

CHAIN ROAD, BLACKLEY

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

Job Number: LKC 21 1026

Date: 4th October 2021

Client: Great Places Housing Group



INCREASING LAND VALUE

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EXECUTIVE SUMMARY

Site Details

Site Location:	Corner of Chain Road and Victoria Avenue in the Blackley area of Manchester. Centred at approximate National Grid Reference 385980E 404160N.
Site Area:	3,500m ² .
Current Land Use:	Vacant land largely vegetated.
Proposed Development:	12no. residential houses (semi-detached and terraced) with front and rear gardens and an apartment building with associated soft landscaping. Also includes associated infrastructure including road network.
Purpose of Report:	Contamination and Geotechnical Assessment.

Preliminary Risk Assessment

PRA Details:	Undertaken by LKC in February 2021. Ref: LKC 21 1026-01.
History:	Public house 1933-2006, bowling green 1952-1978.
Geology / Hydrogeology:	Glacial Till (Secondary Undifferentiated Aquifer) over Manchester Marls Formation (Secondary B Aquifer).
Mining:	Not within a Development High Risk Area.
Preliminary Conceptual Model:	PL1 Direct Contact (Human Health): Moderate Risk (metals, PAHs, ACM), Moderate / Low Risk (Petroleum Hydrocarbons). PL2 Inhalation of Vapours: Moderate / Low Risk (volatile contaminants). PL3 Gas: Moderate Risk (hazardous gas). PL4 Controlled waters: Low Risk (mobile contaminants). PL5 Sulphate Attack: Moderate / Low Risk (sulphate). PL6 Water Pipelines: Moderate / Low Risk (organic contaminants). PL7 Phytotoxic: Low Risk (metals).
PL=Pollutant Linkage	
Recommendations:	Site Investigation was recommended to further assess the pollutant linkages.

Ground Investigation Work Undertaken

Date of Investigation:	18 th June 2021.
Intrusive Investigation Work Undertaken:	5no. window sample boreholes (WS101-WS105). 7no. mechanically excavated trial pits (TP101-TP107). 1no. follow on DP (in WS101).
Monitoring Wells:	Installed in all boreholes.
Soil Sampling:	13no. samples tested for metals, speciated PAHs, pH, sulphate, asbestos and SOM. 32no. samples tested for metals, speciated PAHs, cyanide, pH, sulphate, asbestos, phenol, TPHCWG, BTEX, VOCs, SVOCs and SOM.
Monitoring:	6no. gas monitoring visits.
Insitu and Laboratory Geotechnical Testing:	SPTs, shear vanes, pocket penetrometer tests, PSDs, plasticity, BRE SD1 short suite.

Ground Conditions and Geotechnical Assessment

General Ground conditions	Made Ground to depths of between 0.10m to 1.90mbgl. Hydrocarbon odour noted in W103 at 0.1-0.7mbgl Natural superficial deposits comprised variable horizons of SAND, SILT and CLAY to completion depths of the exploratory holes.. Isolated Groundwater strikes within some of the exploratory holes
Allowable Bearing Pressure	100kN/m ² within natural granular deposits and 102kN/m ² within natural cohesive deposits.

Anticipated Foundation Type	Traditional shallow foundations are not expected to be suitable for the proposed development given the ground conditions encountered. Consideration should be given to a ground improvement option, such as vibro granular columns, to remove variability in the shallow soils.
Other Considerations	Consideration of effects of trees also needs to be considered. The presence of groundwater within a granular strata has the potential to reduce its ABC by as much as 50%. Temporary supports of excavations may be required. Detailed design should be carried out by structural engineer. Concrete Requirements DS2-AC-2.

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, fibres and vegetables).	Moderate	- Elevated arsenic, lead and PAHs identified across the site. Recommendations: Remediation required in garden and soft landscaped areas.
		Low	- No elevated petroleum hydrocarbons or ACM identified. Recommendations: No remediation required.
2	Volatile contaminants posing a risk to site users via the inhalation of vapours.	Low	- No elevated volatile contamination identified. Recommendations: 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 (CO ₂)	- Elevated CO ₂ up to 12.2%v/v. Recommendations: Gas protection measures in line with CS2 / Amber 1 required.
		Moderate / Low (CH ₄)	- No elevated methane concentrations encountered. - Low risk assumed. Recommendations: No remediation required.
4	Mobile contamination posing a risk to controlled waters via the migration through permeable strata.	Low	- Although elevated metals and PAHs identified, given the environmental settings and ground conditions encountered not considered to pose a significant risk to groundwater water. Recommendation: No remediation required.
5	Sulphate posing a risk to building via direct contact (sulphate attack).	Moderate / Low	- Elevated sulphate identified. Recommendations: Sulphate resistant concrete (DS-2 AC-2) in localised areas.
6	Organic contaminants posing a risk to water pipes.	Moderate / Low	- Organic contamination identified although pipework may be installed in underlying natural ground. Recommendations: UU risk assessment to be completed.
7	Phytotoxic metals posing a risk to flora via root uptake.	Very Low	- No phytotoxic metals above generic criteria. Recommendations: 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
Pre-Construction	ALL	<u>Earthworks Inspections / Unexpected Contamination</u> The relevant contractors should be briefed that during development works at the site should any unusual ground conditions and / or visual or olfactory evidence of contamination (including asbestos containing material) be encountered at the site, LKC and the Local Authority should be informed, and further assessment of the material may be required. Should 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 C733¹.	Log of work undertaken including photographs. Details of any sampling undertaken and validation of any potential additional remedial work.
Build-Phase Construction	1 and 7	As the made ground is relatively shallow in some areas of the site the following options are given: <u>Option 1</u> Removal of all reworked topsoil / made ground from garden and soft landscaping and raise levels (as required) with suitably chemically validated subsoil and topsoil. <u>Option 2</u> If all or some of the made ground remains in place in gardens and soft landscaping areas, an environmental cover system will be required. The environmental cover system should be as follows: Private Back Gardens: 600mm thick environmental cover system comprising: <u>Either</u> 100mm physical break layer (MOT type 1 material, 20-30mm, minimal fines) and at least 500mm comprising clean inert fill and sufficient topsoil for a growing medium. <u>Or</u> geotextile membrane and at least 600mm comprising clean inert fill and sufficient topsoil for a growing medium. Private Front Gardens / Shared Landscaping: 450mm thick environmental cover system comprising: <u>Either</u> 100mm physical break layer (MOT type 1 material, 20-30mm, minimal fines) and at least 350mm comprising clean inert fill and sufficient topsoil for a growing medium. <u>Or</u> geotextile membrane and at least 450mm comprising clean inert fill and sufficient topsoil for a growing medium. The subsoil layer can be replaced by additional topsoil. A diagram of a typical environmental cover system is shown in Appendix G.	<u>Option 1</u> Consignment notes confirming the removal of made ground. Photographic evidence of natural strata. Chemical validation of imported soils: See Table 9-2. <u>Option 2</u> Measuring depth of environmental cover system using a staff and providing photographic evidence. Photographic evidence of the granular physical break or geotextile layer will also be collected. Chemical validation of imported soils: See Table 9-2.

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

Phase	PL	Remediation Requirements	Validation Requirements
Build-Phase Construction	3	<u>Gas Protection Measures</u> In line with CS2 / Amber 1 as per UK guidance ^{2,3} . This is likely to / should include: • Passive subfloor or active subfloor ventilation system. • 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
	5	<u>Sulphate Resistant Concrete</u> Sulphate Resistant Concrete in line with DS-2 AC-2 recommended.	N/A
	6	<u>Potable Water Pipes</u> It is recommended that a Water Pipeline Assessment is undertaken once the location and depth of potable water pipes are known. Barrier pipe may be required.	Delivery Notes of Pipe Material. Photographs of the Installed Pipe.

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.

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Appendix F: Generic Assessment Criteria Values
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1 Introduction

1.1 Background

LK Consult Ltd (LKC) has been commissioned by Great Places Housing Group to carry out a Phase 2 Geo-Environmental Investigation, Risk Assessment and Remediation Strategy for Chain Road, Blackley. The investigation was undertaken in support of a redevelopment of the site for residential use.

The following work has previously been undertaken:

- » Preliminary Risk Assessment (PRA) report, undertaken by LKC (Ref: 21 1026, dated 12th February 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. Figure 1 indicates the site location and boundary. Figure 2 indicates the proposed development.

Location	Corner of Chain Road and Victoria Avenue in the Blackley area of Manchester. Centred at approximate National Grid Reference 385980E 404160N.
Area	3,500m ² .
Topography	96 metres Above Ordnance Datum (AOD).
Current Site Use	Vacant land largely vegetated.
Proposed Development	Residential housing with gardens / soft landscaping. 12no. residential houses (semi-detached and terraced) with front and rear gardens and an apartment building with associated soft landscaping. Also includes associated infrastructure including road network.

Table 1-1. Summary of site details.

2 Previous Work

2.1 Summary of Existing Information

A PRA report (Ref: CL-602-LKC 21 1026, dated 12th February 2021) has previously been undertaken by LKC and is summarised in Section 2.2-2.6.

2.2 Site History

Table 2-1 summarises features on site.

Site Features	Location on Site	Dates Present		Comments
		From	To	
Public house	SE	1933	2006	With associated outbuildings. Majority of outbuildings removed by 1982 mapping. Site is vacant by 2020 mapping.
Bowling green	NW	1952	1978	No longer annotated by 1982 mapping. Bowling green area becomes car park for the public house.

Table 2-1: Summary of site features. Dates based on available historical map editions.

Table 2-2 summarises potentially contaminative land uses within approximately 50m and potentially infilled features within approximate 250m.

Surrounding Area Features	Distance (m)	Direction	Dates Present		Comments
			From	To	
Pond	65	NE	1848	1932	No longer present by 1933 mapping.
Pond	150	SW	1848	1932	No longer present by 1933 mapping.
Pond	250	W	1848	1894	No longer present by 1909 mapping.
Pond	200	N	1848	1933	No longer present by 1938 mapping.
Watercourse	50	N	1848	1975	Appears to have been culverted.
Pond	120	SW	1893	1910	No longer present by 1923 mapping.
Pond	125	SE	1893	1932	No longer present by 1933 mapping.
Cutting	60	NE	1933	1966	No longer present by 1975 mapping.
Refuse heap	145	NE	1952	1975	No longer present by 1975 mapping.
Refuse heap	225	ESE	1952	1975	No longer present by 1975 mapping.

Table 2-2: Summary of potentially contaminative features within 50m and potentially infilled features with 250m. Dates are based on available historical map editions.

2.3 Environmental Setting

The environmental setting is summarised in Table 2-3.

Categories		Details
Geology	Artificial	- No BGS recorded artificial.
	Superficial	- Till (diamicton).
	Bedrock	- Manchester Marls Formation (mudstone).
	BGS Logs (<50m)	- None.
Hydro-geology	Aquifer	- Superficial
	Designation	- Bedrock
	Source Protection Zone (SPZ)	- Site not within an SPZ.
	Groundwater Abstractions (100m)	- None.
Hydrology	Surface Water Courses (100m)	- None.
	Flooding risk	- Flood Zone 1.
	Surface Water Abstractions (100m)	- None.
	Discharge Consents	- None.
	Pollution Incidents	- None.
Minerals & Mining	Coal Mining	- Within a Coal Reporting Area. - Not within a Development High Risk Area.
	Coal Authority Report	- No past underground mining recorded. - No probable unrecorded shallow workings. - No mine entries recorded within 100m. - No outcrops recorded.
	Surface Mineral Extractions (250m)	- None.
	Cheshire Brine Compensation District	- Not within Compensation District. - Not within Consultation Area.
	Non-Coal Mining Area	- Not within an area of conclusive metalliferous mining.
Ground Stability	Collapsible Ground	- Very low hazard.
	Compressible Ground	- No hazard.
	Ground Dissolution	- No hazard.
	Landslide	- Very low hazard.
	Running Sand	- Very low hazard.
	Shrinking / Swelling Clay	- Very low hazard.
Landfill Sites (250m)	Known / Registered	- 127m E – 'Land to the Rear of Symond Road'. No further details are given.
	Potentially Infilled Land (non-water and water), based on Envirocheck Report	- 9no. features: 41m to 235m from site.
	Potentially infilled sites, based on LKC historical review	- 9no. features: See Table 2-1.
Radon Potential		- <1% of homes above Action Level. No protective measures are necessary in the construction of new dwellings or extensions.
Designated Sites (50m)		- Site forms part of Nitrate Vulnerable Zone. This is not anticipated to affect the development proposals.
Contemporary Trade Directory (50m)		- 35m S, cash registers and checkout equipment. Listed as active.
Fuel Station Entries (50m)		- None.
Unexploded Ordnance Risk (UXO)	Zetica Risk Map	- Moderate.
	Pre-Desk Study Assessment	- Detailed UXO desk study required.

Table 2-3: Summary of the environmental setting.

2.4 Site Reconnaissance

A site reconnaissance was carried out on 01 February 2021. Hand dug trial holes were undertaken in accessible areas to confirm the shallow ground conditions.

- The site is open access, located between Chain Road and Victoria Avenue.
- The site comprises three main areas. The north-western part consists of an old, tarmacadam car park, in moderate condition with parking bay marks still present. The western part consists of overgrown shrubs, brambles and trees. The south-eastern section comprises tarmacadam around the border, a tarmacadam path through the west and then well-kept grass across the area.
- Street lighting is present surrounding the site.

2.5 Contamination Sources / Pathways and Receptors

Potential contamination sources are detailed in Table 2-4.

Potential Source	Contaminants
On Site	
Deep Made Ground below some of the site (e.g. possible former cellar, levelling / raising of site)	- Demolition rubble, ash and clinker: Asbestos, heavy metals, sulphates, PAHs⁵. - Other fill material sources: Unknown organic / inorganic compounds. - If organic / putrescible material: Hazardous gas (principally carbon dioxide and methane).
Public House	- Assuming a boiler house is / has been present: Petroleum hydrocarbons (fuel / oils) and heavy metals, sulphates, PAHs (waste ash and clinker). - Demolished buildings: ACM.
Car park	- Assuming hardstood surface: No significant contamination source anticipated.
Surrounding Area	
Surrounding area	- No significant contamination sources within influencing distance of the site.
Offsite known / potentially infilled features within 250m	- Given size, distance and age of features, there is considered to be a potential source of hazardous gas.

Table 2-4: Potential contamination sources

Potential receptors are detailed in Table 2-5.

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

Table 2-5: Potential receptors.

⁵ Defra (2002). "Potential Contaminants for the Assessment of Land". R&D Publication CLR 8.

Potential pathways are detailed in Table 2-6.

Pathways		
Soil	Human Health ⁶ (residential land use: houses with private gardens)	- Ingestion of soil. - Ingestion of soil-derived indoor dust. - Ingestion of contaminated vegetables. - Ingestion of soil attached to vegetables. - 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.
		- Windblown dust and fibres to adjacent receptors.
		- Direct contact with receptors (building foundations, services).
		- Root uptake.
Water		- Surface run-off over impermeable surface.
		- Infiltration into the ground, through potentially contaminated material (contamination possibly going into solution).
Water and Gas		- Migration through potentially permeable strata and preferential pathways. - Superficial (Till) likely to be low permeability. - Bedrock (mudstone) likely to be low permeability. - 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 2-6: Potential pathways

2.6 LKC Preliminary Contamination Conceptual Model

The preliminary contamination conceptual model using contaminant-pathway-receptor linkages based on guidance in LCRM⁷ has been summarised in Table 2-7.

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 C552⁸.

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

Where LKC identified a low to very low risk, limited intrusive investigation work, a watching brief (during construction work) or no investigation work will be

⁶ EA (2008). "Updated Technical Background to the CLEA Model". Science Report – SC050021/SR3.

⁷ Land Contamination Risk Management (LCRM) <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

⁸ CIRIA (2001). "Contaminated land risk assessment: A guide to good practice". C552.

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 guidance⁹) should be adopted by all workers involved with site enabling and construction works. Therefore, this receptor is not considered in the contamination conceptual model.

2.7 Recommendations

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

⁹ HSE (1991). "Protection of Workers and the General Public During Development of Contaminated Land" London HMSO.

PL	Pathway	Receptor	Contaminants of Concern (CoC)	Probability	Consequence	Risk	Recommendations
1	- Dermal contact. - Inhalation of soil, fibres and dust. - Ingestion of soils, dust, vegetables, soil attached to vegetables. - Windblown dust.	- Future site users. - Offsite receptors.	- ACM. - Heavy metals. - PAHs.	Likely (given site history, site conditions and proposed end use)	Medium	Moderate	Intrusive investigation required. Soil analysis of CoC.
			- Petroleum hydrocarbons.	Low Likelihood (given site history, site conditions and proposed end use)	Medium	Moderate / Low (moderate assumed until ground conditions confirmed)	Intrusive investigation required. Soil analysis of CoC, subject to ground conditions encountered.
2	- Inhalation of vapours. - Migration via permeable strata and preferential pathways.	- Future site users. - Offsite receptors.	- Volatile contaminants (low end fraction petroleum hydrocarbons).	Low Likelihood (given site history, site conditions and proposed end use)	Medium	Moderate / Low (moderate assumed until ground conditions confirmed)	Intrusive investigation required, to include PID testing. Soil analysis of CoC, subject to ground conditions encountered and PID testing.
3	- Inhalation of gas. - Migration via permeable strata and preferential pathways. - Explosion in confined spaces. - Exposure to radon.	- Future site users. - Buildings. - Offsite land users.	- Hazardous gas (carbon dioxide, methane).	Low Likelihood (clay is expected to limit migration from offsite sources; however, there could be an onsite source associated with made ground)	Severe	Moderate	Intrusive investigation to confirm ground conditions. If significant gas source and pathway identified, gas monitoring or gas protection measures required.
4	- Surface run-off. - Migration via permeable strata and preferential pathways. - Perched waters migration.	- Groundwater (Secondary B Aquifer).	- Mobile contaminants such as metals, PAHs, hydrocarbons.	Unlikely (significant mobile contamination not anticipated and limited pathway due to anticipated clay)	Medium	Low	Intrusive investigation required. Groundwater sampling, subject to ground conditions encountered. Analysis of CoC.
5	- Sulphate attack on concrete.	- Building structure.	- Sulphate.	Likely (given site history, site conditions, and direct contact / pathway)	Mild	Moderate / Low (moderate assumed until ground conditions confirmed)	Intrusive investigation required. Soil analysis of CoC.
6	- Ingestion of tainted water supply.	- Future site users. - Water pipes.	- Organic contaminants such as petroleum hydrocarbons, naphthalene	Low Likelihood (although some contamination may be present, significant contamination not expected at pipeline depth)	Medium	Moderate / Low (moderate risk assumed until ground conditions confirmed)	Intrusive investigation required. Soil analysis of CoC, subject to ground conditions encountered.
7	- Direct contact (plant uptake).	- Flora.	- Phytotoxic contaminants such as heavy metals.	Likely (given site history, site conditions and proposed end use)	Minor	Low	Low density intrusive investigation required. Soil analysis of CoC.

Table 2-7. 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 18th June 2021 and comprised the following:

- 5no. window sample boreholes drilled to 5.00-5.45 metres below ground level (mbgl) (ref. WS101 to WS105).
- 1no. follow on Dynamic Probe from base of WS101, to a depth of 7.59mbgl (ref. DP101).
- 7no. trial pits (using JCB / 10t tracked machine) excavated to 2.00-3.50mbgl (ref. TP101 to TP107).

The dynamic probe was undertaken to allow a quick assessment of the strength of the ground below 5mbgl. It should be noted that the type of strata cannot be confirmed during these tests.

All site investigation locations are shown in Figure 3.

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, TP105 and TP106	Former public house building.
WS102, WS104, WS103, TP101, TP102 and TP103	Former bowling green and car park.
WS105, TP104 and TP107	Site coverage.

Table 3-1: Summary of sampling locations.

The number of site investigation points corresponds to approximately one location per 17m square centres (non-targeted and targeted provided an even spread of investigation locations). This is considered to be a conservative sampling density and is in line with BS10175¹⁰ for a 'detailed investigation'.

3.2 Well Installations

All 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 C665¹¹ 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.

The response zones for the window sample boreholes were installed along the entire length of the borehole. Well installation details are provided in Profile Logs in Appendix B.

¹⁰ British Standard (2017). "Investigation of Potentially Contaminated Sites – Code of Practice." BS10175:2017.

¹¹ 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 investigation¹².

Soil was collected for onsite testing. A plastic zip bag was half filled with soil allowing a suitably sized headspace. The bag was sealed and stored for at least 20 minutes before being tested for total volatile organic compounds (TVOCs) using a PhoCheck Tiger photoionisation detector (PID). Results of the PID readings are presented on the profile logs (Appendix B). The on-site monitoring was carried out in line CIRIA C665¹³ to aid in screening samples for volatile analysis.

Soil samples of approximately 500g were recovered in amber jars, amber vials for volatile analysis and plastic tubs. All the samples were labelled and stored in cool boxes prior to being collected by courier at the end of the day for delivery to the Chemtest laboratory in Newmarket for chemical testing. If collection was not possible the same day then samples were stored in the sample storage fridge at the LK Group offices below 4°C. Samples were tracked using appropriate Chain of Custody forms provided by Chemtest.

Many of the contamination tests are UKAS or MCERTS accredited and further details are given in the Certificate of Analysis presented in Appendix C. Table 3-2 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.	13	TP101 0.05-0.3m TP101 0.3-0.5m TP102 0.1-0.5m TP102 0.5-0.6m TP103 0.1-0.5m TP104 0.0-0.3m TP105 0.3-0.8m TP106 0.0-0.8m TP107 0.0-0.2m WS101 0.0-1.0m WS102 0.1-0.4m WS104 0.1-0.4m WS105 0.0-0.3m	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, clinker 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.	2	WS103 0.1-0.5m WS103 1.2-1.4m	Sample tested where hydrocarbon odour was detected during site works. Strata below the odour was also tested to determine the extent of any contamination present.

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.

¹² EA (2000). "Technical Aspects of Site Investigation. Volumes 1 & 2 Text Supplements Research and Development Technical Report." P5-065/Tr.

¹³ CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665.

3.3.2 *Water Sampling / Leaching Testing*

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

A low risk was identified in the preliminary contamination conceptual model for controlled waters (pollutant linkage 4) and further action was only recommended if significant soil contamination was identified on site. Based on the ground conditions encountered, LKC did not consider testing to be required. This is discussed further in Section 6.4.

3.4 **Gas Monitoring**

All the installed boreholes have been monitored for gas on 6no. occasions between the 5th July and the 29th September 2021.

Monitoring was undertaken using a Geotechnical Instruments GA5000 in accordance with the monitoring protocol outlined in CIRIA C665¹⁴ (flow rate measured first). The monitoring was undertaken over a range of weather conditions (including low and falling barometric pressure and heavy rain) to demonstrate worst-case conditions.

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

3.5 **Site Investigation Scope**

The scope of the contaminated land investigation was agreed with the Local Authority prior to undertaking the work (email from Rebecca Twigg dated 15th June 2021). This investigation was in line with the scope.

3.6 **Geotechnical Testing**

3.6.1 *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.
- » Shear Vane tests (giving undrained shear strength) were performed in the trial pits at approximately 1m intervals, within the natural clay strata.
- » Pocket Penetrometer (PP) tests were undertaken within the window sample boreholes in clay strata.
- » Continuous equivalent SPTs were performed in the dynamic probes (strata not determined).

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

3.6.2 *Laboratory Geotechnical Testing*

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

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

¹⁴ CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665.

Suites and Contaminants	No. Samples	Location	Justification
BRE SD1 Short Suite	1	WS101 2.5-2.6m	Additional samples of natural ground to assess the pH and sulphate for geotechnical purposes. pH and water-soluble sulphate are also included in the environmental suites.
Atterberg Limits (plasticity testing)	4	TP101 0.6-1.0m WS102 1.2-1.65m WS103 1.5-2.0m WS104 1.5-2.0m	A selection of clay samples across the site were tested for Atterberg Limits to assess their shrinkability potential associated with current and proposed trees.
Particle Size Distribution (PSD)	4	TP103 0.6-1.4m TP104 0.3-1.0m TP106 1.0-1.5m TP107 1.0-2.0m	PSD undertaken to confirm grading of granular material.

Table 3-3. Summary of geotechnical testing undertaken.

4 Ground Conditions

4.1 Geology – Generalised Sequence

The ground conditions beneath the site comprised made ground underlain by alternating bands of sand, silt and clay. A summary section of the logs is provided in Plate 4-1, with additional comments below.

