKC 21 1095 - Kelbrook Road, Openshaw
JOB NUMBER	MRN 4066/169

SAMPLE LABEL	WS107 SPT 3.0	DATE SAMPLED	Not advised
SAMPLE No.	103504	DATE RECEIVED	25-Aug-21
DATE TESTED	04-Sep-21	SAMPLED BY	Client

MATERIAL	Firm brown silty sandy CLAY
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
19	34	14	20	100



REMARKS
Sample tested in natural condition

SIGNED

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

DATE 22-Sep-21

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

TEST CERTIFICATE

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

BS 1377 : PART 7: Clause 8 Single Stage

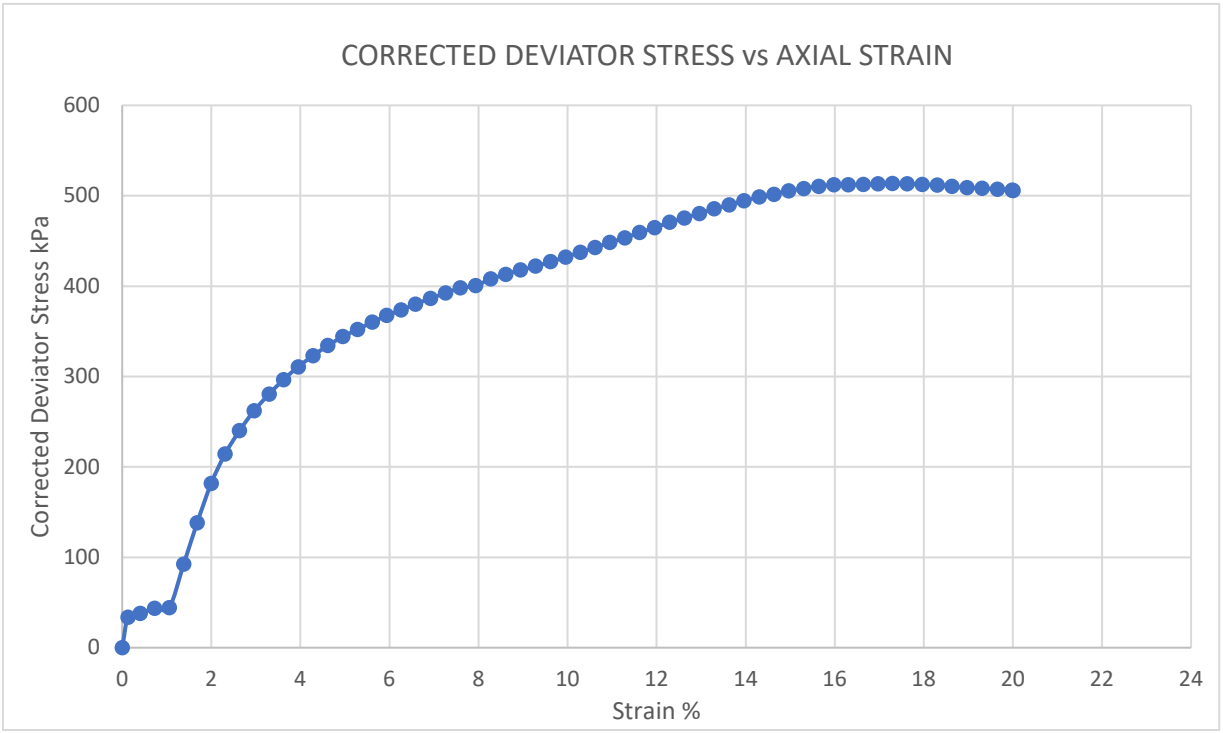
CLIENT	LK Consult Ltd
SITE	LKC 21 1095 - Kelbrook Road, Openshaw
JOB NUMBER	MRN 4066/169

SAMPLE LABEL	CP101 6.8-7.25	**DATE SAMPLED**	Not advised
LAB SAMPLE No.	103505	**DATE RECEIVED**	25-Aug-21
DATE TESTED	17-Sep-21	**SAMPLED BY**	Client
MATERIAL	Stiff brown silty sandy CLAY		
ADVISED SOURCE	Site Investigation Sample		

INITIAL CONDITIONS

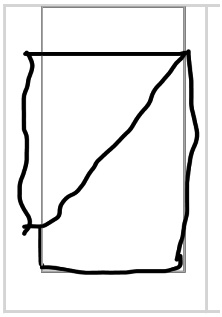
Specimen Location 

Sample Length (mm)	295	Specimen depth from top of Sample (mm)	50
Sample Orientation	Vertical	Specimen Condition	Undisturbed
Specimen Length (mm)	73	Specimen Moisture Content (%)	14
Specimen Diameter (mm)	37	Specimen Bulk Density (Mg/m3)	2.19
Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	1.92
Membrane Correction	4.08		



TEST TYPE
SINGLE STAGE

SKETCH OF SPECIMEN AT FAILURE



SIMPLE_SHEAR

Cell Pressure (kPa)	Failure Strain (%)	Rate of Strain (%/min)	Corrected Deviator Stress (kPa)	Shear Strength Cu (kPa)
110	17	2	513	257

Remarks/Abnormalities
U38 sub-sample taken to give require length/diameter ratio

Name O.P Davies BA (Hons) (Laboratory Manager) Signed  Date 22 September 2021

MURRAY RIX

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

TEST CERTIFICATE

DETERMINATION OF THE ONE-DIMENSIONAL CONSOLIDATION PROPERTIES

BS 1377 : PART 5 : Clause 3 : 1990

CLIENT	LK Consult Ltd
SITE	LKC 21 1095 - Kelbrook Road, Openshaw
JOB NUMBER	MRN 4066/169

SAMPLE LABEL	CP101 5.3-5.75	**DATE SAMPLED**	Not advised
LAB SAMPLE No.	103505	**DATE RECEIVED**	25-Aug-21
DATE TESTED	07-Sep-21	**SAMPLED BY**	Client
MATERIAL	Stiff brown silty sandy CLAY		
ADVISED SOURCE	Site Investigation Sample		

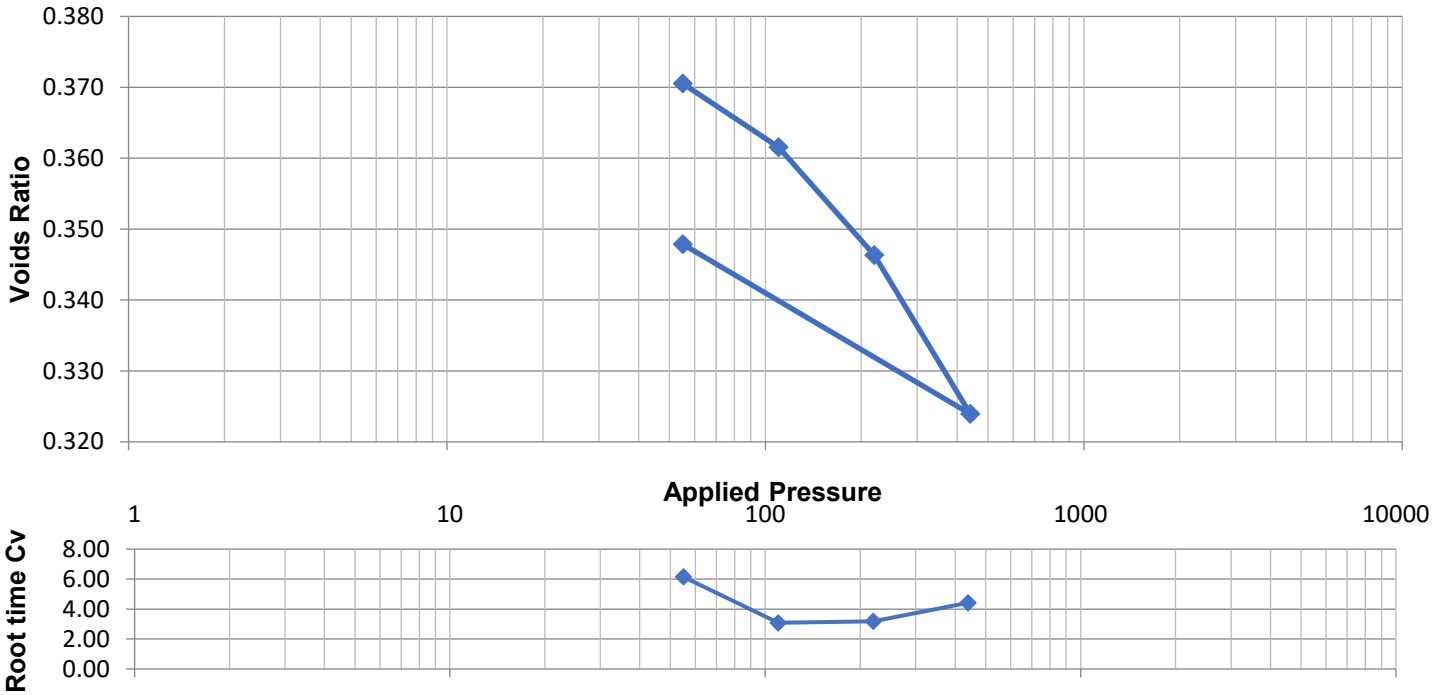
Specimen Location

Sample Length (mm)	295	Specimen depth from top of Sample (mm)	100
Sample Orientation	Vertical	Specimen Condition	Undisturbed

INITIAL CONDITIONS

Height	20.1	mm	Particle density	2.68	Ass
Diameter	75.0	mm	Initial void ratio	0.39	
Weight wet	194.9	g	Deg. of sat.	95	%
Moist. cont.	14	%	Swell. press.	5	kN/m2
Bulk Density	2.19	Mg/m3	Dry density	1.93	Mg/m3

Load No.	Applied Pressure kPa	Sample Height mm	Void Ratio	Mv m2/MN	Temp °C	Cv t90 root m2/yr	Cv t50 log m2/yr
1	55	19.83	0.371	0.12	20	6.15	8.93
2	110	19.70	0.362	0.12	20	3.09	3.49
3	220	19.48	0.346	0.10	20	3.17	2.90
4	440	19.15	0.324	0.08	20	4.41	4.56
5	55	19.50	0.348	0.05	20		
6							
7							



Remarks/Abnormalities

Name O.P Davies BA (Hons) (Laboratory Manager) Signed Date 22 September 2021

MURRAY RIX

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

TEST CERTIFICATE

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

BS 1377 : PART 7: Clause 8 Single Stage

CLIENT	LK Consult Ltd
SITE	LKC 21 1095 - Kelbrook Road, Openshaw
JOB NUMBER	MRN 4066/169

