29 CLOTHORN ROAD
MANCHESTER

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

Job Number: LKC 20 1100
Date: September 2021
Client: Khalid Din

INCREASING LAND VALUE

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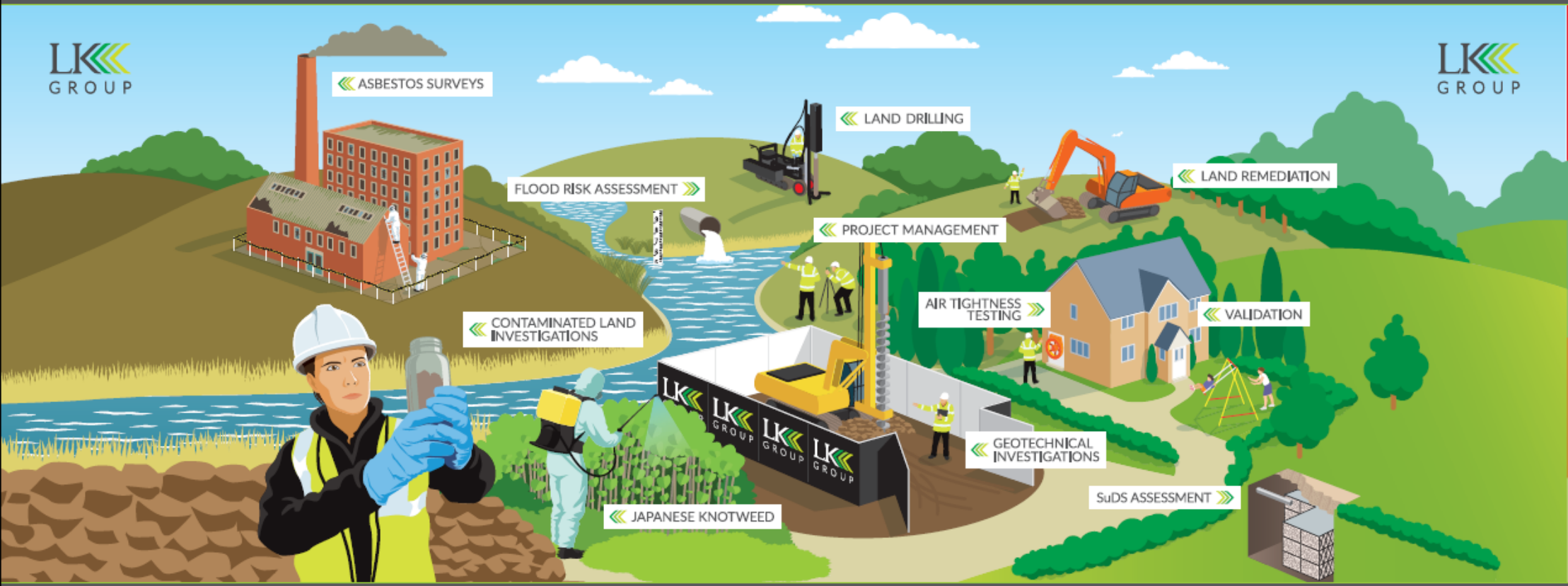

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EXECUTIVE SUMMARY

Site Details

Site Location:	29 Clothorn Road Manchester M20 6BG. On the site of the Christian science church, by the intersection of Clothorn Rd and Clayton Ave. Centred at approximate National Grid Reference 384853E 391622N.
Site Area:	1,253m^2.
Current Land Use:	Derelict building formerly home to the Christian Science Church, and attached car park and soft landscaping.
Proposed Development:	Planning Application Ref 118202/FO/2017 & APP/B4215/W/18/3202618: Residential apartments with soft landscaping. Associated infrastructure including driveway and car parking facilities.
Purpose of Report:	Contamination and Geotechnical Assessment.

Preliminary Risk Assessment

PRA Details:	Undertaken by LKC in July 2021. Ref: LKC 20 1100
History:	Building 1922-1984, Church 1922-1984 and the current church from 1984-present.
Geology / Hydrogeology:	Glaciofluvial sheet deposits (Secondary A Aquifer) over Wilmslow Sandstone (Principal Aquifer).
Mining:	No recorded mining.
Relevant Environmental Setting:	Not within Source Protection Zone. No groundwater abstractions or pollution inclidents.
Preliminary Conceptual Model: PL=Pollutant Linkage	PL1 Direct Contact (Human Health): Moderate Risk (metals, PAHs), Low Risk (Petroleum Hydrocarbons). PL2 Inhalation of Vapours: Low Risk (volatile contaminants). PL3 Gas: High Risk (hazardous and ground gas) Low Risk (Radon). PL4 Controlled waters: Moderate Risk (mobile contaminants). PL5 Sulphate Attack: Moderate Risk (sulphate). PL6 Water Pipelines: Low 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:	25th August 2021
Intrusive Investigation Work Undertaken:	5no. window sample boreholes (WS101-WS105).
Monitoring Wells:	Installed in WS101, WS103 and WS104.
Soil Sampling:	7no. samples tested for metals, speciated PAHs, cyanide, pH, sulphate, asbestos, phenol and SOM. 1no. sample tested for metals, speciated PAHs, cyanide, pH, sulphate, asbestos, phenol, TPHCWG, BTEX and SOM.
Groundwater Sampling:	3no samples tested for metals, speciated PAHs, cyanide, pH, sulphate, hardness, phenol, TPHCWG and BTEX.
Monitoring:	6no. gas monitoring visits over 3 months.
Insitu and Laboratory Geotechnical Testing:	SPT, PSD.

Ground Conditions and Geotechnical Assessment

Location	General Ground conditions	Allowable Bearing Pressure	Anticipated Foundation Type	Other Considerations
Whole Site	Made Ground to 0.5-0.8mbgl. SPTs N=13-19 at 1.2mbgl, N=10-15 at 2m, N=20-50 at 3-4mbgl. Probable weathered sandstone bedrock encountered at base of all window samples. Groundwater encountered at depths of 2.90m and 3.70mbgl in WS101 and WS102 respectively during the course of the investigation.	125kN/m^2 from 1mbgl Within granular deposits of sand. 400kN/m^2 within the weathered sandstone.	Traditional shallow foundations comprising pads supporting column loads and strips supporting walls recommended from approximately 1mbgl. If soft ground is encountered, foundations may need to be deepened / widened or ground replaced with compacted granular material.	Temporary supports of excavations may be required. Detailed design should be carried out by structural engineer. Concrete Requirements DS1-AC-1

Contamination Risk Assessment

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

Pollutant Linkage		Risk	Recommendations
1	Contaminants posing a risk to site users via dermal contact, ingestion and inhalation (of soil dust and fibres).	**Low**	- Unlikely probability as no ACM identified. No elevated metals, PAHs, hydrocarbons or other contaminants. - **Recommendations:** No remediation required.
2	Volatile contaminants posing a risk to site users via the inhalation of vapours.	**Low**	- No elevated contaminants across the site. - **Recommendation:** No remediation required.
3	Gas posing a risk to buildings and site users via the migration of gas into building causing explosion and asphyxiation.	**High**	- Elevated carbon dioxide identified (max. 5.7%v/v) and GSV classified as CS2. - **Recommendations:** Gas protection measures in line with CS2 recommended.
4	Mobile contamination posing a risk to controlled waters via the migration through permeable strata.	**Low**	- No elevated contaminants identified in groundwater. - **Recommendations:** No remediation required.
5	Sulphate posing a risk to building via direct contact (sulphate attack).	**Very Low**	- No elevated sulphate identified in soils or groundwater. - **Recommendation**: No remediation required.
6	Organic contaminants posing a risk to water pipes.	**Low**	- No elevated contaminants identified.

			- **Recommendation:** Barrier piping unlikely to be required. However, this will need to be confirmed once UU risk assessment undertaken.
7	Phytotoxic metals posing a risk to flora via root uptake.	**Very Low**	- One minor exceedance identified. - **Recommendation**: 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.

Phase	PL	Remediation Requirements	Validation Requirements
Post-Demolition Work	**1, 2, 4, 5, 6, 7**	Post-demolition Confirmatory Trial Pitting (Watching Brief) This is recommended to confirm ground conditions below the current buildings and confirm the current ground conditions and remediation strategy. Should any unexpected or unusual ground conditions be encountered then further risk assessment may be required.	N/A (Investigation Report will be provided with an updated Remediation Strategy).
Pre-Construction	**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 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[1].	Log of work undertaken including photographs. Details of any sampling undertaken and validation of any potential additional remedial work.

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

Build-Phase Construction	**3**	Gas Protection Measures In line with CS2 as per UK guidance[2,3]. This is likely to / should include: • Passive subfloor or active subfloor ventilation system. • Methane and carbon dioxide resistant membrane installed as per manufacturer's instructions. • Ventilation of confined spaces within the building. • Well-constructed reinforced suspended, raft or cast in situ ground slab. • Minimum penetration of ground slab by services. • All joints and penetrations to be sealed. Depending on the type of building and foundation design the protection measures can vary. The gas protection measures will be detailed and approved with the Local Authority once the foundation design has been confirmed.	Supply and review of foundation designs. Photographic evidence of sub-floor void, ventilation and suitably sealed gas membrane. Validation of gas protection measures should be in line with CIRIA 735[4]
Other Considerations		Grubbing Out of In-Ground Structures It is recommended that in-ground structures are grubbed out as part of the groundworks. In-ground structures expected in the centre of the site associated with the former buildings.	
		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 [5]): 5,000 tonnes (*c.* 2,500m^3) treatment of crushed concrete / stone. 1,000 tonnes (*c.* 500m^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 bituminous material to be used in roadways. A Materials Management Plan (MMP) with recourse to the CL:AIRE Code of Practice may be required if volumes exceed exemption limits. This must be registered **before** material movement starts onsite. If an MMP is required, this needs to be registered by a Qualified Person (QP) and there must be 'certainty of use' for any material re-used onsite or exported to site to ensure there is no 'sham recovery'. For all the above material will need to be tested at the rate and analytical suites presented in Table 9-2.	
		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).	

[2] CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665
[3] BSI (2015). "Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for new buildings." BS8485:2015.
[4] CIRIA (2014). "Good Practice on the Testing and Verification of Protection Systems for Building Against Hazardous Ground Gas". CIRIA C735.
[5] https://www.gov.uk/guidance/waste-exemptions-using-waste

	A topsoil cover of approximately 150mm is recommended in gardens and soft landscaping areas.

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

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1 Introduction

1.1 Background

LK Consult Ltd (LKC) has been commissioned by Khalid Din to carry out a Phase 2 Geo-Environmental Investigation, Risk Assessment and Remediation Strategy for 29 Clothorn Road, Manchester. The investigation was undertaken in support of a planning application (reference number Ref 118202/FO/2017 & APP/B4215/W/18/3202618) to develop the site for residential use.

The following work has previously been undertaken:

- Preliminary Risk Assessment (PRA) report, undertaken by LKC (Ref: LKC 20 1100, dated July 2021).

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

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

This is an interim report including all investigation work completed to date. A final report will be issued on completion of gas monitoring.

1.2 Site Details

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

Location	29 Clothorn Road Manchester M20 6BG. On the site of the Christian science church, by the intersection of Clothorn Rd and Clayton Ave. Centred at approximate National Grid Reference 384853E 391622N.
Area	1253m2.
Topography	40 metres Above Ordnance Datum (AOD). Site is approximately level.
Land Use	Site Derelict building formerly home to the Christian Science Church, and attached car park and soft landscaping. Surrounding Area Residential buildings in all directions.
Proposed Development	Residential apartments including soft landscaping and car parking.

Table 1-1. Summary of site details.

2 Previous Work

2.1 Site History

The site history is summarised in Table 2-1.

Site Features	Location	Map Dates Present	Comments
Undeveloped Field	Whole Site	1848-1922	
Field Boundary	Centre trending N/S	1893-1907	
Embankment	S	1907-1922	
Woods	SE	1907-1922	
Sunday School Building	NW	1922-1984	- Building first seen in 1922, becomes a Sunday school with the appearance of Church in 1934
Church	SE	1934-1984	- Church not completely onsite. In 1992 Church becomes residential property.
Building	Centre	1984-2021	-
Surrounding Area Features	**Distance/ Location**	**Map Dates Present**	**Comments**
Vehicle Repair Garage	2m NE	1934-1984	- First labelled garage in 1957.
Petrol Filling Station	13m NE	1984-2009	- No longer seen in 2009 mapping.
Residential Housing	17m S	1907-2021	- Residential buildings build up around the site from 1907 to present day. More houses appear in 1934 to the E & N coming within 10m of the site.
Ponds	0-225m SE	1893-1907, 1894-1922 &1894-1922	- 0m SE, 210m SE & 225m SE
Railway Line	228m SW	1893-2021	

Table 2-1: Summary of significant historical features.

2.2 Environmental Setting

The environmental setting is summarised in Table 2-2.

Categories			Details
Geology	Artificial		- Made Ground recorded across site.
	Superficial		- Glaciofluvial deposits (sand and gravel).
	Bedrock		- Wilmslow Sandstone Formation, (Siltstone, Mudstone and Sandstone).
	BGS logs		- None
Hydro-geology	Aquifer Designation	Superficial	- Secondary A.
		Bedrock	- Principal
	Source Protection Zone (SPZ)		- Site is not within an SPZ.
	Groundwater Abstractions		- None within 100m.
Hydrology	Nearest Surface Water		- None within 100m.
	Water Quality Data		- Not applicable.
	Flooding		- No risk from rivers or sea.
	Surface Water Abstractions		- One within 100m
	Discharge Consent		- None.
	Pollution Incidents		- None within site.

Table 2-2: Summary of the environmental setting.

Categories		Details
Minerals / Mining	Coal Mining Development High Risk Area (DHRA)	- Not within DHRA.
	Coal Report	- Not within coal reporting area.
	Surface Extractions	- No mineral extraction within 250m of the site.
	Cheshire Brine Compensation District	- Not within site area.
Ground Stability[1] (on-site)	Collapsible Ground	- Very low hazard.
	Compressible Ground	- No hazard.
	Landslide	- Very low hazard.
	Running Sand	- Very low hazard.
	Shrinking / Swelling Clay	- No hazard.
	Ground Dissolution	- No hazard.
Landfill sites	Known/Registered	- None.
	Potential	- 3 ponds 0m SE, 210m SE & 225m SE, potentially infilled by 1907-1922 mapping.
Radon		- Probability of <1% of homes above Action Level. No further action required.
Designated Sites		- None.
Contemporary Trade Directory		- 18m NE, Priory Filling Station, Petrol Station.
Fuel Station Entries		- 18m NE, Priory Filling Station, Petrol Station.

Table 2-2 (Continued): Summary of the environmental setting.

2.3 Site Reconnaissance

A site reconnaissance was carried out on 28 June 2021. Hand dug trial holes were undertaken in accessible areas to confirm the shallow ground conditions.

Relevant features identified on site are summarised below:

- Ground south of building on site is covered in tarmac beneath leaf litter, tarmac is in reasonable condition where visible though presence of trees has cracked tarmac immediately surrounding them.
- North of site behind building is covered in rough ground with occasional scrub and bushes.
- Derelict building in the centre of the site is in good condition, roofline is straight and intact, some windows have been broken whilst others are boarded up.
- Minimal fly tipping seen across site due to the high brick wall surrounding the majority of the site. Site boundary adjacent to Clothorn road is secured by Heras fencing.
- No evidence of contamination identified.
- Site is level with the footpath.

The surrounding area comprises:

- The surrounding area is predominantly residential.
- Clothorn Road is south of site and Clayton Avenue is to the east.
- North and south of the site are residential houses and attached gardens.
- East and west of the site are apartments.

2.4 Contamination Sources / Pathways and Receptors

Potential contamination sources are detailed in Table 2-3.