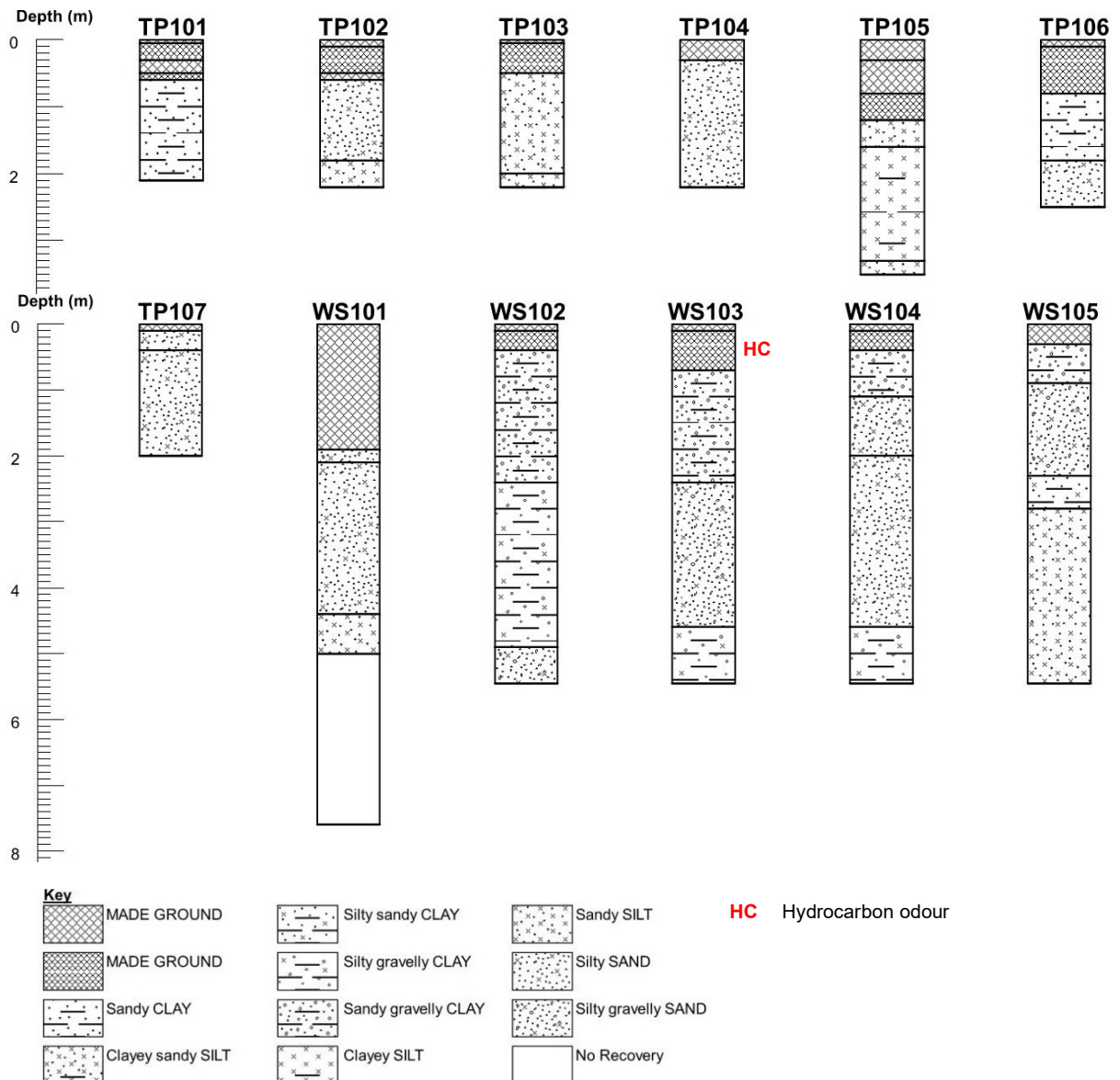


Plate 4-1: Summary of ground conditions.

The car park surfacing currently present on site contains a coal tar binder.

WS101, TP105 and TP106 were located within the footprint of the former public house building and have identified deeper made ground in this area. 1.9m of made ground was identified in WS101 including a possible concrete floor at 1.6m which indicates a former cellar.

4.2 Groundwater

4.2.1 Groundwater Levels

Groundwater strikes were recorded during the investigation in trial pits and boreholes. In addition, groundwater monitoring within the borehole wells has been undertaken on two occasions.

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	2.0, 3.6	1.0-4.0 (MG/S)	6	1.85	2.02	2.75	N	N
WS102	3.0	1.0-5.0 (C/S)	6	0.62	2.40	3.88	N	N
WS103	2.4	1.0-4.0 (C/S)	6	1.75	2.70	3.60	N	N
WS104	2.0	1.0-4.0 (C/S)	6	0.77	2.65	2.74	N	N
WS105	2.4	1.0-5.0 (S/C/ST)	6	2.33	2.71	3.02	N	N
TP101	Dry	-	-	-	-	-	N/A	N/A
TP102	Dry	-	-	-	-	-	N/A	N/A
TP103	2.2	-	-	-	-	-	N	N
TP104	Dry	-	-	-	-	-	N/A	N/A
TP105	2.8	-	-	-	-	-	N	N
TP106	Dry	-	-	-	-	-	N/A	N/A
TP107	Dry	-	-	-	-	-	N/A	N/A

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

Response Zones:

S=Sand; C=Clay; ST=Silt

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	18 (MG)	12 (C)	16 (C)	11 (Si)	17 (S)
2.0	11 (S)	15 (C)	17 (C)	12 (S)	11 (S/C)
3.0	20 (S)	11 (C)	16 (S)	24 (S)	16 (Si)
4.0	25 (S)	16 (C)	20 (S)	23 (S)	14 (Si)
5.0	16 (Si)	17 (S)	18 (C)	21 (C)	20 (Si)
GW Level	2.0-3.6	1.56-3.0	1.75-2.4	0.77-2.0	2.33-2.48

Table 4-2: Summary of SPT (N) values.

Notes:

MG = Made Ground; S=Sand; C=Clay; Si=Silt.

Groundwater level based on strikes during investigation and monitoring data.

4.3.2 Dynamic Probing

Dynamic probing (DP) was carried out from ground level / termination depth of the window sample boreholes and recorded equivalent 'N' values (3 DP blows = 1 'N' values). Results are provided in Appendix B and summarised in Table 4-3.

Approximate Depth (mbgl)	Equivalent 'N' Values
	WS101
5.6	19
5.9	34
6.2	26
6.5	18
6.8	20
7.1	19
7.4	34

Table 4-3: Summary of equivalent 'N' values from dynamic probing.

4.3.3 Shear Vanes

Hand shear vane readings, recording undrained shear strength (s_u), were taken within the clay strata. The results are summarised in Table 4-4 and provided within the profile logs in Appendix B.

Approximate Depth (mbgl)	Average Undrained Shear Strength (kN/m ²)		
	TP101	TP105	TP106
0-1	60	-	90
1-2	55	18	-
GW Level	Dry	2.8	Dry

Table 4-4: Summary of average hand shear vane readings.

Notes:

Groundwater level based on strikes during investigation and monitoring data.
Shear vane readings can be influenced by coarse material including coarse silt.

4.3.4 Pocket Penetrometer Tests

Pocket Penetrometer readings, recording undrained shear strength (s_u), were taken within the clay strata. The results are summarised in Table 4-5 and provided within the profile logs in Appendix B.

Approximate Depth (mbgl)	Average Undrained Shear Strength (kN/m ²)			
	WS102	WS103	WS104	WS105
0-1	-	-	-	-
1-2	38.78, 98.1	110.36	-	-
2-3	147.15	122.63	-	61.31
4-5	-	-	98.10	-
GW Level	1.56-3.0	1.75-2.4	0.77-2.0	2.33-2.48

Table 4-5: Summary of average pocket penetrometer readings.

Notes:

Groundwater level based on strikes during investigation and monitoring data.
Shear vane readings can be influenced by coarse material including coarse silt.

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 4-6.

Location	Depth (mbgl)	Material	Percent passing through sieve		
			63mm	2mm	0.063mm
TP103	0.6-1.4	Brown silty sand.	100	100	32
TP104	0.3-1.0	Brown silty sand.	100	100	15
TP106	1.0-1.5	Stiff brown silty very sandy clay with rare gravel.	100	95	41
TP107	1.0-2.0	Brown silty sand.	100	100	32

Table 4-6: Summary of particle size distribution results.

Notes:

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

4.4.2 Atterberg Limits

Representative samples of natural clay were subjected to Atterberg Limits (plasticity) and Moisture Content testing. Results are presented in Appendix D and summarised in Table 4-7.

Table 4-7 also includes the modified plasticity index as detailed in Chapter 4.2-D5 of the NHBC standards (modified plasticity index = plasticity index x % less than 425µm sieve / 100%).

Location	Depth (mbgl)	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Class	Passing 425 micron (%)	Modified Plasticity Index (%)
TP106	0.6-1.0	19	37	15	22	CI	92	20.24
WS102	1.2-1.65	15	35	14	21	CL	95	19.95
WS103	1.5-2.0	16	36	13	23	CI	92	21.16
WS104	1.5-2.0	22	40	15	25	CI	98	24.50

Table 4-7: Summary of plasticity index testing.

The modified plasticity index characterises the clay as having a low to medium volume change potential.

4.4.3 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 4-8.

Strata	pH	Sulphate (g/l)
Made Ground	7.8-11.5	<0.01-1.0
Natural	8.2-9.4	0.025-0.066

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

5 Geotechnical Assessment

5.1 Proposed Development

It is understood that the proposed development will comprise low rise residential housing with associated landscaping and infrastructure. Details of the proposed loadings are not known and therefore a line loading of 75kN/m has been assumed for preliminary assessment purposes only.

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 comprise Made Ground up to 1.90mbgl at the location of WS101 within the footprint of the former public house, considered representative of an infilled basement, over varying horizons of natural granular and cohesive superficial deposits of SAND, SILT and CLAY 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,
- » Buried structures and old foundations can be anticipated on site. These should be excavated from below the proposed development foot print with the resulting void backfilled.

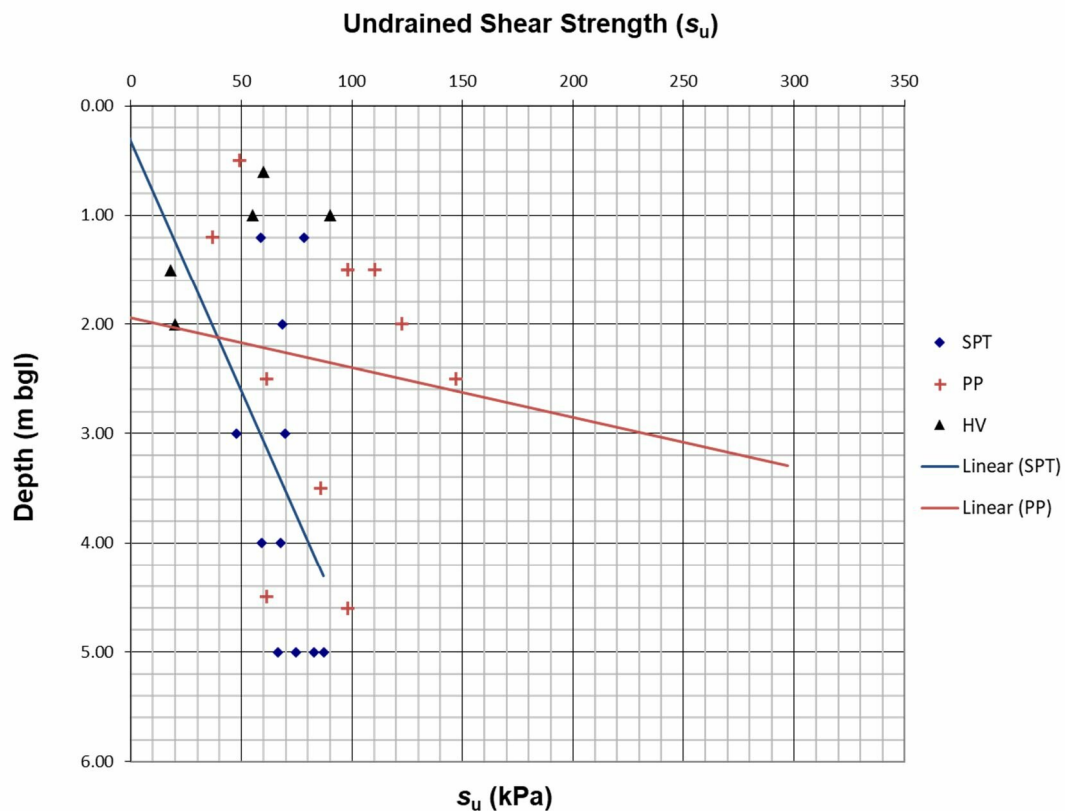
The near surface soils may potentially be disturbed by weathering and site traffic. Precautions should be taken to avoid this, as excessive disturbance may result in more onerous floor slab design, road cap thickness and increased amount of site disposal etc.

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.

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

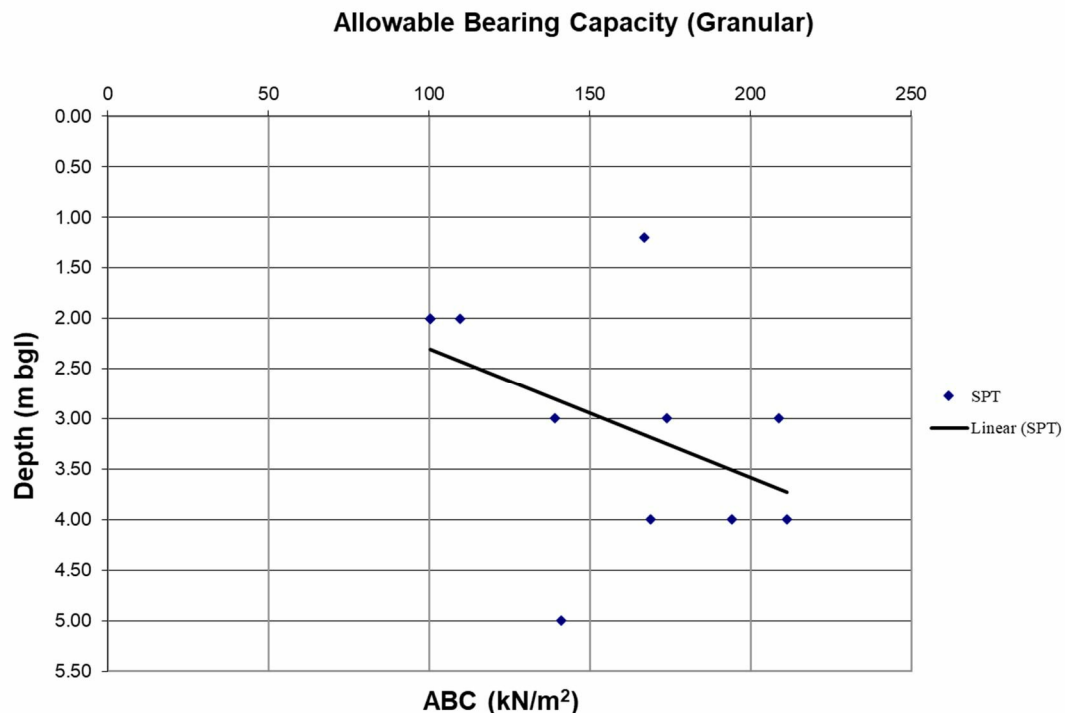


Graph 5-1: Summary of s_u vs depth from in-situ SPT, SHDP and HV testing.

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

A conservative s_u of 50kPa is assigned to the natural cohesive material from a depth of c. 0.5mbgl, returning an allowable bearing capacity (ABC) of 102kN/m² for strip foundations.

The Allowable Bearing Capacity (ABC) of the granular material has been assessed from the in-situ SPT results. The results of the testing have been plotted against depth as is shown in Graph 5- overleaf:



Graph 5-2: Summary of ABC vs depth from in-situ SPT testing.

From Graph 5-2 it can be seen that the density of the granular deposits typically increase with depth. Isolated perched groundwater was recorded within some of the granular horizons, the presence of groundwater in a granular horizon has the potential to reduce bearing capacities by as much as 50%.

A conservative ABC of 100kN/m² has been assigned to the granular deposits.

5.4.2 Strip Foundations

Strip foundations should be constructed at least 150mm into the underlying natural strata where an ABC of 102kN/m² can be obtained within the cohesive strata and 100kN/m² within the granular strata. It is recommended that foundations are placed on a uniform strata and where the foundations bridge across granular and cohesive strata consideration must be given to the potential for differential settlements to occur.

Atterberg limits determinations, summarised in Table 3-6 show the clay to be of low to intermediate to high plasticity and as such the sides of the foundations may require protection using clay board or similar.

Foundation depths should take account of the presence of existing and proposed trees with foundations deepened locally in accordance with the requirements of NHBC Standards for a clay of low to medium plasticity. It is recommended that at working drawing stage a foundation schedule is prepared for the development taking account of the soil plasticity and the locations of trees.

5.4.3 Ground Improvement

The use of ground improvement techniques such as vibro granular columns will allow shallow foundations to be utilised with the Made Ground as well as the differing natural strata. The vibro granular columns should provide a bearing capacity of around 150kN/m² but will also remove variability within the Made Ground and variation within

the natural strata reducing the potential for differential settlement. Specialist advice should be sought from a suitably experienced contractor with regard to allowable bearing capacity and settlements.

5.4.4 Piled Foundations

As an alternative consideration maybe given to the use of mini piled foundations. For preliminary purposes the following initial pile carrying capacities have been calculated based on friction piles socketed into the cohesive deposits. When undertaking these preliminary calculations, the following parameters have been used:

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

Depth	Pile Carrying Capacity (kN)		
	300mm dia	450mm dia	600mm dia
3	21	41	68
5	38	67	102

Table 5-1: Preliminary Pile Carrying Capacity.

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

In areas of significant Made Ground, such as the area of WS101 within the footprint of the former public house, consideration must be given to the potential for negative skin friction to effect the foundation solution and suitable mitigation should be taken, such as the application of casing or coatings.

Recommendation

Given the variability in natural strata along with areas of significant Made Ground, strip foundations are not considered a reliable foundation solution due to the potential for differential settlements and whilst a piling solution is viable it is considered that vibro granular columns will provide the most reliable and cost effective option for the site.

5.5 Ground Floor Slabs

Due to the presence of Made Ground >600mm across the majority site it is considered that ground bearing floor slabs, whilst viable, will require detailed design to accommodate variability of the formation and account for differential settlement.

If vibro granular columns are used for the foundations then this could be extended to the floor slab to improve formation conditions and reduce the risk of damage from settlement. However, it may be more reliable to opt for suspended floor slabs.

The Atterberg Limits determinations, summarised in Table 4-4, show the clay to be of low to intermediate plasticity and as such liable to heave and therefore it is considered that a suspended floor slab would be more appropriate.

Where suspended floor slabs are employed ventilation of the under floor void will be required to address condensation issues. This would also assist in the mitigation of potential gas ingress issues.

5.6 Pavement Construction

It is considered that the topsoil is not suitable for use as a sub-grade. Untreated Made Ground is considered unsuitable as a sub-grade due to its potential variability and potentially low strength/high compressibility. It should be removed to a depth of 0.5m below formation level and sorted to remove any unsuitable or deleterious materials. The sub formation should be rolled and suitable excavated material can then be replaced, up to formation level, in fully compacted thin layers. Any deficit should be made up with suitable imported fill compacted as above. Following this treatment an overall design CBR of 2-5% should be available, although this will require confirmation at a later date through in-situ CBR tests.

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

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

5.7 Drainage

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

5.8 Concrete Durability

Based upon the results of the chemical analyses summarised in Table 4-8 it is considered that subsurface concrete can be designed in accordance with Design Sulphate Class DS-2, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-2 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, however obstructions can be anticipated in the near surface including former foundations and former floor slabs. It is anticipated that any obstructions will be grubbed out during the reduced level dig for the sub structure works.

Some of the exploratory holes were observed to be unstable during the excavation/drilling and the Made Ground and natural deposits included granular strata containing perched groundwater. The short and long term stability of near vertically sided excavations can therefore not be guaranteed and random and sudden instability within these soils should be anticipated.

Due to the variability of the Made Ground it is considered that all excavations are supported or battered back in accordance with guidance contained in CIRIA R97¹⁵. Groundwater seepages were noted in several trial pits, however, these were minor and it is considered that conventional sump pumping should be adequate.

¹⁵ CIRIA Report 97 – Trenching Practice – Second Edition (2001 revision)

5.10 Construction Activity and Inspection

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

- » Due to the variability of the soils at the site it is recommended that sufficient allowance is made for the inspection of formation and sub formations to foundations and pavement construction;
- » Excavations where access is required should be subject to a risk assessment from a competent person and where appropriate mitigation measures such as benching back the sides or use of support systems in accordance with CIRIA 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 (LCRM¹⁶). 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^{17,18}. The recent change to the contaminated land guidance has changed the evaluation of risk from 'minimal' (referred to as Health Criteria values (HCVs))¹⁹ 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 S4ULs²⁰. 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^{21,22,23,24}.

If contaminants are not present as C4SLs and S4ULs then LKC will use ATRISK SSVs or CL:AIRE GACs²⁵. 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

¹⁶ Land Contamination Risk Management (LCRM)

<https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

¹⁷ Defra (2014). "SP1010: Development of Category 4 Screening Levels and Assessment of Land Affected by Contamination – Policy Companion Document."

¹⁸ CL:AIRE (2013). "SP1010: Development of Category 4 Screening Levels and Assessment of Land Affected by Contamination – Final project Report."

¹⁹ EA (2008). "Human Health Toxicological Assessment of Contaminants in Soils." Science Report – SC050021/SR2.

²⁰ LQM (2014). "The LQM/CIEH S4ULs for Human Health Risk Assessment."

²¹ EA (2008). "Updated Technical Background to the CLEA Model." Science Report – SC050021/SR3.

²² EA (2008). "Human Health Toxicological Assessment of Contaminants in Soils." Science Report – SC050021/SR2.

²³ EA (2008). "A Review of Body Weight and Height Data used within the Contaminated Land Exposure Assessment Model (CLEA)." Project SC050021/Technical Review 1.

²⁴ EA (2009). "Compilation of Data for Priority Organic Pollutants for Derivation of Soil Guideline Values." Science report SC050021/SR7.

²⁵ CL:AIRE (2009). "The Soil Generic Assessment Criteria for Human Health Risk Assessment."

PAHs^{26,27} and naphthalene the most volatile and soluble²⁸. 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 negligible²⁹. For B(a)P to be used as a surrogate marker it should follow the profile described by the HPA (2008)³⁰ and CL:AIRE (2013). Naphthalene will be treated separately using the LQM S4ULs.

The proposed development is for residential houses with gardens and apartments with shared soft landscaping. Therefore, the assessment criteria for residential with plant uptake and residential without plant uptake have been used.

All criteria have been generated using the CLEA V1.06 model³¹ based either on 1%, 2.5% and 6% Soil Organic matter (SOM). Results will be compared to the nearest appropriate SOM.

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

B(a)P as Surrogate Marker

Based on the above assumption for PAHs, LKC undertook an assessment of the data for the site with regards to using B(a)P as a surrogate marker for carcinogenic PAHs as per HPA and CL:AIRE guidelines. The primary toxicological study related to Culp *et al.*³², 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.

²⁶ EA (2002). "Contaminants in Soils: Collation of Toxicological Data and Intake Values for Humans. Benzo[a]pyrene." R&D Publication TOX2.

²⁷ USEPA (1984). "Health Effects Assessment of Polycyclic Aromatic Hydrocarbons (PAHs). EPA 540/1-86-013."

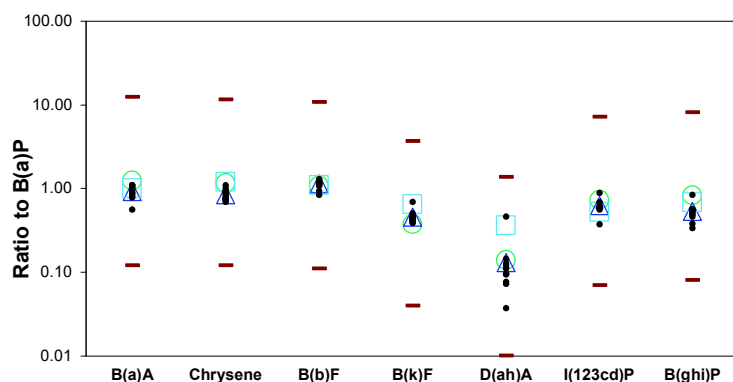
²⁸ EA (2003). "Review of the Fate and Transport of Selected Contaminants in the Soil Environment." Draft technical report P5- 079/TR1.

²⁹ CL:AIRE (2013). "SP1010: Development of Category 4 Screening Levels and Assessment of Land Affected by Contamination – Final project Report."

³⁰ HPA (2010). "HPA Contaminated Land Information Sheet: Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs)." Version 3.

³¹ EA (2008). "CLEA Software (Version 1.05) Handbook." Science Report – SC050021/SR4.

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

Contaminant	Units	No. of samples	Elevated Results	Sample Location	Criteria	Source of Criteria
Metals						
Arsenic	mg/kg	15	41	TP102 (0.5-0.6m)	37 / 40	C4SL Res wpu / Res wopu
Lead	mg/kg	15	210	WS101 (0.0-1.0m)	200 / 310	C4SL Res wpu / Res wopu
			230	WS102 (0.1-0.4m)		
			600	TP102 (0.1-0.5m)		
			360	TP103 (0.1-0.5m)		
			230	TP104 (0.0-0.3m)		
PAHs						
Benzo(a)pyrene	mg/kg	15	7	WS103 (1.2-1.4m)	5.0 / 5.3	C4SL Res wpu / Res wopu
			5.1	WS105 (0.0-0.3m)		
			11	TP105 (0.3-0.8m)		
Coal Tar (B(a)P as surrogate marker)	mg/kg	6	76	WS102 (0.1-0.4m)	0.79	LQM S4UL
			100	TP102 (0.5-0.6m)	(1% SOM)	
			14	TP101 (0.05-0.3m)	0.98	
			20	TP102 (0.1-0.5m)	(2%SOM)	
			24	TP103 (0.1-0.5m)	1.1	
			2.5	WS103 (0.1-0.5m)	(6% SOM)	
GENERAL						
pH	pH	15	Range 7.8 to 11.5			
SOM	%	15	Range 1.7 to 21			
Asbestos	N/A	15	None detected			

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

Notes:

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

Results have been compared to the nearest appropriate SOM.

Res wpu = Residential with Plant Uptake; Res wopu = Residential without Plant Uptake

Coal Tar LQM S4UL assessment criteria used for the samples taken below the tarmac surfacing in the former car park area where coal tar binder was identified.

6.2.3 *Hazard Quotient*

As no significant concentrations of petroleum hydrocarbons were identified in any of the soil samples a hazard index (HI) as described by the Environment Agency³³ technical report (to examine the potential additivity of toxicological effects between the petroleum hydrocarbon fractions) has not been undertaken as part of this assessment.

6.2.4 *Direct Contact Risk – Pollutant Linkage 1*

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

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

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

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

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

6.2.5 *Risk from Inhalation of Vapours – Pollutant Linkage 2*

Although a slight hydrocarbon odour was detected in WS103, confirmatory soil analysis did not detect any hydrocarbons above detection limits. No elevated PID results were recorded on site and no elevated naphthalene concentrations were recorded in the laboratory results.

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.

³³ EA (2005). "The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils." Science Report P5-080/TR3.

6.3 Gas Risk Assessment

Six gas monitoring visits have been undertaken on the study site. Gas monitoring results in full are presented in Appendix E. Following guidance set out in CIRIA C665³⁴ and BS8485³⁵ 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 6-2.