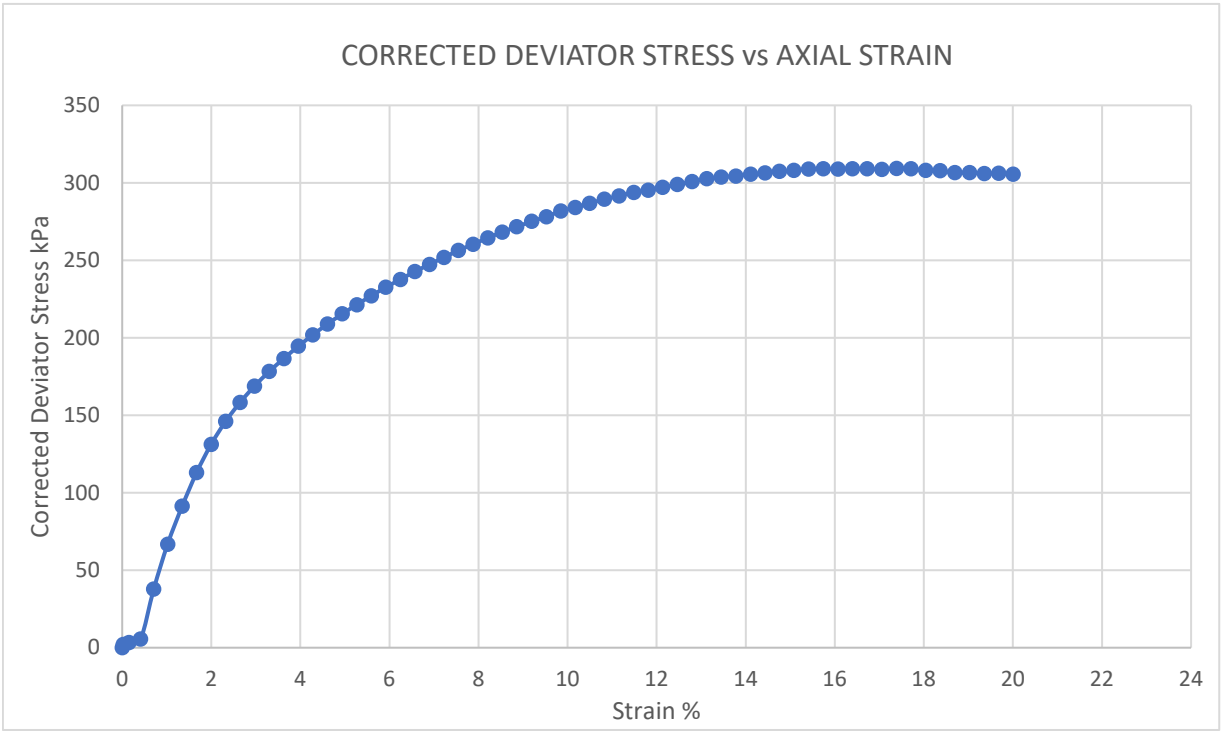
SAMPLE LABEL	CP101 7.8-8.25m	**DATE SAMPLED**	Not advised
LAB SAMPLE No.	103506	**DATE RECEIVED**	25-Aug-21
DATE TESTED	17-Sep-21	**SAMPLED BY**	Client
MATERIAL	Stiff brown silty sandy CLAY		
ADVISED SOURCE	Site Investigation Sample		

INITIAL CONDITIONS

Specimen Location

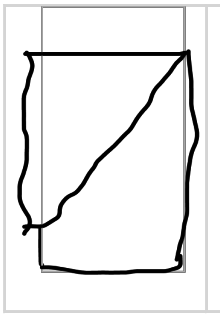


Sample Length (mm)	350	Specimen depth from top of Sample (mm)	70
Sample Orientation	Vertical	Specimen Condition	Undisturbed
Specimen Length (mm)	203	Specimen Moisture Content (%)	15
Specimen Diameter (mm)	101	Specimen Bulk Density (Mg/m3)	2.21
Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	1.92
Membrane Correction	1.49		



TEST TYPE
SINGLE STAGE

SKETCH OF SPECIMEN AT FAILURE



SIMPLE_SHEAR

Cell Pressure (kPa)	Failure Strain (%)	Rate of Strain (%/min)	Corrected Deviator Stress (kPa)	Shear Strength Cu (kPa)
160	17	2	309	155

Remarks/Abnormalities

Name O.P Davies BA (Hons) (Laboratory Manager) Signed  Date 22 September 2021

MURRAY RIX

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

TEST CERTIFICATE

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

BS 1377 : PART 7: Clause 8 Single Stage

CLIENT	LK Consult Ltd
SITE	LKC 21 1095 - Kelbrook Road, Openshaw
JOB NUMBER	MRN 4066/169

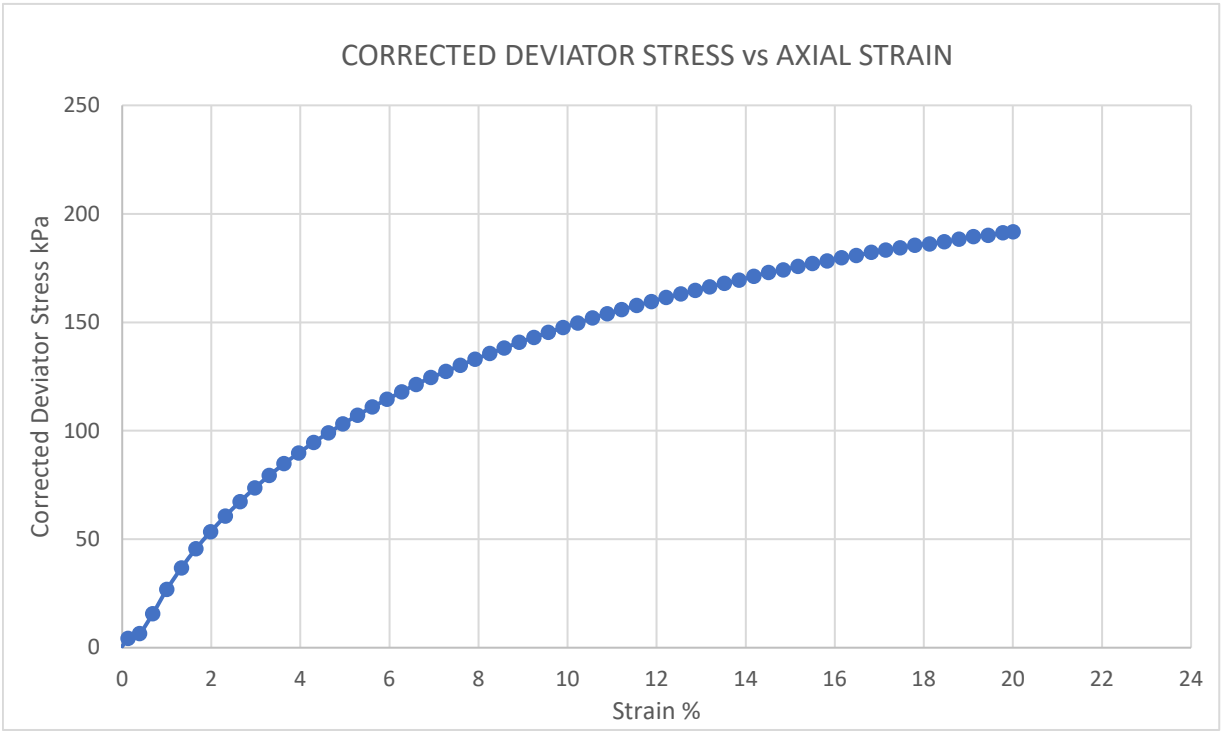
SAMPLE LABEL	CP102 8.5-8.95	**DATE SAMPLED**	Not advised
LAB SAMPLE No.	103507	**DATE RECEIVED**	25-Aug-21
DATE TESTED	17-Sep-21	**SAMPLED BY**	Client
MATERIAL	Stiff brown silty sandy CLAY		
ADVISED SOURCE	Site Investigation Sample		

INITIAL CONDITIONS

Specimen Location

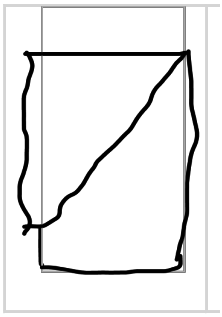


Sample Length (mm)	350	Specimen depth from top of Sample (mm)	120
Sample Orientation	Vertical	Specimen Condition	Undisturbed
Specimen Length (mm)	202	Specimen Moisture Content (%)	14
Specimen Diameter (mm)	102	Specimen Bulk Density (Mg/m3)	2.26
Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	1.99
Membrane Correction	1.48		



TEST TYPE
SINGLE STAGE

SKETCH OF SPECIMEN AT FAILURE



SIMPLE_SHEAR

Cell Pressure (kPa)	Failure Strain (%)	Rate of Strain (%/min)	Corrected Deviator Stress (kPa)	Shear Strength Cu (kPa)
175	20	2	191	96

Remarks/Abnormalities

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

Signed 

Date 22 September 2021

MURRAY RIX

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

TEST CERTIFICATE

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

BS 1377 : PART 7: Clause 8 Single Stage

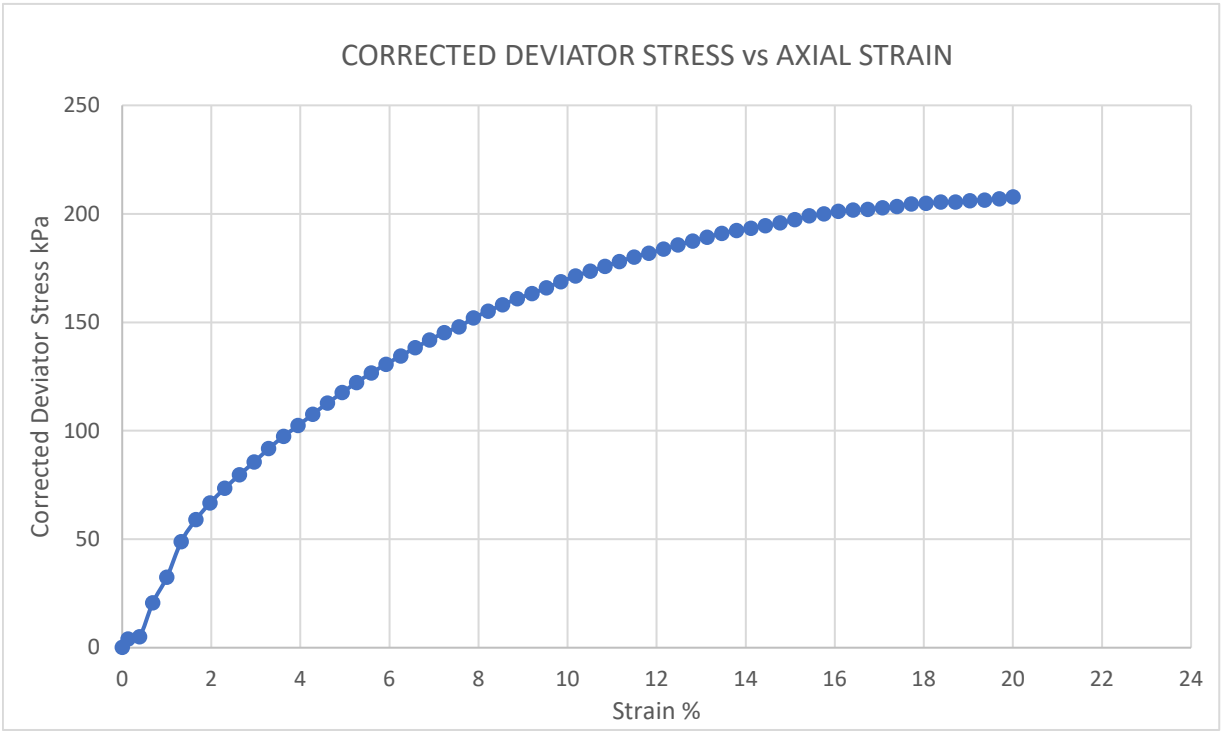
CLIENT	LK Consult Ltd
SITE	LKC 21 1095 - Kelbrook Road, Openshaw
JOB NUMBER	MRN 4066/169

SAMPLE LABEL	CP103 6.5-6.95	**DATE SAMPLED**	Not advised
LAB SAMPLE No.	103508	**DATE RECEIVED**	25-Aug-21
DATE TESTED	17-Sep-21	**SAMPLED BY**	Client
MATERIAL	Stiff brown silty sandy CLAY		
ADVISED SOURCE	Site Investigation Sample		

INITIAL CONDITIONS

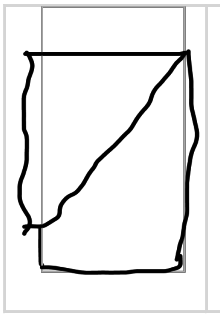
Specimen Location 

Sample Length (mm)	340	Specimen depth from top of Sample (mm)	50
Sample Orientation	Vertical	Specimen Condition	Undisturbed
Specimen Length (mm)	203	Specimen Moisture Content (%)	16
Specimen Diameter (mm)	101	Specimen Bulk Density (Mg/m3)	2.15
Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	1.85
Membrane Correction	1.50		