Source	Contaminants
Onsite former buildings	- Asbestos Containing Material (ACM).
Onsite Made Ground	- Ash and clinker (e.g. from hearths and boilers, often historically used for site raising / levelling, noted in the site walkover): Heavy metals, sulphates and PAHs[6]. - If significant depth of organic / putrescible material: Hazardous gas (principally carbon dioxide and methane).
Onsite Car Park	- Spillages / leakages: petroleum hydrocarbons, oils (source expected to be minimal and localised)
Surrounding Area	- Potentially infilled features considered source of hazardous gases principally carbon dioxide and methane. - Former Petrol station: source of Hydrocarbons, lubricants, ethylene gycol (antifreeze), brake fluids, solvents and paints.

Table 2-3: Potential contamination sources

Potential receptors are detailed in Table 2-4.

Receptors	
Human Health	- Future site users (including residents, visitors and site workers). - Offsite land users.
Controlled Waters	- Secondary A Aquifer (Superficial) and Principal Aquifer (Bedrock). - No surface water within influencing distance.
Buildings and structures.	
Potable water pipes.	
Flora within future gardens/landscaping.	

Table 2-4: Potential receptors

[6] Defra (2002). "Potential Contaminants for the Assessment of Land." R&D Publication CLR 8.

Potential pathways are detailed in Table 2-5.

Pathways		
Soil	Human Health[7] (residential land use: apartments with shared 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 as no private gardens: ingestion of contaminated vegetables and ingestion of soil attached to vegetables.
	- Windblown dust / fibres to adjacent receptors.	
	- Direct contact with receptors (building foundations, services).	
Water	- Northeast and southwest of site is flat and grassed; therefore, surface run-off will be limited.	
	- The centre of the site will be built on, the planned car park will stretch from southeast to north west of the site and is tarmacked; therefore, surface run-off over impermeable surface is to be expected.	
Water and Gas	- Migration through potentially permeable strata and preferential pathways. - Superficial (sand and gravel) is likely to be relatively permeable. - Bedrock (sandstone) likely to be relatively permeable. - Preferential pathways: services..	
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

2.5 LKC Preliminary Contamination Conceptual Model

The preliminary contamination conceptual model using contaminant-pathway-receptor linkages based on guidance in LCRM[8] 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.

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[9].

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.

[7] EA (2008). "Updated Technical Background to the CLEA Model." Science Report – SC050021/SR3.
[8] Land Contamination Risk Management (LCRM) https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm
[9] CIRIA (2001). "Contaminated land risk assessment: A guide to good practice". C552.

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[10]) should be adopted by all workers involved with site enabling and construction works. Therefore, this receptor is not considered in the contamination conceptual model.

2.6 Recommendations

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

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

PL	Pathway	Receptor	Contaminant (source)	Probability	Consequence	Risk	Assessment and Recommendations
1	- Dermal contact. - Inhalation of soil, fibres and dust. - Ingestion of soils, dust. - Windblown dust.	- Future site users. - Offsite receptors.	- Heavy metals. - PAHs. - ACM Other inorganic and organic contaminants.	Likely	Medium	**Moderate**	Intrusive investigation required. - Soil analysis of CoC, subject to ground conditions encountered.
			- Petroleum hydrocarbons.	Unlikely	Medium	**Low**	- Testing not required unless evidence of hydrocarbons in soils.
2	- Inhalation of vapours. - Migration via permeable strata and preferential pathways.	- Future site users. - Offsite receptors.	- Volatile contaminants (TPHCWG, SVOC, VOCs).	Unlikely	Medium	**Low**	- Testing not required unless evidence found of volatile contaminants in soils
3	- Inhalation of gas. - Migration via permeable strata and preferential pathways. - Explosion in confined spaces. - Exposure to radon.	- Future site users. - Buildings - Offsite receptors.	Ground / hazardous gas (carbon dioxide, methane).	Likely	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 dwellings or extensions.
4	- Surface run-off. - Migration via permeable strata and preferential pathways. - Perched waters migration.	Groundwater (Secondary A & Principal Aquifer).	- Mobile contaminants such as metals, PAHs, hydrocarbons, volatile compounds.	Low Likelihood (only minimal mobile contamination)	Medium	**Moderate** / Low (low assumed as significant source not anticipated).	Intrusive investigation required. - Groundwater sampling, subject to ground conditions encountered. Analysis of CoC.
5	- Sulphate attack on concrete.	- Building structure.	- Sulphate.	Likely	Mild	**Moderate /** Low (moderate assumed until ground conditions confirmed)	Intrusive investigation required. - Soil analysis of CoC, subject to ground conditions encountered.
6	- Ingestion of tainted water supply.	- Future site users. - Water pipes.	- Organic contaminants such as petroleum hydrocarbons, naphthalene, volatile compounds.	Low Likelihood	Medium	Moderate **/ Low** (low assumed as significant source not anticipated).	- Testing not required unless evidence of hydrocarbons in soils.
7	- Direct contact (plant uptake).	- Flora.	- Phytotoxic contaminants such as heavy metals.	Low Likelihood	Minor	**Low**	Intrusive investigation required. - Soil analysis of CoC, subject to ground conditions encountered.

Table 2-6. Preliminary Contamination Conceptual Model.

3 Ground Investigation

3.1 Site Investigation Design and Methodology

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

The investigation was carried out on 25th August 2021 and comprised the following:

- 5no. window sample boreholes drilled to 3.30-4.00 metres below ground level (mbgl) (ref. WS101 to WS105).

All site investigation locations are shown in Figure 3.

WS102 was brought closer to the building due to dense vegetation preventing window sample rig from tracking to the far corner of site.

The locations were chosen to allow a good spread across the site as well as target areas of concern. Table 3-1 details the targeted and general coverage (non-targeted) site investigation locations.

Site Investigation Locations	Rationale
WS101	Situated beneath proposed building.
WS102-WS105	General site coverage.

Table 3-1: Summary of sampling locations.

In addition, areas where buildings are still present (location on site) could not be accessed. Further investigation or a watching brief may be required in these areas.

The number of site investigation points corresponds to approximately one location per 18m square centres. This is considered to be a conservative sampling density and is in line with BS10175[11] for a 'main investigation'.

All profile logs are provided in Appendix B and are in line with BS14688-1[12] and BS5930[13].

3.2 Well Installations

3no. (WS101, WS103 & WS104) of the 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[14] and generally comprised approximately 1m plain pipe over a length of slotted pipe surrounded by pea gravel and sealed at the top with bentonite and concrete.

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

[11] British Standard (2017). "Investigation of Potentially Contaminated Sites – Code of Practice." BS10175:2017.
[12] British Standards (2002) Geotechnical investigation and testing – Identification and Classification of Soil. Part 1: Identification and description. BS EN ISO 14688-1:2002.
[13] British Standard (2015). "Code of Practice for Ground Investigations". BS5930:2015.
[14] 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[15].

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 3-2 shows the soil testing undertaken.

Suites and Contaminants	No. Samples	Location & Depth	Justification
Metals / metalloids, pH, water soluble sulphate, speciated PAHs, SOM and asbestos screen.	7	WS101 0.0-0.7m WS102 0.0-0.5m WS102 1.2-2.0m WS103 0.2-0.6m WS104 0.2-0.5m WS104 0.5-1.0m WS105 0.25-0.8m	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.	1	WS101 0-0.7m	Although no visual/olfactory evidence of contamination was identified (with the exception of some ash), due to location of former petrol station, detailed suite undertaken on WS101 0-0.7m.

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

Notes:

If asbestos present during screen identification and quantification will be undertaken.
Metal/metalloids=arsenic, cadmium, chromium, (total and hexavalent), copper, lead, mercury, nickel, selenium, vanadium, zinc and boron; TPHCWG=carbon banded and aromatic/aliphatic split petroleum hydrocarbons; PAH=polycyclic aromatic hydrocarbons, BTEX=benzene, toluene, ethylbenzene and xylenes; MTBE=Methyl tert-butyl ether, SOM=Soil Organic Matter.

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

3.3.2 Leachate Testing

No groundwater was encountered in the boreholes; therefore, leachate tests were undertaken as an alternative.

Sampling was carried out in accordance with BS5930[16] and BS5667-11[17].

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

Suites and Contaminants	No. Samples	Location	Justification
Metals / metalloids, pH, sulphate, cyanide suite, TPHCWG, BTEX, MTBE, speciated PAHs, phenol and hardness.	3	WS101 composite WS103 composite WS104 composite	Detailed suite undertaken across the site to confirm the absence of contamination.

Table 3-3. Summary of leachate tests undertaken.

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

3.4 Gas Monitoring

All the installed boreholes are currently being monitored for gas. To date, two gas monitoring visits have been undertaken. A further four visits are proposed.

Monitoring is being undertaken using a Geotechnical Instruments GA5000 in accordance with the monitoring protocol outlined in CIRIA C665[18] (flow rate measured first). The monitoring will aim to be undertaken over a range of weather conditions (including low and falling barometric pressure and heavy rain) to demonstrate worst-case conditions.

The gas monitoring results to date, 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 at approximately 1m intervals, generally within the natural strata.

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

[16] British Standard (2015). "Code of Practice for Ground Investigations". BS5930:2015.
[17] British Standard (2009). "Water Quality – Sampling. Part 11: Guidance on Sampling of Groundwaters". BS ISO 5667-11:2009.
[18] CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665.

3.5.2 Laboratory Geotechnical Testing

Soil samples taken during the investigation were collected in tubs and bulk bags 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 3-4 shows the geotechnical testing undertaken.

Suites and Contaminants	No. Samples	Location	Justification
Particle Size Distribution (PSD)	3	WS101 0.7-1.3m WS102 1.2-2.0m WS104 0.5-1.0m	PSD undertaken to confirm grading of granular material.

Table 3-4. 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 SAND with variable proportions of silt, clay, gravel and cobbles. A summary section of the logs is provided in Plate 4-1, with additional comments below.

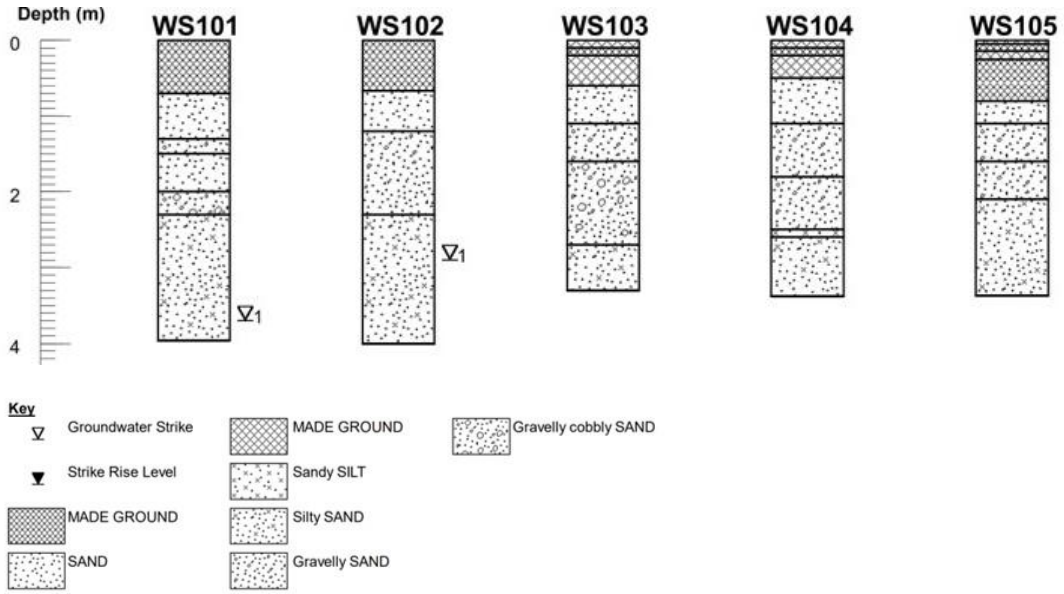


Plate 4-1: Summary of ground conditions.

Additional information on ground conditions:

- Made ground in the north of site (WS101 & WS102) was recorded from depths of 0.0mbgl to 0.70 and 0.67mbgl respectively, consisting of gravelly silty sand with brick, ash and clinker.
- Made ground in the south of site (WS103 - WS105) was recorded from depths of 0.0mbgl to 0.60, 0.50 and 0.80mbgl respectively, consisting of tarmacadam over a sub-base of sandy gravel with brick crush and gravelly silty sand with brick, ash and clinker.
- Natural strata is silty SAND with variable percentages of gravel, silt and occasional cobbles.
- All boreholes refused between 3.30 and 4.00mbgl against red silty sand suspected to be weathered sandstone bedrock.
- Groundwater was struck in WS101 and WS102 at 3.70m and 2.90mbgl respectively.
- No visual / olfactory evidence of hydrocarbons or volatile contaminants in any locations.
- In-ground structures were identified in:
  WS101 (bricks encountered in wall of hand excavated pit at 0.3-0.7m).

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

4.2 Groundwater

4.2.1 Groundwater Levels

Groundwater strikes were recorded during the investigation in boreholes WS101 and WS102. 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		
WS101	3.70	0.3-3.5 (MG/S)	2	3.33	3.33	3.48	N	N
WS103	-	1.0-3.0 (MG/S)	2	Dry	Dry	2.84	N	N
WS104	-	1.0-3.0 (S)	2	Dry	Dry	2.93	N	N

Table 4-1: Summary of water strike depths within boreholes.
Response Zones:
MG=Made Ground; S = Sand.

WS102 and WS103 were dry on both monitoring occasions. WS101 had little water recorded.

4.3 In-Situ Geotechnical Testing

4.3.1 Standard Penetration Tests

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

Approximate Depth (mbgl)	SPT 'N' Values				
	WS101	WS102	WS103	WS104	WS105
1-2	16 (S)	13 (S)	19 (S)	16 (S)	17 (S)
2-3	10 (S)	10 (S)	10 (S)	14 (S)	15 (S)
3-4	20, 50(S)	24, 50 (S)	50 (S)	50 (S)	50 (S)
GW Level	3.70	2.90	-	-	-

Table 4-2: Summary of SPT (N) values.
Notes:
S=Sand.
Groundwater level based on strikes during investigation and monitoring data.

4.4 Geotechnical Laboratory Testing

4.4.1 Particle Size Distribution

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

Location	Depth (mbgl)	Material	Percent passing through sieve		
			63mm	2mm	0.063mm
WS101	0.7-1.3	Silty SAND with rare gravel.	100%	93%	10%
WS102	1.2-2.0	Silty SAND with abundant gravel.	100%	61%	6%
WS104	0.5-1.0	Silty SAND with rare gravel.	100%	93%	14%

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

Notes:

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

4.4.2 Sulphate and pH

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

Strata	pH	Sulphate (g/l)
Made Ground	7.3-9.0	<0.01-0.013
Natural	8.7	<0.010

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

5 Geotechnical Assessment

5.1 Proposed Development

It is understood that the proposed development will comprise the demolition of an existing structure and replacing with a three-storey residential apartment building with associated landscaping, vehicle parking and infrastructure. Details of the proposed loadings are not known at this stage.

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

The depths of any underground engineering works (sewers etc.) are unknown and therefore have not been 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.

Given the nature of the proposed development it is considered that the structure meets the criteria of Geotechnical Category 1 of Euro Code 7.

Given the nature of the development it is considered that acceptable risk from settlement is a total settlement value of 25mm for a masonry structure.

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 0.80mbgl over natural granular superficial deposits of SAND, grading into weathered sandstone to the completion depths investigated.

5.3 Site Preparation

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

- Roots present below the footprint of proposed structures and infrastructure should be grubbed out and the resulting void infilled with suitable compacted engineered fill;
- Redundant services should be sealed off and grubbed out and replaced with suitable compacted engineered fill; and,
- Old foundations can be expected on site. These should be excavated from below the proposed development foot print with the resulting void backfilled.