Boreholes	Visit	CH ₄ (%v/v)	CO ₂ (%v/v)	O ₂ (%v/v)	H ₂ S (ppm)	CO (ppm)	Flow (l/h)	Groundwater (mbgl)	Pressure (mb)
WS101	1	<0.1	1.0	20.1	<1.0	<1.0	<0.1	2.01	992 (v)
	2	<0.1	2.1	18.7	<1.0	6.0	<0.1	2.02	1012 (f)
	3	<0.1	1.5	18.7	<1.0	1.0	<0.1	1.91	1004 (f)
	4	<0.1	2.7	17.9	<1.0	<1.0	<0.1	1.98	1021 (r)
	5	<0.1	2.0	19.3	<1.0	1.0	<0.1	1.90	1002 (f)
	6	<0.1	1.1	19.8	<1.0	<1.0	<0.1	1.85	1005 (r)
WS102	1	<0.1	11.2	5.4	<1.0	<1.0	13.1	1.56	993 (v)
	2	<0.1	9.6	2.5	1.0	12.0	<0.1	1.75	1011 (f)
	3	0.2	4.3	4.9	<1.0	1.0	-0.1	0.62	1004 (f)
	4	0.1	4.9	5.9	<1.0	<1.0	5.2	0.93	1022 (r)
	5	<0.1	12.2	0.2	<1.0	<1.0	-2.7	2.40	1002 (f)
	6	<0.1	9.1	0.4	<1.0	<1.0	13.0	1.50	1003 (r)
WS103	1	<0.1	4.3	15.0	<1.0	1.0	<0.1	1.75	993 (v)
	2	<0.1	4.3	14.2	1.0	5.0	<0.1	2.35	1012 (f)
	3	<0.1	7.0	15.0	<1.0	<1.0	<0.1	1.95	1004 (f)
	4	<0.1	2.6	16.8	<1.0	<1.0	14.9	2.26	1022 (r)
	5	<0.1	4.3	16.0	<1.0	3.0	<0.1	2.68	1002 (f)
	6	<0.1	10.3	1.3	<1.0	<1.0	0.2	2.70	1005 (r)
WS104	1	<0.1	1.9	14.8	<1.0	9.0	<0.1	0.77	993 (v)
	2	<0.1	2.9	15.4	1.0	14.0	<0.1	1.45	1011 (f)
	3	0.2	8.1	1.2	<1.0	2.0	2.7	0.95	1004 (f)
	4	0.1	7.9	3.7	<1.0	1.0	<0.1	1.17	1022 (r)
	5	<0.1	10.1	0.4	<1.0	7.0	<0.1	1.80	1003 (f)
	6	<0.1	2.1	18.2	<1.0	<1.0	<0.1	2.65	1004 (r)
WS105	1	<0.1	4.4	15.5	<1.0	1.0	-0.1	2.33	993 (v)
	2	<0.1	3.3	17.5	<1.0	5.0	<0.1	2.48	1013 (f)
	3	<0.1	3.6	20.1	<1.0	<1.0	0.2	2.05	1004 (f)
	4	<0.1	2.3	18.8	<1.0	<1.0	<0.1	2.40	1022 (r)
	5	<0.1	3.1	17.6	<1.0	1.0	<0.1	2.71	1003 (f)
	6	<0.1	4.6	16.4	<1.0	<1.0	<0.1	2.70	1006 (r)

Table 6-2: Summary of gas monitoring.

Notes:

If concentrations / flow is zero, then equipment detection limits are assumed.

Table shows peak concentrations of CH₄, CO₂, O₂, H₂S and CO.

Bold where CO₂ exceeds 5%v/v and CH₄ exceeds 1%v/v.

Atmospheric pressure (over past 24hrs): v=variable, f=falling, r=rising.

³⁴ CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665.

³⁵ 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.

Carbon monoxide was >1ppm in all boreholes at a maximum concentration of 14ppm (WS104). 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).

Hydrogen sulphide was recorded at 1ppm in three of the boreholes. Workplace exposure limits defined by the HSE are available for hydrogen sulphide. A Short Term Exposure Limit of 10ppm (15 minute period) and Long Term Exposure Limit of 5ppm have been defined (8 hour period).

Based on the above exposure limits, carbon monoxide or hydrogen sulphide is not expected to pose a significant risk to the proposed site receptors.

Gas Screening Value

In accordance with CIRIA C665³⁶, a Gas Screening Value (GSV) may be calculated. Assuming worst-case scenario maximum gas concentrations and flow for each borehole have been used to calculate the GSV. The GSV can be used to determine the characteristic situation (CS).

Table 6-3 shows the maximum GSV for each borehole and the appropriate characteristic situation (based on GSV only). An overall site assessment (WS101-WS105) has also been included (worst case values across the site).

Boreholes	Max GSV (l/hr)	CS / TL
WS101	0.0027	CS1 / Green
WS102	1.5982	CS3 / Amber 2
WS103	1.5347	CS3 / Amber 2
WS104	0.2727	CS2 / Amber 1
WS105	0.0092	CS1 / Green
WS101-105	0.0298 (CH ₄)	CS1 / Green
	1.8178 (CO ₂)	CS3 / Amber 2

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

Notes:

CS – Characteristic Situation; TL= Traffic Light.

Flow rates remained generally low. However, fluctuations in flow, including negative flow rates, were recorded in WS102 and WS103. Flow rates in this borehole ranged between -2.7 to 14.9l/hr. CL:AIRE RB17³⁷ notes that that high flow rates, not representative of the natural soil gas regime, can result from the artificial construction of gas wells for a variety of reasons. For example, “where more permeable strata are confined by impermeable material such as clay over sand layers”. Clay was recorded in WS102 to 4.9m and in WS103 to 2.4m underlain by sand. It is considered by LKC that the drilling of the borehole puncturing the confining clay layer has created artificial conditions within this well.

In WS104, the elevated flow rate is likely due to rising groundwater levels above the slotted pipework and is not considered to be a true reflection of gas flow rates.

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

³⁷ CL:AIRE (2012): ‘A Pragmatic Approach to Ground Gas Risk Assessment’. RB17.

As the fluctuating gas flow rates identified during the monitoring period in these boreholes are not considered to be a true representation of ground conditions, LKC consider that CS2 / Amber 1 gas protection measures are appropriate for the site.

Hazardous gas can potentially migrate into buildings, accumulate in confined spaces and cause explosions (methane) and asphyxiation. The gas risk identified onsite is principally from carbon dioxide. LKC consider the probability of carbon dioxide affecting site users as likely. Assuming a severe consequence, there is a high risk and remediation will be required associated with carbon dioxide.

Minimal methane was recorded; therefore, LKC consider the probability of methane gas affecting site users and buildings as unlikely. Assuming a severe consequence, there is a moderate/low risk. A low risk is assumed given the concentrations of methane identified.

6.4 Controlled Water Assessment

The PRA identified a low risk with respect to controlled waters as no significant source of mobile contamination was anticipated. Furthermore, the site is underlain by a Secondary B Aquifer with no abstractions identified within influencing distance. There are no surface water features in proximity to the site.

No evidence of significant mobile contamination was identified on the site. Although elevated metals and PAHs were identified within the soils, the source is anticipated to be ash, clinker and coal noted within the soil. Contamination associated with ash and clinker is not anticipated to be mobile due to the residual crystalline nature of the matrix. Discrete fragments of tarmacadam are not expected to be significantly mobile.

In addition, clay deposits underlying the site may impede the migration of any residual mobile contamination present.

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

6.5 Additional Risk Assessments

6.5.1 Concrete (Pollutant Linkage 5)

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

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

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 contamination³⁹. Only contaminants of concern, based on the preliminary conceptual model and ground conditions encountered, were analysed. The following contaminants were not considered to be

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

a risk and therefore not included in the analysis suites: chlorinated compounds, cresols, ethers, nitrobenzene, ketones, aldehydes and amines.

The following elevated contaminants were identified:

» Elevated TVOCs (inc. naphthalene) in made ground across the site.

It should be noted typical pipework depths are 0.75mbgl to 1.35mbgl. The pipework may be laid into the underlying natural strata depending on the proposed location.

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

At this stage, the probability of organic contaminants affecting potable water pipes is a low likelihood. Given the consequence is considered to be medium, the risk (pollutant linkage 6) is anticipated to be low / moderate risk and remediation (i.e. barrier pipe) / may be required (subject to further risk assessment).

6.5.3 *Phytotoxicity (Pollutant Linkage 7)*

Soil results were compared to phytotoxic guideline values as outlined in BS3882⁴⁰.

No elevated contaminants were identified therefore 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 very low.

6.6 **Revised Contamination Conceptual Model**

The preliminary contamination conceptual model (Table 2-7) has been revised following the risk assessments undertaken in Sections 6.1-6.5. The revised contamination conceptual model follows the same methodology and guidance used in the preliminary contamination conceptual model. The risk matrix is provided in Appendix A.

The revised contamination conceptual model is presented in Table 6-4.

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

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

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 further work requirements and remedial proposals are given in Section 9.

⁴⁰ BS (2015). "Specifications for Topsoil and Requirements for Use." BS3882:2015.

Pollutant Linkage	Pathway	Receptor	Contaminant	Probability	Consequence	Risk	Assessment
PL1	-Dermal contact. -Inhalation of soil, fibres and dust. -Ingestion of soils, dust, vegetables, soil attached to vegetables. -Windblown dust.	-Future site users. -Offsite receptors.	Heavy metals: -Arsenic and lead PAHs: -B(a)P	Likely	Medium	Moderate	-Likely probability as elevated metals (arsenic and lead) and PAHs identified in the made ground across the site which could come into contact with site users in gardens / soft landscaping areas. -Recommendation*¹ *²: Remediation required. Likely to include an environmental cover system in gardens / soft landscaping areas.
			-Petroleum Hydrocarbons -ACM	Unlikely	Medium	Low	-No asbestos detected and no elevated petroleum hydrocarbons encountered. -Recommendation: 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 volatile 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. 12.2%v/v). -Recommendation: Gas protection measures in line with CS2 / Amber 1 required.
			-Methane	Unlikely	Severe	Moderate / Low	-No elevated methane concentrations identified. GSV classifies site as CS1 / Green. -Low risk assumed. -Recommendation: No remediation required.
PL4	-Surface Run-off. -Migration through permeable strata and preferential pathways -Perched waters migration.	-Groundwater (Secondary B Aquifer).	Mobile contaminants: -Metals and PAHs.	Unlikely	Medium	Low	-Although elevated metals and PAHs identified, given the environmental settings and ground conditions encountered not considered to pose a significant risk to groundwater water. -Recommendation: No remediation required.
PL5	-Sulphate attack on concrete.	-Building structure.	-Sulphate.	Likely	Mild	Moderate / Low	-Elevated sulphate identified therefore moderate risk considered appropriate. -Recommendation: Sulphate resistant concrete in line with DS-2 AC-2.
PL6	-Ingestion of tainted water supply.	-Future site users (via potable water).	Organic Contaminants: -Naphthalene.	Low Likelihood	Medium	Moderate / Low	-Low probability as although elevated naphthalene encountered water pipes may be installed in underlying natural depending on pipe routes. -Recommendation: UU risk assessment undertaken.
PL7	-Direct Contact (plant uptake).	-Flora.	Phytotoxic Contaminants: -Zinc, copper, nickel.	Unlikely	Minor	Very Low	-No elevated contaminants identified. -Recommendation*³: No remediation required.

Table 6-4: Revised Contamination Conceptual Model.

Notes:*¹ Although no ACM identified, contractors should be vigilant during earthworks of any potential ACM.

*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.

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^{41, 42, 43, 44, 45, 46, 47, 48, 49}.

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 have classified the sample from WS101 0.0-1.0m as HAZARDOUS WASTE due to elevated pH (HP8 corrosive).

LKC consider this is associated with concrete fragments noted in the strata. The pH of this sample was 11.5 which is the point at which pH results become hazardous. Therefore, the exceedance is nominal and it is not expected a waste receiver to determine this material as hazardous. Moreover, pH analysis is not without its limitations, on receiving a sample containing fragments of concrete, a laboratory takes a sub-sample and grinds it down to a powder for testing. Experiments have shown that a high (hazardous) pH is typically not found when lumps of concrete are analysed but usually only found when the concrete fragments are ground to a powder. This is because the grinding process increases the surface area of the concrete. Thus, when the pH is measured, it can show a much higher pH than if the pH of the original (un-ground) soil/concrete fragments had been measured.

The results show that the remaining samples tested are classified as NON-HAZARDOUS WASTE.

The Hazwaste Online™ output sheets are provided in Appendix H.

In addition, the current car park surfacing will need to be disposed of as hazardous waste as it contains coal tar.

⁴¹ EA (2018). "Guidance on the Classification and Assessment of Waste (1st Edition v1.1)". Technical Guidance WM3.

⁴² CLP Regulation - Regulation 1272/2008/EC of 16 December 2008.

⁴³ 1st ATP - Regulation 790/2009/EC of 10 August 2009

⁴⁴ Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013

⁴⁵ WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014

⁴⁶ Revised List of Wastes 2014 - Decision 2014/955/EU of 18 December 2014

⁴⁷ 13th ATP - Regulation (EU) 2018/1480 of 4 October 2018

⁴⁸ POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004

⁴⁹ 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	- 12no. residential houses (semi-detached and terraced) with front and rear gardens and an apartment building with associated soft landscaping. Also includes associated infrastructure including road network.
General Ground conditions / Geotechnical Testing	- Based on WS101-WS1035, TP101-TP107. - Maximum investigation depth 5.45mbgl. - Made Ground ranging between 0.1-1.9mbgl. - Natural superficial deposits comprised horizons of CLAY, SILT and SAND. SPTs N=11-21, HV=18-90kN/m ² and PP 36-147kN/m ² . - No bedrock encountered. - Groundwater encountered is considered representative of perched pockets.
Allowable Bearing Pressure	102kN/m ² within the natural cohesive strata and 100kN/m ² within the natural granular strata.
Anticipated Foundation Type	- Ground conditions below the proposed development are variable with varying depths of made ground (0.1-1.9mbgl), and natural superficial deposits comprising horizons of SAND, SILT and CLAY. - Traditional shallow foundations are not expected to be suitable for the proposed development given the ground conditions encountered. Consideration should be given to a ground improvement option, such as vibro granular columns, to remove variability in the shallow soils.
Shallow Groundwater	- Shallow groundwater identified on the site is considered representative of isolated perched water pockets. - The presence of groundwater within a granular strata has the potential to reduce the ABC of the strata by as much as 50% - Suitable drainage should be considered in the proposed development layout.
Concrete Requirements	- Based on BRE Digest 2005 ⁵⁰ – DS-2 AC-2 recommended.
Services	- Services – consideration to the presence of services running through the site. Services may need to re-routed.
Temporary support of excavation	- May be required; some trial pits were recorded as unstable.
Plasticity	- Consideration will need to be given to the shrink / swell of the clay strata if it is to be used as founding strata, particularly where trees/hedges are present. Foundations may need to be deepened. A low to medium volume change potential has been calculated for the site.

Table 8-1: Geotechnical Observations and Conclusions Table.

⁵⁰ BRE (2005). "Concrete in Aggressive Ground." Special Digest 1.

8.2 Contamination Assessment

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

Pollutant Linkage		Risk	Recommendations
1	Contaminants posing a risk to site users via dermal contact, ingestion and inhalation (of soil, dust, fibres and vegetables).	Moderate	- Elevated arsenic, lead and PAHs identified across the site. - Recommendations: Remediation required in garden and soft landscaped areas.
		Low	- No elevated petroleum hydrocarbons or ACM identified. - Recommendations: No remediation required.
2	Volatile contaminants posing a risk to site users via the inhalation of vapours.	Low	- No elevated volatile contamination identified. - Recommendations: 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 (CO₂)	- Elevated CO ₂ up to 12.2%v/v identified. - Recommendations: Gas protection measures in line with CS2 / Amber 1 required.
		Moderate / Low (CH₄)	- No elevated methane concentrations encountered. - Low risk assumed. - Recommendations: No remediation required.
4	Mobile contamination posing a risk to controlled waters via the migration through permeable strata.	Low	- Although elevated metals and PAHs identified, given the environmental settings and ground conditions encountered not considered to pose a significant risk to groundwater water. - Recommendation: No remediation required.
5	Sulphate posing a risk to building via direct contact (sulphate attack).	Moderate / Low	- Elevated sulphate identified. - Recommendations: Sulphate resistant concrete (DS-2 AC-2) in localised areas.
6	Organic contaminants posing a risk to water pipes.	Moderate / Low	- Organic contamination identified although pipework may be installed in underlying natural ground. - Recommendations: UU risk assessment to be completed.
7	Phytotoxic metals posing a risk to flora via root uptake.	Very Low	- No phytotoxic metals above generic criteria. - Recommendations: No remediation required.

Table 8-2: Summary Risk Table.

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. The table shows work required pre-construction (i.e. during earthworks) and during / post construction.

Phase	PL	Remediation Requirements	Validation Requirements
Pre-Construction	ALL	<u>Earthworks Inspections / Unexpected Contamination</u> The relevant contractors should be briefed that during development works at the site should any unusual ground conditions and / or visual or olfactory evidence of contamination (including asbestos containing material) be encountered at the site, LKC and the Local Authority should be informed, and further assessment of the material may be required. Should 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 ⁵¹ .	Log of work undertaken including photographs. Details of any sampling undertaken and validation of any potential additional remedial work.
Build-Phase Construction	1 and 7	As the made ground is relatively shallow in some areas of the site the following options are given: <u>Option 1</u> Removal of all reworked topsoil / made ground from garden and soft landscaping and raise levels (as required) with suitably chemically validated subsoil and topsoil. <u>Option 2</u> If all or some of the made ground remains in place in gardens and soft landscaping areas, an environmental cover system will be required. The environmental cover system should be as follows: Private Back Gardens: 600mm thick environmental cover system comprising: <u>Either</u> 100mm physical break layer (MOT type 1 material, 20-30mm, minimal fines) and at least 500mm comprising clean inert fill and sufficient topsoil for a growing medium. <u>Or</u> geotextile membrane and at least 600mm comprising clean inert fill and sufficient topsoil for a growing medium.	Consignment notes confirming the removal of made ground. Photographic evidence of natural strata. Chemical validation of imported soils: See Table 9-2. Measuring depth of environmental cover system using a staff and providing photographic evidence. Photographic evidence of the granular physical break or geotextile layer will also be collected. Chemical validation of imported soils: See Table 9-2.

Table 9-1: Further work, remediation and validation requirements

Notes: See Table 6-4 for pollutant linkage (PL) details

⁵¹ CIRIA (2014). "Asbestos in Soil and Made Ground: A Guide to Understanding and Managing Risks". C733.

Phase	PL	Remediation Requirements	Validation Requirements
Build-Phase Construction	1 and 7	<u>Option 2 (continued)</u> Private Front Gardens / Shared Landscaping: 450mm thick environmental cover system comprising: Either 100mm physical break layer (MOT type 1 material, 20-30mm, minimal fines) and at least 350mm comprising clean inert fill and sufficient topsoil for a growing medium. Or geotextile membrane and at least 450mm comprising clean inert fill and sufficient topsoil for a growing medium. The subsoil layer can be replaced by additional topsoil. A diagram of a typical environmental cover system is shown in Appendix G.	Measuring depth of environmental cover system using a staff and providing photographic evidence. Photographic evidence of the granular physical break or geotextile layer will also be collected. Chemical validation of imported soils: See Table 9-2.
	3	<u>Gas Protection Measures</u> In line with CS2 / Amber 1 as per UK guidance^{52,53}. This is likely to / should include: • Passive subfloor or active subfloor ventilation system. • 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 735⁵⁴
	5	<u>Sulphate Resistant Concrete</u> Sulphate Resistant Concrete in line with DS-2 AC-2 recommended.	N/A
	6	<u>Potable Water Pipes</u> It is recommended that a Water Pipeline Assessment is undertaken once the location and depth of potable water pipes are known. Barrier pipe may be required.	Delivery Notes of Pipe Material. Photographs of the Installed Pipe.
Other Considerations		<u>Grubbing Out of In-Ground Structures</u> It is recommended that in-ground structures are grubbed out as part of the groundworks. In-ground structures expected in east of site associated with the former building.	

Table 9-1 (continued): Further work, remediation and validation requirements

Notes: See Table 6-4 for pollutant linkage (PL) details

⁵² CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665

⁵³ BSI (2015). "Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for new buildings." BS8485:2015.

⁵⁴ CIRIA (2014). "Good Practice on the Testing and Verification of Protection Systems for Building Against Hazardous Ground Gas". CIRIA C735.

Other Considerations	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 ⁵⁵): 5,000 tonnes (c. 2,500m³) <u>treatment</u> of crushed concrete / stone. 1,000 tonnes (c. 500³) <u>use of</u> non-hazardous soil 5,000 tonnes (c. 2,500m³) <u>use of</u> clays, sand, gravel, brick, concrete, stone etc. 50,000 tonnes (c. 25,000m³) <u>use of</u> 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 <u>before</u> 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. Health and Safety Considerations In working with, removing or treating any contaminating material it is important that any potential risks associated with the actual site works are mitigated by good environmental management of the site during the remedial phases. Standard health and safety precautions (as per HSE guidance⁵⁸) should be adopted by all workers involved with site enabling and construction works.
----------------------	---

Table 9-1: Further work, remediation and validation requirements

Notes: See Table 6-4 for pollutant linkage (PL) details.

9.2 Validation of Subsoil / Topsoil

Any 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, based on MCC 'Guidelines to Developer' (2016). However, LKC consider no testing, but proof of provenance is sufficient for natural, virgin, quarried material.

Ideally, the material should be sampled at source to prevent double handling if soil fails, with confirmatory sampling undertaken on importation to site. However, where this is not possible then material imported should be segregated based on source and soil type. Validation samples should be taken prior to placement in gardens / soft landscaping to ensure suitability for use.

⁵⁵ <https://www.gov.uk/guidance/waste-exemptions-using-waste>

⁵⁸ HSE (1991). "Protection of Workers and the General Public During Development of Contaminated Land" London HMSO.

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

Table 9-2: 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.

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

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

In addition, it should be ensured that the matrix of the topsoil is suitable as a growing medium and no undesirable material is present (in line with BS3882⁵⁹). LKC advise this information is provided by the supplier before material is imported onto site.

Imported material to be used in gardens will be compared against 'residential with plant uptake' criteria)) and any material to be used in landscaped areas around the apartment block should be compared against 'residential without plant uptake' criteria (as used in the contamination risk assessment (Section 6-1). Appropriate remedial target criteria are presented in Appendix F.

9.3 Site Completion Report

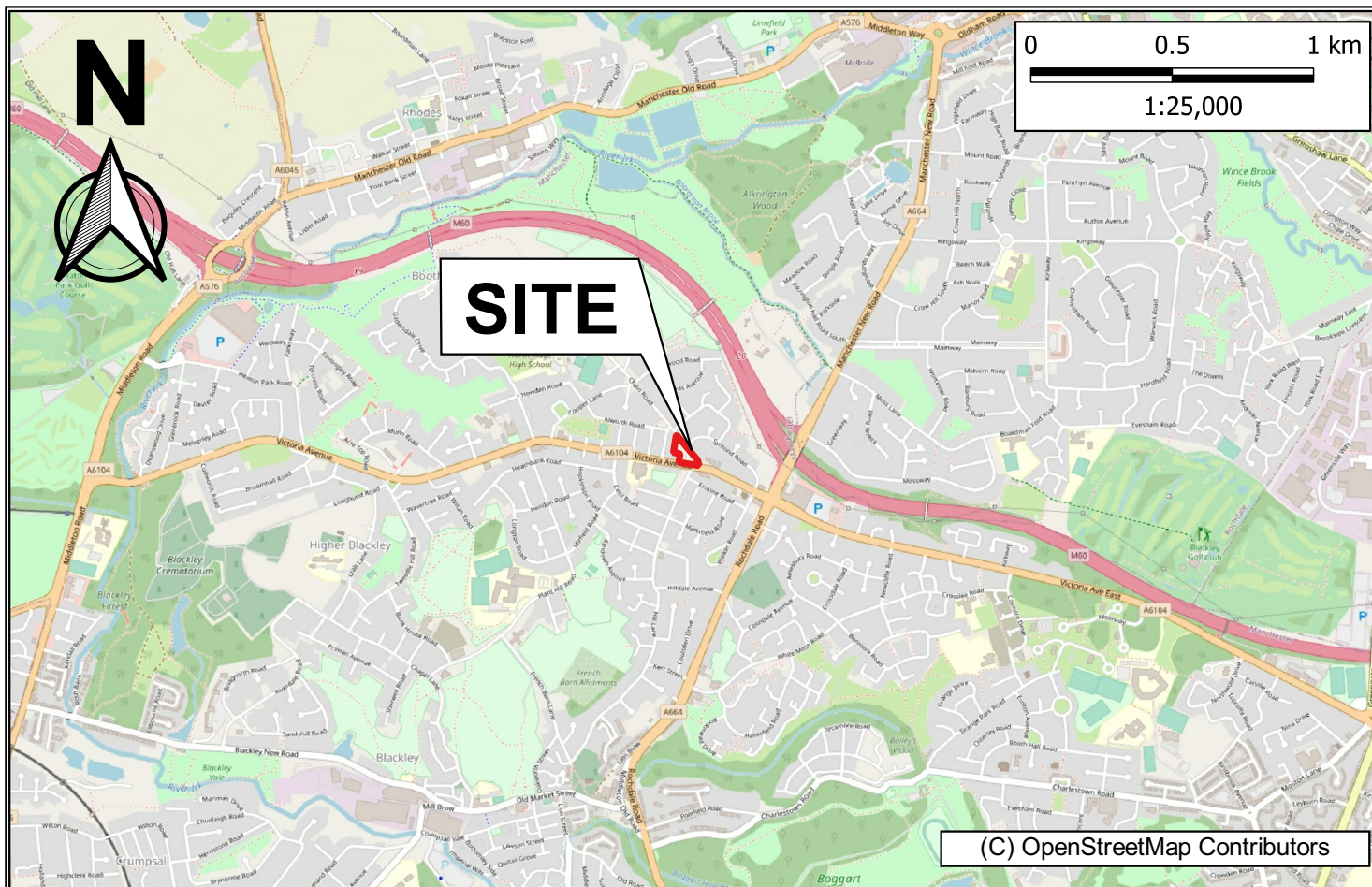
It is recommended that any remediation carried out on the site is validated by a third party and suitable documentary evidence provided in a Site Completion Report, such as photographs, consignment documents and analytical results. This should include as a minimum:

- » Provision of waste transfer documents.
- » If option 1 (source removal): Validation of any made ground removal (photographic evidence that natural strata was reached).
- » If option 2 (environmental capping layer): Validation of environmental cover system depth.
- » Verification testing of all imported soil for garden and soft landscaping areas.
- » Validation of installed gas protection measures.
- » Information on the installation of protective pipes and / or sterile trenches.
- » Details of any unexpected contamination identified onsite, suitably risk assessed and / or validated.