TEST TYPE
SINGLE STAGE

SKETCH OF SPECIMEN AT FAILURE



SIMPLE_SHEAR

Cell Pressure (kPa)	Failure Strain (%)	Rate of Strain (%/min)	Corrected Deviator Stress (kPa)	Shear Strength Cu (kPa)
135	20	2	207	103

Remarks/Abnormalities

Name O.P Davies BA (Hons) (Laboratory Manager) Signed  Date 22 September 2021

MURRAY RIX

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

TEST CERTIFICATE

DETERMINATION OF THE ONE-DIMENSIONAL CONSOLIDATION PROPERTIES
BS 1377 : PART 5 : Clause 3 : 1990

CLIENT	LK Consult Ltd
SITE	LKC 21 1095 - Kelbrook Road, Openshaw
JOB NUMBER	MRN 4066/169

SAMPLE LABEL	CP103 U 6.5-6.95	**DATE SAMPLED**	Not advised
LAB SAMPLE No.	103508	**DATE RECEIVED**	25-Aug-21
DATE TESTED	07-Sep-21	**SAMPLED BY**	Client
MATERIAL	Stiff brown silty sandy CLAY		
ADVISED SOURCE	Site Investigation Sample		

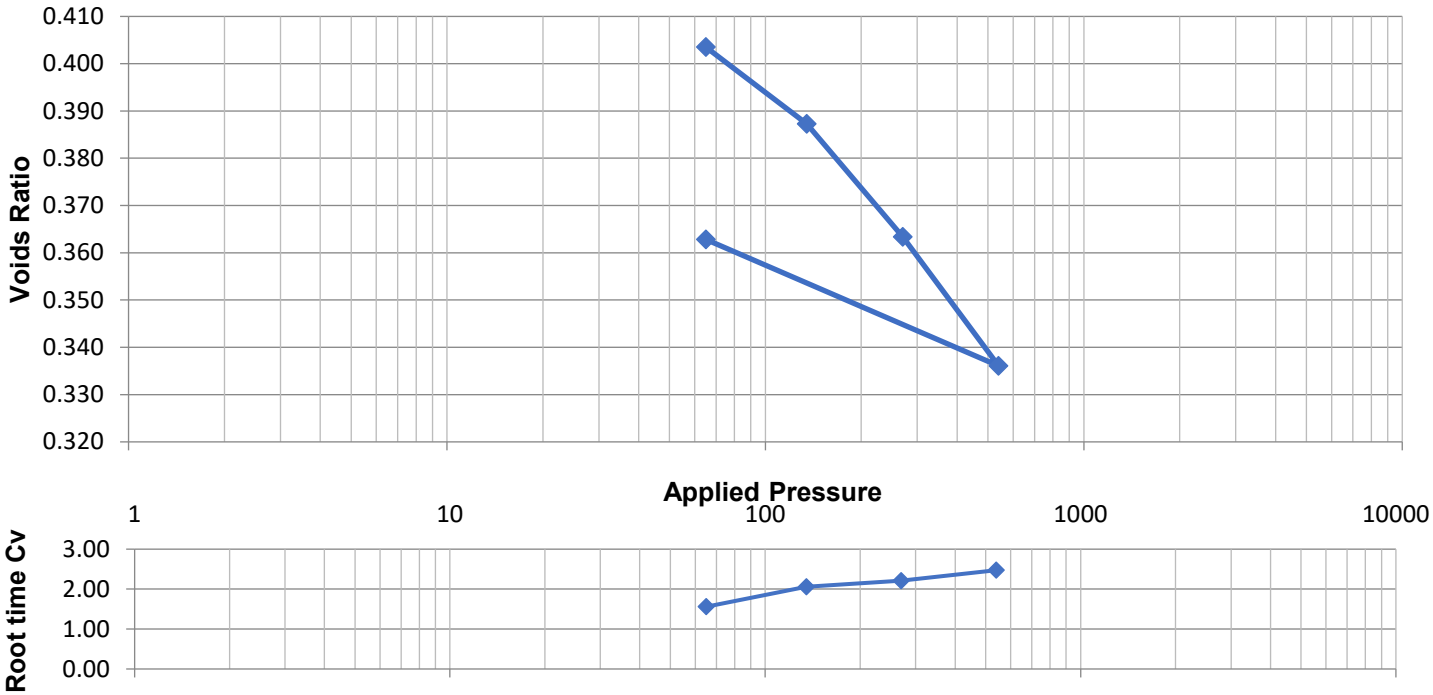
Specimen Location

Sample Length (mm)	295	Specimen depth from top of Sample (mm)	100
Sample Orientation	Vertical	Specimen Condition	Undisturbed

INITIAL CONDITIONS

Height	20.1	mm	Particle density	2.68	Ass
Diameter	75.0	mm	Initial void ratio	0.44	
Weight wet	191.2	g	Deg. of sat.	98	%
Moist. cont.	16	%	Swell. press.	5	kN/m2
Bulk Density	2.16	Mg/m3	Dry density	1.86	Mg/m3

Load No.	Applied Pressure kPa	Sample Height mm	Void Ratio	Mv m2/MN	Temp °C	Cv t90 root m2/yr	Cv t50 log m2/yr
1	65	19.52	0.404	0.34	20	1.56	1.95
2	135	19.30	0.387	0.17	20	2.06	2.04
3	270	18.96	0.363	0.13	20	2.21	2.39
4	540	18.58	0.336	0.08	20	2.47	2.80
5	65	18.96	0.363	0.04	20		
6							
7							



Remarks/Abnormalities

Name O.P Davies BA (Hons) (Laboratory Manager) Signed Date 22 September 2021

MURRAY RIX

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

TEST CERTIFICATE

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

BS 1377 : PART 7: Clause 8 Single Stage

CLIENT	LK Consult Ltd
SITE	LKC 21 1095 - Kelbrook Road, Openshaw
JOB NUMBER	MRN 4066/169

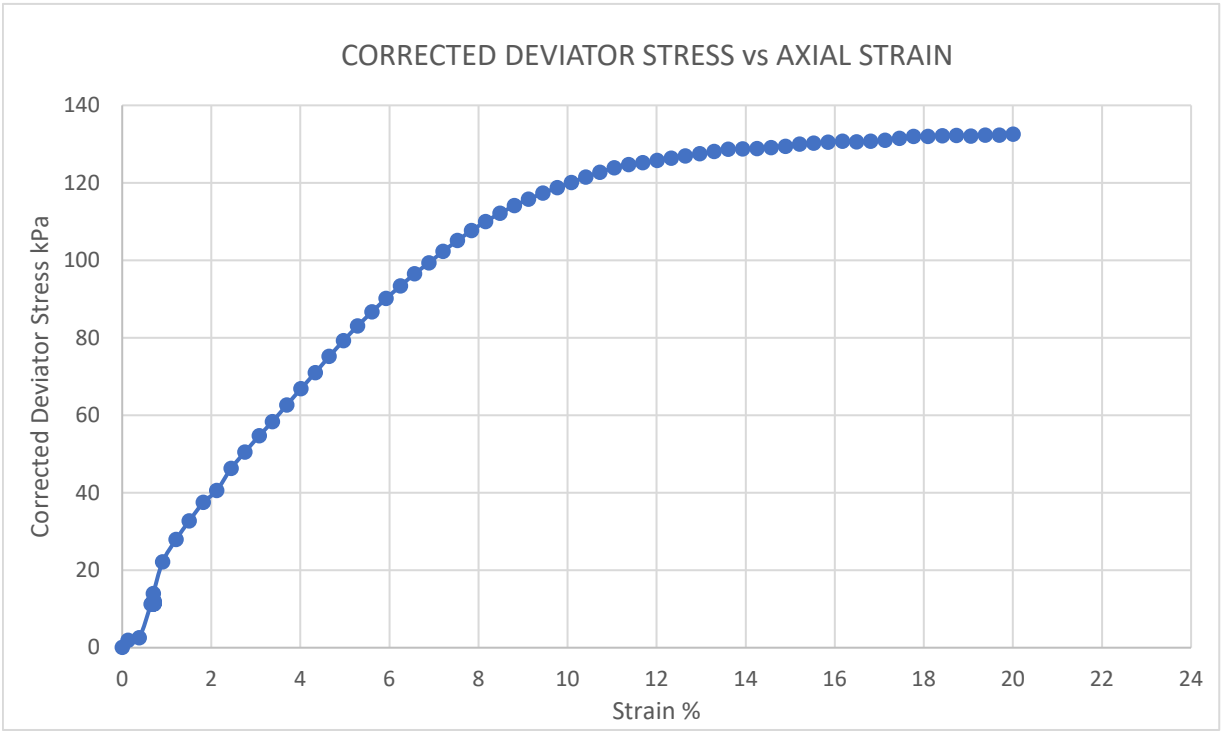
SAMPLE LABEL	CP103 10.9-11.35	**DATE SAMPLED**	Not advised
LAB SAMPLE No.	103509	**DATE RECEIVED**	25-Aug-21
DATE TESTED	17-Sep-21	**SAMPLED BY**	Client
MATERIAL	Stiff brown silty sandy CLAY		
ADVISED SOURCE	Site Investigation Sample		

INITIAL CONDITIONS

Specimen Location



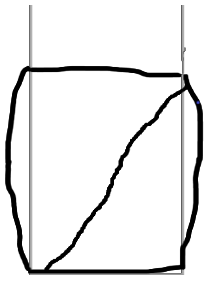
Sample Length (mm)	325	Specimen depth from top of Sample (mm)	60
Sample Orientation	Vertical	Specimen Condition	Undisturbed
Specimen Length (mm)	202	Specimen Moisture Content (%)	20
Specimen Diameter (mm)	99	Specimen Bulk Density (Mg/m3)	2.12
Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	1.76
Membrane Correction	0.00		



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)
220	20	2	133	66

Remarks/Abnormalities

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

Signed 

Date 22 September 2021

Appendix E

Certificate of Analysis – Water

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	21-31132-1
Initial Date of Issue:	15-Sep-2021
Client	LK Consult
Client Address:	Unit 29 Eton Business Park Eton Hill Road Radcliffe Manchester Lancashire M26 2ZS
Contact(s):	Chris Hughes Contaminated Land
Project	LKC 21 1095 Kelbrook Road, Openshaw

Quotation No.:		**Date Received:**	09-Sep-2021
Order No.:	739020	**Date Instructed:**	09-Sep-2021
No. of Samples:	3		
Turnaround (Wkdays):	5	**Results Due:**	15-Sep-2021
Date Approved:	15-Sep-2021		

Approved By:



Details: Glynn Harvey, Technical Manager

Results - Water

Project: LKC 21 1095 Kelbrook Road, Openshaw

Client: LK Consult		**Chemtest Job No.:**			21-31132	21-31132	21-31132
Quotation No.:		**Chemtest Sample ID.:**			1275091	1275092	1275093
		Client Sample ID.:			CP101	CP103	WS103
		Sample Type:			WATER	WATER	WATER
		Date Sampled:			09-Sep-2021	09-Sep-2021	09-Sep-2021
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Diesel Present	N	1670		N/A	False	False	False
pH	U	1010		N/A	6.7	6.5	6.4
Sulphate	U	1220	mg/l	1.0	490	200	160
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050
Cyanide (Free)	U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050
Calcium	U	1455	mg/l	2.00	230	210	200
Total Hardness as CaCO3	U	1270	mg/l	15	720	740	630
Arsenic (Dissolved)	U	1455	µg/l	0.20	1.0	1.6	2.5
Boron (Dissolved)	U	1455	µg/l	10.0	250	390	200
Cadmium (Dissolved)	U	1455	µg/l	0.11	0.28	< 0.11	< 0.11
Chromium (Dissolved)	U	1455	µg/l	0.50	97	83	110
Copper (Dissolved)	U	1455	µg/l	0.50	4.7	2.5	5.2
Nickel (Dissolved)	U	1455	µg/l	0.50	51	41	66
Lead (Dissolved)	U	1455	µg/l	0.50	< 0.50	< 0.50	0.54
Selenium (Dissolved)	U	1455	µg/l	0.50	7.8	0.52	0.66
Vanadium (Dissolved)	U	1455	µg/l	0.50	57	< 0.50	< 0.50
Zinc (Dissolved)	U	1455	µg/l	2.5	44	17	2.9
Mercury Low Level	U	1460	µg/l	0.010	< 0.010	< 0.010	< 0.010
Chromium (Hexavalent)	U	1490	µg/l	20	< 20	< 20	< 20
Dissolved Organic Carbon	U	1610	mg/l	2.0	43	75	65
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10	< 10	< 10
Dichlorodifluoromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Chloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0