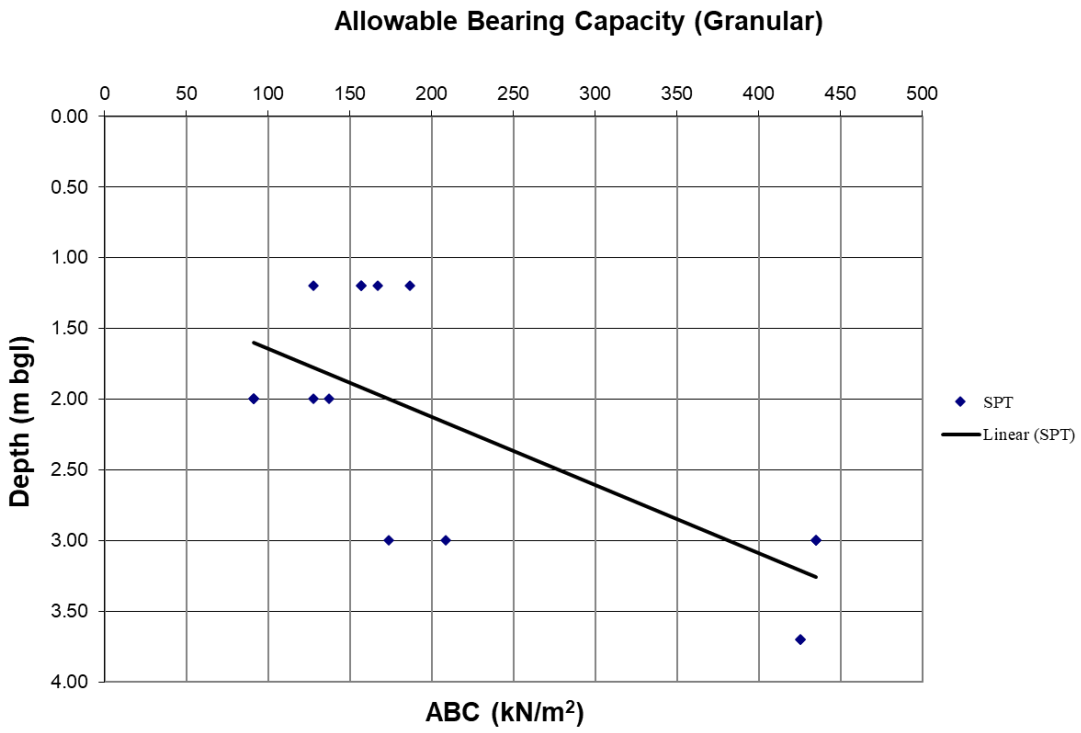
The near surface soils may potentially be disturbed by weathering and site traffic. Precautions should be taken to avoid this, as excessive disturbance may result in more onerous floor slab design, road cap thickness and increased amount of site disposal etc. Based on site observations the near surface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

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.

Density of the natural granular material has been assessed using in-situ testing by SPT. The results of the testing have been plotted against depth as is shown in Graph 5-1 below:



Graph 5-1: Summary of ABC vs depth from in-situ SPT testing.

From Graph 5-1 it can be seen that the density of the granular deposits are typically greater than 125kN/m^2 from 1.20m to 3.00mbgl where the ABC increases to greater than 400kN/m^2 in the probable weathered bedrock.

The presence of groundwater within a granular material has the potential to reduce the bearing capacity by as much as 50%. Groundwater was recorded at depths of between 3.70m and 4.00mbgl within two of the window sample boreholes during the course of the site investigation. Three environmental monitoring wells were installed, WS101 to 3.50m and WS103 & WS104 to 3.00m. During the monitoring undertaken to date, groundwater has only been encountered at a depth of 3.33mbgl within WS101.

The angle of internal friction (ϕ) of the granular material based on SPT results, ranges between 30° and 39°, averaging 34°.

5.4.2 Strip Foundations

Shallow strip foundations should be constructed at least 150mm in to the underlying medium dense SAND. At this depth an allowable bearing capacity of 125kN/m² has been estimated from Graph 5-1.

An assessment of settlement has been undertaken using an SPT N value of N13 and a load of 125kN/m^2. Based on this settlement is estimated at 11mm which is within the tolerance of total settlement for a masonry structure.

As the founding strata is predominantly granular then there is not considered any need to take into account the presence of trees and their water demand with regards to volume change potential of the soils.

5.4.3 Pad Foundations

Based upon the ϕ obtained from the in-situ testing of the granular 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 2mbgl. 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	363
	2.00	724
2m^2 (1.42m x 1.42m)	1.00	371
	2.00	723

Table 5-1: Summary of pad Allowable Load.

The pads show an ABC of 363kN for a 1m^2 pad and 724kN for a 2m^2 pad foundation placed at a depth of 1mbgl in the target stratum of medium dense SAND. Strip foundations supporting cladding walls should be able to support loadings of 125kN/m^2.

It can be seen that increasing the size of the foundation results in a greater ABC, however, increasing the depth of the foundation has little benefit to the ABC.

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

Recommendation

Shallow strip and pad foundations, bearing onto the medium dense SAND are considered suitable for supporting the proposed structure. This should be confirmed by the structural engineer to once the loadings of the structure are known.

5.5 Ground Floor Slabs

Due to the presence of varying thickness' up to 0.8m depth of Made Ground across the site it is considered that suitable preparation of the sub-grade, by a combination of excavation and re-compaction, a ground bearing floor slab should prove suitable for the proposed buildings. Warranty providers, such as NHBC, normally require suspended floor slabs for residential buildings where Made Ground is deeper than 600mm and the warranty provider should be consulted prior to selection of the type of floor slab.

Ground bearing floor slabs, if selected, should be designed by a suitably experienced structural engineer.

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 results of limited PSD tests, the amount of material passing the 63μm sieve is 10%, 6% and 14%, averaging 10%. Granular soils are considered frost susceptible if greater than 10% passes the 63μm sieve and as such consideration should be given to adopting frost protections measures.

5.7 Drainage

The presence of substantial depths of granular soil with groundwater at depths of greater than 2.90mbgl, it is considered that the application of soak away drainage may prove suitable at this site. It is recommended that the permeability of the granular soils is assessed to confirm this assumption.

5.8 Concrete Durability

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

5.9 Excavations

Site observations indicated that excavations should be feasible in the near surface with normal plant. All boreholes were observed to be stable during advancing the window sample holes. The natural deposits included granular strata with groundwater noted at depths below 3.00mbgl. 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 granular nature of the soil, it is considered that all excavations are supported or battered back in accordance with guidance contained in CIRIA R97[19].

5.10 Construction Activity and Inspection

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

[19] 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;
- 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[20]). 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[21,22]. The recent change to the contaminated land guidance has changed the evaluation of risk from 'minimal' (referred to as Health Criteria values (HCVs))[23] 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[24]. 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[25,26,27,28].

If contaminants are not present as C4SLs and S4ULs then LKC will use ATRISK SSVs or CL:AIRE GACs[29]. 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

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

PAHs[30,31] and naphthalene the most volatile and soluble[32]. 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[33]. For B(a)P to be used as a surrogate marker it should follow the profile described by the HPA (2008)[34] and CL:AIRE (2013). Naphthalene will be treated separately using the LQM S4ULs.

The proposed development is for residential apartments with limited shared soft landscaping, therefore the assessment criteria for Public Open Space (Residential) has been used. Where the assessment regards volatile compounds, the assessment criteria for Residential Without Plant Uptake has been used.

All criteria have been generated using the CLEA V1.06 model[35] based either on 1%, 2.5% and 6% Soil Organic matter (SOM). Results will be compared to the nearest appropriate SOM.

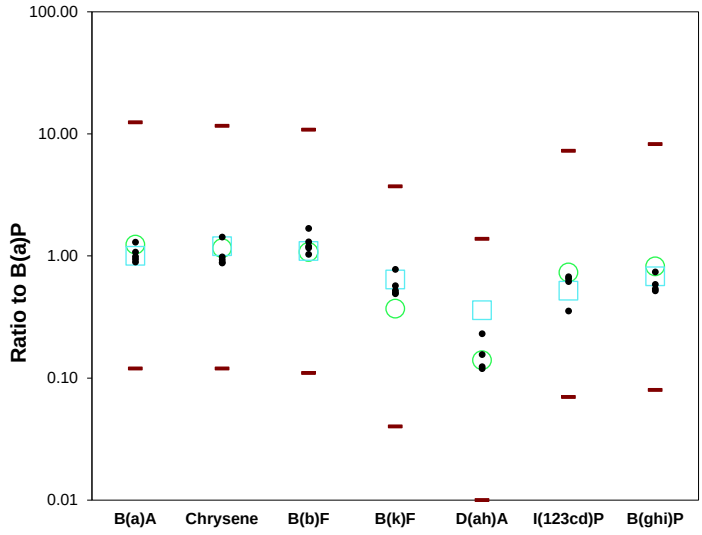
A summary of the generic assessment criteria is provided in Appendix G.

<u>B(a)P as Surrogate Marker</u>

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*[36], 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.

[30] EA (2002). "Contaminants in Soils: Collation of Toxicological Data and Intake Values for Humans. Benzo[a]pyrene." R&D Publication TOX2.
[31] USEPA (1984). "Health Effects Assessment of Polycyclic Aromatic Hydrocarbons (PAHs). EPA 540/1-86-013."
[32] EA (2003). "Review of the Fate and Transport of Selected Contaminants in the Soil Environment." Draft technical report P5- 079/TR1.
[33] CL:AIRE (2013). "SP1010: Development of Category 4 Screening Levels and Assessment of Land Affected by Contamination – Final project Report."
[34] HPA (2010). "HPA Contaminated Land Information Sheet: Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs)." Version 3.
[35] EA (2008). "CLEA Software (Version 1.05) Handbook." Science Report – SC050021/SR4.
[36] 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 7 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

All analysis sheets are presented in Appendix C. All the data has been compared to relevant assessment criteria. There were no exceedances of the assessment criteria of any determinands.

No asbestos was identified in any soil samples analysed.

6.2.3 Direct Contact Risk – Pollutant Linkage 1

None of the determinands tested for exceeded screening criteria. The probability of PAH, metal and hydrocarbon contamination affecting site users is unlikely. With a medium consequence, the risk is considered to be low and no remediation is recommended.

No asbestos was identified in any of the samples, therefore the probability of asbestos affected site users is considered to be unlikely. With a severe consequence, the risk is moderate / low. At this stage, a low risk is assumed (as no asbestos identified) and remediation is not required. However, as a precaution, construction workers should be and vigilant for any suspected ACM during groundworks (discussed further in Section 9.1).

6.2.4 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

2 no. 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[37] and BS8485[38] peak methane and carbon dioxide concentrations have been used in the gas risk assessment. In addition, and as per guidance, flow rates were measured first.

All gas concentrations, flow, pressure and groundwater levels are shown on Table 6-1.

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)
WS101	1	-	-	-	-	-	-	-	-
	2	<0.1	1.0	20.2	<0.1	43 (<0.1)	<0.1	3.33	1028 (s)
WS103	1	<0.1	**5.3**	16.8	<0.1	<0.1	<0.1	Dry	1027 (v)
	2	<0.1	4.7	17.5	<0.1	<0.1	<0.1	Dry	1027 (s)
WS104	1	<0.1	**5.7**	16.8	<0.1	<0.1	<0.1	Dry	1026 (v)
	2	<0.1	4.8	17.6	<0.1	<0.1	<0.1	Dry	1027 (s)

Table 6-1: 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.
Where peak CO_2 differs significantly to the steady, steady is shown in brackets.
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

Methane concentrations were less than detection limits during both monitoring visits. Carbon dioxide concentrations exceeded 5% in two boreholes during the first monitoring visit. Flow rates were extremely low throughout. Peak CO was recorded at 43ppm in WS101 on one occasion but was noted to quickly fall to <0.1ppm. 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.

<u>Gas Screening Value</u>

In accordance with CIRIA C665[39], a Gas Screening Value (GSV) may be calculated. Assuming worst-case scenario maximum gas concentrations and flow for each

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

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

Table 6-2 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 / TL
WS101	0.001	CS1 / Green
WS103	0.0053	CS1 / Green
WS104	0.0057	CS1 / Green
WS101-104	0.0001 (CH_4) 0.0057 (CO_2)	CS1 / Green

Table 6-2: Summary of worst-case Gas Screening Values (GSV).
Notes:
CS – Characteristic Situation; TL= Traffic Light.

In addition, in accordance with CIRIA C665[40], 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.

Due to the number of visits with relatively high carbon dioxide (above 5%), LKC consider that in this case, the site should be treated as CS2. This may change following completion of the gas monitoring.

The gas can potentially migrate into buildings, accumulate in confined spaces and cause explosions (methane) and asphyxiation. LKC consider the probability of carbon dioxide gas affecting site users and buildings as low likelihood. Assuming a severe consequence, there is a moderate risk associated with Pollutant Linkage 3 and gas protection measures are recommended.

6.4 Controlled Water Assessment

LKC considers the Principal Aquifer as the primary receptor. The site is not located within a SPZ, there are no groundwater abstractions within 100m of the site and there are no surface water receptors within 100m of the site.

Leachate testing of made ground soils samples was undertaken as no groundwater was encountered and there is a direct pathway from the made ground through the silty sand superficial deposits to the underlying Principal Aquifer.

LKC have compared leachate 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:

- General quality of groundwater bodies[41] from the updated Water Framework Directive[42].

[40] CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665.
[41] WFD (2010) River Basin Districts Typology, Standards and Groundwater threshold values (Water Framework Directive) (England and Wales) Directions 2010.
[42] Defra (2015). " Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015".

It should be noted that the leaching test is aggressive (de-ionised water) and is not in aqueous equilibrium (steady state) with the solid sample. This may cause rapid dissolution and overestimation of the aqueous phase concentrations compared to groundwater in contact with contaminated soils. Although dissolution may be reduced for highly hydrophobic contaminants[43], such as B(a)P it is likely that the initial leaching will remove the most readily available hydrocarbons and subsequent flushing would reduce the leachable concentrations[44]. Traditionally the leaching test was developed for inorganic constituents and the leaching of organics is poorly understood[45].

No exceedances were encountered. Leachate results are contained in Appendix E.

Based on the above, LKC considers the probability of contaminants on site affecting the Principal Aquifer 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 not be required at the site. The site was classified as DS-1 AC-1.

Based on the above, the probability of sulphate concentrations affecting buildings is unlikely. Given the consequence is considered to be mild, the risk (pollutant linkage 5) is anticipated to be low and no remediation is required. This should be confirmed with the structural engineer.

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

No elevated contaminants were identified when compared to UU assessment criteria.

The probability of organic contaminants affecting potable water pipes is unlikely. Given the consequence is considered to be medium, the risk (Pollutant Linkage 6) is anticipated to be low and no remediation (i.e. barrier pipe) is likely to be required.

UU may require a Potable Waters Risk Assessment to be carried out prior to the connection of any new water supply. This should be carried out once details of the pipeline location and depths are known.

6.5.3 Phytotoxicity (Pollutant Linkage 7)

Soil results were compared to phytotoxic guideline values as outlined in BS3882[47].

[43] EA (1999)."Methodology for the Derivation of Remedial Targets for the Soil and Groundwater to Protect Water Resources." R&D Technical Report, P20
[44] EA (2006)."Remedial targets Methodology: Hydrological Risk Assessment for Land Contamination."
[45] EA (2009). "Petroleum Hydrocarbons in Groundwater: Supplementary Guidance for Hydrological Risk Assessment."
[46] UU(2011). "United Utilities Water Supplementary Guidance for the Selection of Water Pipes in Land Potentially Affected by Contamination."
[47] BS (2015). "Specifications for Topsoil and Requirements for Use." BS3882:2015.

Elevated zinc (maximum concentration 320mg/kg) was identified in one location only. There were no exceedances of copper or nickel. As there was only one minor exceedance, the probability of phytotoxic contaminants affecting vegetation is considered to be unlikely. With a minor consequence, the risk (pollutant linkage 7) is anticipated to be low.