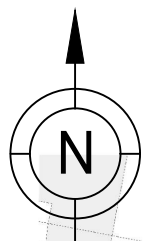
The Site Completion Report will assist the Local Authority in the discharge of any future relevant planning condition and will also be of use to solicitors acting on behalf of any prospective conveyancer who may have concerns over the former use of the site.

⁵⁹ BS (2015). "Specifications for Topsoil and Requirements for use." BS3882:2015.

Figures



Client: Great Places Housing Group				Title: Site Location & Boundary Plan			
Site: Chain Road, Blackley				Scale (see scale bar): 1:25,000 & 1:3,000 @ A4			
Job No.: LKC 21 1026	Drawn By: NJ	Checked By: MT	Drawn: Feb 2021	Figure: 1	Revision:		



KEY

- Site Boundary
- Outline of Former Public House

Schedule of accommodation All to MCC Space standards

Apartment Block - 3No Storeys/single stair/no lift

- 14No 2Bed/3Persons
- 6No 1Bed/2Persons
- 20No TOTAL**

70% (14No) Car parking spaces

Houses

- 10No 3Bed/4Persons
- 2No 4Bed/6Persons
- 12No TOTAL**

100% (1No) Car parking spaces per dwelling

32No Units 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.



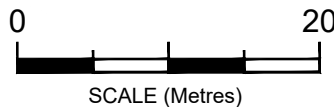
Client:
Great Places Housing Group

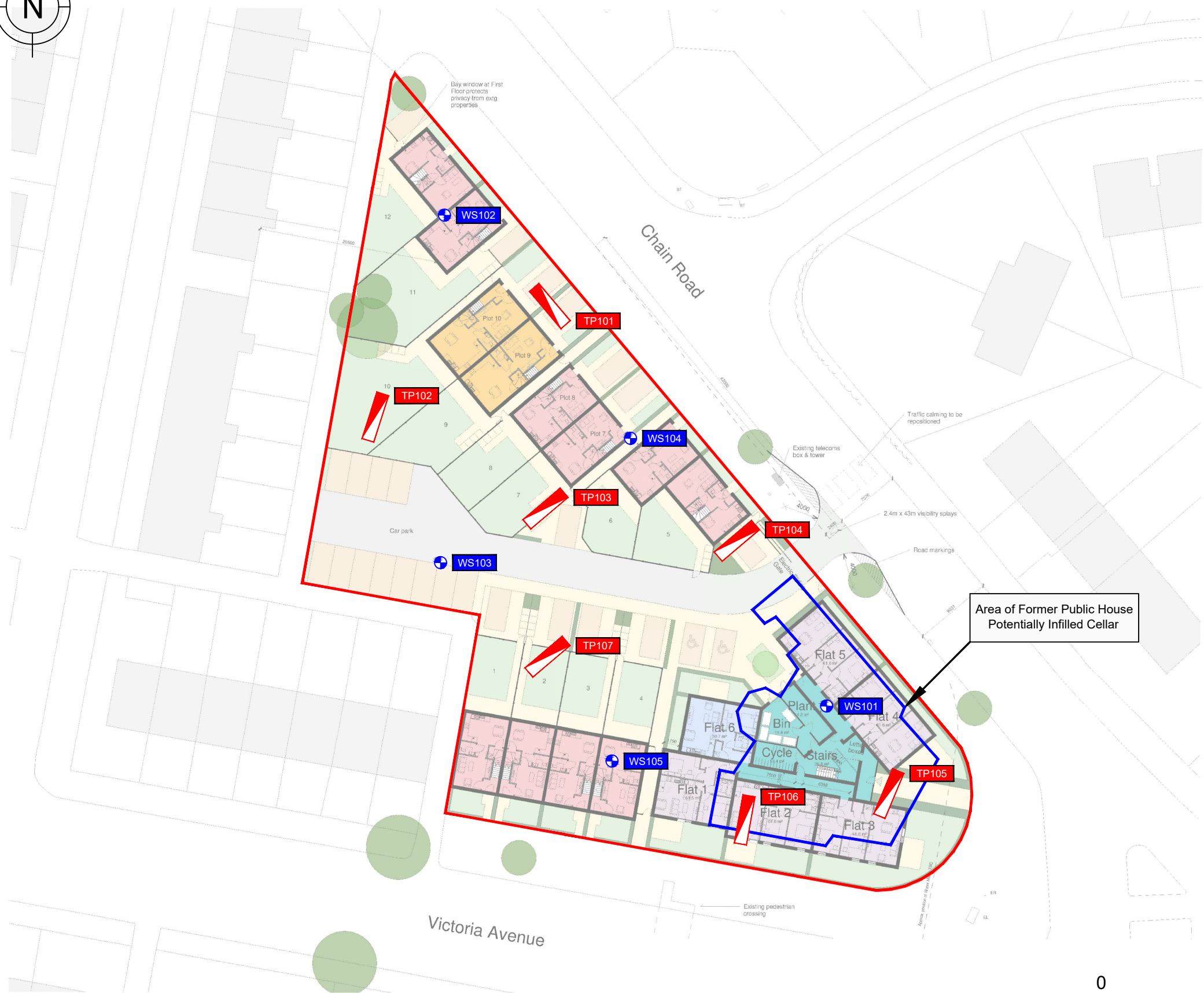
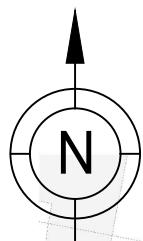
Site:
Chain Road, Blackley

Title:
Proposed Layout Plan

Job No.:	Scale (See Scale Bar):	Figure:	Revision:
LKC 21 1026	1:500 @ A3	2	A
Drawn By:	Checked By:	Drawn:	
AC	MT	Jun 2021	

Extract from: Bowker Sadler Architecture
Drawing Ref: Proposed Site Plan, No.0100, Rev:A (26/05/2021)





KEY

- Site Boundary
- Outline of Former Public House
- Window Sample Borehole (WS)
- Trial Pit (TP)

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



Client:
Great Places Housing Group

Site:
Chain Road, Blackley

Title:
Site Investigation Location Plan

Job No.:	Scale (See Scale Bar):	Figure:	Revision:
LKC 21 1026	1:500 @ A3	3	A
Drawn By:	Checked By:	Drawn:	
AC	MT	Jun 2021	

Extract from: Bowker Sadler Architecture
Drawing Ref: Proposed Site Plan, No.0100, Rev:A (26/05/2021)

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 552⁶⁰. It involves the classification of the:

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

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

Table A. Classification of Consequence

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

Table B. Classification of Probability.

⁶⁰ CIRIA C552 (2001) Contaminated Land Risk Assessment - A Guide to Good Practice.

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

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

Table C. Comparison of Consequence against Probability

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

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

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

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

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

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

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

Appendix B

Profile Logs

Excavation Method

Drive-in Windowless Sampler

Dimensions

101mm to 3.00m

Ground Level (mOD)

<101.00
>98.00

Client

Great Places Housing Group

Job
Number
LKC 21 1026

Location (Handheld GPS)

386006 E 404145 N

Dates

18/06/2021

Engineer

LKC

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-1.00	ES1 PID=0.4ppm					MADE GROUND: Reddish brown silty SAND and GRAVEL with low brick cobble content, occasional ash, clinker, timber fragments, concrete fragments, metal fragments and coal fragments. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular comprising sandstone, limestone, and mudstone. Cobble are angular.			
1.20-1.65	SPT N=18		3,5/7,5,3,3		(1.90)				
2.00-2.45	SPT N=11		Water strike(1) at 2.00m.	99.10	1.90	Concrete noted at 1.60mbgl, possible former cellar floor. Approximate thickness 100mm. Frequent ash and clinker below concrete at 1.70-1.80mbgl.		Σ1	
2.10-2.50	DB2		2,2/2,3,3,3	98.90	(0.20)	Medium dense yellowish brown gravelly silty SAND. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular comprising sandstone and coal.			
2.50-2.60	ES3				2.10				
3.00-3.45	SPT N=20		3,4/4,5,5,6		(2.30)	Medium dense brown silty SAND. Sand is fine to medium.		Σ2	
3.50-4.00	DB4		Water strike(2) at 3.60m.						
4.00-4.45	SPT N=25		3,4/5,6,6,8						
4.50-4.80	DB5			96.60	4.40	Firm consistency medium strength brown very sandy SILT. Sand is fine to medium.			
4.50-5.00	PP 61.31 kPa				(0.60)				
5.00-5.45	SPT N=16		2,3/3,4,4,5	96.00	5.00	No recovery. Follow on DP's.			
					(2.70)				
				93.30	7.70	Complete at 7.59m			

Remarks

Location and elevation from handheld GPS.
Groundwater encountered at 2.00mbgl and 3.60mbgl.
Concrete noted at 1.50mbgl, possible former cellar floor.
CPT used at 1.50mbgl to penetrate concrete at depth.
Borehole unstable, collapsed to 4.00mbgl.
Follow on DPs undertaken between 5.00-7.59mbgl (ref. DP101).
Monitoring well installed to 4.00mbgl.
Limited recovery between 0.00-1.90mbgl.

Scale
(approx)

1:50

Logged
By

BR

Figure No.

LKC 21 1026.WS101



LK CONSULT LTD

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

Site

Chain Road, Blackley

Probe Number

DP101

Method Dynamic Probing	Cone Dimensions	Ground Level (mOD)	Client Great Places Housing Group	Job Number LKC 21 1026
	Location (Handheld GPS)	Dates 01/06/2021	Engineer LKC	Sheet 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)	Blows for Depth Increment
					0 2 4 6 8 10 12 14 16 18 20
				0.00	
				0.50	
				1.00	
				1.50	
				2.00	
				2.50	
				3.00	
				3.50	
				4.00	
				4.50	
				5.00	
				5.50	
				6.00	
				6.50	
				7.00	
				7.50	
				8.00	
5.00-5.10	3				
5.10-5.20	3				
5.20-5.30	3				
5.30-5.40	3				
5.40-5.50	3				
5.50-5.60	4				
5.60-5.70	5				
5.70-5.80	5				
5.80-5.90	9				
5.90-6.00	11				
6.00-6.10	11				
6.10-6.20	12				
6.20-6.30	10				
6.30-6.40	8				
6.40-6.50	8				
6.50-6.60	6				
6.60-6.70	6				
6.70-6.80	6				
6.80-6.90	7				
6.90-7.00	7				
7.00-7.10	6				
7.10-7.20	9				
7.20-7.30	11				
7.30-7.40	14				
7.40-7.50	19				
7.50-7.59	12				

Remarks

Scale (approx) 1:40
Logged By
Figure No. LKC 21 1026.DP101

Excavation Method

Drive-in Windowless Sampler

Dimensions

101mm to 3.00m

Ground Level (mOD)

<101.00
>98.00

Client

Great Places Housing Group

Job
Number

LKC 21 1026

Location (Handheld GPS)

385962 E 404198 N

Dates

18/06/2021

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.10-0.40	ES1 PID=0.2ppm			100.90 100.60	0.10 (0.30) 0.40	MADE GROUND: Tarmacadam with possible coal tar. Coal tar like odour noted.			
1.20-1.65 1.20-1.40 1.20-1.50 1.50-1.70 1.50-2.00	SPT N=12 ES2 PID=0.1ppm PP 36.78 kPa PP 98.10 kPa U3		2,3/3,3,3,3		(2.00)	MADE GROUND: Reddish brown silty SAND and GRAVEL with frequent brick fragments, occasional ash, clinker, timber fragments and coal fragments. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular comprising sandstone, limestone, and mudstone. Firm to stiff consistency low to high strength greyish brown gravelly sandy CLAY. Sand is fine to coarse, angular to subangular comprising sandstone and coal. Low strength at 1.20mbgl. High strength below 1.50mbgl.	    		
2.00-2.45 2.00-2.45	SPT N=15 X4		2,3/3,4,4,4	98.60	2.40	Stiff consistency high strength gravelly silty CLAY. Gravel is fine to coarse, angular to subrounded comprising mudstone and sandstone.	                		
3.00-3.45 3.00-3.45	X5 SPT N=11		Water strike(1) at 3.00m. 2,2/2,3,3,3						
3.60-3.80	DB6				(2.50)				
4.00-4.45	SPT N=16		3,4/4,4,4,4						
5.00-5.45	SPT N=17		3,4/4,4,4,5	96.10 95.55	4.90 (0.55) 5.45	Medium dense yellowish brown gravelly silty SAND. Sand is fine to coarse. Gravel is fine to medium, angular to subangular comprising sandstone. Complete at 5.45m	           		

Remarks

Location and elevation from handheld GPS.
Groundwater encountered at 3.00mbgl.
Borehole stable.
Borehole complete at 5.45mbgl.
Coal tar like odour noted in tarmac at 0.0-0.1mbgl.
Monitoring well installed to 5.00 mbgl.

Scale (approx)

1:50

Logged By

BR

Figure No.

LKC 21 1026.WS102

Excavation Method

Drive-in Windowless Sampler

Dimensions

101mm to 3.00m

Ground Level (mOD)

<101.00
>98.00

Client

Great Places Housing Group

Job
Number
LKC 21 1026

Location (Handheld GPS)

385963 E 404163 N

Dates

18/06/2021

Engineer

LKC

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.10-0.50	ES1 PID=1.4ppm			100.90	0.10	MADE GROUND: Tarmacadam.			
					(0.60)				
				100.30	0.70	MADE GROUND: Brown gravelly sandy CLAY with occasional brick fragments, ash, and clinker. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular comprising sandstone and limestone. Slight hydrocarbon odour noted. High gravel content above 0.40mbgl.			
1.20-1.65	SPT N=16		2,2/3,4,4,5		(1.70)	Firm to stiff consistency high strength greyish brown gravelly sandy CLAY. Sand is fine to coarse, angular to subangular comprising sandstone and coal.			
1.20-1.40	ES2 PID=0.1ppm								
1.50-2.00	DB3								
1.50-2.00	PP 110.36 kPa								
2.00-2.45	SPT N=17		3,4/4,4,4,5						
2.00-2.40	PP 122.63 kPa								
2.50-3.00	DB4		Water strike(1) at 2.40m.	98.60	2.40	Medium dense yellowish brown gravelly silty SAND. Sand is fine to coarse. Gravel is fine to medium, angular to subangular comprising sandstone and coal.			
3.00-3.45	SPT N=16		2,3/4,4,4,4		(2.20)				
4.00-4.45	SPT N=20		4,4/5,5,5,5						
				96.40	4.60	Stiff consistency high strength gravelly silty CLAY. Gravel is fine to coarse, angular to subrounded comprising mudstone and sandstone.			
5.00-5.45	SPT N=18		4,5/5,5,4,4		(0.85)				
				95.55	5.45	Complete at 5.45m			

Remarks

Location and elevation from handheld GPS.
Groundwater encountered at 3.00mbgl.
Borehole unstable. Collapsed to 4.00mbgl.
Borehole complete at 5.45mbgl.
Hydrocarbon odour noted in clay made ground at 0.10-0.70mbgl.
Monitoring well installed to 4.00mbgl.

Scale (approx)

1:50

Logged By

BR

Figure No.

LKC 21 1026.WS103

Excavation Method

Drive-in Windowless Sampler

Dimensions

101mm to 3.00m

Ground Level (mOD)

<101.00
>98.00

Client

Great Places Housing Group

Job
Number
LKC 21 1026

Location (Handheld GPS)

385982 E 404176 N

Dates

18/06/2021

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.10-0.40	ES1 PID=0.3ppm			100.90 100.60	0.10 (0.30) 0.40 (0.70)	MADE GROUND: Tarmacadam with possible coal tar. Coal tar like odour noted. MADE GROUND: Brown gravelly sandy CLAY with occasional brick fragments, ash, and clinker. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular comprising sandstone and limestone.	 		
1.20-1.65	SPT N=11		2,2/3,3,2,3	99.90	1.10 (0.90)	Firm to stiff consistency high strength greyish brown gravelly sandy CLAY. Sand is fine to coarse, angular to subangular comprising sandstone and coal.			
1.50-2.00	DB2 PP 98.10 kPa					Stiff consistency high strength very sandy SILT. Sand is fine to medium.			
2.00-2.45	SPT N=12		Water strike(1) at 2.00m. 3,3/2,2,4,4	99.00	2.00	Medium dense very silty SAND. Sand is fine to medium.		▽1	
2.50-3.00	U3								
3.00-3.45	SPT N=24		4,5/6,6,6,6		(2.60)				
4.00-4.45	SPT N=23		4,4/6,6,6,5						
4.60-5.00	PP 98.10 kPa			96.40	4.60 (0.85)	Stiff consistency high strength gravelly silty CLAY. Gravel is fine to coarse, angular to subrounded comprising mudstone and sandstone.			
5.00-5.45	SPT N=21		5,6/5,5,5,6	95.55	5.45	Complete at 5.45m			

Remarks

Location and elevation from handheld GPS.
Groundwater encountered at 2.00mbgl.
Borehole unstable. Collapsed to 4.00mbgl.
Borehole complete at 5.45mbgl.
Monitoring well installed to 4.00mbgl.

Scale (approx)

1:50

Logged By

BR

Figure No.

LKC 21 1026.WS104

Excavation Method

Drive-in Windowless Sampler

Dimensions

101mm to 3.00m

Ground Level (mOD)

<101.00
>98.00

Client

Great Places Housing Group

Job
Number
LKC 21 1026

Location (Handheld GPS)

385982 E 404141 N

Dates

18/06/2021

Engineer

LKC

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.30	ES1 PID=0.1ppm				(0.30)	MADE GROUND: Dark brown gravelly silty SAND with frequent rootlets and occasional glass fragments. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular comprising sandstone, limestone, and mudstone. Cobble are angular.			
0.50-0.90 0.50-1.00	PP 49.05 kPa DB2			100.70 100.10	0.30 0.90				
1.20-1.65 1.50-2.00	SPT N=17 DB3		4,4/5,4,4,4		(1.40)	Firm consistency medium strength orange mottled grey gravelly sandy CLAY with occasional rootlets. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular comprising sandstone and mudstone.			
2.00-2.45	SPT N=11		1,1/2,3,3,3			Yellowish brown gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular comprising sandstone, mudstone and quartz.			
2.50-2.80	PP 61.31 kPa		Water strike(1) at 2.40m.	98.70	2.30	Firm to stiff consistency medium strength very sandy silty CLAY. Sand is fine to medium.			
3.00-3.45	SPT N=16		3,3/3,4,4,5	98.20	2.80	Stiff consistency medium strength brown very sandy SILT. Sand is fine to medium.			
3.50-4.00	PP 85.84 kPa								
4.00-4.45	SPT N=14		3,2/3,3,4,4		(2.65)				
4.50-5.00	DB4								
5.00-5.45	SPT N=20		3,4/4,5,5,6						
				95.55	5.45	Complete at 5.45m			

Remarks

Location and elevation from handheld GPS.
Groundwater encountered at 2.40mbgl.
Borehole stable.
Monitoring well installed to 5.00mbgl.

Scale
(approx)

1:50

Logged
By

BR

Figure No.

LKC 21 1026.WS105

Appendix C

Certificates of Analysis – Soil



Final Report

Report No.:	21-21196-1		
Initial Date of Issue:	28-Jun-2021		
Client	LK Consult		
Client Address:	Unit 29 Eton Business Park Eton Hill Road Radcliffe Manchester Lancashire M26 2ZS		
Contact(s):	Contaminated Land Michelle Thorniley		
Project	LKC 21 1026 Chain Road, Blackley		
Quotation No.:		Date Received:	22-Jun-2021
Order No.:		Date Instructed:	22-Jun-2021
No. of Samples:	9		
Turnaround (Wkdays):	5	Results Due:	28-Jun-2021
Date Approved:	28-Jun-2021		
Approved By:			
Details:	Glynn Harvey, Technical Manager		

Results - Soil

Project: LKC 21 1026 Chain Road, Blackley

Client: LK Consult	Chemtest Job No.:				21-21196	21-21196	21-21196	21-21196	21-21196	21-21196	21-21196	21-21196	21-21196
Quotation No.:	Chemtest Sample ID.:				1225804	1225805	1225806	1225807	1225808	1225809	1225810	1225811	1225812
	Client Sample ID.:				TP101	TP101	TP102	TP102	TP103	TP104	TP105	TP106	TP107
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.05	0.3	0.1	0.5	0.1	0	0.3	0	0
	Bottom Depth (m):				0.3	0.5	0.5	0.6	0.5	0.3	0.8	0.8	0.2
	Date Sampled:				18-Jun-2021	18-Jun-2021	18-Jun-2021	18-Jun-2021	18-Jun-2021	18-Jun-2021	18-Jun-2021	18-Jun-2021	18-Jun-2021
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD									
ACM Type	U	2192		N/A	-	-	-	-	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	8.6	17	18	18	17	10	17	17	11
Soil Colour	N	2040		N/A	Brown	Grey	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand
pH	M	2010		4.0	8.7	8.0	8.5	8.4	8.6	8.4	8.5	7.8	7.9
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	0.042	0.036	< 0.010	< 0.010	0.024	< 0.010
Arsenic	M	2450	mg/kg	1.0	16	9.3	25	41	22	16	17	6.3	15
Cadmium	M	2450	mg/kg	0.10	0.40	0.32	1.0	0.30	0.34	0.58	0.27	< 0.10	0.46
Chromium	M	2450	mg/kg	1.0	14	12	19	12	16	21	16	14	16
Copper	M	2450	mg/kg	0.50	32	31	83	79	41	53	100	17	65
Mercury	M	2450	mg/kg	0.10	0.18	0.20	0.38	0.12	0.32	0.78	0.20	< 0.10	4.5
Nickel	M	2450	mg/kg	0.50	14	13	46	27	14	16	30	12	18
Lead	M	2450	mg/kg	0.50	130	82	600	170	360	230	88	35	170
Selenium	M	2450	mg/kg	0.20	< 0.20	0.52	0.56	0.69	< 0.20	0.22	0.48	0.30	0.65
Vanadium	U	2450	mg/kg	5.0	17	16	48	36	20	26	40	19	19
Zinc	M	2450	mg/kg	0.50	82	72	300	79	130	280	86	34	160
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	3.5	5.0	19	17	3.5	5.3	21	2.4	7.1
Naphthalene	M	2800	mg/kg	0.10	0.54	1.6	1.4	0.39	0.58	0.14	1.3	0.18	0.42
Acenaphthylene	N	2800	mg/kg	0.10	0.45	< 0.10	0.69	1.4	0.78	0.11	0.35	< 0.10	0.12
Acenaphthene	M	2800	mg/kg	0.10	1.8	0.92	0.64	14	2.6	< 0.10	2.5	0.21	0.78
Fluorene	M	2800	mg/kg	0.10	1.7	0.79	0.36	11	1.6	< 0.10	1.4	< 0.10	0.44
Phenanthrene	M	2800	mg/kg	0.10	12	2.8	4.2	67	17	1.7	18	1.4	4.7
Anthracene	M	2800	mg/kg	0.10	4.8	0.72	2.3	36	7.5	0.66	3.7	0.37	1.1
Fluoranthene	M	2800	mg/kg	0.10	31	4.0	28	220	60	5.4	29	2.7	9.6
Pyrene	M	2800	mg/kg	0.10	25	3.5	26	190	49	5.0	26	2.2	8.0
Benzo[a]anthracene	M	2800	mg/kg	0.10	14	2.5	16	110	24	2.0	12	1.2	3.6
Chrysene	M	2800	mg/kg	0.10	13	2.4	15	93	21	2.8	12	1.1	3.2
Benzo[b]fluoranthene	M	2800	mg/kg	0.10	16	2.8	23	93	27	4.2	14	1.4	5.1
Benzo[k]fluoranthene	M	2800	mg/kg	0.10	6.3	1.8	8.6	50	10	1.6	4.6	0.53	1.7
Benzo[a]pyrene	M	2800	mg/kg	0.10	14	2.6	20	100	24	3.6	11	1.1	4.3
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10	8.4	2.3	12	68	14	2.2	6.6	0.64	2.4
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	1.7	1.2	2.2	9.4	2.7	0.52	1.4	< 0.10	0.31
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10	6.9	2.2	11	49	11	2.0	6.3	0.42	2.4
Total Of 16 PAH's	N	2800	mg/kg	2.0	160	32	170	1100	270	32	150	14	48

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

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*; Diben[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS



Final Report

Report No.:	21-21210-1		
Initial Date of Issue:	28-Jun-2021		
Client	LK Consult		
Client Address:	Unit 29 Eton Business Park Eton Hill Road Radcliffe Manchester Lancashire M26 2ZS		
Contact(s):	Contaminated Land Michelle Thorniley		
Project	LKC 21 1026 Chain Road, Blackley		
Quotation No.:		Date Received:	22-Jun-2021
Order No.:		Date Instructed:	22-Jun-2021
No. of Samples:	7		
Turnaround (Wkdays):	5	Results Due:	28-Jun-2021
Date Approved:	28-Jun-2021		
Approved By:			
Details:	Glynn Harvey, Technical Manager		