Results - Water

Project: LKC 21 1095 Kelbrook Road, Openshaw

Client: LK Consult		**Chemtest Job No.:**			21-31132	21-31132	21-31132
Quotation No.:		**Chemtest Sample ID.:**			1275091	1275092	1275093
		Client Sample ID.:			CP101	CP103	WS103
		Sample Type:			WATER	WATER	WATER
		Date Sampled:			09-Sep-2021	09-Sep-2021	09-Sep-2021
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Vinyl Chloride	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Bromomethane	U	1760	µg/l	5	< 5	< 5	< 5
Chloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Trichlorofluoromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Bromochloromethane	U	1760	µg/l	5	< 5	< 5	< 5
Trichloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Benzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Trichloroethene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	U	1760	µg/l	10	< 10	< 10	< 10
Bromodichloromethane	U	1760	µg/l	5	< 5	< 5	< 5
cis-1,3-Dichloropropene	N	1760	µg/l	10	< 10	< 10	< 10
Toluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-Dichloropropene	N	1760	µg/l	10	< 10	< 10	< 10
1,1,2-Trichloroethane	U	1760	µg/l	10	< 10	< 10	< 10
Tetrachloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Dibromochloromethane	U	1760	µg/l	10	< 10	< 10	< 10
1,2-Dibromoethane	U	1760	µg/l	5	< 5	< 5	< 5
Chlorobenzene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Styrene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	N	1760	µg/l	50	< 50	< 50	< 50
N-Propylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0

Results - Water

Project: LKC 21 1095 Kelbrook Road, Openshaw

Client: LK Consult		**Chemtest Job No.:**			21-31132	21-31132	21-31132
Quotation No.:		**Chemtest Sample ID.:**			1275091	1275092	1275093
		Client Sample ID.:			CP101	CP103	WS103
		Sample Type:			WATER	WATER	WATER
		Date Sampled:			09-Sep-2021	09-Sep-2021	09-Sep-2021
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Tert-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Sec-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
4-Isopropyltoluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
N-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	1760	µg/l	50	< 50	< 50	< 50
1,2,4-Trichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Carbon Disulphide	N	1760	µg/l	50	< 50	< 50	< 50
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
N-Nitrosodimethylamine	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Phenol	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Chlorophenol	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Bis-(2-Chloroethyl)Ether	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
1,3-Dichlorobenzene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
1,4-Dichlorobenzene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
1,2-Dichlorobenzene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Methylphenol (o-Cresol)	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Bis(2-Chloroisopropyl)Ether	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Hexachloroethane	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
N-Nitrosodi-n-propylamine	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Methylphenol	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Nitrobenzene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Isophorone	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Nitrophenol	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,4-Dimethylphenol	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Bis(2-Chloroethoxy)Methane	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,4-Dichlorophenol	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
1,2,4-Trichlorobenzene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Naphthalene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Chloroaniline	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Hexachlorobutadiene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Chloro-3-Methylphenol	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Methylnaphthalene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Hexachlorocyclopentadiene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,4,6-Trichlorophenol	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,4,5-Trichlorophenol	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50

Results - Water

Project: LKC 21 1095 Kelbrook Road, Openshaw

Client: LK Consult		**Chemtest Job No.:**			21-31132	21-31132	21-31132
Quotation No.:		**Chemtest Sample ID.:**			1275091	1275092	1275093
		Client Sample ID.:			CP101	CP103	WS103
		Sample Type:			WATER	WATER	WATER
		Date Sampled:			09-Sep-2021	09-Sep-2021	09-Sep-2021
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
2-Chloronaphthalene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Nitroaniline	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Acenaphthylene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Dimethylphthalate	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,6-Dinitrotoluene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Acenaphthene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
3-Nitroaniline	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Dibenzofuran	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Chlorophenylphenylether	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,4-Dinitrotoluene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Fluorene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Diethyl Phthalate	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Nitroaniline	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Methyl-4,6-Dinitrophenol	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Azobenzene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Bromophenylphenyl Ether	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Hexachlorobenzene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Pentachlorophenol	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Phenanthrene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Anthracene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Carbazole	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Di-N-Butyl Phthalate	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Fluoranthene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Pyrene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Butylbenzyl Phthalate	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzo[a]anthracene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Chrysene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Bis(2-Ethylhexyl)Phthalate	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Di-N-Octyl Phthalate	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzo[b]fluoranthene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzo[k]fluoranthene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzo[a]pyrene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Indeno(1,2,3-c,d)Pyrene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Dibenz(a,h)Anthracene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzo[g,h,i]perylene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Nitrophenol	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Naphthalene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Acenaphthylene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Acenaphthene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Fluorene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Phenanthrene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010

Results - Water

Project: LKC 21 1095 Kelbrook Road, Openshaw

Client: LK Consult			**Chemtest Job No.:**		21-31132	21-31132	21-31132
Quotation No.:			**Chemtest Sample ID.:**		1275091	1275092	1275093
			Client Sample ID.:		CP101	CP103	WS103
			Sample Type:		WATER	WATER	WATER
			Date Sampled:		09-Sep-2021	09-Sep-2021	09-Sep-2021
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Anthracene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Fluoranthene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Pyrene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[a]anthracene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Chrysene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Total Of 16 PAH's	N	1800	µg/l	0.20	< 0.20	< 0.20	< 0.20
Total Phenols	U	1920	mg/l	0.030	< 0.030	< 0.030	< 0.030

TPH Interpretation

Job	Sample	Matrix	Location	Sample Ref	Sample ID	Sample Depth (m)	Gasoline / Diesel Present	TPH Interpretation
21-31132	1275091	W			CP101		No	N/A
21-31132	1275092	W			CP103		No	N/A
21-31132	1275093	W			WS103		No	N/A

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH 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.
1270	Total Hardness of Waters	Total hardness	Calculation applied to calcium and magnesium results, expressed as mg l-1 CaCO3 equivalent.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
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).
1460	Mercury low-level in Waters by AFS	Mercury	Atomic Fluorescence Spectrometry, with collimated UV source, wavelength 253.7 nm.
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1670	Total Petroleum Hydrocarbons (TPH) in Waters by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO	Pentane extraction / GC FID detection
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	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	Pentane extraction / GCxGC FID detection
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1790	Semi-Volatile Organic Compounds (SVOCs) in Waters by GC-MS	Semi-volatile organic compounds	Solvent extraction / GCMS detection
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection
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.

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 F

Gas Monitoring Results

LK CONSULT LTD

GAS MONITORING RECORD

Site	Kelbrook road
Job Number	LKC 21 1095
Date	20/08/2021
Engineer	JW/MP
Visit	1 of 4

Equipment[1]		
Instrument	**Serial Number**	**Comments**
Gas Analyser GA5000	G502417	Serviced, calibrated, gas checked.
Geotech Dipmeter	HT-01	Operating normally.

Atmospheric / Ground Conditions	
Atmospheric pressure trend onsite	Variable
Atmospheric pressure (prev 24hrs)	Rising
Weather Conditions	Warm, clear sky, very low wind speed
Ground Conditions	Wet

Borehole ID	**Date & Time**	**CH_4 (%v/v)**	**CO_2 (%v/v)**	**O_2 (%v/v)**	**Peak CH_4 (%v/v)**	**Peak CO_2 (%v/v)**	**% LEL[2]**	**CO Pod (ppm)**	**H_2S Pod (ppm)**	**Balance (%)**	**Barometric Pressure (mb)**	**Internal Flow[3] (l/hr)**	**Standing water level (mbgl)**	**Installation base depth (mbgl)**	**Notes**
CP101	20/08/2021 11:01	0	2.7	16.6	0	2.7	0	1	0	80.7	1009	0.1	2.1	9.05	Peak CO=2ppm, steady=1ppm, PID=1ppm
CP102	20/08/2021 10:10	0	0.3	17	0	0.3	0	49	0	82.7	1008	0	Dry	11.6	Peak CO=49ppm, steady=49ppm, PID=0.7ppm
CP103	20/08/2021 10:35	0	3.1	15.4	0	3.7	0	28	0	81.6	1009	0.3	3.65	11.4	Peak CO= 28ppm, steady=28ppm, PID=0.6ppm, Failed to store data
WS102	20/08/2021 12:25	0	2.7	17.5	0	2.7	0	1	0	79.8	1010	0.3	Dry	2.45	Peak CO=8ppm, steady=1ppm, PID=0.7ppm
WS103	20/08/2021 12:04	0	6.8	11.1	0	6.8	0	6	0	82.1	1010	0.2	1.1	1.9	Peak CO=8ppm, steady=6ppm, PID=37.4ppm
WS105	20/08/2021 11:31	0	5.1	15	0	5.1	0	2	0	79.9	1009	0	Dry	2.8	Peak CO=14ppm, steady=2ppm, PID=0.9ppm
WS106	20/08/2021 11:47	0	4.1	14.8	0	4.1	0	1	0	81.1	1009	0	Dry	2.55	Peak CO=7ppm, steady=1ppm, PID=0.4ppm
WS107													Dry	2.55	Well was destroyed

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).

LK CONSULT LTD

GAS MONITORING RECORD

Site	Kellbrook Road, Openshaw
Job Number	LKC 21 1095
Date	08/09/2021
Engineer	EM & JT
Visit	2 of 6

Equipment[1]		
Instrument	**Serial Number**	**Comments**
Gas Analyser GA5000	G502417	Serviced, calibrated, gas checked.
Geotech Dipmeter	79864	Operating normally.

Atmospheric / Ground Conditions	
Atmospheric pressure trend onsite	Steady
Atmospheric pressure (prev 24hrs)	Rising
Weather Conditions	Sunny, Clear
Ground Conditions	Dry

Borehole ID	Date & Time	CH_4 (%v/v)	CO_2 (%v/v)	O_2 (%v/v)	Peak CH_4 (%v/v)	Peak CO_2 (%v/v)	% LEL[2]	CO Pod (ppm)	H_2S Pod (ppm)	Balance (%)	Barometric Pressure (mb)	Internal Flow[3] (l/hr)	Standing water level (mbgl)	Installation base depth (mbgl)	Notes
CP101	08/09/2021 10:15	0	2.1	18	0	2.2	0	2	0	79.9	1007	0	2.13	9	
CP102	08/09/2021 09:52	0	0.5	18.1	0.1	0.5	0	0	0	81.4	1006	0	Dry	11.62	
CP103	08/09/2021 11:43	0	2.1	18.1	0	2.1	0	2	0	79.8	1008	0	4.51	11.41	
WS102B	08/09/2021 11:24	0	6.6	14.7	0	6.6	0	(Peak: 3	0	78.7	1008	0.2	Dry	2.44	
WS103	08/09/2021 11:05	0	5.8	15.3	0	5.8	0	(Peak: 4	0	78.9	1008	0.1	1.18	1.9	
WS105	08/09/2021 10:46	0	4.5	16.7	0	4.5	0	(Peak: 5	0	78.8	1008	0	Dry	2.8	
WS106	08/09/2021 10:04	0	4.8	15.4	0	4.8	0	(Peak: 3	0	79.8	1007	0	Dry	2.55	
WS107	08/09/2021 13:12	0	2	19.1	0	2.1	0	(Peak: 2	0	78.9	1006	0	Dry	2.53	No bung, new bung added
WS108	08/09/2021 12:53	0	5.3	16.6	0.1	5.9	0	(Peak: 1	0	78.1	1006	0	Dry	2.88	Left open for 15 mins, gas monitored for 10

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).