In addition to the above, the characteristics of the made ground should also be taken into account if it is to be used as a topsoil / growing medium for flora. The material should be assessed against the parameters outlined in Table 1 of BS3882 (not included within this assessment). Made ground with undesirable material (e.g. glass, brick, metal, pottery) was noted at shallow depth in localised areas of the site / across the site. Irrespective of the contamination risk, this material should not be used as topsoil and it is recommended that a suitable topsoil of at least 150mm is placed over this undesirable made ground.

6.6 Revised Contamination Conceptual Model

The preliminary contamination conceptual model (Table 2-3) has been revised following the risk assessments undertaken in Sections 6.1-6.5. 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 6-3.

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

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

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

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

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

Pollutant Linkage	Pathway	Receptor	Contaminant	Probability	Consequence	Risk	Assessment
PL1	- Dermal contact. - Inhalation of soil, fibres and dust. - Ingestion of soil and dust. - Windblown dust.	- Future site users. - Offsite receptors.	- Heavy metals. - PAHs - ACM - Petroleum hydrocarbons - Other inorganic and organic contaminants.	Unlikely	Medium	**Low**	- Unlikely probability as no ACM identified. No elevated metals, PAHs, hydrocarbons or other contaminants. - **Recommendation**[*1 *2]**:** No remediation required.
PL2	- Inhalation of vapours. - Migration through permeable strata and preferential pathways.	- Future site users. - Offsite receptors.	Volatile Contaminants - None identified.	Unlikely	Medium	**Low**	- No elevated contaminants across the site. - **Recommendation:** No remediation required.
PL3	- Inhalation of gas. - Migration through permeable strata and preferential pathways. - Explosion in confined spaces (methane only).	- Future site users. - Buildings. - Offsite land users.	- Carbon dioxide	Likely	Severe	**High**	- Elevated carbon dioxide identified (max. 5.7%v/v) and GSV classified as CS2. - **Recommendation:** Gas protection measures in line with CS2 recommended.
PL4	- Surface Run-off. - Migration through permeable strata and preferential pathways - Perched waters migration.	- Groundwater (Principal Aquifer).	Mobile contaminants: - Metals and PAHs.	Unlikely	Medium	**Low**	- No elevated contaminants. - **Recommendation**: No remediation required.
PL5	- Sulphate attack on concrete.	- Building structure.	- Sulphate (remainder of site).	Unlikely	Mild	**Very Low**	- No elevated sulphate identified in soils or groundwater. - **Recommendation**: No remediation required.
PL6	- Ingestion of tainted water supply.	- Future site users (via potable water).	Organic Contaminants: - None identified.	Unlikely	Medium	**Low**	- No elevated contaminants identified. - **Recommendation:** Barrier piping unlikely to be required. However, this will need to be confirmed once UU risk assessment undertaken.

PL7	- Direct Contact (plant uptake).	- Flora.	Phytotoxic Contaminants: - Zinc.	Unlikely	Minor	**Very Low**	- One minor exceedance identified. - **Recommendation**: No remediation required.

Table 6-3: Revised Contamination Conceptual Model.

Notes

[1] Although no ACM identified, contractors should be vigilant during earthworks of any potential ACM. This is discussed further in Section 9.[2] The conceptual model only takes into consideration the future use of the site and long-term exposure. Consideration should also be given to the short-term exposure of construction workers and nearby land users to ACM containing soils during groundworks. This is discussed further in Section…….

*[3] Although no phytotoxic contaminants identified in soils, the characteristics of the made ground should also be taken into account if it is to be used as a topsoil / growing medium for flora. The material should be assessed against the parameters outlined in Table 1 of BS3882 (not included within this assessment).

7 Waste Disposal Assessment

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

As an initial screen the soil results were inputted into Hazwaste Online™. This is a web-based facility that allows an assessment waste as either hazardous or non-hazardous waste based on relevant guidance and legislation[48, 49 ,50,51 ,52 ,53, 54, 55, 56].

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 results show that all the samples tested are classified as NON-HAZARDOUS WASTE and LoW code “17-05-04 - soil and stones other than those mentioned in 17 05 03” is suitable. The Hazwaste Online™ output sheets are provided in Appendix H.

[48] EA (2018). “Guidance on the Classification and Assessment of Waste (1st Edition v1.1)”. Technical Guidance WM3.
[49] CLP Regulation - Regulation 1272/2008/EC of 16 December 2008.
[50] 1st ATP - Regulation 790/2009/EC of 10 August 2009
[51] Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
[52] WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
[53] Revised List of Wastes 2014 - Decision 2014/955/EU of 18 December 2014
[54] 13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
[55] POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004
[56] 2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010

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	- Demolition of existing structure and replacement with a three-storey residential apartment building.
General Ground conditions / Geotechnical Testing	- Based on WS101-WS105. - Maximum investigation depth 4.00mbgl. - Made Ground to 0.5-0.8mbgl. SPTs N=13-19 at 1.2mbgl, N=10-15 at 2m, N=20-50 at 3-4mbgl. - Probable weathered sandstone bedrock encountered at base of all window samples. - Groundwater encountered at depths of 2.90m and 3.70mbgl in WS101 and WS102 respectively during the course of the investigation.
Allowable Bearing Pressure	- 125kN/m^2 between 1.2-3.0mbgl in the granular SAND. - >400kN/m^2 in the weathered sandstone.
Anticipated Foundation Type	-Traditional shallow foundations comprising pads supporting column loads and strips supporting walls recommended from approximately 1mbgl. If soft ground is encountered, foundations may need to be deepened / widened or ground replaced with compacted granular material.
Shallow Groundwater	- Groundwater identified on the site at depths in excess of 2.90mbgl and is not considered to present a constraint to the development. - Suitable drainage should be considered in the proposed development layout.
Concrete Requirements	- Based on BRE Digest 2005[57] – DS-1 AC-1 recommended.
Services	- Services – consideration to the presence of services running through the site. Services may need to re-routed.
Temporary support of excavation	- Recommend that all excavations are supported in accordance with guidance contained in CIRIA R97.

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 5).

Pollutant Linkage		Risk	Recommendations
1	Contaminants posing a risk to site users via dermal contact, ingestion and inhalation (of soil dust and fibres).	**Low**	- Unlikely probability as no ACM identified. No elevated metals, PAHs, hydrocarbons or other contaminants. - **Recommendations:** No remediation required.
2	Volatile contaminants posing a risk to site users via the inhalation of vapours.	**Low**	- No elevated contaminants across the site. - **Recommendation:** No remediation required.

Table 8-1: Summary Risk Table.

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

3	Gas posing a risk to buildings and site users via the migration of gas into building causing explosion and asphyxiation.	**High**	- Elevated carbon dioxide identified (max. 5.7%v/v) and GSV classified as CS2. - **Recommendations:** Gas protection measures in line with CS2 recommended.
4	Mobile contamination posing a risk to controlled waters via the migration through permeable strata.	**Low**	- No elevated contaminants identified in groundwater. - **Recommendations:** No remediation required.
5	Sulphate posing a risk to building via direct contact (sulphate attack).	**Very Low**	- No elevated sulphate identified in soils or groundwater. - **Recommendation**: No remediation required.
6	Organic contaminants posing a risk to water pipes.	**Low**	- No elevated contaminants identified. - **Recommendation:** Barrier piping unlikely to be required. However, this will need to be confirmed once UU risk assessment undertaken.
7	Phytotoxic metals posing a risk to flora via root uptake.	**Very Low**	- One minor exceedance identified. - **Recommendation**: No remediation required.

Table 8-1 (continued): 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.

Phase	PL	Remediation Requirements	Validation Requirements
Post-Demolition Work	**1, 2, 4, 5, 6, 7**	Post-demolition Confirmatory Trial Pitting (Watching Brief) This is recommended to confirm ground conditions below the current buildings and confirm the current ground conditions and remediation strategy. Should any unexpected or unusual ground conditions be encountered then further risk assessment may be required.	N/A (Investigation Report will be provided with an updated Remediation Strategy).
Pre-Construction	**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 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[58].	Log of work undertaken including photographs. Details of any sampling undertaken and validation of any potential additional remedial work.

Table 9-1: Remediation and validation requirements
Notes: See Table 6-1 for pollutant linkage (PL) details.

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

Build-Phase Construction	**3**	Gas Protection Measures In line with CS2 as per UK guidance[59,60]. This is likely to / should include: • Passive subfloor or active subfloor ventilation system. • Methane and carbon dioxide resistant membrane installed as per manufacturer's instructions. • Ventilation of confined spaces within the building. • Well-constructed reinforced suspended, raft or cast in situ ground slab. • Minimum penetration of ground slab by services. • All joints and penetrations to be sealed. Depending on the type of building and foundation design the protection measures can vary. The gas protection measures will be detailed and approved with the Local Authority once the foundation design has been confirmed.	Supply and review of foundation designs. Photographic evidence of sub-floor void, ventilation and suitably sealed gas membrane. Validation of gas protection measures should be in line with CIRIA 735[61]
Other Considerations		Grubbing Out of In-Ground Structures It is recommended that in-ground structures are grubbed out as part of the groundworks. In-ground structures expected in the centre of the site associated with the former buildings.	
		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 [62]): 5,000 tonnes (*c.* 2,500m^3) treatment of crushed concrete / stone. 1,000 tonnes (*c.* 500m^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 bituminous material to be used in roadways. A Materials Management Plan (MMP) with recourse to the CL:AIRE Code of Practice may be required if volumes exceed exemption limits. This must be registered **before** material movement starts onsite. If an MMP is required, this needs to be registered by a Qualified Person (QP) and there must be 'certainty of use' for any material re-used onsite or exported to site to ensure there is no 'sham recovery'. For all the above material will need to be tested at the rate and analytical suites presented in Table 9-2.	

Table 9-1 (continued): Remediation and validation requirements
Notes: See Table 6-1 for pollutant linkage (PL) details.

[59] CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665
[60] BSI (2015). "Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for new buildings." BS8485:2015.
[61] CIRIA (2014). "Good Practice on the Testing and Verification of Protection Systems for Building Against Hazardous Ground Gas". CIRIA C735.
[62] https://www.gov.uk/guidance/waste-exemptions-using-waste

Other Considerations	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 gardens and soft landscaping areas.

Table 9-1 (continued): Remediation and validation requirements
Notes: See Table 6-1 for pollutant linkage (PL) details.

9.2 Validation of Subsoil / Topsoil

Chemical validation of all imported soils to be used on site in gardens and 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*
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	
	First Generation i.e. quarried sand (subsoil) or stone (break layer)	No testing is required. Certification of material provenance is required.	
Physical Stone Break Layer			
	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[63]). LKC advise this information is provided by the supplier before material is imported onto site.

Imported material to be used in gardens will be compared against public open space (residential) (as used in the contamination risk assessment (Section 6-1)). Appropriate remedial target criteria are presented in Appendix G.

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

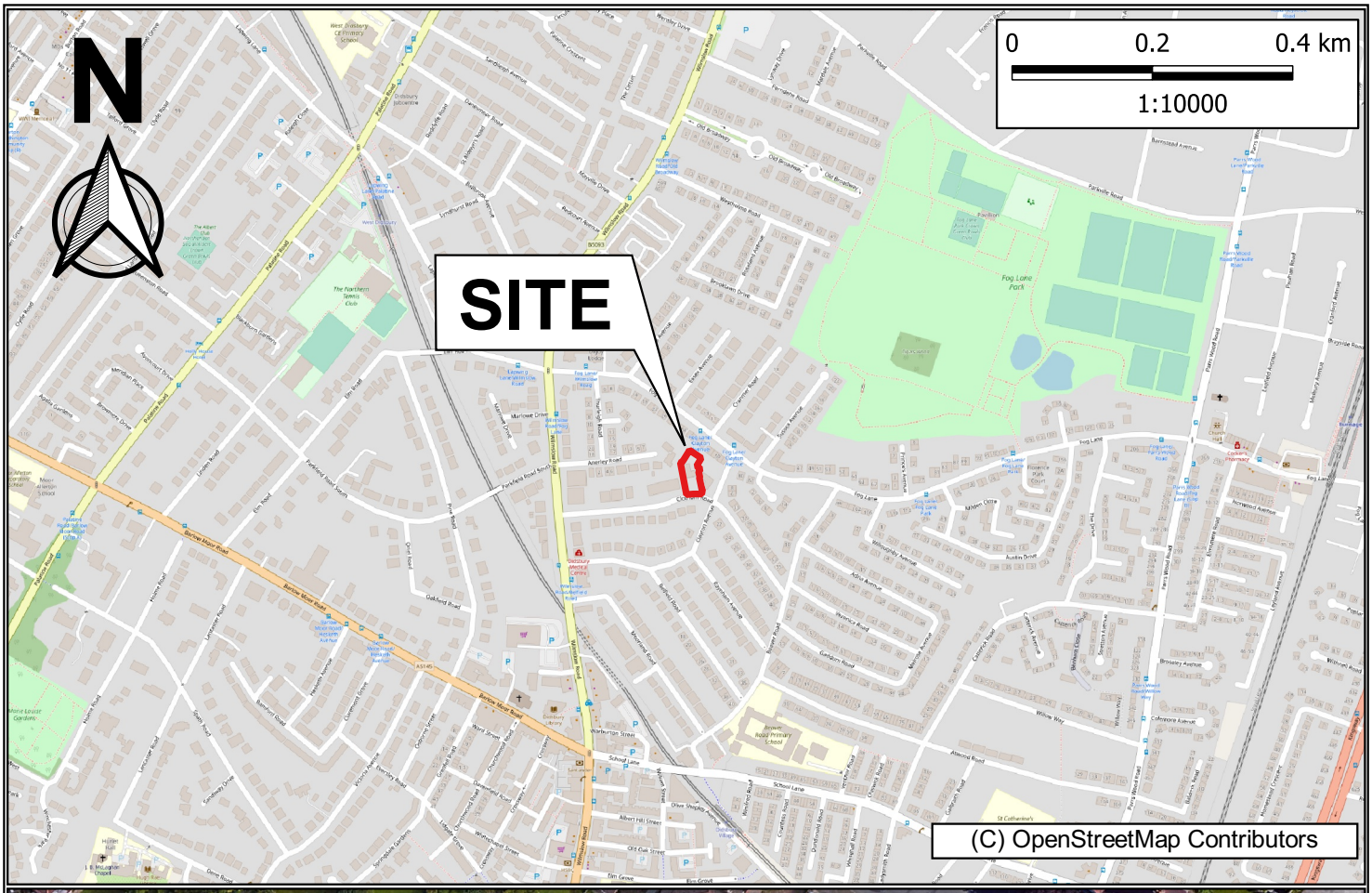
9.3 Site Completion Report

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:

- Details of the watching brief below existing buildings.
- Validation of gas protection measures installed or assessment of the gas risk after monitoring.
- Provision of waste transfer documents.
- Verification testing of all imported soil for soft landscaping areas.
- 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.