Results - Soil

Project: LKC 21 1026 Chain Road, Blackley

Client: LK Consult	Chemtest Job No.:				21-21210	21-21210	21-21210	21-21210	21-21210	21-21210	21-21210
Quotation No.:	Chemtest Sample ID.:				1225869	1225870	1225871	1225872	1225873	1225874	1225875
	Client Sample ID.:				WS101	WS101	WS102	WS103	WS103	WS104	WS105
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0	2.5	0.1	0.1	1.2	0.1	0
	Bottom Depth (m):				1	2.6	0.4	0.5	1.4	0.4	0.3
	Date Sampled:				18-Jun-2021	18-Jun-2021	18-Jun-2021	18-Jun-2021	18-Jun-2021	18-Jun-2021	18-Jun-2021
	Asbestos Lab:				DURHAM		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD							
ACM Type	U	2192		N/A	-		-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected		No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	11	21	5.9	15	16	16	16
Soil Colour	N	2040		N/A	Other	Brown	Brown	Brown	Black	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones, Glass and Roots	Stones and Roots	Stones and Roots	Stones	Stones, Roots and
Soil Texture	N	2040		N/A	Sand	Sand	Sand	Clay	Sand	Clay	Sand
Chromatogram (TPH)	N			N/A				See Attached	See Attached		
pH	M	2010		4.0	11.5	9.4	9.0	8.1	8.2	8.3	8.1
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40				< 0.40	0.82		
Magnesium (Water Soluble)	N	2120	g/l	0.010		< 0.010					
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	1.0	0.025	0.15	0.016	0.066	< 0.010	0.19
Chloride (Water Soluble)	M	2220	g/l	0.010		< 0.010					
Nitrate (Water Soluble)	N	2220	g/l	0.010		< 0.010					
Cyanide (Free)	M	2300	mg/kg	0.50				< 0.50	< 0.50		
Cyanide (Total)	M	2300	mg/kg	0.50				< 0.50	< 0.50		
Arsenic	M	2450	mg/kg	1.0	10		14	7.1	15	5.4	14
Cadmium	M	2450	mg/kg	0.10	3.9		1.4	0.29	0.27	0.10	0.46
Chromium	M	2450	mg/kg	1.0	17		12	22	20	17	16
Copper	M	2450	mg/kg	0.50	42		36	23	74	18	49
Mercury	M	2450	mg/kg	0.10	< 0.10		0.13	< 0.10	0.16	< 0.10	0.25
Nickel	M	2450	mg/kg	0.50	15		26	31	25	24	19
Lead	M	2450	mg/kg	0.50	210		230	15	90	9.7	130
Selenium	M	2450	mg/kg	0.20	< 0.20		< 0.20	0.23	0.60	0.20	0.49
Vanadium	U	2450	mg/kg	5.0	28		16	20	33	15	24
Zinc	M	2450	mg/kg	0.50	88		56	47	73	39	130
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	3.5		5.7	1.9	7.9	1.7	11
Diesel Present	N	2670		N/A				False	False		
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0				< 1.0	< 1.0		
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0				< 1.0	< 1.0		
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0				< 1.0	< 1.0		
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0				< 1.0	< 1.0		
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0				< 1.0	< 1.0		
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0				< 1.0	< 1.0		
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0				< 1.0	< 1.0		
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0				< 1.0	< 1.0		

Results - Soil

Project: LKC 21 1026 Chain Road, Blackley

Client: LK Consult	Chemtest Job No.:				21-21210	21-21210	21-21210	21-21210	21-21210	21-21210	21-21210
Quotation No.:	Chemtest Sample ID.:				1225869	1225870	1225871	1225872	1225873	1225874	1225875
	Client Sample ID.:				WS101	WS101	WS102	WS103	WS103	WS104	WS105
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0	2.5	0.1	0.1	1.2	0.1	0
	Bottom Depth (m):				1	2.6	0.4	0.5	1.4	0.4	0.3
	Date Sampled:				18-Jun-2021	18-Jun-2021	18-Jun-2021	18-Jun-2021	18-Jun-2021	18-Jun-2021	18-Jun-2021
	Asbestos Lab:				DURHAM		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD							
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0				< 5.0	< 5.0		
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0				< 1.0	< 1.0		
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0				< 1.0	< 1.0		
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0				< 1.0	< 1.0		
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0				< 1.0	< 1.0		
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0				< 1.0	< 1.0		
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0				< 1.0	< 1.0		
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0				< 1.0	< 1.0		
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0				< 1.0	< 1.0		
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0				< 5.0	< 5.0		
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0				< 10	< 10		
Benzene	M	2760	µg/kg	1.0				< 1.0	9.4		
Toluene	M	2760	µg/kg	1.0				< 1.0	2.1		
Ethylbenzene	M	2760	µg/kg	1.0				< 1.0	19		
m & p-Xylene	M	2760	µg/kg	1.0				< 1.0	42		
o-Xylene	M	2760	µg/kg	1.0				< 1.0	26		
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0				< 1.0	< 1.0		
Naphthalene	M	2800	mg/kg	0.10	< 0.10		5.3	0.40	0.80	< 0.10	0.32
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10		1.3	0.10	0.21	< 0.10	0.16
Acenaphthene	M	2800	mg/kg	0.10	< 0.10		17	1.0	1.5	< 0.10	0.44
Fluorene	M	2800	mg/kg	0.10	< 0.10		18	0.96	1.1	< 0.10	0.39
Phenanthrene	M	2800	mg/kg	0.10	0.60		97	4.6	5.1	0.35	2.8
Anthracene	M	2800	mg/kg	0.10	0.14		34	1.6	1.6	0.11	0.89
Fluoranthene	M	2800	mg/kg	0.10	0.97		130	5.7	12	0.32	10
Pyrene	M	2800	mg/kg	0.10	0.80		110	4.1	11	0.28	8.5
Benzo[a]anthracene	M	2800	mg/kg	0.10	0.41		66	2.2	5.5	< 0.10	4.7
Chrysene	M	2800	mg/kg	0.10	0.33		58	1.9	5.1	< 0.10	3.5
Benzo[b]fluoranthene	M	2800	mg/kg	0.10	0.43		86	2.1	8.2	< 0.10	6.0
Benzo[k]fluoranthene	M	2800	mg/kg	0.10	0.16		35	1.1	2.7	< 0.10	2.3
Benzo[a]pyrene	M	2800	mg/kg	0.10	0.39		76	2.5	7.0	< 0.10	5.1
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10	< 0.10		52	1.7	4.2	< 0.10	1.9
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10		7.1	0.24	0.53	< 0.10	0.19
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10	< 0.10		42	1.3	3.7	< 0.10	1.7
Total Of 16 PAH's	N	2800	mg/kg	2.0	4.2		840	32	70	< 2.0	49
Total Phenols	M	2920	mg/kg	0.10				< 0.10	< 0.10		

TPH Chromatogram on Soil Sample: 1225872

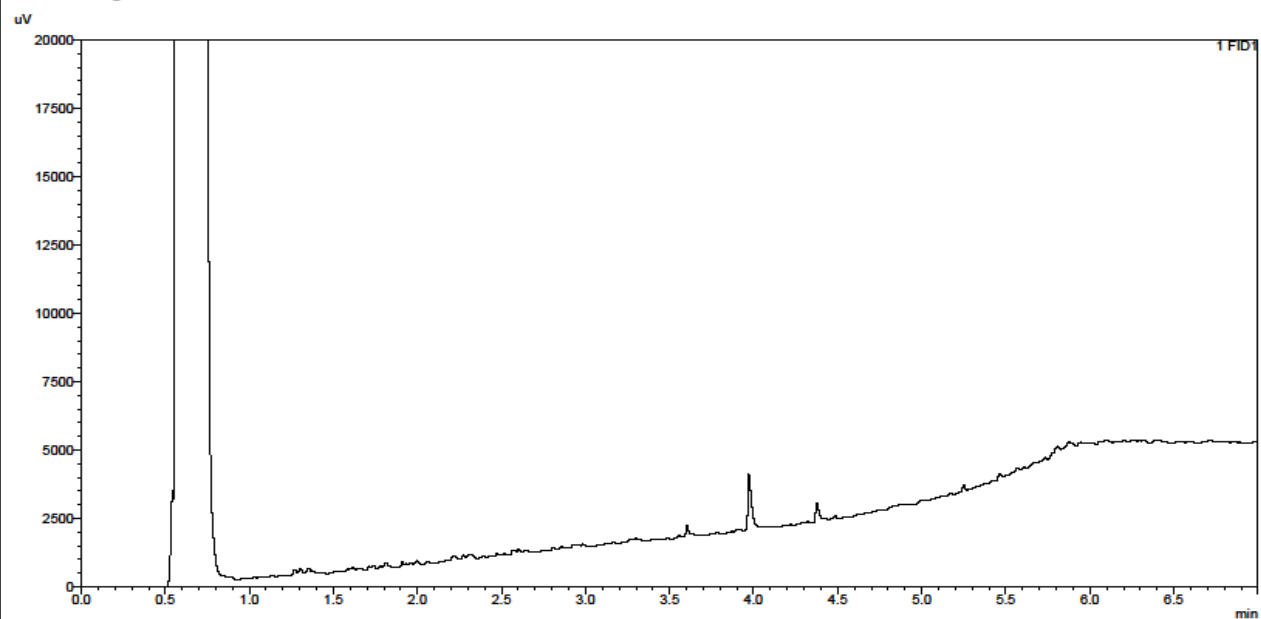
<Sample Information>

Sample Name : 1225872 21-21210
Data Filename : 24 June 2021_24062021_1225872 21-21210_101.gcd
Method Filename : TPH 12m Fast OSv2.gcm
Sample # : 51
Date Acquired : 25/06/2021 04:09:02
Date Processed : 25/06/2021



Chemtest

<Chromatogram>



TPH Chromatogram on Soil Sample: 1225873

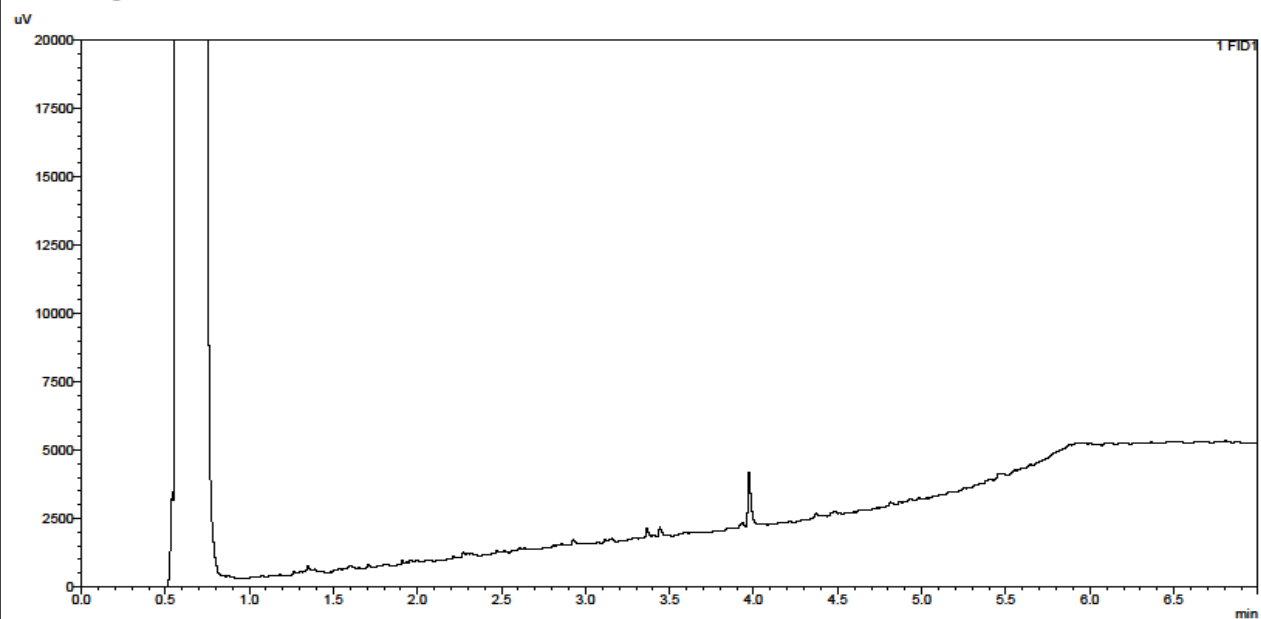
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Data Filename : 24 June 2021_24062021_1225873 21-21210_103.gcd
Method Filename : TPH 12m Fast OSv2.gcm
Sample # : 52
Date Acquired : 25/06/2021 04:22:06
Date Processed : 25/06/2021



Chemtest

<Chromatogram>



TPH Interpretation

Job	Sample	Matrix	Location	Sample Ref	Sample ID	Sample Depth (m)	Gasoline / Diesel Present	TPH Interpretation
21-21210	1225872	S			WS103	0.1	No	N/A
21-21210	1225873	S			WS103	1.2	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
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measurement by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
2300	Cyanides & Thiocyanate in Soils	Free (or easily liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline 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–C44 Aromatics: >C5–C7, >C7–C8, >C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35–C44	Dichloromethane extraction / GCxGC FID detection
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenzo[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and Trimethylphenols Note: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

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

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

All Asbestos testing is performed at the indicated laboratory

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

Sample Deviation Codes

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

Sample Retention and Disposal

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

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

Charges may apply to extended sample storage

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

customerservices@chemtest.com

Appendix D

Certificates of Analysis - Geotechnical



TEST REPORT

Client LK Consult Ltd

Address Unit 29 Eton Business Park
Eton Hill Road
Radcliffe
Greater Manchester
M26 7ZS

Contract LKC 21 1026 -
Chain Road, Blackley

Job Number MRN 4066/128
Date of Issue 13 July 2021
Page 1 of 9

Approved Signatories

S J Hutchings, O P Davies

Notes

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



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

Also at: London: 020 8523 1999

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

MURRAY RIX

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



TEST CERTIFICATE

LIQUID AND PLASTIC LIMIT

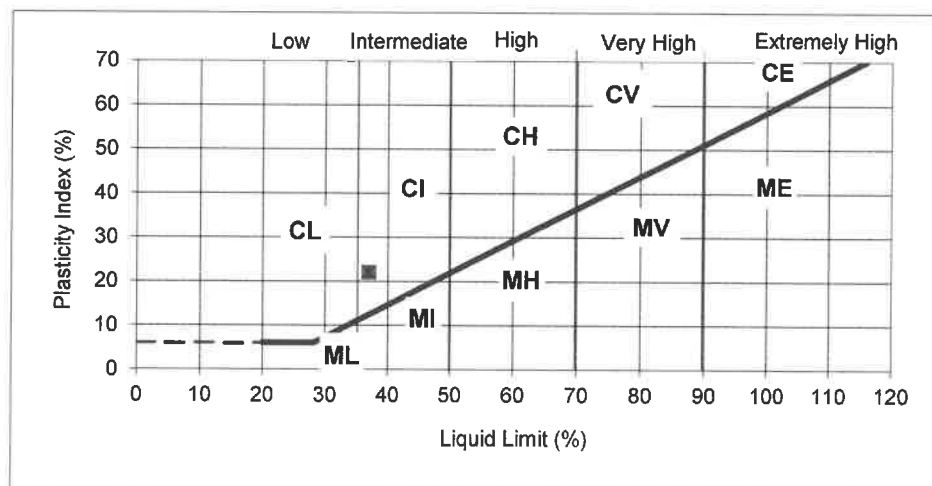
BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	LK Consult Ltd
SITE	LKC 21 1026 - Chain Road, Blackley
JOB NUMBER	MRN 4066/128

SAMPLE LABEL	TP101 0.60-1.00	DATE SAMPLED	Not advised
SAMPLE No.	100614	DATE RECEIVED	22-Jun-21
DATE TESTED	30-Jun-21	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY with rare gravel
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
19	37	15	22	92



REMARKS

Sample tested in natural condition

SIGNED

NAME O.P. Davies BA (Hons)
Page 2 of 9 (Laboratory Manager)

DATE 13-Jul-21

MURRAY RIX

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



TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS 1377: PART 2: Clause 9.2: 1990

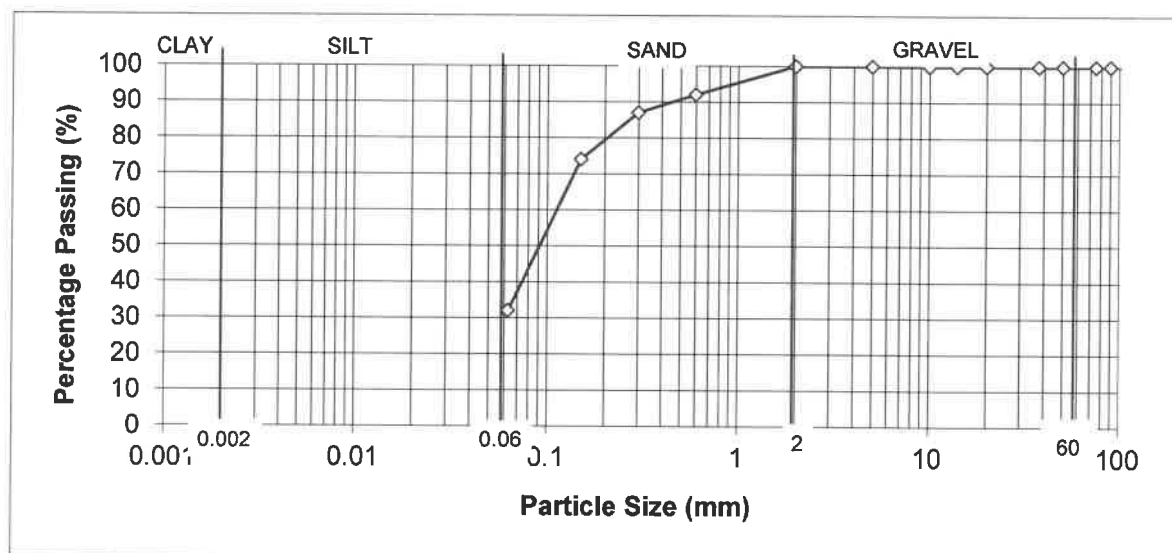
Determination of Moisture Content in accordance with BS 1377: PART 2: Clause 3: 1990 (Oven Dry)

CLIENT	LK Consult Ltd
SITE	LKC 21 1026 - Chain Road, Blackley
JOB NUMBER	MRN 4066/128

SAMPLE LABEL	TP103 0.60-1.40	DATE SAMPLED	Not advised
LAB SAMPLE No	100615	DATE RECEIVED	22-Jun-21
DATE TESTED	30-Jun-21	SAMPLED BY	Client

MATERIAL	Brown silty SAND
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		10	100	
90	100		5	100	
75	100		2	100	
50	100		0.6	92	
37.5	100		0.3	87	
20	100		0.15	74	
14	100		0.063	32	



REMARKS

As received moisture content = 9.2%

SIGNED

NAME

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

DATE

13-Jul-21

MURRAY RIX

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



TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS 1377: PART 2: Clause 9.2: 1990

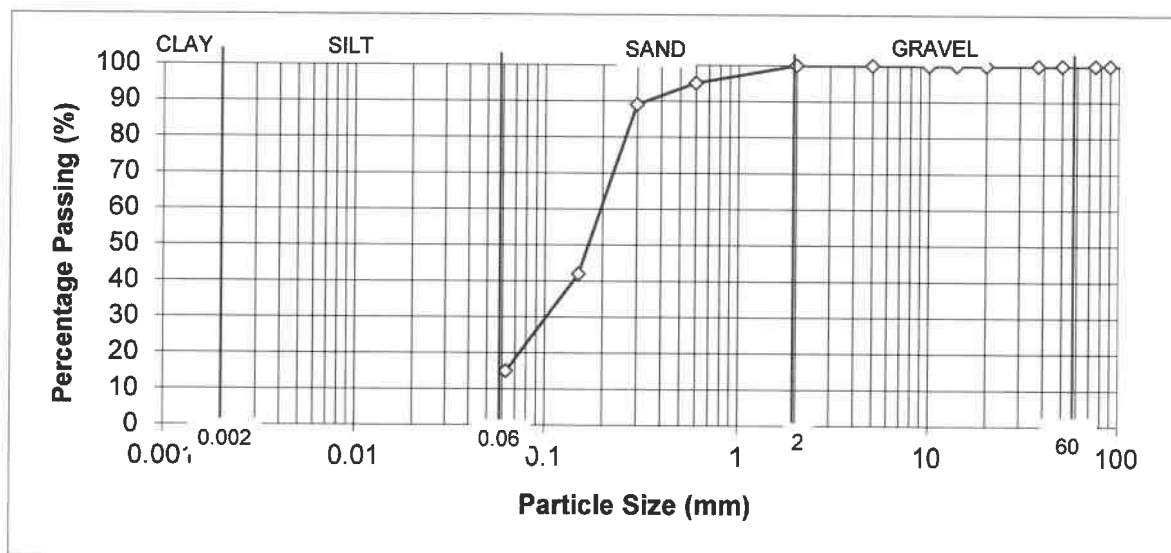
Determination of Moisture Content in accordance with BS 1377: PART 2: Clause 3: 1990 (Oven Dry)

CLIENT	LK Consult Ltd
SITE	LKC 21 1026 - Chain Road, Blackley
JOB NUMBER	MRN 4066/128

SAMPLE LABEL	TP104 0.30-1.00	DATE SAMPLED	Not advised
LAB SAMPLE No	100616	DATE RECEIVED	22-Jun-21
DATE TESTED	30-Jun-21	SAMPLED BY	Client

MATERIAL	Brown silty SAND
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		10	100	
90	100		5	100	
75	100		2	100	
50	100		0.6	95	
37.5	100		0.3	89	
20	100		0.15	42	
14	100		0.063	15	



REMARKS

As received moisture content = 6.3%

SIGNED

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

DATE 13-Jul-21

MURRAY RIX

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



TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS 1377: PART 2: Clause 9.2: 1990

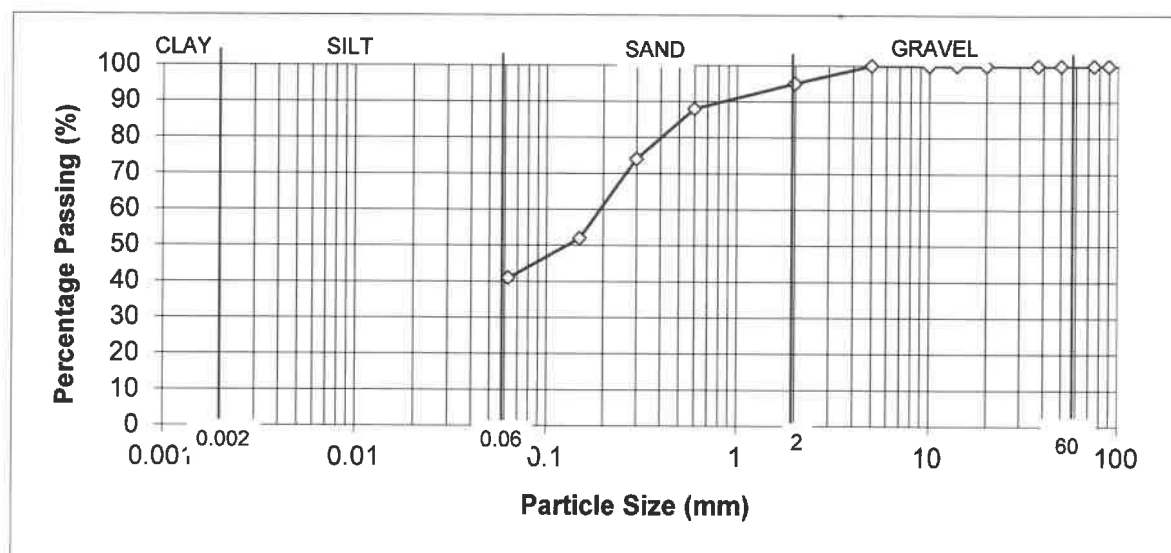
Determination of Moisture Content in accordance with BS 1377: PART 2: Clause 3: 1990 (Oven Dry)

CLIENT	LK Consult Ltd
SITE	LKC 21 1026 - Chain Road, Blackley
JOB NUMBER	MRN 4066/128

SAMPLE LABEL	TP106 1.00-1.50	DATE SAMPLED	Not advised
LAB SAMPLE No	100617	DATE RECEIVED	22-Jun-21
DATE TESTED	30-Jun-21	SAMPLED BY	Client

MATERIAL	Stiff brown silty very sandy CLAY with rare gravel
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		10	100	
90	100		5	100	
75	100		2	95	
50	100		0.6	88	
37.5	100		0.3	74	
20	100		0.15	52	
14	100		0.063	41	



REMARKS

As received moisture content = 6.3%

SIGNED

NAME

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

DATE

13-Jul-21

MURRAY RIX

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



TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS 1377: PART 2: Clause 9.2: 1990

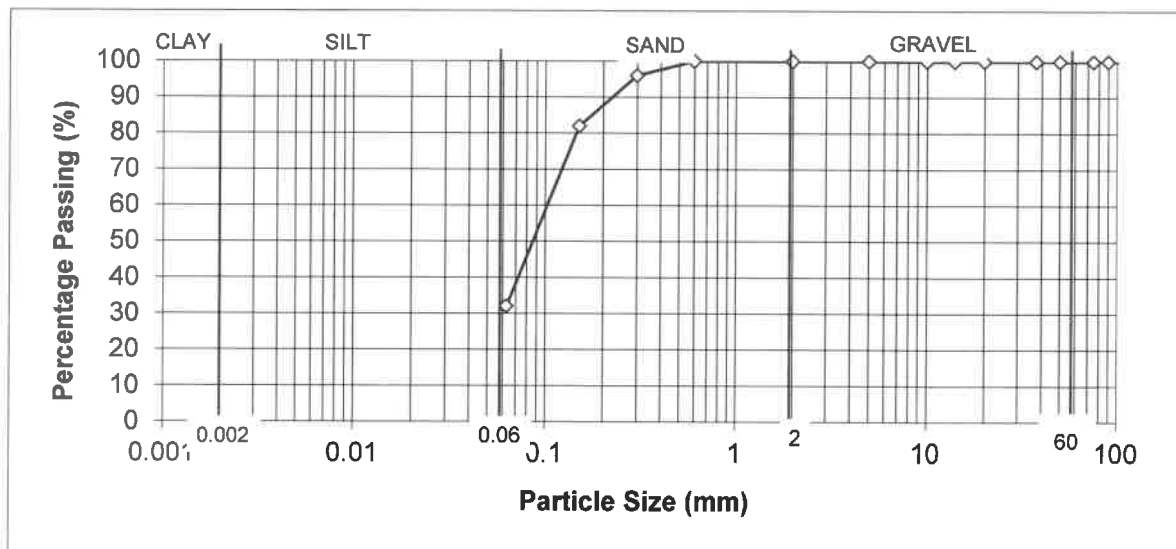
Determination of Moisture Content in accordance with BS 1377: PART 2: Clause 3: 1990 (Oven Dry)