LK CONSULT LTD

GAS MONITORING RECORD

Site	Kellbrook Road, Openshaw
Job Number	LKC 21 1095
Date	22/09/2021
Engineer	JT & JW
Visit	3 of 4

Equipment[1]		
Instrument	**Serial Number**	**Comments**
Gas Analyser GA5000	G502417	Serviced, calibrated, gas checked.
Geotech Dipmeter	HT-01	Operating normally.

Atmospheric / Ground Conditions	
Atmospheric pressure trend onsite	Rising then steady
Atmospheric pressure (prev 24hrs)	Variable
Weather Conditions	Overcast, breezy
Ground Conditions	Wet

Borehole ID	**Date & Time**	**CH_4 (%v/v)**	**CO_2 (%v/v)**	**O_2 (%v/v)**	**Peak CH_4 (%v/v)**	**Peak CO_2 (%v/v)**	**% LEL[2]**	**CO Pod (ppm)**	**H_2S Pod (ppm)**	**Balance (%)**	**Barometric Pressure (mb)**	**Internal Flow[3] (l/hr)**	**Standing water level (mbgl)**	**Installation base depth (mbgl)**	**Notes**
CP101	22/09/2021 09:55	0.00	1.80	18.90	0.00	1.90	0.00	2.00	0.00	79.30	1018	0.00	2.21	8.27	
CP102	22/09/2021 10:03	0.00	0.50	19.00	0.00	0.50	0.00	0.00	0.00	80.50	1019	0.00	Dry	11.63	
CP103	22/09/2021 10:13	0.00	3.20	16.70	0.00	3.20	0.00	0.00	0.00	80.10	1019	0.00	4.50	11.50	
WS102B	22/09/2021 10:22	0.00	0.60	20.60	0.00	0.90	0.00	0.00	0.00	78.80	1020	0.00	Dry	2.41	
WS103	22/09/2021 10:38	0.00	0.40	20.70	0.00	1.00	0.00	0.00	0.00	78.90	1020	0.00	1.80	1.90	
WS105	22/09/2021 10:46	0.00	4.00	17.80	0.00	4.00	0.00	0.00	0.00	78.20	1020	0.20	Dry	2.80	
WS106	22/09/2021 10:54	0.00	3.20	18.60	0.00	3.30	0.00	0.00	0.00	78.20	1020	0.00	Dry	2.54	
WS107	22/09/2021 11:03	0.00	2.30	19.30	0.00	2.30	0.00	0.00	0.00	78.40	1020	0.00	Dry	2.53	
WS108	22/09/2021 11:16	0.00	6.40	16.00	0.00	6.60	0.00	0.00	0.00	77.60	1020	0.00	Dry	2.85	

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).

LK CONSULT LTD

GAS MONITORING RECORD

Site	Kelbrook Road, Openshaw
Job Number	LKC 21 1095
Date	44484
Engineer	JW MP
Visit	4 of 4

Equipment[1]		
Instrument	**Serial Number**	**Comments**
Gas Analyser GA5000	GA507782	Serviced, calibrated, gas checked.
Geotech Oil-in-Water Interface Meter	0	Operating normally.

Atmospheric / Ground Conditions	
Atmospheric pressure trend onsite	Rising
Atmospheric pressure (prev 24hrs)	Falling
Weather Conditions	Dry, Cool, Small Breeze, Clear Sky
Ground Conditions	Damp

Borehole ID	**Date & Time**	**CH_4 (%v/v)**	**CO_2 (%v/v)**	**O_2 (%v/v)**	**Peak CH_4 (%v/v)**	**Peak CO_2 (%v/v)**	**% LEL[2]**	**CO Pod (ppm)**	**H_2S Pod (ppm)**	**Balance (%)**	**Barometric Pressure (mb)**	**Internal Flow[3] (l/hr)**	**Standing water level (mbgl)**	**Installation base depth (mbgl)**	**Notes**
Cp101	15/10/2021 09:04	0	2.4	18.6	0	2.4	0	1	0	79	1014	-1.3	2.2	9.1	Peak Flow[a] (l/hr) = -1.9 Peak CO =0ppm
Cp102	15/10/2021 09:24	0	0.6	18.9	0	0.6	0	0	0	80.5	1015	0	11.7	11.8	Peak Flow[a] (l/hr) = 0 Peak CO = 1ppm Tap left open from previous visit.
Cp103	15/10/2021 09:34	0	2.7	18	0	2.8	0	0	0	79.3	1015	0	4.51	11.55	Peak Flow[a] (l/hr) = 0 Peak CO = 0ppm
WS101B	15/10/2021 09:46	0	0.7	20.9	0	0.7	0	0	0	78.4	1015	0	Dry	2.51	Peak Flow[a] (l/hr) = 0 Peak CO = 0ppm
WS103	15/10/2021 09:55	0	3.5	18	0	3.5	0	0	0	78.5	1016	0	1.75	2.5	Peak Flow[a] (l/hr) = 0 Peak CO = 0ppm
WS105	15/10/2021 10:06	0	4.6	16.9	0	4.6	0	0	0	78.5	1016	0	2.73	2.88	Peak Flow[a] (l/hr) = 0 Peak CO = 0ppm
WS106	15/10/2021 10:17	0	3.9	17.1	0	3.9	0	0	0	79	1016	0	1.35	2.62	Peak Flow[a] (l/hr) = 0 Peak CO = 1ppm
WS107	15/10/2021 10:30	0	2.8	18.5	0	2.8	0	0	0	78.7	1016	0	Dry	2.6	Peak Flow[a] (l/hr) = 0 Peak CO = 1ppm
WS109	15/10/2021 10:44	0	6.7	15.4	0	6.7	0	0	0	77.9	1016	0	Dry	2.94	Peak Flow[a] (l/hr) = 0 Peak CO = 2ppm

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 G

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.

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

	Contaminant	SOM	LQM Generic Assessment Criteria (mg/kg) Dry weight soil					
			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}
Petroleum Hydrocarbons	**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 +Aromatic >EC44	1%	1,600 f	1,900 f	1,200 f	28,000 f	3,800 f	7,800 f
		2.5%	1,800 f	1,900 f	2,100 f	28,000 f	3,800 f	7,800 f
		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.

	Contaminant	SOM	LQM Generic Assessment Criteria (mg/kg) Dry weight soil: 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-Trinitritoluene (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
	Endosulfanns (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.

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

Hazard Index Spreadsheets

$$HI = \sum_{Fi=1}^{16} HQ\ Fi = \frac{\text{Measured concentration Fi (mg/kg)}}{\text{S4UL Fi (mg/kg)}}$$

where: HI = Hazard Index
HQ = Hazard Quotient
Fi = Fraction I
S4UL = LQM Suitable 4 Use Levels (S4ULs)

Job Kelbrook Road, Openshaw
Job No. LKC 21 1095
SOM 6%
Comment Based upon the highest concentrations (TP103 0.5-0.9m) as a conservative measure.

Commercial

	1% S4UL	2.50% S4UL	6% S4UL	Max Soil concn.	HQ (1%SOM)	HQ (2.5%SOM)	HQ (6% SOM)
Aliphatic							
EC5-EC6	3200	5900	12000	1	0.0003125	0.00016949	8.3333E-05
EC6-EC8	7800	17000	40000	1	0.0001282	5.8824E-05	0.000025
EC8-EC10	2000	4800	11000	190	0.095	0.03958333	0.01727273
EC10-EC12	9700	23000	47000	390	0.0402062	0.01695652	0.00829787
EC12-EC16	59000	82000	90000	890	0.0150847	0.01085366	0.00988889
EC16-EC21	160000	1700000	1800000	18100	0.113125	0.01064706	0.01005556
EC21-EC35							
EC35-EC44	160000	1700000	1800000	2700	0.016875	0.00158824	0.0015
Aromatic							
EC5-EC7 (benzene)	26000	46000	86000	1	3.846E-05	2.1739E-05	1.1628E-05
EC7-EC8 (tolulene)	56000	110000	180000	1	1.786E-05	9.0909E-06	5.5556E-06
EC8-EC10	3500	8100	17000	74	0.0211429	0.0091358	0.00435294
EC10-EC12	16000	28000	34000	280	0.0175	0.01	0.00823529
EC12-EC16	36000	37000	38000	1500	0.0416667	0.04054054	0.03947368
EC16-EC21	28000	28000	28000	3500	0.125	0.125	0.125
EC21-EC35	28000	28000	28000	28000	1	1	1
EC35-EC44	28000	28000	28000	7500	0.2678571	0.26785714	0.26785714
				HI	**1.75**	**1.53**	**1.49**

Sample number	**MAX or US95**
Depth	
Aliphatic	
EC5-EC6	1
EC6-EC8	1
EC8-EC10	190
EC10-EC12	390
EC12-EC16	890
EC16-EC21	2100
EC21-EC35	16000
EC35-EC44	2700
Aromatic	
EC5-EC7 (benzene)	1
EC7-EC8 (tolulene)	1
EC8-EC10	74
EC10-EC12	280
EC12-EC16	1500
EC16-EC21	3500
EC21-EC35	28000
EC35-EC44	7500
0.00E+00 0.00E+00 0.00E+00 0.00E+00	

Appendix I

Hazwaste Online Classification Report

HazWasteOnline™

Waste Classification Report

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

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

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

SWFFZ-QOU0E-11MT2

Job name

LKC 21 1095[2]

Description/Comments

Project

LKC 21 1095

Site

Kelibrook Road, Openshaw

Classified by

Name:
Peter Dunn
Company:
LK Group
Date:
22 Sep 2021 14:36 GMT
Telephone:
0161 763 7200

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	Date
Hazardous Waste Classification	18 Sep 2019

Next 3 year Refresher due by Sep 2022

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS101-12/08/2021-0	0-0.6	Non Hazardous		2
2	WS102B-12/08/2021-0	0-0.5	Non Hazardous		4
3	WS102B-12/08/2021-2.5	2.5-2.6	Non Hazardous		6
4	WS103-12/08/2021-0	0-1	Non Hazardous		7
5	WS103-12/08/2021-1.8	1.8-2.0	Non Hazardous		10
6	WS104-12/08/2021-0.0	0.0-0.6	Non Hazardous		11
7	WS105-12/08/2021-1.4	1.4-1.5	Non Hazardous		13
8	WS106-13/08/2021-0.0	0.0-0.7	Non Hazardous		14
9	WS106-13/08/2021-1.5	1.5-1.6	Non Hazardous		16
10	WS107-13/08/2021-0.0	0.0-0.5	Non Hazardous		17
11	WS108-13/08/2021-0.0	0.0-0.5	Non Hazardous		19
12	WS109-13/08/2021-0.0	0.0-1.0	Non Hazardous		21
13	CP101-12/08/2021-0.0	0.0-1.0	Non Hazardous		23

Related documents

#	Name	Description
1	HWOL_21-28395-20210825 151346.hwol	.hwol file used to create the Job
2	Example waste stream template for contaminated soils	waste stream template used to create this Job

Report

Created by: Peter Dunn
Created date: 22 Sep 2021 14:36 GMT

Appendices	Page
Appendix A: Classifier defined and non CLP determinands	26
Appendix B: Rationale for selection of metal species	27
Appendix C: Version	28

Classification of sample: WS101-12/08/2021-0

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

Sample details

Sample name:
WS101-12/08/2021-0
Sample Depth:
0-0.6 m
Moisture content:
12%
(wet weight correction)