Figures



Client: Khalid Din	Title: Site Location & Boundary Plan		LKC CONSULT
Site: 29 Clothorn Road, Manchester	Scale (see scale bar): 1:20,000 & 1:1,000 @ A4	Figure: 1	Revision:
Job No.: LKC 22 1100 / Drawn By: FP / Checked By: XX / Drawn: June 2021			

Extract from: Howard & Seddon Chartered Architects
Drawing Ref: Proposed Site Plan, No.13, Rev:E (04/05/2018)

KEY

Site Boundary

SCHEDULE

GROUND FLOOR
APARTMENT 1_61.9 sq.m (2-B)
APARTMENT 2_61.9 sq.m (2-B)
APARTMENT 3_61.2 sq.m (2-B)
3 No RESIDENTIAL UNITS_185.0 sq.m

REFUSE STORE
9 PARKING SPACES

FIRST FLOOR
APARTMENT 4_64.2 sq.m (2-B)
APARTMENT 5_64.2 sq.m (2-B)
APARTMENT 6_61.2 sq.m (2-B)
3 No RESIDENTIAL UNITS_189.6sq.m

SECOND FLOOR
APARTMENT 7_52.4 sq.m (1-B/STUDY)
APARTMENT 8_52.4 sq.m (1-B/STUDY)
2 No RESIDENTIAL UNITS_104.8 sq.m

TOTAL
8 No APARTMENTS_479.4 sq.m
8 PARKING SPACES
1 No ADDITIONAL DISABLED P.S
9 TOTAL

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

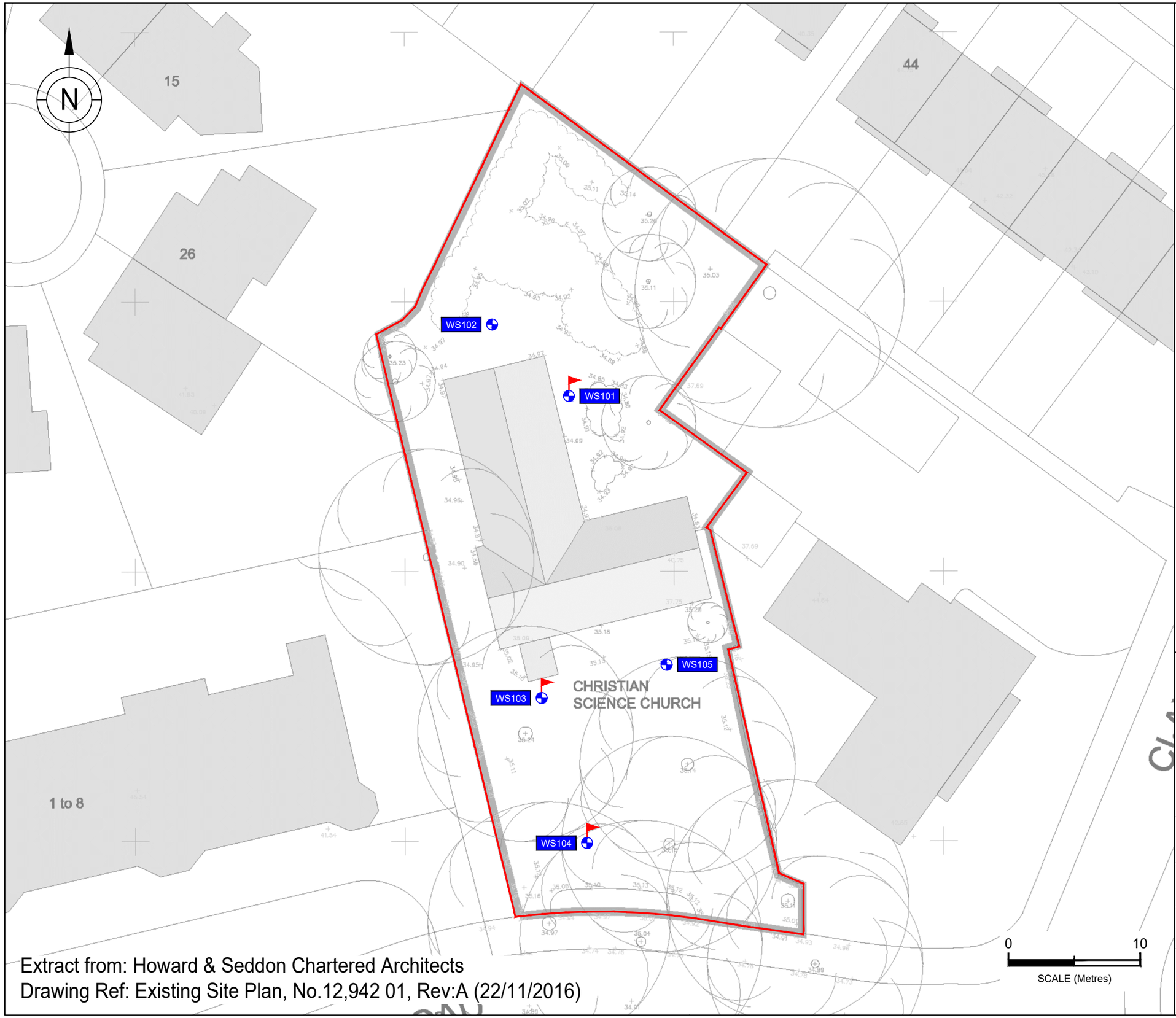
Client: Khalid Din

Site: 29 Clothorn Road, Manchester

Title: Proposed Development Plan

Job No.:	Scale (See Scale Bar):	Figure:	Revision:
LKC 20 1100	See Scale Bar	2	

Drawn By:	Checked By:	Drawn:
AC	RC	Jul 2021



Extract from: Howard & Seddon Chartered Architects
Drawing Ref: Existing Site Plan, No.12,942 01, Rev:A (22/11/2016)

KEY

- Site Boundary
- Window Sample Borehole (WS)
- Installation

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:	Khalid Din
Site:	29 Clothorn Road, Manchester
Title:	Site Investigation Location Plan

Job No.:	Scale (See Scale Bar):	Figure:	Revision:
LKC 20 1100	See Scale Bar	3	

Drawn By:	Checked By:	Drawn:
AC	FP	Sep 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[64]. 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.

[64] 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

Window Sample Logs

LK CONSULT LTD

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

Site	Number
29 Clothorn Road, Manchester	**WS101**

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler	101mm to 1.00m		Khalid Din	LKC 20 1100
	Location (Handheld GPS) 384854 E 391641 N	**Dates** 25/08/2021	**Engineer** LKC	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.70 0.00-0.70	B1 ES2				(0.70) 0.70	MADE GROUND: Gravelly silty SAND with frequent rootlets, bricks, coal, occasional clinker, plastic and pottery. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprised of sandstone and mudstone.			
0.70-1.30 0.70-1.30	B3 ES4				(0.60) 1.30	Orange SAND. Sand is fine to coarse.			
1.20-1.65	SPT N=16		3,3/4,4,4,4		(0.20) 1.50	Grey gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprised of mudstone and sandstone.			
					(0.50) 2.00	Orangish grey SAND. Sand is fine to coarse.			
2.00-2.45 2.30-2.80	SPT(C) N=10 B5		4,3/3,2,2,3		(0.30) 2.30	Orangish grey gravelly SAND with a low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprised of mudstone and sandstone. Cobbles are subrounded to rounded comprised of sandstone and mudstone.			
3.00-3.45	SPT(C) N=20		4,4/5,5,5,5		(1.66)	Red silty SAND. Sand is fine to coarse. Possible weathered sandstone bedrock.		∇1	
3.70-3.96	SPT(C) 25*/105 50/150		Water strike(1) at 3.70m. 16,9/24,26		3.96	Complete at 3.96m			

Remarks
Well installed.
Location is from handheld GPS and is accurate to 3-5m.
Borehole was stable.
Groundwater encountered at 3.70 mbgl.
Refusal on possibe weathered bedrock.

Scale (approx)	Logged By
1:50	FP

Figure No. LKC 20 1100.WS101

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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	Number
29 Clothorn Road, Manchester	WS102

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler	101mm to 1.00m		Khalid Din	LKC 20 1100
	Location (Handheld GPS) 384845 E 391644 N	**Dates** 25/08/2021	**Engineer** LKC	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.50	ES1				(0.67) 0.67	MADE GROUND: Dark brown gravelly silty SAND with frequent rootlets and occasional bricks, ash and coal. Gravel is fine to coarse, subangular to subrounded comprised of sandstone and mudstone. Sand is fine to coarse.		
					(0.53) 1.20	Orangish grey SAND. Sand is fine to coarse.		
1.20-1.65 1.20-2.00 1.20-2.00	SPT(C) N=13 B2 ES3		2,3/2,3,4,4		(1.10) 2.30	Grey gravelly SAND with rare coal fragments. Gravel is fine to coarse, subangular to subrounded comprised of mudstone and sandstone. Sand is fine to coarse.		
2.00-2.45	SPT(C) N=10		3,3/4,3,2,1					
			Water strike(1) at 2.90m.			Red silty SAND. Sand is fine to coarse. Possible weathered sandstone bedrock.		▽1
3.00-3.38	SPT(C) 24/225		4,4/5,5,6,8		(1.70) 4.00			
3.70-4.00	SPT(C) 25*/125 50/175		14,11/22,19,9			Complete at 4.00m		

Remarks
Location is from handheld GPS and is accurate to 3-5m.
Borehole was stable.
Groundwater encountered at 2.90 mbgl.
Refusal on possibe weathered bedrock.

Scale (approx)	Logged By
1:50	FP

Figure No. LKC 20 1100.WS102

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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	Number
29 Clothorn Road, Manchester	WS103

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler	101mm to 1.00m		Khalid Din	LKC 20 1100
	Location (Handheld GPS) 384851 E 391614 N	**Dates** 25/08/2021	**Engineer** LKC	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					0.10	MADE GROUND: Tarmacadam			
0.20-0.60	ES1				0.20 (0.40) 0.60	MADE GROUND: Brick crush and light yellowish white sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprised of limestone and sandstone.			
1.20-1.65	SPT(C) N=19		3,5/4,4,5,6		(0.50) 1.10 (0.50)	MADE GROUND: Dark brown gravelly silty SAND with frequent rootlets, occasional bricks, ash and coal. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprised of sandstone and mudstone.			
1.60-2.00	B2				1.60	Light brown and orange mottled SAND. Sand is fine to coarse.			
2.00-2.45	SPT(C) N=10		3,3/2,3,2,3		(1.10) 2.70	Grey gravelly SAND with rare coal fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprised of mudstone and sandstone.			
3.00-3.30	SPT(C) 50/150		10,10/20,30		(0.60) 3.30	Orangish grey gravelly SAND with a low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprised of mudstone and sandstone. Cobbles are subrounded to rounded comprised of sandstone and mudstone.			
						Red silty SAND. Sand is fine to coarse. Possible weathered sandstone bedrock.			
						Complete at 3.30m			

Remarks
Well installed.
Location is from handheld GPS and is accurate to 3-5m.
Borehole was stable.
Refusal on possibe weathered bedrock.
No Groundwater encountered.

Scale (approx)	Logged By
1:50	FP

Figure No. LKC 20 1100.WS103

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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	Number
29 Clothorn Road, Manchester	WS104

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler	101mm to 1.00m		Khalid Din	LKC 20 1100
	Location (Handheld GPS) 384851 E 391605 N	**Dates** 25/08/2021	**Engineer** LKC	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					0.10	MADE GROUND: Tarmacadam			
					0.20				
0.20-0.50	ES1				(0.30)	MADE GROUND: Brick crush			
					0.50				
0.50-1.00	B2					MADE GROUND: Dark brown gravelly silty SAND with frequent rootlets, occasional bricks, ash and coal. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprised of sandstone and mudstone.			
0.50-1.00	ES3				(0.60)				
					1.10				
1.20-1.65	SPT(C) N=16		3,4/4,4,4,4		(0.70)	Light brown and orange mottled SAND. Sand is fine to coarse.			
					1.80	Grey gravelly SAND with rare coal fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprised of mudstone and sandstone.			
2.00-2.45	SPT(C) N=14		3,4/3,4,4,3		(0.70)	Orangish grey gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprised of mudstone and sandstone.			
					2.50				
					2.60	Grey sandy SILT. Sand is fine to coarse.			
3.00-3.38	SPT(C) 50/225		8,11/15,15,20		(0.78)	Red silty SAND. Sand is fine to coarse. Possible weathered sandstone bedrock.			
					3.38	Complete at 3.38m			

Remarks
Well installed.
Location is from handheld GPS and is accurate to 3-5m.
Borehole was stable.
Refusal on possibe weathered bedrock.
No groundwater encountered.

Scale (approx)	Logged By
1:50	FP

Figure No. LKC 20 1100.WS104

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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	Number
29 Clothorn Road, Manchester	WS105

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler	101mm to 1.00m		Khalid Din	LKC 20 1100
	Location (Handheld GPS) 384860 E 391614 N	**Dates** 25/08/2021	**Engineer** LKC	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					0.05	MADE GROUND: Tarmacadam		
0.14-0.25	B1				0.14			
0.25-0.80	ES2				0.25 (0.55)	MADE GROUND: Light yellowish white sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprised of limestone and sandstone.		
					0.80 (0.30)	MADE GROUND: Brick crush		
1.20-1.65	SPT(C) N=17		4,3/4,4,5,4		1.10 (0.50)	MADE GROUND: Dark brown gravelly silty SAND with frequent rootlets, occasional bricks, ash and coal. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprised of sandstone and mudstone.		
					1.60 (0.50)	Light brown and orange mottled SAND. Sand is fine to coarse.		
2.00-2.45	SPT(C) N=15		5,6/3,3,4,5		2.10 (1.27)	Grey gravelly SAND with rare coal fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprised of mudstone and sandstone.		
						Orangish grey gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprised of mudstone and sandstone.		
3.00-3.37	SPT(C) 50/215		8,11/13,18,19		3.37	Red silty SAND. Sand is fine to coarse. Possible weathered sandstone bedrock.		
						Complete at 3.37m		

Remarks
Location is from handheld GPS and is accurate to 3-5m.
Borehole was stable.
Refusal on possibe weathered bedrock.
No groundwater encountered.

Scale (approx)	Logged By
1:50	FP

Figure No. LKC 20 1100.WS105

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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.:	21-29891-1		
Initial Date of Issue:	03-Sep-2021		
Client	LK Consult		
Client Address:	Unit 29 Eton Business Park Eton Hill Road Radcliffe Manchester Lancashire M26 2ZS		
Contact(s):	Contaminated Land Rosemary Cummings		
Project	LKC 20 1100 29 Clothorn Road, Manchester		
Quotation No.:		**Date Received:**	27-Aug-2021
Order No.:	738970	**Date Instructed:**	27-Aug-2021
No. of Samples:	3		
Turnaround (Wkdays):	5	**Results Due:**	03-Sep-2021
Date Approved:	03-Sep-2021		

Approved By:

Details: Glynn Harvey, Technical Manager

Results - Soil

Project: LKC 20 1100 29 Clothorn Road, Manchester

Client: LK Consult					**Chemtest Job No.:**	21-29891	21-29891	21-29891
Quotation No.:					**Chemtest Sample ID.:**	1268446	1268447	1268448
					Client Sample ID.:	WS101	WS102	WS104
					Sample Type:	SOIL	SOIL	SOIL
					Top Depth (m):	0.0	1.2	0.5
					Bottom Depth (m):	0.7	2.0	1.0
					Date Sampled:	25-Aug-2021	25-Aug-2021	25-Aug-2021
					Asbestos Lab:	COVENTRY	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	No Asbestos Detected
Moisture	N	2030	%	0.020	9.0	3.8	8.4
Soil Colour	N	2040		N/A	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Sand	Sand
pH	M	2010		4.0	8.7	8.7	8.2
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	< 0.010	< 0.010	< 0.010
Arsenic	M	2450	mg/kg	1.0	2.8	2.5	7.7
Cadmium	M	2450	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Chromium	M	2450	mg/kg	1.0	7.5	7.9	12
Copper	M	2450	mg/kg	0.50	6.9	10	3.9
Mercury	M	2450	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Nickel	M	2450	mg/kg	0.50	9.0	13	12
Lead	M	2450	mg/kg	0.50	20	6.1	4.4
Selenium	M	2450	mg/kg	0.20	< 0.20	< 0.20	0.32
Vanadium	U	2450	mg/kg	5.0	11	10	20
Zinc	M	2450	mg/kg	0.50	21	21	22
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	0.79	0.88	0.71
Naphthalene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Anthracene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	M	2800	mg/kg	0.10	0.13	< 0.10	< 0.10
Pyrene	M	2800	mg/kg	0.10	0.14	< 0.10	< 0.10
Benzo[a]anthracene	M	2800	mg/kg	0.10	0.11	< 0.10	< 0.10
Chrysene	M	2800	mg/kg	0.10	0.13	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	N	2800	mg/kg	2.0	< 2.0	< 2.0	< 2.0