CLIENT	LK Consult Ltd
SITE	LKC 21 1026 - Chain Road, Blackley
JOB NUMBER	MRN 4066/128

SAMPLE LABEL	TP107 1.00-2.00	DATE SAMPLED	Not advised
LAB SAMPLE No	100618	DATE RECEIVED	22-Jun-21
DATE TESTED	30-Jun-21	SAMPLED BY	Client

MATERIAL	Brown silty SAND
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		10	100	
90	100		5	100	
75	100		2	100	
50	100		0.6	100	
37.5	100		0.3	96	
20	100		0.15	82	
14	100		0.063	32	



REMARKS

As received moisture content = 10%

SIGNED

NAME

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

DATE

13-Jul-21

MURRAY RIX

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



TEST CERTIFICATE

LIQUID AND PLASTIC LIMIT

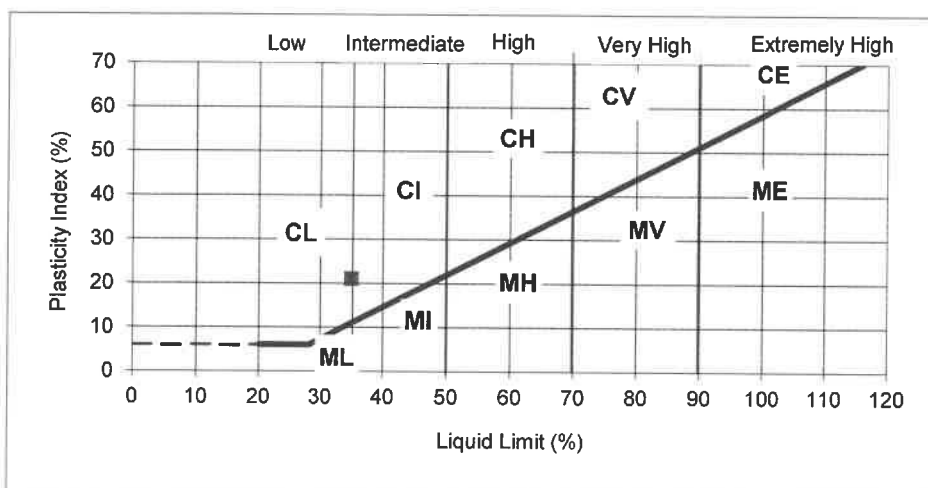
BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	LK Consult Ltd
SITE	LKC 21 1026 - Chain Road, Blackley
JOB NUMBER	MRN 4066/128

SAMPLE LABEL	WS102 1.20-1.65	DATE SAMPLED	Not advised
SAMPLE No.	100619	DATE RECEIVED	22-Jun-21
DATE TESTED	30-Jun-21	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY with rare gravel
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
15	35	14	21	95



REMARKS

Sample tested in natural condition

SIGNED

NAME
Page 7 of 9

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

DATE 13-Jul-21

MURRAY RIX

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



TEST CERTIFICATE

LIQUID AND PLASTIC LIMIT

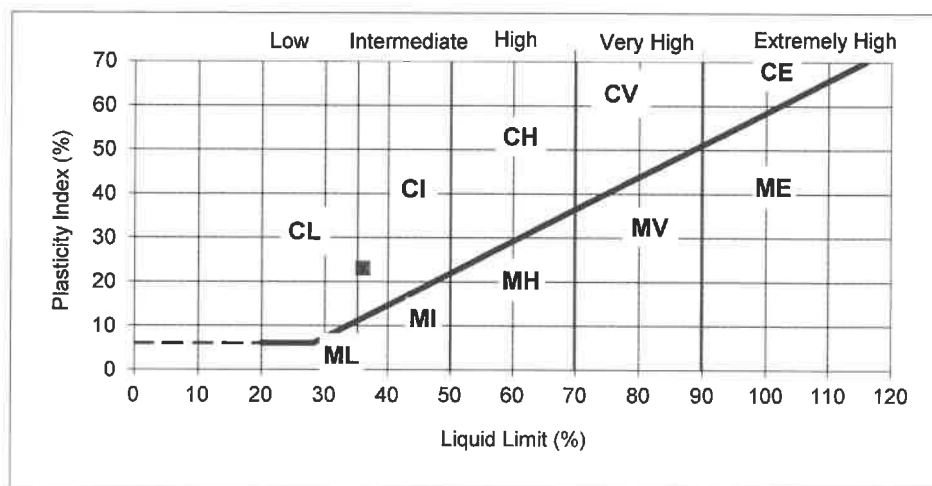
BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	LK Consult Ltd
SITE	LKC 21 1026 - Chain Road, Blackley
JOB NUMBER	MRN 4066/128

SAMPLE LABEL	WS103 1.50-2.00	DATE SAMPLED	Not advised
SAMPLE No.	100620	DATE RECEIVED	22-Jun-21
DATE TESTED	30-Jun-21	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY with rare gravel
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
16	36	13	23	92



REMARKS

Sample tested in natural condition

SIGNED

NAME O.P. Davies BA (Hons)
Page 8 of 9 (Laboratory Manager)

DATE 13-Jul-21

MURRAY RIX

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



TEST CERTIFICATE

LIQUID AND PLASTIC LIMIT

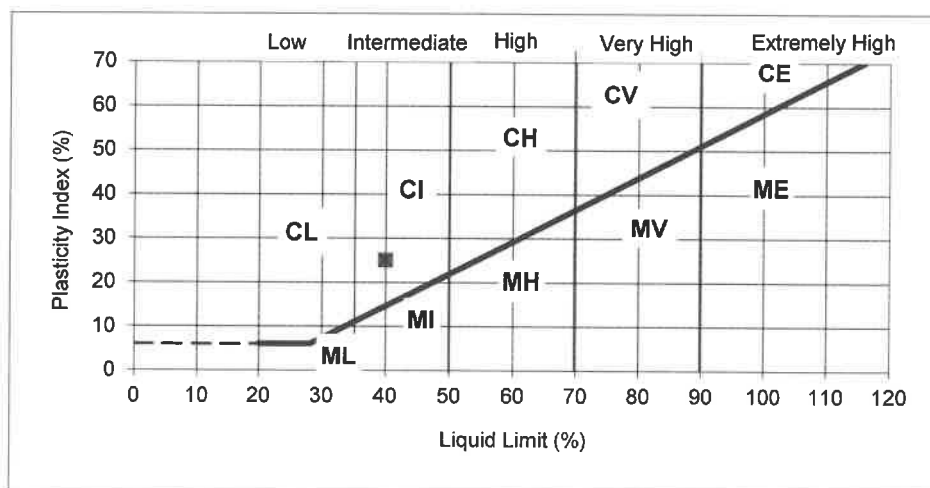
BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	LK Consult Ltd
SITE	LKC 21 1026 - Chain Road, Blackley
JOB NUMBER	MRN 4066/128

SAMPLE LABEL	WS104 SPT 1.50-2.0	DATE SAMPLED	Not advised
SAMPLE No.	100621	DATE RECEIVED	22-Jun-21
DATE TESTED	30-Jun-21	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY with rare gravel
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
22	40	15	25	98



REMARKS

Sample tested in natural condition

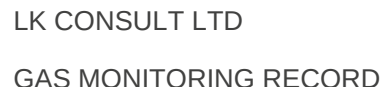
SIGNED

NAME O.P. Davies BA (Hons)
Page 9 of 9 (Laboratory Manager)

DATE 13-Jul-21

Appendix E

Gas Monitoring Results



Atmospheric / Ground Conditions	
Atmospheric pressure trend onsite	Rising then steady
Atmospheric pressure (prev 24hrs)	Variable
Weather Conditions	Dry, Hot, Muggy
Ground Conditions	Dry

[illegible]

NOTES
All monitoring is carried out in line with LK Consult Ltd procedures, with reference to CIRIA C665.
¹ Equipment is serviced and checked as recommended by the manufacturer. Refer to calibration records and service certificates.
² CH4 is explosive between the range of 5-15%v/v. 100% lower explosive limit is equal to 5%v/v CH4.
³ Flow readings are based on a 1 minute average value where flow is detected (equipment range of +/- 12 ltr/hr).

Site	Chain Road, Blackley
Job Number	LKC 21 1026
Date	22/07/2021
Engineer	RW
Visit	2 of 6

Equipment ¹		
Instrument	Serial Number	Comments
Gas Analyser GA5000	G502417	Serviced, calibrated, gas checked.
Hvdrotechnik	HT-02	Operating normally.

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

[illegible]

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

NOTES
All monitoring is carried out in line with LK Consult Ltd procedures, with reference to CIRIA C665.
¹ Equipment is serviced and checked as recommended by the manufacturer. Refer to calibration records and service certificates.
² CH4 is explosive between the range of 5-15%v/v. 100% lower explosive limit is equal to 5%v/v CH4.
³ Flow readings are based on a 1 minute average value where flow is detected (equipment range of +/- 12 ltr/hr).

Site	Chain Road Blackley
Job Number	LKC 21 1026
Date	11/08/2021
Engineer	MP
Visit	3 of 6

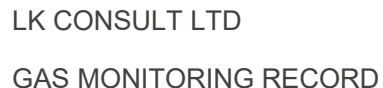
Equipment ¹		
Instrument	Serial Number	Comments
Gas Analyser GA5000	G502417	Serviced, calibrated, gas checked.
Geotech Dipmeter	HT-02	Operating normally.

Atmospheric / Ground Conditions	
Atmospheric pressure trend onsite	Steady
Atmospheric pressure (prev 24hrs)	Falling
Weather Conditions	Dry, low wind speed
Ground Conditions	Slightly damp

[illegible]

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

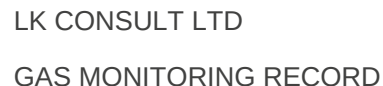
NOTES	
All monitoring is carried out in line with LK Consult Ltd procedures, with reference to CIRIA C665.	
¹ Equipment is serviced and checked as recommended by the manufacturer. Refer to calibration records and service certificates.	
² CH4 is explosive between the range of 5-15%v/v. 100% lower explosive limit is equal to 5%v/v CH4.	
³ Flow readings are based on a 1 minute average value where flow is detected (equipment range of +/- 12 ltr/hr).	



Atmospheric / Ground Conditions	
Atmospheric pressure trend onsite	Rising then steady
Atmospheric pressure (prev 24hrs)	Rising
Weather Conditions	Dry, overcast
Ground Conditions	Dry

[illegible]

NOTES	
All monitoring is carried out in line with LK Consult Ltd procedures, with reference to CIRIA C665.	
¹ Equipment is serviced and checked as recommended by the manufacturer. Refer to calibration records and service certificates.	
² CH4 is explosive between the range of 5-15%v/v. 100% lower explosive limit is equal to 5%v/v CH4.	
³ Flow readings are based on a 1 minute average value where flow is detected (equipment range of +/- 12 ltr/hr).	



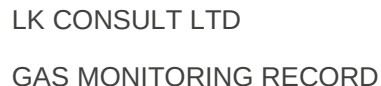
Equipment ¹		
Instrument	Serial Number	Comments
Gas Analyser GA5000	G502417	Serviced, calibrated, gas checked.
Geotech Dilometer	81318	Operating normally.

Atmospheric / Ground Conditions	
Atmospheric pressure trend onsite	Falling
Atmospheric pressure (prev 24hrs)	Falling then steady
Weather Conditions	Sun/clouds
Ground Conditions	Dry

[illegible]

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

NOTES
All monitoring is carried out in line with LK Consult Ltd procedures, with reference to CIRIA C665.
¹ Equipment is serviced and checked as recommended by the manufacturer. Refer to calibration records and service certificates.
² CH4 is explosive between the range of 5-15%v/v. 100% lower explosive limit is equal to 5%v/v CH4.
³ Flow readings are based on a 1 minute average value where flow is detected (equipment range of +/- 12 ltr/hr).



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

Atmospheric / Ground Conditions	
Atmospheric pressure trend onsite	Rising
Atmospheric pressure (prev 24hrs)	Rising
Weather Conditions	Sun with rain
Ground Conditions	Wet

[illegible]

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

NOTES	
All monitoring is carried out in line with LK Consult Ltd procedures, with reference to CIRIA C665.	
¹ Equipment is serviced and checked as recommended by the manufacturer. Refer to calibration records and service certificates.	
² CH4 is explosive between the range of 5-15%v/v. 100% lower explosive limit is equal to 5%v/v CH4.	
³ Flow readings are based on a 1 minute average value where flow is detected (equipment range of +/- 12 ltr/hr).	

Appendix F

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.

		LQM Generic Assessment Criteria (mg/kg) Dry weight soil						
Contaminant		SOM	Res +	Res -	Allot.	Comm.	POS _{resi}	POS _{park}
Metals	Inorganic Arsenic	6%	37	40	43	640	79	170
	Beryllium	6%	1.7	1.7	35	12	2.2	63
	Boron	6%	290	11,000	45	240,000	21,000	46,000
	Cadmium	6%	11	85	1.9	190	120	532
	Chromium (III)	6%	910	910	18,000	8,600	1,500	33,000
	Chromium (VI)	6%	6.0	6.0	1.8	33	7.7	220
	Copper	6%	2,400	7,100	520	68,000	12,000	44,000
	Elemental Mercury	6%	1.2	1.2	21	58 (25.8) ^{vap}	16	30 (25.8) ^{vap}
	Inorganic Mercury	6%	40	56	19	1,100	120	240
	Methylmercury	6%	11	15	6.0	320	40	68
	Nickel (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.

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

NOTES

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

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

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

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

Contaminant	SOM	Res +	Res -	Allot.	Comm.	POS _{resi}	POS _{park}
Aliphatic							
EC 5-6	1%	42	42	730	3,200 (304) ^{sol}	570,000(304) ^{sol}	95,000 (304) ^{sol}
EC>6-8	1%	100	100	2,300	7,800 (144) ^{sol}	600,000	150,000 (144) ^{sol}
EC>8-10	1%	27	27	320	2,000 (78) ^{sol}	13,000	14,000 (78) ^{vap}
EC>10-12	1%	130 (48) ^{vap}	130 (48) ^{vap}	2,200	9,700 (48) ^{sol}	13,000	21,000 (48) ^{vap}
EC>12-16	1%	1,100 (24) ^{sol}	1,100 (24) ^{sol}	11,000	59,000 (24) ^{sol}	13,000	25,000 (24) ^{sol}
EC>16-35	1%	65,000 (8.48) ^{f, sol}	65,000 (8.48) ^{f, sol}	260,000 ^f	160,000 ^f	250,000 ^f	450,000 ^f
EC>35-44	1%	65,000 (8.48) ^{f, sol}	65,000 (8.48) ^{f, sol}	260,000 ^f	160,000 ^f	250,000 ^f	450,000 ^f
Aliphatic							
EC 5-6	2.5%	78	78	1,700	5,900 (558) ^{sol}	590,000	130,000 (558) ^{sol}
EC>6-8	2.5%	230	230	5,600	17,000 (322) ^{sol}	610,000	220,000 (322) ^{sol}
EC>8-10	2.5%	65	65	770	4,800 (190) ^{vap}	13,000	18,000 (190) ^{vap}
EC>10-12	2.5%	330 (118) ^{vap}	330 (118) ^{vap}	4,400	23,000 (118) ^{vap}	13,000	23,000 (118) ^{vap}
EC>12-16	2.5%	2,400 (59) ^{sol}	2,400 (59) ^{sol}	13,000	82,000 (59) ^{sol}	13,000	25,000 (59) ^{sol}
EC>16-35	2.5%	92,000 (21) ^{f, sol}	92,000 (21) ^{f, sol}	270,000 ^f	1,700,000 ^f	250,000 ^f	480,000 ^f
EC>35-44	2.5%	92,000 (21) ^{f, sol}	92,000 (21) ^{f, sol}	270,000 ^f	1,700,000 ^f	250,000 ^f	480,000 ^f
Aliphatic							
EC 5-6	6%	160	160	3,900	12,000 (1,150) ^{sol}	600,000	180,000 (1,150) ^{sol}
EC>6-8	6%	530	530	13,000	40,000 (736) ^{sol}	620,000	320,000 (736) ^{sol}
EC>8-10	6%	150	150	1,700	11,000 (451) ^{vap}	13,000	21,000 (451) ^{vap}
EC>10-12	6%	760 (283) ^{vap}	760 (283) ^{vap}	7,300	47,000 (283) ^{vap}	13,000	24,000 (283) ^{vap}
EC>12-16	6%	4,300 (142) ^{sol}	4,400 (142) ^{sol}	13,000	90,000 (142) ^{sol}	13,000	26,000 (142) ^{sol}
EC>16-35	6%	110,000 ^f	110,000 ^f	270,000 ^f	1,800,000 ^f	250,000 ^f	490,000 ^f
EC>35-44	6%	110,000 ^f	110,000 ^f	270,000 ^f	1,800,000 ^f	250,000 ^f	490,000 ^f
Aromatic							
EC5-7(benzene as non-threshold)	1%	70	370	13	26,000 (1,220) ^{sol}	56,000	76,000 (1,220) ^{sol}
EC>7-8(toluene)	1%	130	860	22	56,000 (869) ^{vap}	56,000	87,000 (869) ^{vap}
EC>8-10	1%	34	47	8.6	3,500 (613) ^{vap}	5,000	7,200 (613) ^{vap}
EC>10-12	1%	74	250	13	16,000 (364) ^{sol}	5,000	9,200 (364) ^{sol}
EC>12-16	1%	140	1,800	23	36,000 (169) ^{sol}	5,100	10,000
EC>16-21	1%	260 ^f	1,900 ^f	46 ^f	28,000 ^f	3,800 ^f	7,600 ^f
EC>21-35	1%	1,100 ^f	1,900 ^f	370 ^f	28,000 ^f	3,800 ^f	7,800 ^f
EC>35-44	1%	1,100 ^f	1,900 ^f	370 ^f	28,000 ^f	3,800 ^f	7,800 ^f
Aromatic							
EC5-7(benzene as non-threshold)	2.5%	140	690	27	46,000 (2,260) ^{sol}	56,000	84,000 (2,260) ^{sol}
EC>7-8(toluene)	2.5%	290	1,800	51	110,000 (1,920) ^{sol}	56,000	95,000 (1,920) ^{sol}
EC>8-10	2.5%	83	110	21	8,100 (1,500) ^{vap}	5,000	8,500 (1,500) ^{vap}
EC>10-12	2.5%	180	590	31	28,000 (899) ^{sol}	5,000	9,700 (899) ^{sol}
EC>12-16	2.5%	330	2,300 (419) ^{sol}	57	37,000	5,100	10,000
EC>16-21	2.5%	540 ^f	1,900 ^f	110 ^f	28,000 ^f	3,800 ^f	7,700 ^f
EC>21-35	2.5%	1,500 ^f	1,900 ^f	820 ^f	28,000 ^f	3,800 ^f	7,800 ^f
EC>35-44	2.5%	1,500 ^f	1,900 ^f	820 ^f	28,000 ^f	3,800 ^f	7,800 ^f
Aromatic							
EC5-7(benzene as non-threshold)	6%	300	1,400	57	86,000 (4,710) ^{sol}	56,000	92,000 (4,710) ^{sol}
EC>7-8(toluene)	6%	660	3,900	120	180,000 (4,360) ^{vap}	56,000	100,000 (4,360) ^{vap}
EC>8-10	6%	190	270	51	17,000 (3,580) ^{vap}	5,000	9,300 (3,580) ^{vap}
EC>10-12	6%	380	1,200	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.

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

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

NOTES

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

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

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

Appendix G

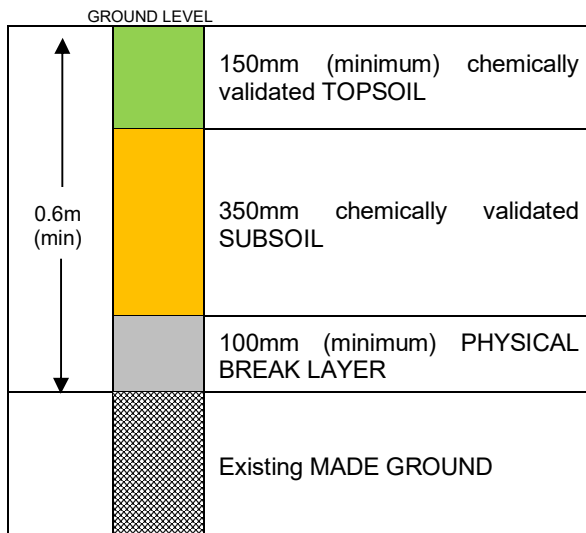
Environmental Cover System Construction

Private Gardens

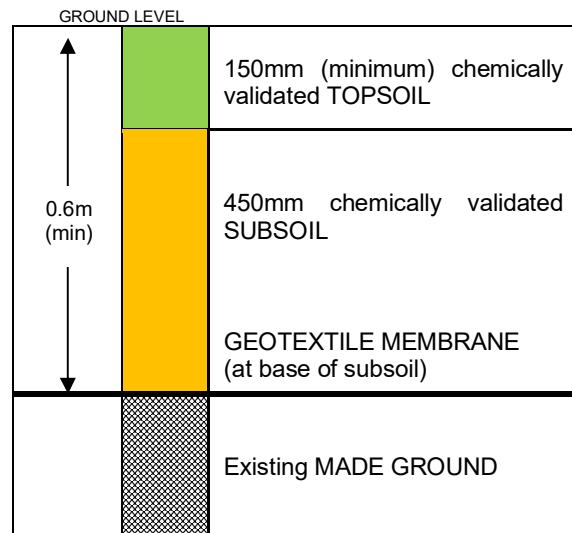
Shared Landscaping

PRIVATE BACK GARDENS:

Either (physical break layer)

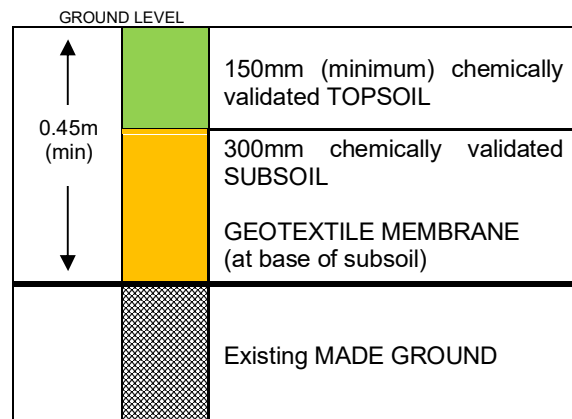
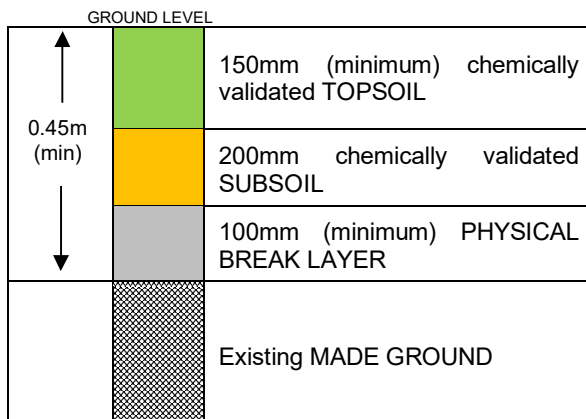


Or (geotextile membrane)



PRIVATE FRONT GARDENS / SHARED LANDSCAPING:

Either (physical break layer)
Or (geotextile membrane)



Hardstood Areas – No Remediation Required

If excavation in garden / landscaped areas reach natural strata then no specific environmental capping layer will be required, except a nominal clean soil cover as a growing medium.