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

Hazard properties

None identified

Determinands

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

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		13 mg/kg	1.32	15.105 mg/kg	0.00151 %	✓	
2	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		0.46 mg/kg	3.22	1.303 mg/kg	0.00013 %	✓	
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.15 mg/kg	1.142	0.151 mg/kg	0.0000151 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		15 mg/kg	1.462	19.293 mg/kg	0.00193 %	✓	
5	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.5 mg/kg	2.27	<1.135 mg/kg	<0.000113 %		<LOD
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		30 mg/kg	1.126	29.723 mg/kg	0.00297 %	✓	
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	93 mg/kg		81.84 mg/kg	0.00818 %	✓	
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.16 mg/kg	1.353	0.191 mg/kg	0.0000191 %	✓	
9	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		14 mg/kg	2.976	36.668 mg/kg	0.00367 %	✓	
10	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		0.37 mg/kg	2.554	0.832 mg/kg	0.0000832 %	✓	
11	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		62 mg/kg	1.245	67.912 mg/kg	0.00679 %	✓	
12	TPH (C6 to C40) petroleum group			TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
13	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
14	benzene	601-020-00-8	200-753-7	71-43-2		<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
15	toluene	601-021-00-3	203-625-9	108-88-3		<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		ethylbenzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
17		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]									
18		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 }				0.7	mg/kg	1.884	1.161	mg/kg	0.000116 %	✓	
		006-007-00-5											
19		pH				7.7	pH		7.7	pH	7.7 pH		
				PH									
20		naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
21		acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-917-1	208-96-8									
22		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			201-469-6	83-32-9									
23		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			201-695-5	86-73-7									
24		phenanthrene				0.73	mg/kg		0.642	mg/kg	0.0000642 %	✓	
			201-581-5	85-01-8									
25		anthracene				0.19	mg/kg		0.167	mg/kg	0.0000167 %	✓	
			204-371-1	120-12-7									
26		fluoranthene				0.89	mg/kg		0.783	mg/kg	0.0000783 %	✓	
			205-912-4	206-44-0									
27		pyrene				0.81	mg/kg		0.713	mg/kg	0.0000713 %	✓	
			204-927-3	129-00-0									
28		benzo[a]anthracene				0.35	mg/kg		0.308	mg/kg	0.0000308 %	✓	
		601-033-00-9	200-280-6	56-55-3									
29		chrysene				0.38	mg/kg		0.334	mg/kg	0.0000334 %	✓	
		601-048-00-0	205-923-4	218-01-9									
30		benzo[b]fluoranthene				0.43	mg/kg		0.378	mg/kg	0.0000378 %	✓	
		601-034-00-4	205-911-9	205-99-2									
31		benzo[k]fluoranthene				0.18	mg/kg		0.158	mg/kg	0.0000158 %	✓	
		601-036-00-5	205-916-6	207-08-9									
32		benzo[a]pyrene; benzo[def]chrysene				0.31	mg/kg		0.273	mg/kg	0.0000273 %	✓	
		601-032-00-3	200-028-5	50-32-8									
33		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-893-2	193-39-5									
34		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									
35		benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-883-8	191-24-2									
36		vanadium { divanadium pentaoxide; vanadium pentoxide }				34	mg/kg	1.785	53.413	mg/kg	0.00534 %	✓	
		023-001-00-8	215-239-8	1314-62-1									
37		monohydric phenols				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
				P1186									
										Total:	0.0323 %		

Key

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

Classification of sample: WS102B-12/08/2021-0

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

Sample details

Sample name:
WS102B-12/08/2021-0
Sample Depth:
0-0.5 m
Moisture content:
13%
(wet weight correction)

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

Hazard properties

None identified

Determinands

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

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		22	mg/kg	1.32	25.271	mg/kg	0.00253 %	✓	
2	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		2.1	mg/kg	1.142	2.087	mg/kg	0.000209 %	✓	
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		36	mg/kg	1.462	45.776	mg/kg	0.00458 %	✓	
4	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.5	mg/kg	2.27	<1.135	mg/kg	<0.000113 %		<**LOD**
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		130	mg/kg	1.126	127.338	mg/kg	0.0127 %	✓	
6	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	160	mg/kg		139.2	mg/kg	0.0139 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.58	mg/kg	1.353	0.683	mg/kg	0.0000683 %	✓	
8	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		44	mg/kg	2.976	113.931	mg/kg	0.0114 %	✓	
9	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		0.5	mg/kg	2.554	1.111	mg/kg	0.000111 %	✓	
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		320	mg/kg	1.245	346.528	mg/kg	0.0347 %	✓	
11	pH			PH		8.1	pH		8.1	pH	8.1 pH		
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.35	mg/kg		0.305	mg/kg	0.0000305 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.16	mg/kg		0.139	mg/kg	0.0000139 %	✓	
14	acenaphthene		201-469-6	83-32-9		0.94	mg/kg		0.818	mg/kg	0.0000818 %	✓	
15	fluorene		201-695-5	86-73-7		0.69	mg/kg		0.6	mg/kg	0.00006 %	✓	
16	phenanthrene		201-581-5	85-01-8		8	mg/kg		6.96	mg/kg	0.000696 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
17		anthracene				1.8	mg/kg		1.566	mg/kg	0.000157 %	✓	
			204-371-1	120-12-7									
18		fluoranthene				10	mg/kg		8.7	mg/kg	0.00087 %	✓	
			205-912-4	206-44-0									
19		pyrene				9.3	mg/kg		8.091	mg/kg	0.000809 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				4.6	mg/kg		4.002	mg/kg	0.0004 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				4.7	mg/kg		4.089	mg/kg	0.000409 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				5.6	mg/kg		4.872	mg/kg	0.000487 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				2.1	mg/kg		1.827	mg/kg	0.000183 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				4.2	mg/kg		3.654	mg/kg	0.000365 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				3	mg/kg		2.61	mg/kg	0.000261 %	✓	
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.66	mg/kg		0.574	mg/kg	0.0000574 %	✓	
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				2.7	mg/kg		2.349	mg/kg	0.000235 %	✓	
			205-883-8	191-24-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				44	mg/kg	1.785	68.337	mg/kg	0.00683 %	✓	
		023-001-00-8	215-239-8	1314-62-1									
										Total:	0.0923 %		

Key

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

Classification of sample: WS102B-12/08/2021-2.5

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

Sample details

Sample name:
WS102B-12/08/2021-2.5
Sample Depth:
2.5-2.6 m
Moisture content:
13%
(wet weight correction)

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

Hazard properties

None identified

Determinands

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

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
1	●	pH		PH		8.5 pH		8.5 pH	8.5 pH		
								Total:	0%		

Key

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

Classification of sample: WS103-12/08/2021-0

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

Sample details

Sample name:
WS103-12/08/2021-0
Sample Depth:
0-1 m
Moisture content:
11%
(wet weight correction)

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

Hazard properties

None identified

Determinands

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

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		34	mg/kg	1.32	39.953	mg/kg	0.004 %	✓	
2	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		0.53	mg/kg	3.22	1.519	mg/kg	0.000152 %	✓	
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		2.8	mg/kg	1.142	2.847	mg/kg	0.000285 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		28	mg/kg	1.462	36.422	mg/kg	0.00364 %	✓	
5	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.5	mg/kg	2.27	<1.135	mg/kg	<0.000113 %		<**LOD**
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		300	mg/kg	1.126	300.612	mg/kg	0.0301 %	✓	
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	300	mg/kg		267	mg/kg	0.0267 %	✓	
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.54	mg/kg	1.353	0.65	mg/kg	0.000065 %	✓	
9	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		53	mg/kg	2.976	140.39	mg/kg	0.014 %	✓	
10	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		0.69	mg/kg	2.554	1.568	mg/kg	0.000157 %	✓	
11	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		530	mg/kg	1.245	587.132	mg/kg	0.0587 %	✓	
12	TPH (C6 to C40) petroleum group			TPH		200	mg/kg		178	mg/kg	0.0178 %	✓	
13	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
14	benzene	601-020-00-8	200-753-7	71-43-2		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
15	toluene	601-021-00-3	203-625-9	108-88-3		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
16		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
17		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.002	mg/kg		<0.002	mg/kg	<0.0000002 %		<LOD
18		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<LOD
19		pH			PH		7.8	pH		7.8	pH	7.8 pH		
20		naphthalene	601-052-00-2	202-049-5	91-20-3		1.2	mg/kg		1.068	mg/kg	0.000107 %	✓	
21		acenaphthylene		205-917-1	208-96-8		0.1	mg/kg		0.089	mg/kg	0.0000089 %	✓	
22		acenaphthene		201-469-6	83-32-9		1.2	mg/kg		1.068	mg/kg	0.000107 %	✓	
23		fluorene		201-695-5	86-73-7		0.78	mg/kg		0.694	mg/kg	0.0000694 %	✓	
24		phenanthrene		201-581-5	85-01-8		11	mg/kg		9.79	mg/kg	0.000979 %	✓	
25		anthracene		204-371-1	120-12-7		2.2	mg/kg		1.958	mg/kg	0.000196 %	✓	
26		fluoranthene		205-912-4	206-44-0		17	mg/kg		15.13	mg/kg	0.00151 %	✓	
27		pyrene		204-927-3	129-00-0		16	mg/kg		14.24	mg/kg	0.00142 %	✓	
28		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		8	mg/kg		7.12	mg/kg	0.000712 %	✓	
29		chrysene	601-048-00-0	205-923-4	218-01-9		8.3	mg/kg		7.387	mg/kg	0.000739 %	✓	
30		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		9.6	mg/kg		8.544	mg/kg	0.000854 %	✓	
31		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		3.6	mg/kg		3.204	mg/kg	0.00032 %	✓	
32		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		7.7	mg/kg		6.853	mg/kg	0.000685 %	✓	
33		indeno[123-cd]pyrene		205-893-2	193-39-5		5.3	mg/kg		4.717	mg/kg	0.000472 %	✓	
34		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.99	mg/kg		0.881	mg/kg	0.0000881 %	✓	
35		benzo[ghi]perylene		205-883-8	191-24-2		5	mg/kg		4.45	mg/kg	0.000445 %	✓	
36		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		78	mg/kg	1.785	123.928	mg/kg	0.0124 %	✓	
37		monohydric phenols			P1186		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
											Total:	0.177 %		

Key

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

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because Concentrations at less than 1.0% are "unlikely to be flammable". 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.: 0.0178%)

Classification of sample: WS103-12/08/2021-1.8

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

Sample details

Sample name:
WS103-12/08/2021-1.8
Sample Depth:
1.8-2.0 m
Moisture content:
16%
(wet weight correction)

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

Hazard properties

None identified

Determinands

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

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1	●	TPH (C6 to C40) petroleum group TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<**LOD**
2		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane 603-181-00-X / 216-653-1 / 1634-04-4		<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<**LOD**
3		benzene 601-020-00-8 / 200-753-7 / 71-43-2		<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<**LOD**
4		toluene 601-021-00-3 / 203-625-9 / 108-88-3		<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<**LOD**
5	●	ethylbenzene 601-023-00-4 / 202-849-4 / 100-41-4		<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<**LOD**
6		xylene 601-022-00-9 / 202-422-2 [1], 203-396-5 [2], 203-576-3 [3], 215-535-7 [4] / 95-47-6 [1], 106-42-3 [2], 108-38-3 [3], 1330-20-7 [4]		<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<**LOD**
						Total:	0.001 %		

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)
<LOD	Below limit of detection
ND	Not detected

Classification of sample: WS104-12/08/2021-0.0

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

Sample details

Sample name:
WS104-12/08/2021-0.0
Sample Depth:
0.0-0.6 m
Moisture content:
13%
(wet weight correction)