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
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.
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

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.:	21-29933-1		
Initial Date of Issue:	06-Sep-2021		
Client	LK Consult		
Client Address:	Unit 29 Eton Business Park Eton Hill Road Radcliffe Manchester Lancashire M26 2ZS		
Contact(s):	Contaminated Land Rosemary Cummings		
Project	LKC 20 1100 29 Clothorn Road, Manchester		
Quotation No.:		**Date Received:**	27-Aug-2021
Order No.:	738970	**Date Instructed:**	27-Aug-2021
No. of Samples:	5		
Turnaround (Wkdays):	5	**Results Due:**	03-Sep-2021
Date Approved:	06-Sep-2021		
Approved By:			
Details:	Glynn Harvey, Technical Manager		

Results - Soil

Project: LKC 20 1100 29 Clothorn Road, Manchester

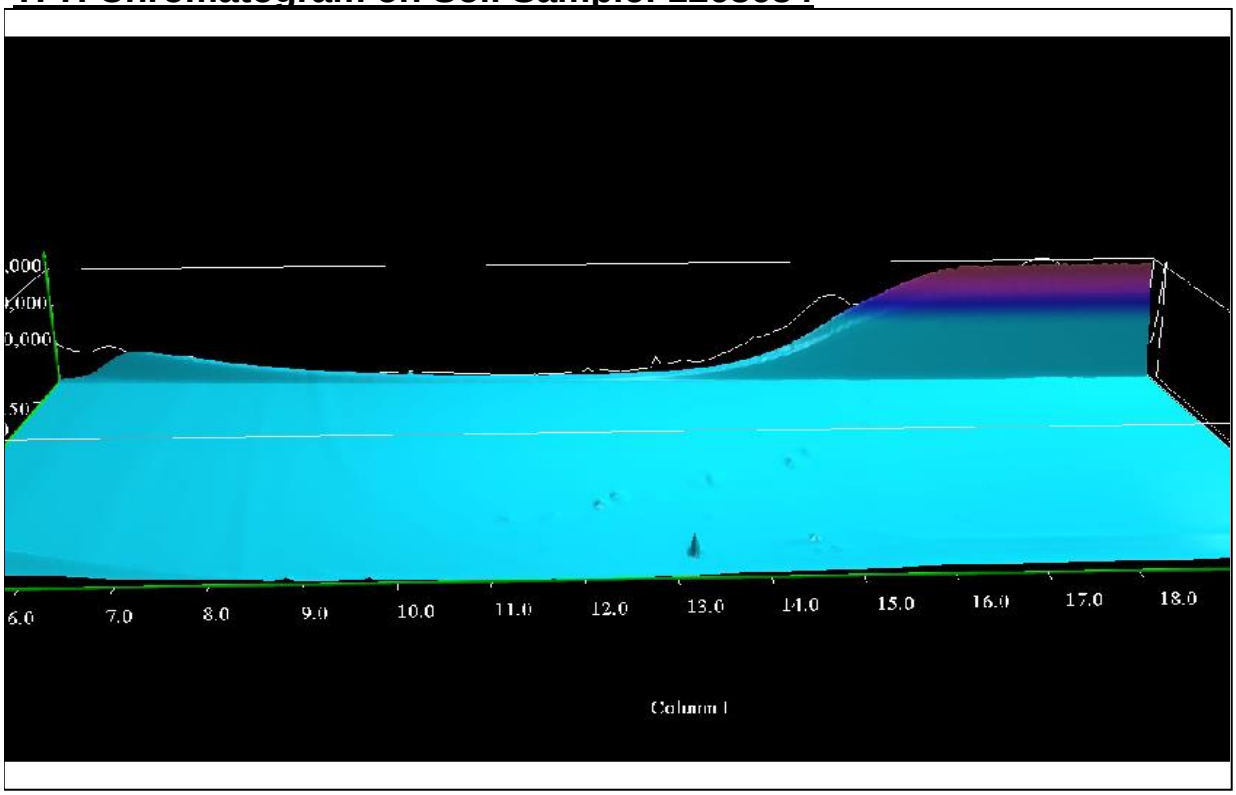
Client: LK Consult				**Chemtest Job No.:**	21-29933	21-29933	21-29933	21-29933	21-29933
Quotation No.:				**Chemtest Sample ID.:**	1268634	1268635	1268636	1268637	1268638
				Client Sample ID.:	WS101	WS102	WS103	WS104	WS105
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0	0	0.2	0.2	0.25
				Bottom Depth (m):	0.7	05	0.6	0.5	0.8
				Date Sampled:	25-Aug-2021	25-Aug-2021	25-Aug-2021	25-Aug-2021	25-Aug-2021
				Asbestos Lab:	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
Moisture	N	2030	%	0.020	13	15	9.6	1.9	7.1
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones and Roots	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Clay	Sand	Sand	Sand
Chromatogram (TPH)	N			N/A	See Attached				
pH	M	2010		4.0	8.0	7.3	9.0	8.9	8.6
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	< 0.40				
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.013
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	15	33	1.2	< 1.0	< 1.0
Cadmium	M	2450	mg/kg	0.10	0.43	0.22	< 0.10	< 0.10	0.12
Chromium	M	2450	mg/kg	1.0	27	20	13	15	12
Copper	M	2450	mg/kg	0.50	52	7.3	5.9	9.9	6.3
Mercury	M	2450	mg/kg	0.10	0.37	< 0.10	< 0.10	< 0.10	< 0.10
Nickel	M	2450	mg/kg	0.50	25	27	15	24	14
Lead	M	2450	mg/kg	0.50	210	7.8	5.8	4.4	12
Selenium	M	2450	mg/kg	0.20	0.41	< 0.20	< 0.20	< 0.20	< 0.20
Vanadium	U	2450	mg/kg	5.0	43	52	25	27	25
Zinc	M	2450	mg/kg	0.50	320	28	32	32	36
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	5.5	5.7	5.9	7.9	5.5
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	< 1.0				
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0				
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0				
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0				
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0				

Results - Soil

Project: LKC 20 1100 29 Clothorn Road, Manchester

Client: LK Consult			**Chemtest Job No.:**		21-29933	21-29933	21-29933	21-29933	21-29933
Quotation No.:			**Chemtest Sample ID.:**		1268634	1268635	1268636	1268637	1268638
			Client Sample ID.:		WS101	WS102	WS103	WS104	WS105
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0	0	0.2	0.2	0.25
			Bottom Depth (m):		0.7	05	0.6	0.5	0.8
			Date Sampled:		25-Aug-2021	25-Aug-2021	25-Aug-2021	25-Aug-2021	25-Aug-2021
			Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
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	< 1.0				
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0				
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0				
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10				
Benzene	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	0.32	0.17	< 0.10	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	0.20	0.32	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2800	mg/kg	0.10	0.47	0.34	< 0.10	< 0.10	< 0.10
Fluorene	M	2800	mg/kg	0.10	0.35	0.45	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2800	mg/kg	0.10	3.9	8.6	0.57	1.7	0.22
Anthracene	M	2800	mg/kg	0.10	0.71	2.2	0.11	0.13	0.15
Fluoranthene	M	2800	mg/kg	0.10	10	25	1.3	2.2	0.36
Pyrene	M	2800	mg/kg	0.10	9.3	21	1.3	2.5	0.25
Benzo[a]anthracene	M	2800	mg/kg	0.10	4.1	9.9	0.70	1.0	0.17
Chrysene	M	2800	mg/kg	0.10	4.3	8.8	0.64	1.1	0.16
Benzo[b]fluoranthene	M	2800	mg/kg	0.10	6.0	12	0.67	1.3	0.21
Benzo[k]fluoranthene	M	2800	mg/kg	0.10	2.4	5.0	0.32	0.44	0.14
Benzo[a]pyrene	M	2800	mg/kg	0.10	4.6	10	0.65	0.77	0.18
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10	3.0	6.2	0.23	0.52	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	0.57	1.2	0.15	0.12	< 0.10
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10	2.7	5.2	0.35	0.57	< 0.10
Total Of 16 PAH's	N	2800	mg/kg	2.0	53	120	7.0	12	< 2.0
Total Phenols	M	2920	mg/kg	0.10	< 0.10				

TPH Chromatogram on Soil Sample: 1268634



TPH Interpretation

Job	Sample	Matrix	Location	Sample Ref	Sample ID	Sample Depth (m)	Gasoline / Diesel Present	TPH Interpretation
21-29933	1268634	S			WS101	0	No	N/A

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	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 20 1100 -
Clothorn Road

Job Number MRN 4066/167
Date of Issue 21 September 2021
Pages 1 of 4

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

PARTICLE SIZE DISTRIBUTION

BS 1377: PART 2: Clause 9.2: 1990

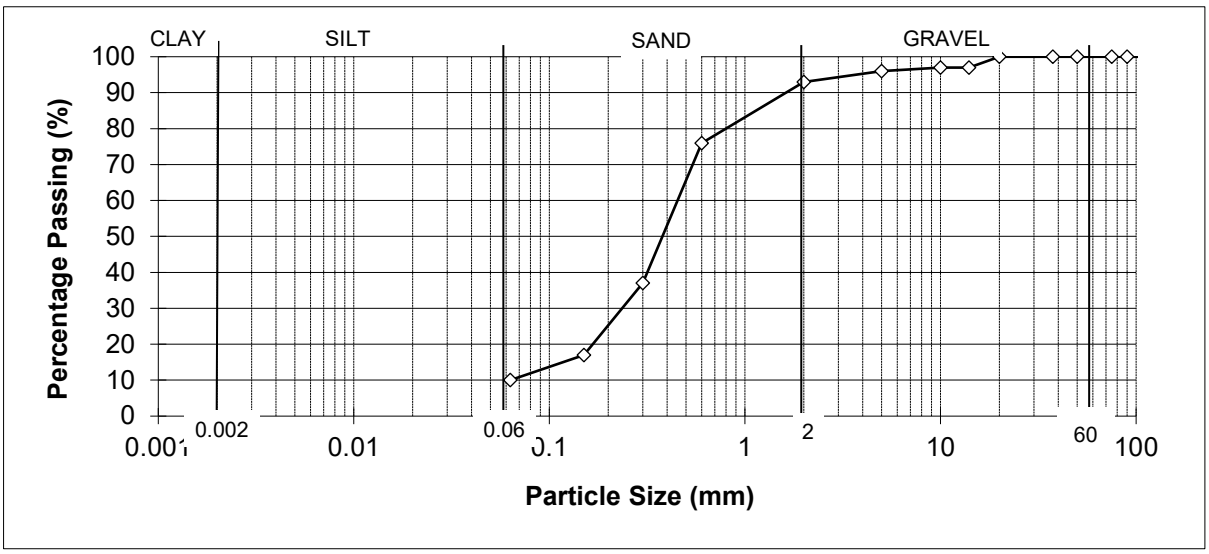
Determination of Moisture Content in accordance with BS 1377: PART 2: Clause 3: 1990 (Oven Dry)

CLIENT	LK Consult Ltd
SITE	LKC 20 1100 - Clothorn Road
JOB NUMBER	MRN 4066/167

SAMPLE LABEL	WS101 0.7-1.3	DATE SAMPLED	Not advised
LAB SAMPLE No	103705	DATE RECEIVED	02-Sep-21
DATE TESTED	13-Sep-21	SAMPLED BY	Client

MATERIAL	Brown silty SAND with rare gravel
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		10	97	
90	100		5	96	
75	100		2	93	
50	100		0.6	76	
37.5	100		0.3	37	
20	100		0.15	17	
14	97		0.063	10	



REMARKS
As received moisture content = 8.2%

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 21-Sep-21

MURRAY RIX

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

UKAS TESTING 1580

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS 1377: PART 2: Clause 9.2: 1990

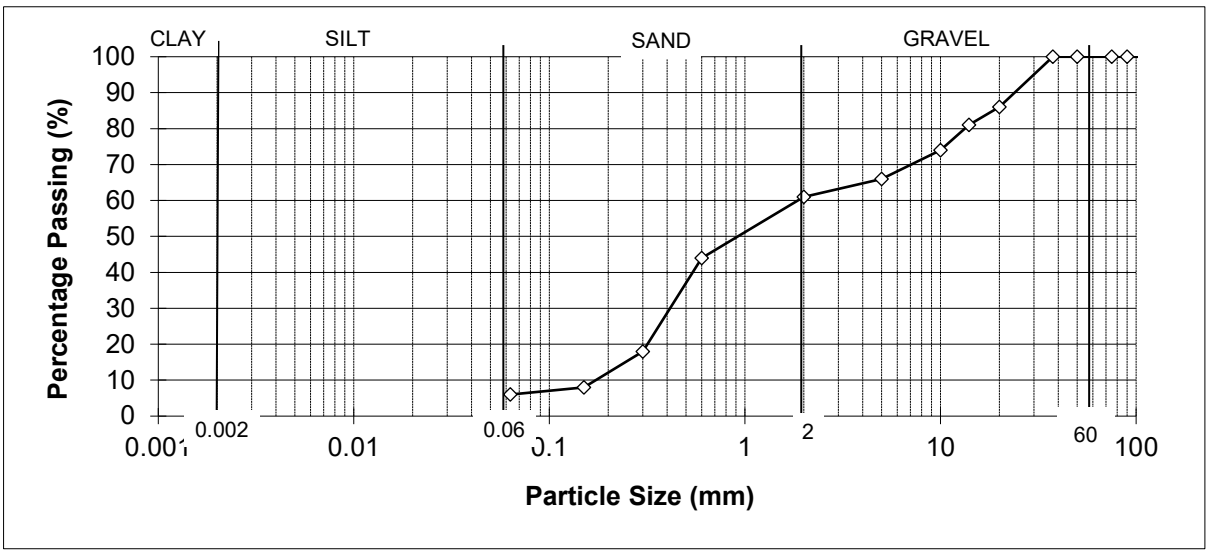
Determination of Moisture Content in accordance with BS 1377: PART 2: Clause 3: 1990 (Oven Dry)

CLIENT	LK Consult Ltd
SITE	LKC 20 1100 - Clothorn Road
JOB NUMBER	MRN 4066/167

SAMPLE LABEL	WS102 1.2-2.0	DATE SAMPLED	Not advised
LAB SAMPLE No	103706	DATE RECEIVED	02-Sep-21
DATE TESTED	13-Sep-21	SAMPLED BY	Client

MATERIAL	Brown silty SAND with abundant gravel
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		10	74	
90	100		5	66	
75	100		2	61	
50	100		0.6	44	
37.5	100		0.3	18	
20	86		0.15	8	
14	81		0.063	6	



REMARKS
As received moisture content = 6.9%

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 21-Sep-21

MURRAY RIX

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

UKAS TESTING 1580

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS 1377: PART 2: Clause 9.2: 1990