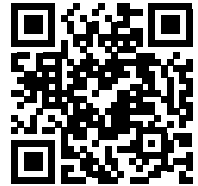
Appendix H

HazWasteOnline Output Sheets

Waste Classification Report

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

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



P5DVA-LUWK3-LHYNC

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

Job name

LKC 21 1026

Description/Comments

Project

LKC 21 1026

Site

Chain Road, Blackley

Classified by

Name: **Peter Dunn**
 Date: **29 Jul 2021 07:34 GMT**
 Telephone: **0161 763 7200**
 Company: **LK Group**

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

HazWasteOnline™ Certification:

CERTIFIED

Course

Hazardous Waste Classification

Date

18 Sep 2019

Next 3 year Refresher due by Sep 2022

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS101-18/06/2021-0	0-1	Hazardous	HP 8	3
2	WS101-18/06/2021-2.5	2.5-2.6	Non Hazardous		5
3	WS102-18/06/2021-0.1	0.1-0.4	Non Hazardous		6
4	WS103-18/06/2021-0.1	0.1-0.5	Non Hazardous		8
5	WS103-18/06/2021-1.2	1.2-1.4	Non Hazardous		10
6	WS104-18/06/2021-0.1	0.1-0.4	Non Hazardous		13
7	WS105-18/06/2021-0	0-0.3	Non Hazardous		15
8	TP101-18/06/2021-0.05	0.05-0.3	Non Hazardous		17
9	TP101-18/06/2021-0.3	0.3-0.5	Non Hazardous		19
10	TP102-18/06/2021-0.1	0.1-0.5	Non Hazardous		21
11	TP102-18/06/2021-0.5	0.5-0.6	Non Hazardous		23
12	TP103-18/06/2021-0.1	0.1-0.5	Non Hazardous		25
13	TP104-18/06/2021-0	0-0.3	Non Hazardous		27
14	TP105-18/06/2021-0.3	0.3-0.8	Non Hazardous		29
15	TP106-18/06/2021-0	0-0.8	Non Hazardous		31
16	TP107-18/06/2021-0	0-0.2	Non Hazardous		33

Related documents

#	Name	Description
1	HWOL_21-21210-20210628 212328.hwol	.hwol file used to create the Job
2	HWOL_21-21196-20210628 183022.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: 29 Jul 2021 07:34 GMT

Appendices

Appendix A: Classifier defined and non CLP determinands

Page

35

Appendices	Page
Appendix B: Rationale for selection of metal species	36
Appendix C: Version	37

Classification of sample: WS101-18/06/2021-0

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

Sample details

Sample name:	LoW Code:
WS101-18/06/2021-0	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 03 * (Soil and stones containing hazardous substances)
0-1 m	
Moisture content:	
11%	
(wet weight correction)	

Hazard properties

HP 8: Corrosive "waste which on application can cause skin corrosion"

pH; pH "Assumed to be irritant/corrosive because of pH value"

Because of determinand:

pH: (conc.: 11.5 pH)

Determinands

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

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				10 mg/kg	1.32	11.751 mg/kg	0.00118 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				3.9 mg/kg	1.142	3.965 mg/kg	0.000397 %	✓	
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				17 mg/kg	1.462	22.113 mg/kg	0.00221 %	✓	
		215-160-9	1308-38-9							
4	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.5 mg/kg	2.27	<1.135 mg/kg	<0.000113 %		<LOD
	024-017-00-8									
5	copper { dicopper oxide; copper (I) oxide }				42 mg/kg	1.126	42.086 mg/kg	0.00421 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
6	lead { lead chromate }			1	210 mg/kg	1.56	291.529 mg/kg	0.0187 %	✓	
	082-004-00-2	231-846-0	7758-97-6							
7	mercury { mercury dichloride }				<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
8	nickel { nickel chromate }				15 mg/kg	2.976	39.733 mg/kg	0.00397 %	✓	
	028-035-00-7	238-766-5	14721-18-7							
9	selenium { nickel selenate }				<0.2 mg/kg	2.554	<0.511 mg/kg	<0.0000511 %		<LOD
	028-031-00-5	239-125-2	15060-62-5							
10	zinc { zinc chromate }				88 mg/kg	2.774	217.271 mg/kg	0.0217 %	✓	
	024-007-00-3	236-878-9	13530-65-9							
11	pH				11.5 pH		11.5 pH	11.5 pH		
			PH							
12	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
13	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
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		0.6 mg/kg		0.534 mg/kg	0.0000534 %		✓	
17	anthracene	204-371-1	120-12-7		0.14 mg/kg		0.125 mg/kg	0.0000125 %		✓	
18	fluoranthene	205-912-4	206-44-0		0.97 mg/kg		0.863 mg/kg	0.0000863 %		✓	
19	pyrene	204-927-3	129-00-0		0.8 mg/kg		0.712 mg/kg	0.0000712 %		✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.41 mg/kg		0.365 mg/kg	0.0000365 %		✓	
21	chrysene	601-048-00-0	205-923-4	218-01-9	0.33 mg/kg		0.294 mg/kg	0.0000294 %		✓	
22	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.43 mg/kg		0.383 mg/kg	0.0000383 %		✓	
23	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.16 mg/kg		0.142 mg/kg	0.0000142 %		✓	
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.39 mg/kg		0.347 mg/kg	0.0000347 %		✓	
25	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
28	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1	28 mg/kg	1.785	44.487 mg/kg	0.00445 %		✓	
Total:									0.0575 %		

Key

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

Classification of sample: WS101-18/06/2021-2.5

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

Sample details

Sample name:	LoW Code:	
WS101-18/06/2021-2.5	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
2.5-2.6 m		
Moisture content:		
21%		
(wet weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 21% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	• pH				9.4 pH		9.4 pH	9.4 pH		
			PH							
Total:								0%		

Key

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

Classification of sample: WS102-18/06/2021-0.1

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

Sample details

Sample name:	LoW Code:
WS102-18/06/2021-0.1	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.1-0.4 m	
Moisture content:	
5.9%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 5.9% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	 arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	14	mg/kg	1.32	17.394	mg/kg	0.00174 %	✓	
2	 cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0								
3	 chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		12	mg/kg	1.462	16.504	mg/kg	0.00165 %	✓	
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										
5	 copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	36	mg/kg	1.126	38.141	mg/kg	0.00381 %	✓	
6	 lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6								
7	 mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7	0.13	mg/kg	1.353	0.166	mg/kg	0.0000166 %	✓	
8	 nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7								
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								
11	pH				9	pH		9	pH	9pH		
12	naphthalene	601-052-00-2	202-049-5	91-20-3								
13	acenaphthylene		205-917-1	208-96-8	1.3	mg/kg		1.223	mg/kg	0.000122 %	✓	
14	acenaphthene		201-469-6	83-32-9								
15	fluorene		201-695-5	86-73-7	18	mg/kg		16.938	mg/kg	0.00169 %	✓	
16	phenanthrene		201-581-5	85-01-8								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
17	anthracene	204-371-1	120-12-7		34 mg/kg		31.994 mg/kg	0.0032 %	✓	
18	fluoranthene	205-912-4	206-44-0		130 mg/kg		122.33 mg/kg	0.0122 %	✓	
19	pyrene	204-927-3	129-00-0		110 mg/kg		103.51 mg/kg	0.0104 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6		66 mg/kg		62.106 mg/kg	0.00621 %	✓	
21	chrysene	601-048-00-0	205-923-4		58 mg/kg		54.578 mg/kg	0.00546 %	✓	
22	benzo[b]fluoranthene	601-034-00-4	205-911-9		86 mg/kg		80.926 mg/kg	0.00809 %	✓	
23	benzo[k]fluoranthene	601-036-00-5	205-916-6		35 mg/kg		32.935 mg/kg	0.00329 %	✓	
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		76 mg/kg		71.516 mg/kg	0.00715 %	✓	
25	indeno[123-cd]pyrene	205-893-2	193-39-5		52 mg/kg		48.932 mg/kg	0.00489 %	✓	
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8		7.1 mg/kg		6.681 mg/kg	0.000668 %	✓	
27	benzo[ghi]perylene	205-883-8	191-24-2		42 mg/kg		39.522 mg/kg	0.00395 %	✓	
28	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8		16 mg/kg	1.785	26.878 mg/kg	0.00269 %	✓	
Total:								0.132 %		

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: WS103-18/06/2021-0.1

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

Sample details

Sample name:	LoW Code:
WS103-18/06/2021-0.1	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.1-0.5 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
15%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 15% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				7.1	mg/kg	1.32	7.968	mg/kg	0.000797 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	boron { diboron trioxide; boric oxide }				<0.4	mg/kg	3.22	<1.288	mg/kg	<0.000129 %		<LOD
	005-008-00-8	215-125-8	1303-86-2									
3	cadmium { cadmium oxide }				0.29	mg/kg	1.142	0.282	mg/kg	0.0000282 %	✓	
	048-002-00-0	215-146-2	1306-19-0									
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				22	mg/kg	1.462	27.331	mg/kg	0.00273 %	✓	
		215-160-9	1308-38-9									
5	chromium in chromium(VI) compounds { chromium(VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.5	mg/kg	2.27	<1.135	mg/kg	<0.000113 %		<LOD
	024-017-00-8											
6	copper { dicopper oxide; copper (I) oxide }				23	mg/kg	1.126	22.011	mg/kg	0.0022 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
7	lead { lead chromate }			1	15	mg/kg	1.56	19.888	mg/kg	0.00128 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
8	mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7									
9	nickel { nickel chromate }				31	mg/kg	2.976	78.425	mg/kg	0.00784 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
10	selenium { nickel selenate }				0.23	mg/kg	2.554	0.499	mg/kg	0.0000499 %	✓	
	028-031-00-5	239-125-2	15060-62-5									
11	zinc { zinc chromate }				47	mg/kg	2.774	110.827	mg/kg	0.0111 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
12	TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
			TPH									
13	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
	603-181-00-X	216-653-1	1634-04-4									
14	benzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2									
15	toluene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3									
16	ethylbenzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4									

#	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 601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %			<LOD
18	 cyanides {  salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } 006-007-00-5				<0.5 mg/kg	1.884	<0.942 mg/kg	<0.0000942 %			<LOD
19	 pH		PH		8.1 pH		8.1 pH	8.1 pH			
20	naphthalene 601-052-00-2	202-049-5	91-20-3		0.4 mg/kg		0.34 mg/kg	0.000034 %		✓	
21	 acenaphthylene	205-917-1	208-96-8		0.1 mg/kg		0.085 mg/kg	0.0000085 %		✓	
22	 acenaphthene	201-469-6	83-32-9		1 mg/kg		0.85 mg/kg	0.000085 %		✓	
23	 fluorene	201-695-5	86-73-7		0.96 mg/kg		0.816 mg/kg	0.0000816 %		✓	
24	 phenanthrene	201-581-5	85-01-8		4.6 mg/kg		3.91 mg/kg	0.000391 %		✓	
25	 anthracene	204-371-1	120-12-7		1.6 mg/kg		1.36 mg/kg	0.000136 %		✓	
26	 fluoranthene	205-912-4	206-44-0		5.7 mg/kg		4.845 mg/kg	0.000484 %		✓	
27	 pyrene	204-927-3	129-00-0		4.1 mg/kg		3.485 mg/kg	0.000349 %		✓	
28	benzo[a]anthracene 601-033-00-9	200-280-6	56-55-3		2.2 mg/kg		1.87 mg/kg	0.000187 %		✓	
29	chrysene 601-048-00-0	205-923-4	218-01-9		1.9 mg/kg		1.615 mg/kg	0.000162 %		✓	
30	benzo[b]fluoranthene 601-034-00-4	205-911-9	205-99-2		2.1 mg/kg		1.785 mg/kg	0.000179 %		✓	
31	benzo[k]fluoranthene 601-036-00-5	205-916-6	207-08-9		1.1 mg/kg		0.935 mg/kg	0.0000935 %		✓	
32	benzo[a]pyrene; benzo[def]chrysene 601-032-00-3	200-028-5	50-32-8		2.5 mg/kg		2.125 mg/kg	0.000213 %		✓	
33	 indeno[123-cd]pyrene	205-893-2	193-39-5		1.7 mg/kg		1.445 mg/kg	0.000145 %		✓	
34	dibenz[a,h]anthracene 601-041-00-2	200-181-8	53-70-3		0.24 mg/kg		0.204 mg/kg	0.0000204 %		✓	
35	 benzo[ghi]perylene	205-883-8	191-24-2		1.3 mg/kg		1.105 mg/kg	0.000111 %		✓	
36	 vanadium { divanadium pentaoxide; vanadium pentoxide } 023-001-00-8	215-239-8	1314-62-1		20 mg/kg	1.785	30.348 mg/kg	0.00303 %		✓	
37	 monohydric phenols		P1186		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
Total:									0.0331 %		

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: WS103-18/06/2021-1.2

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

Sample details

Sample name:	LoW Code:
WS103-18/06/2021-1.2	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
1.2-1.4 m	
Moisture content:	
16%	
(wet weight correction)	

Hazard properties

None identified

Determinands

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

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				15	mg/kg	1.32	16.636	mg/kg	0.00166 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	boron { diboron trioxide; boric oxide }				0.82	mg/kg	3.22	2.218	mg/kg	0.000222 %	✓	
	005-008-00-8	215-125-8	1303-86-2									
3	cadmium { cadmium oxide }				0.27	mg/kg	1.142	0.259	mg/kg	0.0000259 %	✓	
	048-002-00-0	215-146-2	1306-19-0									
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				20	mg/kg	1.462	24.554	mg/kg	0.00246 %	✓	
		215-160-9	1308-38-9									
5	chromium in chromium(VI) compounds { chromium(VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.5	mg/kg	2.27	<1.135	mg/kg	<0.000113 %		<LOD
	024-017-00-8											
6	copper { dicopper oxide; copper (I) oxide }				74	mg/kg	1.126	69.985	mg/kg	0.007 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
7	lead { lead chromate }			1	90	mg/kg	1.56	117.922	mg/kg	0.00756 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
8	mercury { mercury dichloride }				0.16	mg/kg	1.353	0.182	mg/kg	0.0000182 %	✓	
	080-010-00-X	231-299-8	7487-94-7									
9	nickel { nickel chromate }				25	mg/kg	2.976	62.502	mg/kg	0.00625 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
10	selenium { nickel selenate }				0.6	mg/kg	2.554	1.287	mg/kg	0.000129 %	✓	
	028-031-00-5	239-125-2	15060-62-5									
11	zinc { zinc chromate }				73	mg/kg	2.774	170.111	mg/kg	0.017 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
12	TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
			TPH									
13	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
	603-181-00-X	216-653-1	1634-04-4									
14	benzene				0.0094	mg/kg		0.0079	mg/kg	0.00000079 %	✓	
	601-020-00-8	200-753-7	71-43-2									
15	toluene				0.0021	mg/kg		0.0017	mg/kg	0.000000176 %	✓	
	601-021-00-3	203-625-9	108-88-3									
16	ethylbenzene				0.019	mg/kg		0.016	mg/kg	0.00000016 %	✓	
	601-023-00-4	202-849-4	100-41-4									

#	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 601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		0.068 mg/kg		0.0571 mg/kg	0.00000571 %	✓	
18	 cyanides {  salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } 006-007-00-5				<0.5 mg/kg	1.884	<0.942 mg/kg	<0.0000942 %		<LOD
19	 pH		PH		8.2 pH		8.2 pH	8.2 pH		
20	naphthalene 601-052-00-2	202-049-5	91-20-3		0.8 mg/kg		0.672 mg/kg	0.0000672 %	✓	
21	 acenaphthylene	205-917-1	208-96-8		0.21 mg/kg		0.176 mg/kg	0.0000176 %	✓	
22	 acenaphthene	201-469-6	83-32-9		1.5 mg/kg		1.26 mg/kg	0.000126 %	✓	
23	 fluorene	201-695-5	86-73-7		1.1 mg/kg		0.924 mg/kg	0.0000924 %	✓	
24	 phenanthrene	201-581-5	85-01-8		5.1 mg/kg		4.284 mg/kg	0.000428 %	✓	
25	 anthracene	204-371-1	120-12-7		1.6 mg/kg		1.344 mg/kg	0.000134 %	✓	
26	 fluoranthene	205-912-4	206-44-0		12 mg/kg		10.08 mg/kg	0.00101 %	✓	
27	 pyrene	204-927-3	129-00-0		11 mg/kg		9.24 mg/kg	0.000924 %	✓	
28	benzo[a]anthracene 601-033-00-9	200-280-6	56-55-3		5.5 mg/kg		4.62 mg/kg	0.000462 %	✓	
29	chrysene 601-048-00-0	205-923-4	218-01-9		5.1 mg/kg		4.284 mg/kg	0.000428 %	✓	
30	benzo[b]fluoranthene 601-034-00-4	205-911-9	205-99-2		8.2 mg/kg		6.888 mg/kg	0.000689 %	✓	
31	benzo[k]fluoranthene 601-036-00-5	205-916-6	207-08-9		2.7 mg/kg		2.268 mg/kg	0.000227 %	✓	
32	benzo[a]pyrene; benzo[def]chrysene 601-032-00-3	200-028-5	50-32-8		7 mg/kg		5.88 mg/kg	0.000588 %	✓	
33	 indeno[123-cd]pyrene	205-893-2	193-39-5		4.2 mg/kg		3.528 mg/kg	0.000353 %	✓	
34	dibenz[a,h]anthracene 601-041-00-2	200-181-8	53-70-3		0.53 mg/kg		0.445 mg/kg	0.0000445 %	✓	
35	 benzo[ghi]perylene	205-883-8	191-24-2		3.7 mg/kg		3.108 mg/kg	0.000311 %	✓	
36	 vanadium { divanadium pentaoxide; vanadium pentoxide } 023-001-00-8	215-239-8	1314-62-1		33 mg/kg	1.785	49.485 mg/kg	0.00495 %	✓	
37	 monohydric phenols		P1186		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
Total:								0.0544 %		

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

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because Concentrations at less than 1.0% are "unlikely to be flammable". Flammability of soils is unlikely to result in a hazardous classification in soils (AGS Waste Classification – A Practitioner's Guide).

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinands:

benzene: (conc.: 7.9e-07%)

toluene: (conc.: 1.76e-07%)

ethylbenzene: (conc.: 1.6e-06%)

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

xylene: (conc.: 5.71e-06%)

Classification of sample: WS104-18/06/2021-0.1

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

Sample details

Sample name:	LoW Code:
WS104-18/06/2021-0.1	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.1-0.4 m	
Moisture content:	
16%	
(wet weight correction)	

Hazard properties

None identified

Determinands

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

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				5.4	mg/kg	1.32	5.989	mg/kg	0.000599 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				0.1	mg/kg	1.142	0.096	mg/kg	0.0000096 %	✓	
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				17	mg/kg	1.462	20.871	mg/kg	0.00209 %	✓	
		215-160-9	1308-38-9									
4	chromium in chromium(VI) compounds { chromium(VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.5	mg/kg	2.27	<1.135	mg/kg	<0.000113 %		<LOD
		024-017-00-8										
5	copper { dicopper oxide; copper (I) oxide }				18	mg/kg	1.126	17.023	mg/kg	0.0017 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	9.7	mg/kg	1.56	12.709	mg/kg	0.000815 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7									
8	nickel { nickel chromate }				24	mg/kg	2.976	60.001	mg/kg	0.006 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
9	selenium { nickel selenate }				0.2	mg/kg	2.554	0.429	mg/kg	0.0000429 %	✓	
	028-031-00-5	239-125-2	15060-62-5									
10	zinc { zinc chromate }				39	mg/kg	2.774	90.881	mg/kg	0.00909 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
11	pH				8.3	pH		8.3	pH	8.3 pH		
			PH									
12	naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
13	acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8									
14	acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9									
15	fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-695-5	86-73-7									
16	phenanthrene				0.35	mg/kg		0.294	mg/kg	0.0000294 %	✓	
		201-581-5	85-01-8									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
17	anthracene	204-371-1	120-12-7		0.11 mg/kg		0.0924 mg/kg	0.00000924 %	✓	
18	fluoranthene	205-912-4	206-44-0		0.32 mg/kg		0.269 mg/kg	0.0000269 %	✓	
19	pyrene	204-927-3	129-00-0		0.28 mg/kg		0.235 mg/kg	0.0000235 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
21	chrysene	601-048-00-0	205-923-4	218-01-9	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
23	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1	15 mg/kg	1.785	22.493 mg/kg	0.00225 %	✓	
Total:								0.0229 %		

Key

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

Classification of sample: WS105-18/06/2021-0

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

Sample details

Sample name:	LoW Code:
WS105-18/06/2021-0	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0-0.3 m	
Moisture content:	
16%	
(wet weight correction)	

Hazard properties

None identified

Determinands

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

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				14	mg/kg	1.32	15.527	mg/kg	0.00155 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				0.46	mg/kg	1.142	0.441	mg/kg	0.0000441 %	✓	
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				16	mg/kg	1.462	19.643	mg/kg	0.00196 %	✓	
		215-160-9	1308-38-9									
4	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.5	mg/kg	2.27	<1.135	mg/kg	<0.000113 %		<LOD
	024-017-00-8											
5	copper { dicopper oxide; copper (I) oxide }				49	mg/kg	1.126	46.342	mg/kg	0.00463 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	130	mg/kg	1.56	170.332	mg/kg	0.0109 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	mercury { mercury dichloride }				0.25	mg/kg	1.353	0.284	mg/kg	0.0000284 %	✓	
	080-010-00-X	231-299-8	7487-94-7									
8	nickel { nickel chromate }				19	mg/kg	2.976	47.501	mg/kg	0.00475 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
9	selenium { nickel selenate }				0.49	mg/kg	2.554	1.051	mg/kg	0.000105 %	✓	
	028-031-00-5	239-125-2	15060-62-5									
10	zinc { zinc chromate }				130	mg/kg	2.774	302.937	mg/kg	0.0303 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
11	pH				8.1	pH		8.1	pH	8.1 pH		
			PH									
12	naphthalene				0.32	mg/kg		0.269	mg/kg	0.0000269 %	✓	
	601-052-00-2	202-049-5	91-20-3									
13	acenaphthylene				0.16	mg/kg		0.134	mg/kg	0.0000134 %	✓	
		205-917-1	208-96-8									
14	acenaphthene				0.44	mg/kg		0.37	mg/kg	0.000037 %	✓	
		201-469-6	83-32-9									
15	fluorene				0.39	mg/kg		0.328	mg/kg	0.0000328 %	✓	
		201-695-5	86-73-7									
16	phenanthrene				2.8	mg/kg		2.352	mg/kg	0.000235 %	✓	
		201-581-5	85-01-8									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
17	anthracene	204-371-1	120-12-7		0.89 mg/kg		0.748 mg/kg	0.000748 %	✓	
18	fluoranthene	205-912-4	206-44-0		10 mg/kg		8.4 mg/kg	0.00084 %	✓	
19	pyrene	204-927-3	129-00-0		8.5 mg/kg		7.14 mg/kg	0.000714 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	4.7 mg/kg		3.948 mg/kg	0.000395 %	✓	
21	chrysene	601-048-00-0	205-923-4	218-01-9	3.5 mg/kg		2.94 mg/kg	0.000294 %	✓	
22	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	6 mg/kg		5.04 mg/kg	0.000504 %	✓	
23	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	2.3 mg/kg		1.932 mg/kg	0.000193 %	✓	
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	5.1 mg/kg		4.284 mg/kg	0.000428 %	✓	
25	indeno[123-cd]pyrene	205-893-2	193-39-5		1.9 mg/kg		1.596 mg/kg	0.00016 %	✓	
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	0.19 mg/kg		0.16 mg/kg	0.000016 %	✓	
27	benzo[ghi]perylene	205-883-8	191-24-2		1.7 mg/kg		1.428 mg/kg	0.000143 %	✓	
28	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1	24 mg/kg	1.785	35.989 mg/kg	0.0036 %	✓	
Total:								0.0621 %		

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: TP101-18/06/2021-0.05

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

Sample details

Sample name:	LoW Code:
TP101-18/06/2021-0.05	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.05-0.3 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
8.6%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 8.6% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				16 mg/kg	1.32	19.308 mg/kg	0.00193 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				0.4 mg/kg	1.142	0.418 mg/kg	0.0000418 %	✓	
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				14 mg/kg	1.462	18.702 mg/kg	0.00187 %	✓	
		215-160-9	1308-38-9							
4	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.5 mg/kg	2.27	<1.135 mg/kg	<0.000113 %		<LOD
	024-017-00-8									
5	copper { dicopper oxide; copper (I) oxide }				32 mg/kg	1.126	32.93 mg/kg	0.00329 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
6	lead { lead chromate }			1	130 mg/kg	1.56	185.337 mg/kg	0.0119 %	✓	
	082-004-00-2	231-846-0	7758-97-6							
7	mercury { mercury dichloride }				0.18 mg/kg	1.353	0.223 mg/kg	0.0000223 %	✓	
	080-010-00-X	231-299-8	7487-94-7							
8	nickel { nickel chromate }				14 mg/kg	2.976	38.084 mg/kg	0.00381 %	✓	
	028-035-00-7	238-766-5	14721-18-7							
9	selenium { nickel selenate }				<0.2 mg/kg	2.554	<0.511 mg/kg	<0.0000511 %		<LOD
	028-031-00-5	239-125-2	15060-62-5							
10	zinc { zinc chromate }				82 mg/kg	2.774	207.917 mg/kg	0.0208 %	✓	
	024-007-00-3	236-878-9	13530-65-9							
11	pH				8.7 pH		8.7 pH	8.7 pH		
			PH							
12	naphthalene				0.54 mg/kg		0.494 mg/kg	0.0000494 %	✓	
	601-052-00-2	202-049-5	91-20-3							
13	acenaphthylene				0.45 mg/kg		0.411 mg/kg	0.0000411 %	✓	
		205-917-1	208-96-8							
14	acenaphthene				1.8 mg/kg		1.645 mg/kg	0.000165 %	✓	
		201-469-6	83-32-9							
15	fluorene				1.7 mg/kg		1.554 mg/kg	0.000155 %	✓	
		201-695-5	86-73-7							
16	phenanthrene				12 mg/kg		10.968 mg/kg	0.0011 %	✓	
		201-581-5	85-01-8							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
17	anthracene	204-371-1	120-12-7		4.8 mg/kg		4.387 mg/kg	0.000439 %	✓	
18	fluoranthene	205-912-4	206-44-0		31 mg/kg		28.334 mg/kg	0.00283 %	✓	
19	pyrene	204-927-3	129-00-0		25 mg/kg		22.85 mg/kg	0.00229 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	14 mg/kg		12.796 mg/kg	0.00128 %	✓	
21	chrysene	601-048-00-0	205-923-4	218-01-9	13 mg/kg		11.882 mg/kg	0.00119 %	✓	
22	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	16 mg/kg		14.624 mg/kg	0.00146 %	✓	
23	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	6.3 mg/kg		5.758 mg/kg	0.000576 %	✓	
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	14 mg/kg		12.796 mg/kg	0.00128 %	✓	
25	indeno[123-cd]pyrene	205-893-2	193-39-5		8.4 mg/kg		7.678 mg/kg	0.000768 %	✓	
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	1.7 mg/kg		1.554 mg/kg	0.000155 %	✓	
27	benzo[ghi]perylene	205-883-8	191-24-2		6.9 mg/kg		6.307 mg/kg	0.000631 %	✓	
28	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1	17 mg/kg	1.785	27.738 mg/kg	0.00277 %	✓	
Total:								0.061 %		