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

Hazard properties

None identified

Determinands

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

#		Determinand	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number									
1		arsenic { arsenic trioxide }		56	mg/kg	1.32	64.326	mg/kg	0.00643 %	✓	
		033-003-00-0 / 215-481-4 / 1327-53-3									
2		cadmium { cadmium oxide }		4.9	mg/kg	1.142	4.87	mg/kg	0.000487 %	✓	
		048-002-00-0 / 215-146-2 / 1306-19-0									
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		49	mg/kg	1.462	62.306	mg/kg	0.00623 %	✓	
		/ 215-160-9 / 1308-38-9									
4		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }		<0.5	mg/kg	2.27	<1.135	mg/kg	<0.000113 %		**<LOD**
		024-017-00-8 / /									
5		copper { dicopper oxide; copper (I) oxide }		320	mg/kg	1.126	313.447	mg/kg	0.0313 %	✓	
		029-002-00-X / 215-270-7 / 1317-39-1									
6		lead { lead compounds with the exception of those specified elsewhere in this Annex }	1	810	mg/kg		704.7	mg/kg	0.0705 %	✓	
		082-001-00-6 / /									
7		mercury { mercury dichloride }		1.3	mg/kg	1.353	1.531	mg/kg	0.000153 %	✓	
		080-010-00-X / 231-299-8 / 7487-94-7									
8		nickel { nickel chromate }		79	mg/kg	2.976	204.559	mg/kg	0.0205 %	✓	
		028-035-00-7 / 238-766-5 / 14721-18-7									
9		selenium { nickel selenate }		0.55	mg/kg	2.554	1.222	mg/kg	0.000122 %	✓	
		028-031-00-5 / 239-125-2 / 15060-62-5									
10		zinc { zinc oxide }		880	mg/kg	1.245	952.953	mg/kg	0.0953 %	✓	
		030-013-00-7 / 215-222-5 / 1314-13-2									
11		pH		8.3	pH		8.3	pH	8.3 pH		
		/ / PH									
12		naphthalene		0.28	mg/kg		0.244	mg/kg	0.0000244 %	✓	
		601-052-00-2 / 202-049-5 / 91-20-3									
13		acenaphthylene		0.1	mg/kg		0.087	mg/kg	0.0000087 %	✓	
		/ 205-917-1 / 208-96-8									
14		acenaphthene		0.53	mg/kg		0.461	mg/kg	0.0000461 %	✓	
		/ 201-469-6 / 83-32-9									
15		fluorene		0.33	mg/kg		0.287	mg/kg	0.0000287 %	✓	
		/ 201-695-5 / 86-73-7									
16		phenanthrene		3.5	mg/kg		3.045	mg/kg	0.000305 %	✓	
		/ 201-581-5 / 85-01-8									

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
17		anthracene				1.1	mg/kg		0.957	mg/kg	0.0000957 %	✓	
			204-371-1	120-12-7									
18		fluoranthene				5.7	mg/kg		4.959	mg/kg	0.000496 %	✓	
			205-912-4	206-44-0									
19		pyrene				5.2	mg/kg		4.524	mg/kg	0.000452 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				2.7	mg/kg		2.349	mg/kg	0.000235 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				2.8	mg/kg		2.436	mg/kg	0.000244 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				3.4	mg/kg		2.958	mg/kg	0.000296 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				1.3	mg/kg		1.131	mg/kg	0.000113 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				2.6	mg/kg		2.262	mg/kg	0.000226 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				1.8	mg/kg		1.566	mg/kg	0.000157 %	✓	
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.39	mg/kg		0.339	mg/kg	0.0000339 %	✓	
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				1.7	mg/kg		1.479	mg/kg	0.000148 %	✓	
			205-883-8	191-24-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				73	mg/kg	1.785	113.377	mg/kg	0.0113 %	✓	
		023-001-00-8	215-239-8	1314-62-1									
										Total:	0.245 %		

Key

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

Classification of sample: WS105-12/08/2021-1.4

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

Sample details

Sample name:
WS105-12/08/2021-1.4
Sample Depth:
1.4-1.5 m
Moisture content:
16%
(wet weight correction)

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

Hazard properties

None identified

Determinands

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

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
1	●	pH		PH		8 pH		8 pH	8pH		
								Total:	0%		

Key

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

Classification of sample: WS106-13/08/2021-0.0

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

Sample details

Sample name:
WS106-13/08/2021-0.0
Sample Depth:
0.0-0.7 m
Moisture content:
12%
(wet weight correction)

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

Hazard properties

None identified

Determinands

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

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		22	mg/kg	1.32	25.561	mg/kg	0.00256 %	✓	
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		4.3	mg/kg	1.142	4.323	mg/kg	0.000432 %	✓	
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		31	mg/kg	1.462	39.871	mg/kg	0.00399 %	✓	
4		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.5	mg/kg	2.27	<1.135	mg/kg	<0.000113 %		<**LOD**
5		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		270	mg/kg	1.126	267.511	mg/kg	0.0268 %	✓	
6		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	1200	mg/kg		1056	mg/kg	0.106 %	✓	
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.35	mg/kg	1.353	0.417	mg/kg	0.0000417 %	✓	
8		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		23	mg/kg	2.976	60.24	mg/kg	0.00602 %	✓	
9		selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<0.2	mg/kg	2.554	<0.511	mg/kg	<0.0000511 %		<**LOD**
10		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		860	mg/kg	1.245	942	mg/kg	0.0942 %	✓	
11		pH			PH		8.7	pH		8.7	pH	8.7 pH		
12		naphthalene	601-052-00-2	202-049-5	91-20-3		0.37	mg/kg		0.326	mg/kg	0.0000326 %	✓	
13		acenaphthylene		205-917-1	208-96-8		0.12	mg/kg		0.106	mg/kg	0.0000106 %	✓	
14		acenaphthene		201-469-6	83-32-9		0.26	mg/kg		0.229	mg/kg	0.0000229 %	✓	
15		fluorene		201-695-5	86-73-7		0.18	mg/kg		0.158	mg/kg	0.0000158 %	✓	
16		phenanthrene		201-581-5	85-01-8		2.2	mg/kg		1.936	mg/kg	0.000194 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
17		anthracene				0.49	mg/kg		0.431	mg/kg	0.0000431 %	✓	
			204-371-1	120-12-7									
18		fluoranthene				3.5	mg/kg		3.08	mg/kg	0.000308 %	✓	
			205-912-4	206-44-0									
19		pyrene				3.3	mg/kg		2.904	mg/kg	0.00029 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				1.7	mg/kg		1.496	mg/kg	0.00015 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				1.8	mg/kg		1.584	mg/kg	0.000158 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				2.4	mg/kg		2.112	mg/kg	0.000211 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				0.94	mg/kg		0.827	mg/kg	0.0000827 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				1.8	mg/kg		1.584	mg/kg	0.000158 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				1.4	mg/kg		1.232	mg/kg	0.000123 %	✓	
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.24	mg/kg		0.211	mg/kg	0.0000211 %	✓	
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				1.3	mg/kg		1.144	mg/kg	0.000114 %	✓	
			205-883-8	191-24-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				30	mg/kg	1.785	47.129	mg/kg	0.00471 %	✓	
		023-001-00-8	215-239-8	1314-62-1									
										Total:	0.246 %		

Key

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

Classification of sample: WS106-13/08/2021-1.5

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

Sample details

Sample name:
WS106-13/08/2021-1.5
Sample Depth:
1.5-1.6 m
Moisture content:
13%
(wet weight correction)

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

Hazard properties

None identified

Determinands

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

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
1	●	pH		PH		8.6 pH		8.6 pH	8.6 pH		
								Total:	0%		

Key

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

Classification of sample: WS107-13/08/2021-0.0

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

Sample details

Sample name:
WS107-13/08/2021-0.0
Sample Depth:
0.0-0.5 m
Moisture content:
6.4%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 6.4% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		17	mg/kg	1.32	21.009	mg/kg	0.0021 %	✓	
2	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.35	mg/kg	1.142	0.374	mg/kg	0.0000374 %	✓	
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		20	mg/kg	1.462	27.36	mg/kg	0.00274 %	✓	
4	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.5	mg/kg	2.27	<1.135	mg/kg	<0.000113 %		**<LOD**
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		72	mg/kg	1.126	75.876	mg/kg	0.00759 %	✓	
6	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	140	mg/kg		131.04	mg/kg	0.0131 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.56	mg/kg	1.353	0.709	mg/kg	0.0000709 %	✓	
8	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		30	mg/kg	2.976	83.574	mg/kg	0.00836 %	✓	
9	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		0.38	mg/kg	2.554	0.908	mg/kg	0.0000908 %	✓	
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		130	mg/kg	1.245	151.457	mg/kg	0.0151 %	✓	
11	pH			PH		8.2	pH		8.2	pH	8.2 pH		
12	naphthalene	601-052-00-2	202-049-5	91-20-3		5.3	mg/kg		4.961	mg/kg	0.000496 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.45	mg/kg		0.421	mg/kg	0.0000421 %	✓	
14	acenaphthene		201-469-6	83-32-9		4.6	mg/kg		4.306	mg/kg	0.000431 %	✓	
15	fluorene		201-695-5	86-73-7		7.5	mg/kg		7.02	mg/kg	0.000702 %	✓	
16	phenanthrene		201-581-5	85-01-8		46	mg/kg		43.056	mg/kg	0.00431 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
17		anthracene				16	mg/kg		14.976	mg/kg	0.0015 %	✓	
			204-371-1	120-12-7									
18		fluoranthene				55	mg/kg		51.48	mg/kg	0.00515 %	✓	
			205-912-4	206-44-0									
19		pyrene				44	mg/kg		41.184	mg/kg	0.00412 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				23	mg/kg		21.528	mg/kg	0.00215 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				21	mg/kg		19.656	mg/kg	0.00197 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				23	mg/kg		21.528	mg/kg	0.00215 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				8.9	mg/kg		8.33	mg/kg	0.000833 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				18	mg/kg		16.848	mg/kg	0.00168 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				11	mg/kg		10.296	mg/kg	0.00103 %	✓	
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				2.3	mg/kg		2.153	mg/kg	0.000215 %	✓	
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				9.9	mg/kg		9.266	mg/kg	0.000927 %	✓	
			205-883-8	191-24-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				27	mg/kg	1.785	45.115	mg/kg	0.00451 %	✓	
		023-001-00-8	215-239-8	1314-62-1									
										Total:	0.0816 %		

Key

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

Classification of sample: WS108-13/08/2021-0.0

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

Sample details

Sample name:
WS108-13/08/2021-0.0
Sample Depth:
0.0-0.5 m
Moisture content:
13%
(wet weight correction)

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

Hazard properties

None identified

Determinands

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

#	Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number / EC Number / CAS Number							
1	arsenic { arsenic trioxide }		18 mg/kg	1.32	20.676 mg/kg	0.00207 %	✓	
	033-003-00-0 / 215-481-4 / 1327-53-3							
2	cadmium { cadmium oxide }		0.46 mg/kg	1.142	0.457 mg/kg	0.0000457 %	✓	
	048-002-00-0 / 215-146-2 / 1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		27 mg/kg	1.462	34.332 mg/kg	0.00343 %	✓	
	/ 215-160-9 / 1308-38-9							
4	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }		<0.5 mg/kg	2.27	<1.135 mg/kg	<0.000113 %		**<LOD**
	024-017-00-8 / /							
5	copper { dicopper oxide; copper (I) oxide }		68 mg/kg	1.126	66.608 mg/kg	0.00666 %	✓	
	029-002-00-X / 215-270-7 / 1317-39-1							
6	lead { lead compounds with the exception of those specified elsewhere in this Annex }	1	310 mg/kg		269.7 mg/kg	0.027 %	✓	
	082-001-00-6 / /							
7	mercury { mercury dichloride }		0.5 mg/kg	1.353	0.589 mg/kg	0.0000589 %	✓	
	080-010-00-X / 231-299-8 / 7487-94-7							
8	nickel { nickel chromate }		28 mg/kg	2.976	72.502 mg/kg	0.00725 %	✓	
	028-035-00-7 / 238-766-5 / 14721-18-7							
9	selenium { nickel selenate }		0.37 mg/kg	2.554	0.822 mg/kg	0.0000822 %	✓	
	028-031-00-5 / 239-125-2 / 15060-62-5							
10	zinc { zinc oxide }		110 mg/kg	1.245	119.119 mg/kg	0.0119 %	✓	
	030-013-00-7 / 215-222-5 / 1314-13-2							
11	pH		8.3 pH		8.3 pH	8.3 pH		
	/ / PH							
12	naphthalene		0.67 mg/kg		0.583 mg/kg	0.0000583 %	✓	
	601-052-00-2 / 202-049-5 / 91-20-3							
13	acenaphthylene		0.17 mg/kg		0.148 mg/kg	0.0000148 %	✓	
	/ 205-917-1 / 208-96-8							
14	acenaphthene		1.5 mg/kg		1.305 mg/kg	0.000131 %	✓	
	/ 201-469-6 / 83-32-9							
15	fluorene		1.3 mg/kg		1.131 mg/kg	0.000113 %	✓	
	/ 201-695-5 / 86-73-7							
16	phenanthrene		7.9 mg/kg		6.873 mg/kg	0.000687 %	✓	
	/ 201-581-5 / 85-01-8							