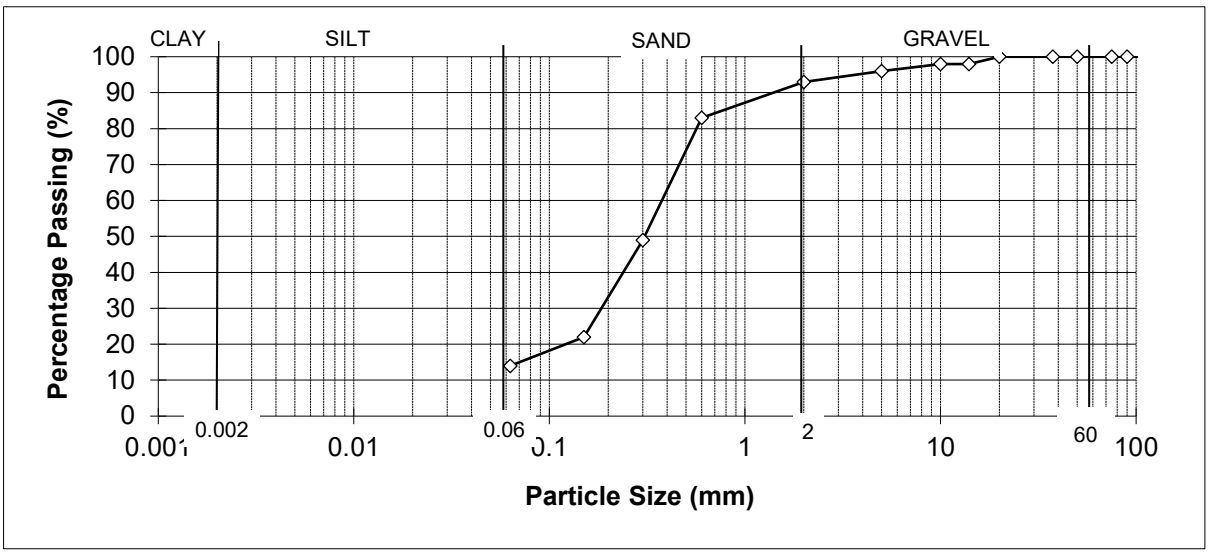
Determination of Moisture Content in accordance with BS 1377: PART 2: Clause 3: 1990 (Oven Dry)

CLIENT	LK Consult Ltd
SITE	LKC 20 1100 - Clothorn Road
JOB NUMBER	MRN 4066/167

SAMPLE LABEL	WS104 0.5-1.0	DATE SAMPLED	Not advised
LAB SAMPLE No	103707	DATE RECEIVED	02-Sep-21
DATE TESTED	13-Sep-21	SAMPLED BY	Client

MATERIAL	Brown silty SAND with rare gravel
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		10	98	
90	100		5	96	
75	100		2	93	
50	100		0.6	83	
37.5	100		0.3	49	
20	100		0.15	22	
14	98		0.063	14	



REMARKS
As received moisture content = 9.0%

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 21-Sep-21

Appendix E

Certificate of Analysis – Leaching Test

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

2183

Final Report

Report No.:	21-32919-1		
Initial Date of Issue:	30-Sep-2021		
Client	LK Consult		
Client Address:	Unit 29 Eton Business Park Eton Hill Road Radcliffe Manchester Lancashire M26 2ZS		
Contact(s):	Contaminated Land Rosemary Cummings Emma Khadun		
Project	LKC 20 1100 29 Clothorn Road, Manchester		
Quotation No.:		**Date Received:**	22-Sep-2021
Order No.:	738970	**Date Instructed:**	22-Sep-2021
No. of Samples:	3		
Turnaround (Wkdays):	5	**Results Due:**	28-Sep-2021
Date Approved:	30-Sep-2021		

Approved By:

Details: Glynn Harvey, Technical Manager

Results - Leachate

Project: LKC 20 1100 29 Clothorn Road, Manchester

Client: LK Consult					**Chemtest Job No.:**	21-32919	21-32919	21-32919
Quotation No.:					**Chemtest Sample ID.:**	1284222	1284223	1284224
					Sample Location:	WS101 Composite	WS103 Composite	WS104 Composite
					Sample Type:	SOIL	SOIL	SOIL
					Date Sampled:	25-Aug-2021	25-Aug-2021	25-Aug-2021
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**			
pH	U	1010	2:1		N/A	8.5	8.3	8.5
Sulphate	U	1220	2:1	mg/l	1.0	15	9.9	8.8
Cyanide (Total)	U	1300	2:1	mg/l	0.050	0.080	0.080	0.070
Cyanide (Free)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050
Calcium	U	1455	2:1	mg/l	2.00	65	70	10
Hardness	U	1415	2:1	mg/l	15	170	180	28
Arsenic (Dissolved)	U	1455	2:1	µg/l	0.20	1.1	1.9	5.6
Boron (Dissolved)	U	1455	2:1	µg/l	10.0	10	< 10	< 10
Cadmium (Dissolved)	U	1455	2:1	µg/l	0.11	< 0.11	0.14	< 0.11
Chromium (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Copper (Dissolved)	U	1455	2:1	µg/l	0.50	5.5	7.4	5.5
Mercury (Dissolved)	U	1455	2:1	µg/l	0.05	0.05	< 0.05	< 0.05
Nickel (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	0.87	4.3
Lead (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	2.0	2.7
Selenium (Dissolved)	U	1455	2:1	µg/l	0.50	1.0	1.2	0.54
Vanadium (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	0.71	7.9
Zinc (Dissolved)	U	1455	2:1	µg/l	2.5	< 2.5	< 2.5	8.6
Chromium (Hexavalent)	U	1490	2:1	µg/l	20	< 20	< 20	< 20
C2 Aliphatic TPH >C5-C6	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10
C2 Aliphatic TPH >C6-C8	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10
C2 Aliphatic TPH >C8-C10	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10
C2 Aliphatic TPH >C10-C12	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10
C2 Aliphatic TPH >C12-C16	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10
C2 Aliphatic TPH >C16-C21	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10
C2 Aliphatic TPH >C21-C35	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10
C2 Aliphatic TPH >C35-C44	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10
Total Aliphatic Hydrocarbons	N	1675	2:1	µg/l	5.0	[B] < 5.0	[B] < 5.0	[B] < 5.0
C2 Aromatic TPH >C5-C7	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10
C2 Aromatic TPH >C7-C8	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10
C2 Aromatic TPH >C8-C10	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10
C2 Aromatic TPH >C10-C12	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10
C2 Aromatic TPH >C12-C16	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10
C2 Aromatic TPH >C16-C21	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10
C2 Aromatic TPH >C21-C35	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10
C2 Aromatic TPH >C35-C44	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10
C2 Total Aromatic Hydrocarbons	N	1675	2:1	µg/l	5.0	[B] < 5.0	[B] < 5.0	[B] < 5.0
Total Petroleum Hydrocarbons	N	1675	2:1	µg/l	10	[B] < 10	[B] < 10	[B] < 10
Dissolved Organic Carbon	U	1610	2:1	mg/l	2.0	23	20	130
Benzene	U	1760	2:1	µg/l	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Toluene	U	1760	2:1	µg/l	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0

Results - Leachate

Project: LKC 20 1100 29 Clothorn Road, Manchester

Client: LK Consult					**Chemtest Job No.:**	21-32919	21-32919	21-32919
Quotation No.:					**Chemtest Sample ID.:**	1284222	1284223	1284224
					Sample Location:	WS101 Composite	WS103 Composite	WS104 Composite
					Sample Type:	SOIL	SOIL	SOIL
					Date Sampled:	25-Aug-2021	25-Aug-2021	25-Aug-2021
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**			
Ethylbenzene	U	1760	2:1	µg/l	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
m & p-Xylene	U	1760	2:1	µg/l	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
o-Xylene	U	1760	2:1	µg/l	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Methyl Tert-Butyl Ether	N	1760	2:1	µg/l	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Naphthalene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Acenaphthylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Acenaphthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Fluorene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Phenanthrene	N	1800	2:1	µg/l	0.010	< 0.010	1.8	< 0.010
Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	0.88	< 0.010
Fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	3.6	< 0.010
Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	3.5	< 0.010
Benzo[a]anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Chrysene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Total Phenols	U	1920	2:1	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
21-32919	1284222	2	WS101 Composite				No	N/A
21-32919	1284223	2	WS103 Composite				No	N/A
21-32919	1284224	2	WS104 Composite				No	N/A

Deviations

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

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1284222			WS101 Composite	25-Aug-2021	B	Amber Glass 250ml
1284222			WS101 Composite	25-Aug-2021	B	Amber Glass 60ml
1284222			WS101 Composite	25-Aug-2021	B	Plastic Bag
1284222			WS101 Composite	25-Aug-2021	B	Plastic Tub 500g
1284223			WS103 Composite	25-Aug-2021	B	Amber Glass 250ml
1284223			WS103 Composite	25-Aug-2021	B	Amber Glass 60ml
1284223			WS103 Composite	25-Aug-2021	B	Plastic Bag
1284223			WS103 Composite	25-Aug-2021	B	Plastic Tub 500g
1284224			WS104 Composite	25-Aug-2021	B	Amber Glass 250ml
1284224			WS104 Composite	25-Aug-2021	B	Amber Glass 60ml
1284224			WS104 Composite	25-Aug-2021	B	Plastic Bag
1284224			WS104 Composite	25-Aug-2021	B	Plastic Tub 500g

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.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
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).
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.
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.
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
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

Appendix F

Gas Monitoring Results

LK CONSULT LTD

GAS MONITORING RECORD

Site	29 Clothorn Road, Manchester
Job Number	LKC 20 1100
Date	02/09/2021
Engineer	MP
Visit	1 of 6

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)	Falling
Weather Conditions	Dry, low wind speed, warm
Ground Conditions	Dry, no sign of vegatation stress

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
WS101															Unable to gain access to borehole WS101.
WS103	02/09/2021 09:44	0	5.3	16.8	0	5.3	0	0	0	77.9	1027	0	Dry	2.84	CO peak quickly decreased after 30 seconds.
WS104	02/09/2021 09:33	0	5.7	16.8	0	5.7	0	0	0	77.5	1026	0	Dry	2.93	CO peak quickly decreased after 30 seconds.

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	29 Clothorn Road
Job Number	LKC 20 1100
Date	21/09/2021
Engineer	JW
Visit	2 of 6

Equipment[1]		
Instrument	**Serial Number**	**Comments**
Gas Analyser GA5000	G507783	Serviced, calibrated, gas checked.
Geotech Dipmeter	HT-02	Operating normally.

Atmospheric / Ground Conditions	
Atmospheric pressure trend onsite	Steady
Atmospheric pressure (prev 24hrs)	Rising
Weather Conditions	Overcast, mild, dry.
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
WS101	21/09/2021 09:36	0	1	20.2	0	1	0	0	0	78.8	1028	0	3.33	3.48	Initial CO peak of 43 but quickly decreased after 20 seconds.
WS103	21/09/2021 09:18	0	4.7	17.5	0	4.7	0	0	0	77.8	1027	0	Dry	2.75	
WS104	21/09/2021 09:05	0	4.7	17.6	0	4.8	0	0	0	77.7	1027	0	Dry	2.89	

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

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	170 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	5.0 mg/kg	5.3 mg/kg	5.7 mg/kg	77 mg/kg	10 mg/kg	21 mg/kg
Cadmium	22 mg/kg	150 mg/kg	3.9 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	21 mg/kg	250 mg/kg
Lead	200 mg/kg	310 mg/kg	80 mg/kg	2300 mg/kg	630 mg/kg	1300 mg/kg
Tetrachlorethene (PCE) – 1% SOM	0.31 mg/kg	0.32 mg/kg	2.0 mg/kg	24 mg/kg	3,200 mg/kg	1,400 mg/kg
Tetrachlorethene (PCE) – 2.5% SOM	0.70 mg/kg	0.71 mg/kg	4.8 mg/kg	55 mg/kg	3,300 mg/kg	1,900 mg/kg
Tetrachlorethene (PCE) – 6% SOM	1.6 mg/kg	1.6 mg/kg	11 mg/kg	130 mg/kg	3,400 mg/kg	2,500 mg/kg
Trichlorethene (TCE) – 1% SOM	0.0093 mg/kg	0.0097 mg/kg	0.032 mg/kg	0.73 mg/kg	76 mg/kg	41 mg/kg
Trichlorethene (TCE) – 2.5% SOM	0.020 mg/kg	0.020 mg/kg	0.072 mg/kg	1.5 mg/kg	78 mg/kg	54 mg/kg
Trichlorethene (TCE) – 6% SOM	0.043 mg/kg	0.045 mg/kg	0.16 mg/kg	3.4 mg/kg	79 mg/kg	69 mg/kg
Vinyl Chloride (VC) – 1%SOM	0.0064 mg/kg	0.015 mg/kg	0.0017 mg/kg	1.1 mg/kg	7.8 mg/kg	18 mg/kg
Vinyl Chloride (VC) – 2.5%SOM	0.010 mg/kg	0.019 mg/kg	0.0031 mg/kg	1.4 mg/kg	7.8 mg/kg	19 mg/kg
Vinyl Chloride (VC) – 6%SOM	0.017 mg/kg	0.029 mg/kg	0.0058 mg/kg	2.2 mg/kg	7.8 mg/kg	19 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 (update 2015)	6%	126	181	53	983	231	804
	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.

	Contaminant	SOM	Res +	Res -	Allot.	Comm.	POS_{resi}	POS_{park}
			LQM Generic Assessment Criteria (mg/kg) Dry weight soil					
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	74	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

Hazwaste Online Assessment

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.

EHZAJ-GVWIJ-8V82Z

Job name

LKC 20 1100

Description/Comments

Project

LKC 20 1100

Site

29 Clothorn Road

Classified by

Name:
Peter Dunn
Company:
LK Group
Date:
24 Sep 2021 08:34 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	WS101-25/08/2021-0	0-0.7	Non Hazardous		2
2	WS102-25/08/2021-0	0-05	Non Hazardous		4
3	WS103-25/08/2021-0.2	0.2-0.6	Non Hazardous		6
4	WS104-25/08/2021-0.2	0.2-0.5	Non Hazardous		8
5	WS105-25/08/2021-0.25	0.25-0.8	Non Hazardous		10
6	WS101-25/08/2021-0.0	0.0-0.7	Non Hazardous		12
7	WS102-25/08/2021-1.2	1.2-2.0	Non Hazardous		14
8	WS104-25/08/2021-0.5	0.5-1.0	Non Hazardous		16

Related documents

#	Name	Description
1	HWOL_21-29933-20210906 092056.hwol	.hwol file used to create the Job
2	HWOL_21-29891-20210903 142637.hwol	.hwol file used to create the Job
3	Example waste stream template for contaminated soils	waste stream template used to create this Job

Report

Created by: Peter Dunn

Created date: 24 Sep 2021 08:34 GMT

Appendices	Page
Appendix A: Classifier defined and non CLP determinands	18
Appendix B: Rationale for selection of metal species	19
Appendix C: Version	20