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: TP101-18/06/2021-0.3

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

Sample details

Sample name:	LoW Code:
TP101-18/06/2021-0.3	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.3-0.5 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
17%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 17% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				9.3	mg/kg	1.32	10.192	mg/kg	0.00102 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				0.32	mg/kg	1.142	0.303	mg/kg	0.0000303 %	✓	
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				12	mg/kg	1.462	14.557	mg/kg	0.00146 %	✓	
		215-160-9	1308-38-9									
4	chromium in chromium(VI) compounds { chromium(VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.5	mg/kg	2.27	<1.135	mg/kg	<0.000113 %		<LOD
	024-017-00-8											
5	copper { dicopper oxide; copper (I) oxide }				31	mg/kg	1.126	28.969	mg/kg	0.0029 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	82	mg/kg	1.56	106.161	mg/kg	0.00681 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	mercury { mercury dichloride }				0.2	mg/kg	1.353	0.225	mg/kg	0.0000225 %	✓	
	080-010-00-X	231-299-8	7487-94-7									
8	nickel { nickel chromate }				13	mg/kg	2.976	32.114	mg/kg	0.00321 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
9	selenium { nickel selenate }				0.52	mg/kg	2.554	1.102	mg/kg	0.00011 %	✓	
	028-031-00-5	239-125-2	15060-62-5									
10	zinc { zinc chromate }				72	mg/kg	2.774	165.783	mg/kg	0.0166 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
11	pH				8	pH		8	pH	8pH		
			PH									
12	naphthalene				1.6	mg/kg		1.328	mg/kg	0.000133 %	✓	
	601-052-00-2	202-049-5	91-20-3									
13	acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8									
14	acenaphthene				0.92	mg/kg		0.764	mg/kg	0.0000764 %	✓	
		201-469-6	83-32-9									
15	fluorene				0.79	mg/kg		0.656	mg/kg	0.0000656 %	✓	
		201-695-5	86-73-7									
16	phenanthrene				2.8	mg/kg		2.324	mg/kg	0.000232 %	✓	
		201-581-5	85-01-8									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
17	anthracene	204-371-1	120-12-7		0.72 mg/kg		0.598 mg/kg	0.0000598 %	✓	
18	fluoranthene	205-912-4	206-44-0		4 mg/kg		3.32 mg/kg	0.000332 %	✓	
19	pyrene	204-927-3	129-00-0		3.5 mg/kg		2.905 mg/kg	0.000291 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	2.5 mg/kg		2.075 mg/kg	0.000208 %	✓	
21	chrysene	601-048-00-0	205-923-4	218-01-9	2.4 mg/kg		1.992 mg/kg	0.000199 %	✓	
22	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	2.8 mg/kg		2.324 mg/kg	0.000232 %	✓	
23	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	1.8 mg/kg		1.494 mg/kg	0.000149 %	✓	
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	2.6 mg/kg		2.158 mg/kg	0.000216 %	✓	
25	indeno[123-cd]pyrene	205-893-2	193-39-5		2.3 mg/kg		1.909 mg/kg	0.000191 %	✓	
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	1.2 mg/kg		0.996 mg/kg	0.0000996 %	✓	
27	benzo[ghi]perylene	205-883-8	191-24-2		2.2 mg/kg		1.826 mg/kg	0.000183 %	✓	
28	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1	16 mg/kg	1.785	23.707 mg/kg	0.00237 %	✓	
Total:								0.0373 %		

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: TP102-18/06/2021-0.1

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

Sample details

Sample name:	LoW Code:
TP102-18/06/2021-0.1	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.1-0.5 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
18%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 18% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				25	mg/kg	1.32	27.067	mg/kg	0.00271 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				1	mg/kg	1.142	0.937	mg/kg	0.0000937 %	✓	
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				19	mg/kg	1.462	22.771	mg/kg	0.00228 %	✓	
		215-160-9	1308-38-9									
4	chromium in chromium(VI) compounds { chromium(VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.5	mg/kg	2.27	<1.135	mg/kg	<0.000113 %		<LOD
	024-017-00-8											
5	copper { dicopper oxide; copper (I) oxide }				83	mg/kg	1.126	76.628	mg/kg	0.00766 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	600	mg/kg	1.56	767.429	mg/kg	0.0492 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	mercury { mercury dichloride }				0.38	mg/kg	1.353	0.422	mg/kg	0.0000422 %	✓	
	080-010-00-X	231-299-8	7487-94-7									
8	nickel { nickel chromate }				46	mg/kg	2.976	112.265	mg/kg	0.0112 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
9	selenium { nickel selenate }				0.56	mg/kg	2.554	1.173	mg/kg	0.000117 %	✓	
	028-031-00-5	239-125-2	15060-62-5									
10	zinc { zinc chromate }				300	mg/kg	2.774	682.44	mg/kg	0.0682 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
11	pH				8.5	pH		8.5	pH	8.5 pH		
			PH									
12	naphthalene				1.4	mg/kg		1.148	mg/kg	0.000115 %	✓	
	601-052-00-2	202-049-5	91-20-3									
13	acenaphthylene				0.69	mg/kg		0.566	mg/kg	0.0000566 %	✓	
		205-917-1	208-96-8									
14	acenaphthene				0.64	mg/kg		0.525	mg/kg	0.0000525 %	✓	
		201-469-6	83-32-9									
15	fluorene				0.36	mg/kg		0.295	mg/kg	0.0000295 %	✓	
		201-695-5	86-73-7									
16	phenanthrene				4.2	mg/kg		3.444	mg/kg	0.000344 %	✓	
		201-581-5	85-01-8									

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
17	•	anthracene				2.3	mg/kg		1.886	mg/kg	0.000189 %	✓	
			204-371-1	120-12-7									
18	•	fluoranthene				28	mg/kg		22.96	mg/kg	0.0023 %	✓	
			205-912-4	206-44-0									
19	•	pyrene				26	mg/kg		21.32	mg/kg	0.00213 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				16	mg/kg		13.12	mg/kg	0.00131 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				15	mg/kg		12.3	mg/kg	0.00123 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				23	mg/kg		18.86	mg/kg	0.00189 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				8.6	mg/kg		7.052	mg/kg	0.000705 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				20	mg/kg		16.4	mg/kg	0.00164 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25	•	indeno[123-cd]pyrene				12	mg/kg		9.84	mg/kg	0.000984 %	✓	
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				2.2	mg/kg		1.804	mg/kg	0.00018 %	✓	
		601-041-00-2	200-181-8	53-70-3									
27	•	benzo[ghi]perylene				11	mg/kg		9.02	mg/kg	0.000902 %	✓	
			205-883-8	191-24-2									
28	🧪	vanadium { divanadium pentaoxide; vanadium pentoxide }				48	mg/kg	1.785	70.265	mg/kg	0.00703 %	✓	
		023-001-00-8	215-239-8	1314-62-1									
Total:											0.163 %		

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: TP102-18/06/2021-0.5

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

Sample details

Sample name:	LoW Code:
TP102-18/06/2021-0.5	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.5-0.6 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
18%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 18% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				41	mg/kg	1.32	44.389	mg/kg	0.00444 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				0.3	mg/kg	1.142	0.281	mg/kg	0.0000281 %	✓	
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				12	mg/kg	1.462	14.382	mg/kg	0.00144 %	✓	
		215-160-9	1308-38-9									
4	chromium in chromium(VI) compounds { chromium(VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.5	mg/kg	2.27	<1.135	mg/kg	<0.000113 %		<LOD
		024-017-00-8										
5	copper { dicopper oxide; copper (I) oxide }				79	mg/kg	1.126	72.935	mg/kg	0.00729 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	170	mg/kg	1.56	217.438	mg/kg	0.0139 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	mercury { mercury dichloride }				0.12	mg/kg	1.353	0.133	mg/kg	0.0000133 %	✓	
	080-010-00-X	231-299-8	7487-94-7									
8	nickel { nickel chromate }				27	mg/kg	2.976	65.895	mg/kg	0.00659 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
9	selenium { nickel selenate }				0.69	mg/kg	2.554	1.445	mg/kg	0.000144 %	✓	
	028-031-00-5	239-125-2	15060-62-5									
10	zinc { zinc chromate }				79	mg/kg	2.774	179.709	mg/kg	0.018 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
11	pH				8.4	pH		8.4	pH	8.4 pH		
			PH									
12	naphthalene				0.39	mg/kg		0.32	mg/kg	0.000032 %	✓	
	601-052-00-2	202-049-5	91-20-3									
13	acenaphthylene				1.4	mg/kg		1.148	mg/kg	0.000115 %	✓	
		205-917-1	208-96-8									
14	acenaphthene				14	mg/kg		11.48	mg/kg	0.00115 %	✓	
		201-469-6	83-32-9									
15	fluorene				11	mg/kg		9.02	mg/kg	0.000902 %	✓	
		201-695-5	86-73-7									
16	phenanthrene				67	mg/kg		54.94	mg/kg	0.00549 %	✓	
		201-581-5	85-01-8									

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
17	anthracene	204-371-1	120-12-7		36	mg/kg		29.52	mg/kg	0.00295 %	✓	
18	fluoranthene	205-912-4	206-44-0		220	mg/kg		180.4	mg/kg	0.018 %	✓	
19	pyrene	204-927-3	129-00-0		190	mg/kg		155.8	mg/kg	0.0156 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	110	mg/kg		90.2	mg/kg	0.00902 %	✓	
21	chrysene	601-048-00-0	205-923-4	218-01-9	93	mg/kg		76.26	mg/kg	0.00763 %	✓	
22	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	93	mg/kg		76.26	mg/kg	0.00763 %	✓	
23	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	50	mg/kg		41	mg/kg	0.0041 %	✓	
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	100	mg/kg		82	mg/kg	0.0082 %	✓	
25	indeno[123-cd]pyrene	205-893-2	193-39-5		68	mg/kg		55.76	mg/kg	0.00558 %	✓	
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	9.4	mg/kg		7.708	mg/kg	0.000771 %	✓	
27	benzo[ghi]perylene	205-883-8	191-24-2		49	mg/kg		40.18	mg/kg	0.00402 %	✓	
28	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1	36	mg/kg	1.785	52.699	mg/kg	0.00527 %	✓	
Total:										0.148 %		

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: TP103-18/06/2021-0.1

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

Sample details

Sample name:	LoW Code:
TP103-18/06/2021-0.1	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.1-0.5 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
17%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 17% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				22	mg/kg	1.32	24.109	mg/kg	0.00241 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				0.34	mg/kg	1.142	0.322	mg/kg	0.0000322 %	✓	
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				16	mg/kg	1.462	19.409	mg/kg	0.00194 %	✓	
		215-160-9	1308-38-9									
4	chromium in chromium(VI) compounds { chromium(VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.5	mg/kg	2.27	<1.135	mg/kg	<0.000113 %		<LOD
	024-017-00-8											
5	copper { dicopper oxide; copper (I) oxide }				41	mg/kg	1.126	38.314	mg/kg	0.00383 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	360	mg/kg	1.56	466.073	mg/kg	0.0299 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	mercury { mercury dichloride }				0.32	mg/kg	1.353	0.359	mg/kg	0.0000359 %	✓	
	080-010-00-X	231-299-8	7487-94-7									
8	nickel { nickel chromate }				14	mg/kg	2.976	34.584	mg/kg	0.00346 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
9	selenium { nickel selenate }				<0.2	mg/kg	2.554	<0.511	mg/kg	<0.0000511 %		<LOD
	028-031-00-5	239-125-2	15060-62-5									
10	zinc { zinc chromate }				130	mg/kg	2.774	299.33	mg/kg	0.0299 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
11	pH				8.6	pH		8.6	pH	8.6 pH		
			PH									
12	naphthalene				0.58	mg/kg		0.481	mg/kg	0.0000481 %	✓	
	601-052-00-2	202-049-5	91-20-3									
13	acenaphthylene				0.78	mg/kg		0.647	mg/kg	0.0000647 %	✓	
		205-917-1	208-96-8									
14	acenaphthene				2.6	mg/kg		2.158	mg/kg	0.000216 %	✓	
		201-469-6	83-32-9									
15	fluorene				1.6	mg/kg		1.328	mg/kg	0.000133 %	✓	
		201-695-5	86-73-7									
16	phenanthrene				17	mg/kg		14.11	mg/kg	0.00141 %	✓	
		201-581-5	85-01-8									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
17	anthracene	204-371-1	120-12-7		7.5 mg/kg		6.225 mg/kg	0.000622 %	✓	
18	fluoranthene	205-912-4	206-44-0		60 mg/kg		49.8 mg/kg	0.00498 %	✓	
19	pyrene	204-927-3	129-00-0		49 mg/kg		40.67 mg/kg	0.00407 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	24 mg/kg		19.92 mg/kg	0.00199 %	✓	
21	chrysene	601-048-00-0	205-923-4	218-01-9	21 mg/kg		17.43 mg/kg	0.00174 %	✓	
22	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	27 mg/kg		22.41 mg/kg	0.00224 %	✓	
23	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	10 mg/kg		8.3 mg/kg	0.00083 %	✓	
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	24 mg/kg		19.92 mg/kg	0.00199 %	✓	
25	indeno[123-cd]pyrene	205-893-2	193-39-5		14 mg/kg		11.62 mg/kg	0.00116 %	✓	
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	2.7 mg/kg		2.241 mg/kg	0.000224 %	✓	
27	benzo[ghi]perylene	205-883-8	191-24-2		11 mg/kg		9.13 mg/kg	0.000913 %	✓	
28	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1	20 mg/kg	1.785	29.634 mg/kg	0.00296 %	✓	
Total:								0.0973 %		

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: TP104-18/06/2021-0

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

Sample details

Sample name:	LoW Code:
TP104-18/06/2021-0	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0-0.3 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
10%	
(wet weight correction)	

Hazard properties

None identified

Determinands

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

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				16	mg/kg	1.32	19.013	mg/kg	0.0019 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				0.58	mg/kg	1.142	0.596	mg/kg	0.0000596 %	✓	
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				21	mg/kg	1.462	27.623	mg/kg	0.00276 %	✓	
		215-160-9	1308-38-9									
4	chromium in chromium(VI) compounds { chromium(VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.5	mg/kg	2.27	<1.135	mg/kg	<0.000113 %		<LOD
	024-017-00-8											
5	copper { dicopper oxide; copper (I) oxide }				53	mg/kg	1.126	53.705	mg/kg	0.00537 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	230	mg/kg	1.56	322.882	mg/kg	0.0207 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	mercury { mercury dichloride }				0.78	mg/kg	1.353	0.95	mg/kg	0.000095 %	✓	
	080-010-00-X	231-299-8	7487-94-7									
8	nickel { nickel chromate }				16	mg/kg	2.976	42.858	mg/kg	0.00429 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
9	selenium { nickel selenate }				0.22	mg/kg	2.554	0.506	mg/kg	0.0000506 %	✓	
	028-031-00-5	239-125-2	15060-62-5									
10	zinc { zinc chromate }				280	mg/kg	2.774	699.085	mg/kg	0.0699 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
11	pH				8.4	pH		8.4	pH	8.4 pH		
			PH									
12	naphthalene				0.14	mg/kg		0.126	mg/kg	0.0000126 %	✓	
	601-052-00-2	202-049-5	91-20-3									
13	acenaphthylene				0.11	mg/kg		0.099	mg/kg	0.0000099 %	✓	
		205-917-1	208-96-8									
14	acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9									
15	fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-695-5	86-73-7									
16	phenanthrene				1.7	mg/kg		1.53	mg/kg	0.000153 %	✓	
		201-581-5	85-01-8									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
17	anthracene	204-371-1	120-12-7		0.66 mg/kg		0.594 mg/kg	0.0000594 %	✓	
18	fluoranthene	205-912-4	206-44-0		5.4 mg/kg		4.86 mg/kg	0.000486 %	✓	
19	pyrene	204-927-3	129-00-0		5 mg/kg		4.5 mg/kg	0.00045 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	2 mg/kg		1.8 mg/kg	0.00018 %	✓	
21	chrysene	601-048-00-0	205-923-4	218-01-9	2.8 mg/kg		2.52 mg/kg	0.000252 %	✓	
22	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	4.2 mg/kg		3.78 mg/kg	0.000378 %	✓	
23	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	1.6 mg/kg		1.44 mg/kg	0.000144 %	✓	
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	3.6 mg/kg		3.24 mg/kg	0.000324 %	✓	
25	indeno[123-cd]pyrene	205-893-2	193-39-5		2.2 mg/kg		1.98 mg/kg	0.000198 %	✓	
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	0.52 mg/kg		0.468 mg/kg	0.0000468 %	✓	
27	benzo[ghi]perylene	205-883-8	191-24-2		2 mg/kg		1.8 mg/kg	0.00018 %	✓	
28	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1	26 mg/kg	1.785	41.773 mg/kg	0.00418 %	✓	
Total:								0.112 %		

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: TP105-18/06/2021-0.3

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

Sample details

Sample name:	LoW Code:
TP105-18/06/2021-0.3	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.3-0.8 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
17%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 17% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				17	mg/kg	1.32	18.63	mg/kg	0.00186 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				0.27	mg/kg	1.142	0.256	mg/kg	0.0000256 %	✓	
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				16	mg/kg	1.462	19.409	mg/kg	0.00194 %	✓	
		215-160-9	1308-38-9									
4	chromium in chromium(VI) compounds { chromium(VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.5	mg/kg	2.27	<1.135	mg/kg	<0.000113 %		<LOD
	024-017-00-8											
5	copper { dicopper oxide; copper (I) oxide }				100	mg/kg	1.126	93.449	mg/kg	0.00934 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	88	mg/kg	1.56	113.929	mg/kg	0.0073 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	mercury { mercury dichloride }				0.2	mg/kg	1.353	0.225	mg/kg	0.0000225 %	✓	
	080-010-00-X	231-299-8	7487-94-7									
8	nickel { nickel chromate }				30	mg/kg	2.976	74.109	mg/kg	0.00741 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
9	selenium { nickel selenate }				0.48	mg/kg	2.554	1.017	mg/kg	0.000102 %	✓	
	028-031-00-5	239-125-2	15060-62-5									
10	zinc { zinc chromate }				86	mg/kg	2.774	198.019	mg/kg	0.0198 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
11	pH				8.5	pH		8.5	pH	8.5 pH		
12	naphthalene				1.3	mg/kg		1.079	mg/kg	0.000108 %	✓	
	601-052-00-2	202-049-5	91-20-3									
13	acenaphthylene				0.35	mg/kg		0.291	mg/kg	0.0000291 %	✓	
		205-917-1	208-96-8									
14	acenaphthene				2.5	mg/kg		2.075	mg/kg	0.000208 %	✓	
		201-469-6	83-32-9									
15	fluorene				1.4	mg/kg		1.162	mg/kg	0.000116 %	✓	
		201-695-5	86-73-7									
16	phenanthrene				18	mg/kg		14.94	mg/kg	0.00149 %	✓	
		201-581-5	85-01-8									

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
17	•	anthracene				3.7	mg/kg		3.071	mg/kg	0.000307 %	✓	
			204-371-1	120-12-7									
18	•	fluoranthene				29	mg/kg		24.07	mg/kg	0.00241 %	✓	
			205-912-4	206-44-0									
19	•	pyrene				26	mg/kg		21.58	mg/kg	0.00216 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				12	mg/kg		9.96	mg/kg	0.000996 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				12	mg/kg		9.96	mg/kg	0.000996 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				14	mg/kg		11.62	mg/kg	0.00116 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				4.6	mg/kg		3.818	mg/kg	0.000382 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				11	mg/kg		9.13	mg/kg	0.000913 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25	•	indeno[123-cd]pyrene				6.6	mg/kg		5.478	mg/kg	0.000548 %	✓	
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				1.4	mg/kg		1.162	mg/kg	0.000116 %	✓	
		601-041-00-2	200-181-8	53-70-3									
27	•	benzo[ghi]perylene				6.3	mg/kg		5.229	mg/kg	0.000523 %	✓	
			205-883-8	191-24-2									
28	🧪	vanadium { divanadium pentaoxide; vanadium pentoxide }				40	mg/kg	1.785	59.268	mg/kg	0.00593 %	✓	
		023-001-00-8	215-239-8	1314-62-1									
Total:											0.0663 %		

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: TP106-18/06/2021-0

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

Sample details

Sample name:	LoW Code:
TP106-18/06/2021-0	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0-0.8 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
17%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 17% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				6.3 mg/kg	1.32	6.904 mg/kg	0.00069 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				14 mg/kg	1.462	16.983 mg/kg	0.0017 %	✓	
		215-160-9	1308-38-9							
4	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.5 mg/kg	2.27	<1.135 mg/kg	<0.000113 %		<LOD
	024-017-00-8									
5	copper { dicopper oxide; copper (I) oxide }				17 mg/kg	1.126	15.886 mg/kg	0.00159 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
6	lead { lead chromate }			1	35 mg/kg	1.56	45.313 mg/kg	0.00291 %	✓	
	082-004-00-2	231-846-0	7758-97-6							
7	mercury { mercury dichloride }				<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
8	nickel { nickel chromate }				12 mg/kg	2.976	29.644 mg/kg	0.00296 %	✓	
	028-035-00-7	238-766-5	14721-18-7							
9	selenium { nickel selenate }				0.3 mg/kg	2.554	0.636 mg/kg	0.0000636 %	✓	
	028-031-00-5	239-125-2	15060-62-5							
10	zinc { zinc chromate }				34 mg/kg	2.774	78.286 mg/kg	0.00783 %	✓	
	024-007-00-3	236-878-9	13530-65-9							
11	pH				7.8 pH		7.8 pH	7.8 pH		
			PH							
12	naphthalene				0.18 mg/kg		0.149 mg/kg	0.0000149 %	✓	
	601-052-00-2	202-049-5	91-20-3							
13	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							
14	acenaphthene				0.21 mg/kg		0.174 mg/kg	0.0000174 %	✓	
		201-469-6	83-32-9							
15	fluorene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-695-5	86-73-7							
16	phenanthrene				1.4 mg/kg		1.162 mg/kg	0.000116 %	✓	
		201-581-5	85-01-8							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
17	anthracene	204-371-1	120-12-7		0.37 mg/kg		0.307 mg/kg	0.0000307 %	✓	
18	fluoranthene	205-912-4	206-44-0		2.7 mg/kg		2.241 mg/kg	0.000224 %	✓	
19	pyrene	204-927-3	129-00-0		2.2 mg/kg		1.826 mg/kg	0.000183 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	1.2 mg/kg		0.996 mg/kg	0.0000996 %	✓	
21	chrysene	601-048-00-0	205-923-4	218-01-9	1.1 mg/kg		0.913 mg/kg	0.0000913 %	✓	
22	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	1.4 mg/kg		1.162 mg/kg	0.000116 %	✓	
23	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.53 mg/kg		0.44 mg/kg	0.000044 %	✓	
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	1.1 mg/kg		0.913 mg/kg	0.0000913 %	✓	
25	indeno[123-cd]pyrene	205-893-2	193-39-5		0.64 mg/kg		0.531 mg/kg	0.0000531 %	✓	
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		0.42 mg/kg		0.349 mg/kg	0.0000349 %	✓	
28	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1	19 mg/kg	1.785	28.152 mg/kg	0.00282 %	✓	
Total:								0.0218 %		

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: TP107-18/06/2021-0

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

Sample details

Sample name:	LoW Code:
TP107-18/06/2021-0	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0-0.2 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
11%	
(wet weight correction)	

Hazard properties

None identified

Determinands

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

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				15 mg/kg	1.32	17.626 mg/kg	0.00176 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				0.46 mg/kg	1.142	0.468 mg/kg	0.0000468 %	✓	
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				16 mg/kg	1.462	20.813 mg/kg	0.00208 %	✓	
		215-160-9	1308-38-9							
4	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.5 mg/kg	2.27	<1.135 mg/kg	<0.000113 %		<LOD
	024-017-00-8									
5	copper { dicopper oxide; copper (I) oxide }				65 mg/kg	1.126	65.133 mg/kg	0.00651 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
6	lead { lead chromate }			1	170 mg/kg	1.56	236 mg/kg	0.0151 %	✓	
	082-004-00-2	231-846-0	7758-97-6							
7	mercury { mercury dichloride }				4.5 mg/kg	1.353	5.421 mg/kg	0.000542 %	✓	
	080-010-00-X	231-299-8	7487-94-7							
8	nickel { nickel chromate }				18 mg/kg	2.976	47.68 mg/kg	0.00477 %	✓	
	028-035-00-7	238-766-5	14721-18-7							
9	selenium { nickel selenate }				0.65 mg/kg	2.554	1.477 mg/kg	0.000148 %	✓	
	028-031-00-5	239-125-2	15060-62-5							
10	zinc { zinc chromate }				160 mg/kg	2.774	395.038 mg/kg	0.0395 %	✓	
	024-007-00-3	236-878-9	13530-65-9							
11	pH				7.9 pH		7.9 pH	7.9 pH		
			PH							
12	naphthalene				0.42 mg/kg		0.374 mg/kg	0.0000374 %	✓	
	601-052-00-2	202-049-5	91-20-3							
13	acenaphthylene				0.12 mg/kg		0.107 mg/kg	0.0000107 %	✓	
		205-917-1	208-96-8							
14	acenaphthene				0.78 mg/kg		0.694 mg/kg	0.0000694 %	✓	
		201-469-6	83-32-9							
15	fluorene				0.44 mg/kg		0.392 mg/kg	0.0000392 %	✓	
		201-695-5	86-73-7							
16	phenanthrene				4.7 mg/kg		4.183 mg/kg	0.000418 %	✓	
		201-581-5	85-01-8							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
17	anthracene	204-371-1	120-12-7		1.1 mg/kg		0.979 mg/kg	0.0000979 %	✓	
18	fluoranthene	205-912-4	206-44-0		9.6 mg/kg		8.544 mg/kg	0.000854 %	✓	
19	pyrene	204-927-3	129-00-0		8 mg/kg		7.12 mg/kg	0.000712 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	3.6 mg/kg		3.204 mg/kg	0.00032 %	✓	
21	chrysene	601-048-00-0	205-923-4	218-01-9	3.2 mg/kg		2.848 mg/kg	0.000285 %	✓	
22	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	5.1 mg/kg		4.539 mg/kg	0.000454 %	✓	
23	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	1.7 mg/kg		1.513 mg/kg	0.000151 %	✓	
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	4.3 mg/kg		3.827 mg/kg	0.000383 %	✓	
25	indeno[123-cd]pyrene	205-893-2	193-39-5		2.4 mg/kg		2.136 mg/kg	0.000214 %	✓	
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	0.31 mg/kg		0.276 mg/kg	0.0000276 %	✓	
27	benzo[ghi]perylene	205-883-8	191-24-2		2.4 mg/kg		2.136 mg/kg	0.000214 %	✓	
28	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1	19 mg/kg	1.785	30.187 mg/kg	0.00302 %	✓	
Total:								0.0779 %		

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

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 E conc. < 3 % , Eye Irrit. 2 H319 1 E 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) Worst 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: 2021.197.4823.9172 (16 Jul 2021)

HazWasteOnline Database: 2021.197.4823.9172 (16 Jul 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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- » Geotechnical
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- » Invasive Species
- » Land Remediation
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