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
17		anthracene				1.8	mg/kg		1.566	mg/kg	0.000157 %	✓	
			204-371-1	120-12-7									
18		fluoranthene				7.3	mg/kg		6.351	mg/kg	0.000635 %	✓	
			205-912-4	206-44-0									
19		pyrene				6.6	mg/kg		5.742	mg/kg	0.000574 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				3.2	mg/kg		2.784	mg/kg	0.000278 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				3.2	mg/kg		2.784	mg/kg	0.000278 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				3.5	mg/kg		3.045	mg/kg	0.000305 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				1.3	mg/kg		1.131	mg/kg	0.000113 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				2.9	mg/kg		2.523	mg/kg	0.000252 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				2	mg/kg		1.74	mg/kg	0.000174 %	✓	
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.39	mg/kg		0.339	mg/kg	0.0000339 %	✓	
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				1.9	mg/kg		1.653	mg/kg	0.000165 %	✓	
			205-883-8	191-24-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				35	mg/kg	1.785	54.359	mg/kg	0.00544 %	✓	
		023-001-00-8	215-239-8	1314-62-1									
										Total:	0.068 %		

Key

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

Classification of sample: WS109-13/08/2021-0.0

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

Sample details

Sample name:
WS109-13/08/2021-0.0
Sample Depth:
0.0-1.0 m
Moisture content:
20%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 20% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number									
1		arsenic { arsenic trioxide }		80	mg/kg	1.32	84.501	mg/kg	0.00845 %	✓	
		033-003-00-0 / 215-481-4 / 1327-53-3									
2		cadmium { cadmium oxide }		0.54	mg/kg	1.142	0.493	mg/kg	0.0000493 %	✓	
		048-002-00-0 / 215-146-2 / 1306-19-0									
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		27	mg/kg	1.462	31.57	mg/kg	0.00316 %	✓	
		/ 215-160-9 / 1308-38-9									
4		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }		<0.5	mg/kg	2.27	<1.135	mg/kg	<0.000113 %		**<LOD**
		024-017-00-8 / /									
5		copper { dicopper oxide; copper (I) oxide }		190	mg/kg	1.126	171.135	mg/kg	0.0171 %	✓	
		029-002-00-X / 215-270-7 / 1317-39-1									
6		lead { lead compounds with the exception of those specified elsewhere in this Annex }	1	470	mg/kg		376	mg/kg	0.0376 %	✓	
		082-001-00-6 / /									
7		mercury { mercury dichloride }		2.2	mg/kg	1.353	2.382	mg/kg	0.000238 %	✓	
		080-010-00-X / 231-299-8 / 7487-94-7									
8		nickel { nickel chromate }		56	mg/kg	2.976	133.337	mg/kg	0.0133 %	✓	
		028-035-00-7 / 238-766-5 / 14721-18-7									
9		selenium { nickel selenate }		0.78	mg/kg	2.554	1.594	mg/kg	0.000159 %	✓	
		028-031-00-5 / 239-125-2 / 15060-62-5									
10		zinc { zinc oxide }		320	mg/kg	1.245	318.647	mg/kg	0.0319 %	✓	
		030-013-00-7 / 215-222-5 / 1314-13-2									
11		pH		8	pH		8	pH	8pH		
		/ / PH									
12		naphthalene		16	mg/kg		12.8	mg/kg	0.00128 %	✓	
		601-052-00-2 / 202-049-5 / 91-20-3									
13		acenaphthylene		0.59	mg/kg		0.472	mg/kg	0.0000472 %	✓	
		/ 205-917-1 / 208-96-8									
14		acenaphthene		36	mg/kg		28.8	mg/kg	0.00288 %	✓	
		/ 201-469-6 / 83-32-9									
15		fluorene		24	mg/kg		19.2	mg/kg	0.00192 %	✓	
		/ 201-695-5 / 86-73-7									
16		phenanthrene		170	mg/kg		136	mg/kg	0.0136 %	✓	
		/ 201-581-5 / 85-01-8									

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
17		anthracene				26	mg/kg		20.8	mg/kg	0.00208 %	✓	
			204-371-1	120-12-7									
18		fluoranthene				180	mg/kg		144	mg/kg	0.0144 %	✓	
			205-912-4	206-44-0									
19		pyrene				170	mg/kg		136	mg/kg	0.0136 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				81	mg/kg		64.8	mg/kg	0.00648 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				89	mg/kg		71.2	mg/kg	0.00712 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				87	mg/kg		69.6	mg/kg	0.00696 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				31	mg/kg		24.8	mg/kg	0.00248 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				71	mg/kg		56.8	mg/kg	0.00568 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				40	mg/kg		32	mg/kg	0.0032 %	✓	
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				9.5	mg/kg		7.6	mg/kg	0.00076 %	✓	
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				40	mg/kg		32	mg/kg	0.0032 %	✓	
			205-883-8	191-24-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				78	mg/kg	1.785	111.396	mg/kg	0.0111 %	✓	
		023-001-00-8	215-239-8	1314-62-1									
										Total:	0.209 %		

Key

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

Classification of sample: CP101-12/08/2021-0.0

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

Sample details

Sample name:
CP101-12/08/2021-0.0
Sample Depth:
0.0-1.0 m
Moisture content:
10%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 10% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		22	mg/kg	1.32	26.142	mg/kg	0.00261 %	✓	
2		boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		<0.4	mg/kg	3.22	<1.288	mg/kg	<0.000129 %		<**LOD**
3		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		2.9	mg/kg	1.142	2.981	mg/kg	0.000298 %	✓	
4		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		21	mg/kg	1.462	27.623	mg/kg	0.00276 %	✓	
5		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.5	mg/kg	2.27	<1.135	mg/kg	<0.000113 %		<**LOD**
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		140	mg/kg	1.126	141.862	mg/kg	0.0142 %	✓	
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	220	mg/kg		198	mg/kg	0.0198 %	✓	
8		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.46	mg/kg	1.353	0.56	mg/kg	0.000056 %	✓	
9		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		36	mg/kg	2.976	96.431	mg/kg	0.00964 %	✓	
10		selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<0.2	mg/kg	2.554	<0.511	mg/kg	<0.0000511 %		<**LOD**
11		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		340	mg/kg	1.245	380.882	mg/kg	0.0381 %	✓	
12		TPH (C6 to C40) petroleum group			TPH		190	mg/kg		171	mg/kg	0.0171 %	✓	
13		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
14		benzene	601-020-00-8	200-753-7	71-43-2		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
15		toluene	601-021-00-3	203-625-9	108-88-3		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
16	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
17		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.002	mg/kg		<0.002	mg/kg	<0.0000002 %		<LOD
18		cyanides { ● salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<LOD
19	●	pH			PH		8.5	pH		8.5	pH	8.5 pH		
20		naphthalene	601-052-00-2	202-049-5	91-20-3		0.8	mg/kg		0.72	mg/kg	0.000072 %	✓	
21	●	acenaphthylene		205-917-1	208-96-8		0.11	mg/kg		0.099	mg/kg	0.0000099 %	✓	
22	●	acenaphthene		201-469-6	83-32-9		1.2	mg/kg		1.08	mg/kg	0.000108 %	✓	
23	●	fluorene		201-695-5	86-73-7		0.85	mg/kg		0.765	mg/kg	0.0000765 %	✓	
24	●	phenanthrene		201-581-5	85-01-8		6.2	mg/kg		5.58	mg/kg	0.000558 %	✓	
25	●	anthracene		204-371-1	120-12-7		1.2	mg/kg		1.08	mg/kg	0.000108 %	✓	
26	●	fluoranthene		205-912-4	206-44-0		7	mg/kg		6.3	mg/kg	0.00063 %	✓	
27	●	pyrene		204-927-3	129-00-0		6.4	mg/kg		5.76	mg/kg	0.000576 %	✓	
28		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		3.2	mg/kg		2.88	mg/kg	0.000288 %	✓	
29		chrysene	601-048-00-0	205-923-4	218-01-9		3.2	mg/kg		2.88	mg/kg	0.000288 %	✓	
30		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		3.8	mg/kg		3.42	mg/kg	0.000342 %	✓	
31		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		1.3	mg/kg		1.17	mg/kg	0.000117 %	✓	
32		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		3	mg/kg		2.7	mg/kg	0.00027 %	✓	
33	●	indeno[123-cd]pyrene		205-893-2	193-39-5		1.8	mg/kg		1.62	mg/kg	0.000162 %	✓	
34		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.43	mg/kg		0.387	mg/kg	0.0000387 %	✓	
35	●	benzo[ghi]perylene		205-883-8	191-24-2		1.9	mg/kg		1.71	mg/kg	0.000171 %	✓	
36		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		46	mg/kg	1.785	73.907	mg/kg	0.00739 %	✓	
37	●	monohydric phenols			P1186		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
											Total:	0.116 %		

Key

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

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because Concentrations at less than 1.0% are "unlikely to be flammable". 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.: 0.0171%)

Appendix A: Classifier defined and non CLP 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**

CLP 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 CLP protocols, considers many simple lead compounds to be Carcinogenic category 2
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s):
03 Jun 2015 - 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

- **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)

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s):
03 Jun 2015 - 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**

CLP index number: 006-007-00-5
Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
Data source: Commission Regulation (EC) No 790/2009 - 1st Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP1)
Additional Hazard Statement(s): EUH032 >= 0.2 %
Reason for additional Hazards Statement(s):
14 Dec 2015 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2 H351

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

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

- **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: Acute Tox. 3 H301 , Acute Tox. 3 H311 , Acute Tox. 3 H331 , Skin Corr. 1B H314 , Skin Corr. 1B H314 >= 3 %, Skin Irrit. 2 H315 1 £ conc. < 3 %, Eye Irrit. 2 H319 1 £ conc. < 3 %, Muta. 2 H341 , STOT RE 2 H373 , 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 (edit as required)

boron {diboron trioxide; boric oxide}

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

cadmium {cadmium oxide}

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

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

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

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

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

copper {dicopper oxide; copper (I) oxide}

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

lead {lead 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.

mercury {mercury dichloride}

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

nickel {nickel chromate}

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

selenium {nickel selenate}

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

zinc {zinc oxide}

Worst case compound based on absence of CrVI and assumed metal oxides from a combustion, ash based source.

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

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

vanadium {divanadium pentaoxide; vanadium pentoxide}

worst case/most likely scenario

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2021.246.4869.9247 (05 Sep 2021)
HazWasteOnline Database: 2021.246.4869.9247 (05 Sep 2021)

This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
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 2019 - UK: 2019 No. 720 of 27th March 2019
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
POPs Regulation 2019 - Regulation (EU) 2019/1021 of 20 June 2019

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