Classification of sample: WS101-25/08/2021-0

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

Sample details

Sample name:
WS101-25/08/2021-0
Sample Depth:
0-0.7 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		15	mg/kg	1.32	17.23	mg/kg	0.00172 %	✓	
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		0.43	mg/kg	1.142	0.427	mg/kg	0.0000427 %	✓	
4		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		27	mg/kg	1.462	34.332	mg/kg	0.00343 %	✓	
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		52	mg/kg	1.126	50.935	mg/kg	0.00509 %	✓	
7		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	210	mg/kg	1.56	284.978	mg/kg	0.0183 %	✓	
8		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.37	mg/kg	1.353	0.436	mg/kg	0.0000436 %	✓	
9		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		25	mg/kg	2.976	64.734	mg/kg	0.00647 %	✓	
10		selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		0.41	mg/kg	2.554	0.911	mg/kg	0.0000911 %	✓	
11		zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		320	mg/kg	2.774	772.322	mg/kg	0.0772 %	✓	
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**
16		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<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									
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 }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		**<LOD**
		006-007-00-5											
19		pH				8	pH		8	pH	8pH		
				PH									
20		naphthalene				0.32	mg/kg		0.278	mg/kg	0.0000278 %	✓	
		601-052-00-2	202-049-5	91-20-3									
21		acenaphthylene				0.2	mg/kg		0.174	mg/kg	0.0000174 %	✓	
			205-917-1	208-96-8									
22		acenaphthene				0.47	mg/kg		0.409	mg/kg	0.0000409 %	✓	
			201-469-6	83-32-9									
23		fluorene				0.35	mg/kg		0.305	mg/kg	0.0000305 %	✓	
			201-695-5	86-73-7									
24		phenanthrene				3.9	mg/kg		3.393	mg/kg	0.000339 %	✓	
			201-581-5	85-01-8									
25		anthracene				0.71	mg/kg		0.618	mg/kg	0.0000618 %	✓	
			204-371-1	120-12-7									
26		fluoranthene				10	mg/kg		8.7	mg/kg	0.00087 %	✓	
			205-912-4	206-44-0									
27		pyrene				9.3	mg/kg		8.091	mg/kg	0.000809 %	✓	
			204-927-3	129-00-0									
28		benzo[a]anthracene				4.1	mg/kg		3.567	mg/kg	0.000357 %	✓	
		601-033-00-9	200-280-6	56-55-3									
29		chrysene				4.3	mg/kg		3.741	mg/kg	0.000374 %	✓	
		601-048-00-0	205-923-4	218-01-9									
30		benzo[b]fluoranthene				6	mg/kg		5.22	mg/kg	0.000522 %	✓	
		601-034-00-4	205-911-9	205-99-2									
31		benzo[k]fluoranthene				2.4	mg/kg		2.088	mg/kg	0.000209 %	✓	
		601-036-00-5	205-916-6	207-08-9									
32		benzo[a]pyrene; benzo[def]chrysene				4.6	mg/kg		4.002	mg/kg	0.0004 %	✓	
		601-032-00-3	200-028-5	50-32-8									
33		indeno[123-cd]pyrene				3	mg/kg		2.61	mg/kg	0.000261 %	✓	
			205-893-2	193-39-5									
34		dibenz[a,h]anthracene				0.57	mg/kg		0.496	mg/kg	0.0000496 %	✓	
		601-041-00-2	200-181-8	53-70-3									
35		benzo[ghi]perylene				2.7	mg/kg		2.349	mg/kg	0.000235 %	✓	
			205-883-8	191-24-2									
36		vanadium { divanadium pentaoxide; vanadium pentoxide }				43	mg/kg	1.785	66.784	mg/kg	0.00668 %	✓	
		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:	0.125 %		

Key

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

Classification of sample: WS102-25/08/2021-0

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

Sample details

Sample name:
WS102-25/08/2021-0
Sample Depth:
0-05 m
Moisture content:
15%
(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: 15% 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		33	mg/kg	1.32	37.035	mg/kg	0.0037 %	✓	
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.22	mg/kg	1.142	0.214	mg/kg	0.0000214 %	✓	
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		20	mg/kg	1.462	24.846	mg/kg	0.00248 %	✓	
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		7.3	mg/kg	1.126	6.986	mg/kg	0.000699 %	✓	
6		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	7.8	mg/kg	1.56	10.342	mg/kg	0.000663 %	✓	
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		**<LOD**
8		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		27	mg/kg	2.976	68.305	mg/kg	0.00683 %	✓	
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 chromate }	024-007-00-3	236-878-9	13530-65-9		28	mg/kg	2.774	66.025	mg/kg	0.0066 %	✓	
11		pH			PH		7.3	pH		7.3	pH	7.3 pH		
12		naphthalene	601-052-00-2	202-049-5	91-20-3		0.17	mg/kg		0.145	mg/kg	0.0000145 %	✓	
13		acenaphthylene		205-917-1	208-96-8		0.32	mg/kg		0.272	mg/kg	0.0000272 %	✓	
14		acenaphthene		201-469-6	83-32-9		0.34	mg/kg		0.289	mg/kg	0.0000289 %	✓	
15		fluorene		201-695-5	86-73-7		0.45	mg/kg		0.383	mg/kg	0.0000383 %	✓	
16		phenanthrene		201-581-5	85-01-8		8.6	mg/kg		7.31	mg/kg	0.000731 %	✓	

#		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				2.2	mg/kg		1.87	mg/kg	0.000187 %	✓	
			204-371-1	120-12-7									
18		fluoranthene				25	mg/kg		21.25	mg/kg	0.00213 %	✓	
			205-912-4	206-44-0									
19		pyrene				21	mg/kg		17.85	mg/kg	0.00179 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				9.9	mg/kg		8.415	mg/kg	0.000841 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				8.8	mg/kg		7.48	mg/kg	0.000748 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				12	mg/kg		10.2	mg/kg	0.00102 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				5	mg/kg		4.25	mg/kg	0.000425 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				10	mg/kg		8.5	mg/kg	0.00085 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				6.2	mg/kg		5.27	mg/kg	0.000527 %	✓	
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				1.2	mg/kg		1.02	mg/kg	0.000102 %	✓	
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				5.2	mg/kg		4.42	mg/kg	0.000442 %	✓	
			205-883-8	191-24-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				52	mg/kg	1.785	78.905	mg/kg	0.00789 %	✓	
		023-001-00-8	215-239-8	1314-62-1									
										Total:	0.039 %		

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: WS103-25/08/2021-0.2

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

Sample details

Sample name:
WS103-25/08/2021-0.2
Sample Depth:
0.2-0.6 m
Moisture content:
9.6%
(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: 9.6% 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		1.2	mg/kg	1.32	1.432	mg/kg	0.000143 %	✓	
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		13	mg/kg	1.462	17.176	mg/kg	0.00172 %	✓	
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		5.9	mg/kg	1.126	6.005	mg/kg	0.000601 %	✓	
6		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	5.8	mg/kg	1.56	8.178	mg/kg	0.000524 %	✓	
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
8		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		15	mg/kg	2.976	40.358	mg/kg	0.00404 %	✓	
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 chromate }	024-007-00-3	236-878-9	13530-65-9		32	mg/kg	2.774	80.251	mg/kg	0.00803 %	✓	
11		pH			PH		9	pH		9	pH	9pH		
12		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
13		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
14		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
15		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
16		phenanthrene		201-581-5	85-01-8		0.57	mg/kg		0.515	mg/kg	0.0000515 %	✓	

#		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				0.11	mg/kg		0.0994	mg/kg	0.00000994 %	✓	
			204-371-1	120-12-7									
18		fluoranthene				1.3	mg/kg		1.175	mg/kg	0.000118 %	✓	
			205-912-4	206-44-0									
19		pyrene				1.3	mg/kg		1.175	mg/kg	0.000118 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				0.7	mg/kg		0.633	mg/kg	0.0000633 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				0.64	mg/kg		0.579	mg/kg	0.0000579 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				0.67	mg/kg		0.606	mg/kg	0.0000606 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				0.32	mg/kg		0.289	mg/kg	0.0000289 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				0.65	mg/kg		0.588	mg/kg	0.0000588 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				0.23	mg/kg		0.208	mg/kg	0.0000208 %	✓	
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.15	mg/kg		0.136	mg/kg	0.0000136 %	✓	
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				0.35	mg/kg		0.316	mg/kg	0.0000316 %	✓	
			205-883-8	191-24-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				25	mg/kg	1.785	40.345	mg/kg	0.00403 %	✓	
		023-001-00-8	215-239-8	1314-62-1									
										Total:	0.0199 %		

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: WS104-25/08/2021-0.2

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

Sample details

Sample name:
WS104-25/08/2021-0.2
Sample Depth:
0.2-0.5 m
Moisture content:
1.9%
(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: 1.9% 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		<1	mg/kg	1.32	<1.32	mg/kg	<0.000132 %		**<LOD**
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		**<LOD**
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		15	mg/kg	1.462	21.507	mg/kg	0.00215 %	✓	
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		9.9	mg/kg	1.126	10.935	mg/kg	0.00109 %	✓	
6		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	4.4	mg/kg	1.56	6.733	mg/kg	0.000432 %	✓	
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		**<LOD**
8		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		24	mg/kg	2.976	70.073	mg/kg	0.00701 %	✓	
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 chromate }	024-007-00-3	236-878-9	13530-65-9		32	mg/kg	2.774	87.086	mg/kg	0.00871 %	✓	
11		pH			PH		8.9	pH		8.9	pH	8.9 pH		
12		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
13		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
14		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
15		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
16		phenanthrene		201-581-5	85-01-8		1.7	mg/kg		1.668	mg/kg	0.000167 %	✓	

#		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				0.13	mg/kg		0.128	mg/kg	0.0000128 %	✓	
			204-371-1	120-12-7									
18		fluoranthene				2.2	mg/kg		2.158	mg/kg	0.000216 %	✓	
			205-912-4	206-44-0									
19		pyrene				2.5	mg/kg		2.453	mg/kg	0.000245 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				1	mg/kg		0.981	mg/kg	0.0000981 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				1.1	mg/kg		1.079	mg/kg	0.000108 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				1.3	mg/kg		1.275	mg/kg	0.000128 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				0.44	mg/kg		0.432	mg/kg	0.0000432 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				0.77	mg/kg		0.755	mg/kg	0.0000755 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				0.52	mg/kg		0.51	mg/kg	0.000051 %	✓	
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.12	mg/kg		0.118	mg/kg	0.0000118 %	✓	
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				0.57	mg/kg		0.559	mg/kg	0.0000559 %	✓	
			205-883-8	191-24-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				27	mg/kg	1.785	47.284	mg/kg	0.00473 %	✓	
		023-001-00-8	215-239-8	1314-62-1									
										Total:	0.0257 %		

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: WS105-25/08/2021-0.25

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

Sample details

Sample name:
WS105-25/08/2021-0.25
Sample Depth:
0.25-0.8 m
Moisture content:
7.1%
(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: 7.1% 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		<1	mg/kg	1.32	<1.32	mg/kg	<0.000132 %		**<LOD**
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.12	mg/kg	1.142	0.127	mg/kg	0.0000127 %	✓	
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		12	mg/kg	1.462	16.293	mg/kg	0.00163 %	✓	
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		6.3	mg/kg	1.126	6.589	mg/kg	0.000659 %	✓	
6		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	12	mg/kg	1.56	17.389	mg/kg	0.00111 %	✓	
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		**<LOD**
8		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		14	mg/kg	2.976	38.709	mg/kg	0.00387 %	✓	
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 chromate }	024-007-00-3	236-878-9	13530-65-9		36	mg/kg	2.774	92.779	mg/kg	0.00928 %	✓	
11		pH			PH		8.6	pH		8.6	pH	8.6 pH		
12		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
13		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
14		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
15		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
16		phenanthrene		201-581-5	85-01-8		0.22	mg/kg		0.204	mg/kg	0.0000204 %	✓	

#		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				0.15	mg/kg		0.139	mg/kg	0.0000139 %	✓	
			204-371-1	120-12-7									
18		fluoranthene				0.36	mg/kg		0.334	mg/kg	0.0000334 %	✓	
			205-912-4	206-44-0									
19		pyrene				0.25	mg/kg		0.232	mg/kg	0.0000232 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				0.17	mg/kg		0.158	mg/kg	0.0000158 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				0.16	mg/kg		0.149	mg/kg	0.0000149 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				0.21	mg/kg		0.195	mg/kg	0.0000195 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				0.14	mg/kg		0.13	mg/kg	0.000013 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				0.18	mg/kg		0.167	mg/kg	0.0000167 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-893-2	193-39-5									
26		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									
27		benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-883-8	191-24-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				25	mg/kg	1.785	41.461	mg/kg	0.00415 %	✓	
		023-001-00-8	215-239-8	1314-62-1									
										Total:	0.0213 %		

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: WS101-25/08/2021-0.0

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

Sample details

Sample name:
WS101-25/08/2021-0.0
Sample Depth:
0.0-0.7 m
Moisture content:
9%
(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: 9% 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		2.8	mg/kg	1.32	3.364	mg/kg	0.000336 %	✓	
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		7.5	mg/kg	1.462	9.975	mg/kg	0.000998 %	✓	
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		6.9	mg/kg	1.126	7.069	mg/kg	0.000707 %	✓	
6		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	20	mg/kg	1.56	28.389	mg/kg	0.00182 %	✓	
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
8		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		9	mg/kg	2.976	24.376	mg/kg	0.00244 %	✓	
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 chromate }	024-007-00-3	236-878-9	13530-65-9		21	mg/kg	2.774	53.014	mg/kg	0.0053 %	✓	
11		pH			PH		8.7	pH		8.7	pH	8.7 pH		
12		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
13		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
14		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
15		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
16		phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<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									
17		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			204-371-1	120-12-7									
18		fluoranthene				0.13	mg/kg		0.118	mg/kg	0.0000118 %	✓	
			205-912-4	206-44-0									
19		pyrene				0.14	mg/kg		0.127	mg/kg	0.0000127 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				0.11	mg/kg		0.1	mg/kg	0.00001 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				0.13	mg/kg		0.118	mg/kg	0.0000118 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-893-2	193-39-5									
26		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									
27		benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-883-8	191-24-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				11	mg/kg	1.785	17.87	mg/kg	0.00179 %	✓	
		023-001-00-8	215-239-8	1314-62-1									
										Total:	0.0137 %		

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: WS102-25/08/2021-1.2

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

Sample details

Sample name:
WS102-25/08/2021-1.2
Sample Depth:
1.2-2.0 m
Moisture content:
3.8%
(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: 3.8% 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		2.5	mg/kg	1.32	3.175	mg/kg	0.000318 %	✓	
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		7.9	mg/kg	1.462	11.108	mg/kg	0.00111 %	✓	
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		10	mg/kg	1.126	10.831	mg/kg	0.00108 %	✓	
6		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	6.1	mg/kg	1.56	9.153	mg/kg	0.000587 %	✓	
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
8		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		13	mg/kg	2.976	37.221	mg/kg	0.00372 %	✓	
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 chromate }	024-007-00-3	236-878-9	13530-65-9		21	mg/kg	2.774	56.043	mg/kg	0.0056 %	✓	
11		pH			PH		8.7	pH		8.7	pH	8.7 pH		
12		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
13		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
14		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
15		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
16		phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<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									
17		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			204-371-1	120-12-7									
18		fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-912-4	206-44-0									
19		pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			204-927-3	129-00-0									
20		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-893-2	193-39-5									
26		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									
27		benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-883-8	191-24-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				10	mg/kg	1.785	17.173	mg/kg	0.00172 %	✓	
		023-001-00-8	215-239-8	1314-62-1									
										Total:	0.0145 %		

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: WS104-25/08/2021-0.5

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

Sample details

Sample name:
WS104-25/08/2021-0.5
Sample Depth:
0.5-1.0 m
Moisture content:
8.4%
(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: 8.4% 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		7.7	mg/kg	1.32	9.313	mg/kg	0.000931 %	✓	
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		12	mg/kg	1.462	16.065	mg/kg	0.00161 %	✓	
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		3.9	mg/kg	1.126	4.022	mg/kg	0.000402 %	✓	
6		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	4.4	mg/kg	1.56	6.287	mg/kg	0.000403 %	✓	
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
8		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		12	mg/kg	2.976	32.715	mg/kg	0.00327 %	✓	
9		selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		0.32	mg/kg	2.554	0.749	mg/kg	0.0000749 %	✓	
10		zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		22	mg/kg	2.774	55.905	mg/kg	0.00559 %	✓	
11		pH			PH		8.2	pH		8.2	pH	8.2 pH		
12		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
13		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
14		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
15		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
16		phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<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									
17		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			204-371-1	120-12-7									
18		fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-912-4	206-44-0									
19		pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			204-927-3	129-00-0									
20		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-893-2	193-39-5									
26		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									
27		benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-883-8	191-24-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				20	mg/kg	1.785	32.705	mg/kg	0.00327 %	✓	
		023-001-00-8	215-239-8	1314-62-1									
										Total:	0.0158 %		

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- **TPH (C6 to C40) petroleum group** (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Flam. Liq. 3 H226 , Asp. Tox. 1 H304 , STOT RE 2 H373 , Muta. 1B H340 , Carc. 1B H350 , Repr. 2 H361d , Aquatic Chronic 2 H411

- **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

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

- **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)

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 chromate}

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

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 chromate}

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

vanadium {divanadium pentaoxide; vanadium pentoxide}

worst case/most likely scenario

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)

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)

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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