

ARDWICK GREEN NORTH, MANCHESTER

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

Job Number: LKC 22 1502

Date: August 2023

Client: Church Inn (Ardwick) Ltd



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R1	29.02.24	Executive Summary amended	RC

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EXECUTIVE SUMMARY

Site Details

Site Location:	On the junction of Ardwick Green North and Cotter Street in the Ardwick area of Manchester. Centred at approximate National Grid Reference 385210E 397300N.
Site Area:	1,500m ² .
Current Land Use:	Vacant site with some hardstanding and vegetation.
Proposed Development:	Planning – 16no. back-to-back 3 storey residential dwellings in 2no blocks.
Purpose of Report:	Contamination and Geotechnical Assessment.

Preliminary Risk Assessment

PRA Details:	Undertaken by LKC in October 2022. Ref: LKC 22 1502.
History:	Onsite: unreferenced buildings and roads, brewery, public houses. Surrounding Area: lake, reservoirs, graveyard and laundry.
Geology / Hydrogeology:	Artificial: No BGS recorded artificial. Superficial: Till. Secondary Undifferentiated Aquifer. Bedrock: Chester Formation (sandstone). Principal Aquifer.
Mining:	Not within Development High Risk Area.
Preliminary Conceptual Model: PL=Pollutant Linkage	PL1 Direct Contact (Human Health): Moderate Risk (metals, PAHs, Petroleum Hydrocarbons). PL2 Inhalation of Vapours: Moderate Risk (volatile contaminants). PL3 Gas: Moderate Risk (hazardous and ground gas). PL4 Controlled waters: Moderate Risk (mobile contaminants). PL5 Water Pipelines: Moderate Risk (organic contaminants).
UXO	Moderate Risk. Detailed Desk Study recommended.
Recommendations:	Site Investigation was recommended to further assess all the above pollutant linkages.

Ground Investigation Work Undertaken

Date of Investigation:	25 th - 27 th April 2023
Intrusive Investigation Work Undertaken:	3 no. cable percussive boreholes (CP101-CP103) 6no. mechanically excavated trial pits (TP101-TP106)
Monitoring Wells:	Installed in CP101-CP103
Soil Sampling:	6no. samples tested for metals, speciated PAHs, pH, sulphate, asbestos and SOM. 2no. samples tested for metals, speciated PAHs, cyanide, pH, sulphate, asbestos, phenol, TPHCWG, BTEX and SOM.
Groundwater Sampling:	Not required.
Monitoring:	6no. gas monitoring visits over 3 months
In-situ and Laboratory Geotechnical Testing:	SPTs, shear vanes, Single stage triaxial, plasticity.

Ground Conditions and Geotechnical Assessment

Location	General Ground conditions	Allowable Bearing Pressure	Anticipated Foundation Type	Other Considerations
Whole Site	Made Ground to approx. 1.30mbgl, and up to 2.50mbgl at former basement.	103kN/m ² and 169kN/m ² within the stiff CLAY and medium dense SAND	Strip and pad foundations for southern building.	Consideration of effects of trees also needs to be considered.

	Interbedded medium dense SAND and stiff high strength CLAY to approx. 6.20m to 7.10mbgl. Weathered Sandstone, recovered as SAND to 8.70mbgl. Groundwater at 2.76m to 4.82mbgl.	respectively, at 1.50mbgl for strip. 202kN/m ² and 282kN/m ² within the stiff CLAY and medium dense SAND and respectively, at 1.50mbgl for pad. At the northern building, pile capacity of 322kN at 6.00mbgl.	Ground improvement and pile foundation for the southern building.	Temporary supports of excavations may be required. Detailed design should be carried out by structural engineer. Concrete Requirements DS-1 AC-1 for natural strata, DS-2 AC-2 to DS-3 AC-3 in Made ground.
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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 home-grown produce).	Moderate	- Elevated lead identified across the site. Recommendations: Remediation required in garden areas.
		Low	- No elevated ACM, PAHs, petroleum hydrocarbons identified. Recommendations: No remediation required.
2	Volatile contaminants posing a risk to site users via the inhalation of vapours.	Low	- No 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.	Moderate / Low	- Low gas concentrations and flow rates. Classified as CS1. Recommendations: No remediation required.
4	Mobile contamination posing a risk to controlled waters via the migration through permeable strata.	Low	- Low risk identified in PRA. No groundwater testing required. No mobile contamination encountered. Recommendations: No remediation required.
5	Organic contaminants posing a risk to water pipes.	Low	- No organic contamination identified at potable pipe depth. Recommendations: UU risk assessment to be completed. The site will unlikely require barrier piping.

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 C733⁴.	Log of work undertaken including photographs. Details of any sampling undertaken and validation of any potential additional remedial work.

⁴ CIRIA (2014). "Asbestos in Soil and Made Ground: A Guide to Understanding and Managing Risks". C733.

Build-Phase Construction	1 and 7	As the made ground is relatively shallow 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 H.	<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.
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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 northeast of the site associated with cellars of the former pub.
	<u>Re-use of site won material</u> To ensure material is compliant with appropriate waste regulations, any site won material re-used onsite should be in recourse to appropriate exemptions. A U1 and T5 exemption should be registered. This will allow the following to be used onsite or brought in for use onsite (refer to guidance for types of waste that can be used ⁵): 5,000 tonnes (c. 2,500m³) <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. <u>Health and Safety Considerations</u> 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 guidance⁶) should be adopted by all workers involved with site enabling and construction works.

⁵ <https://www.gov.uk/guidance/waste-exemptions-using-waste>

⁶ HSE (1991). "Protection of Workers and the General Public During Development of Contaminated Land" London HMSO.

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Figure 2: Proposed Development Plan

Figure 3A: Site Investigation Location Plan

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Appendix A: Risk Matrix

Appendix B: Profile Logs

Appendix C: Certificates of Analysis - Soil

Appendix D: Certificates of Analysis - Geotechnical

Appendix E: Gas Monitoring Results

Appendix F: Soakaway Test Results

Appendix G: Generic Assessment Criteria Values

Appendix H: Hazwaste Assessment

Appendix I: Typical Environmental Cover System

1 Introduction

1.1 Background

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

The following work has previously been undertaken:

- Preliminary Risk Assessment (PRA) report, undertaken by LKC (Ref: LKC 22 1502, dated 25th October 2022).

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.

1.2 Site Details

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

Site Location	On the junction of Ardwick Green North and Cotter Street in the Ardwick area of Manchester. Centred at approximate National Grid Reference 385210E 397300N.
Approximate Area	1500m ²
Topography	40 metres Above Ordnance Datum (AOD). Site has gradual slope to the south.
Current Site Use	Vacant site with some hardstanding and vegetation.
Purpose of Report	Planning.
Proposed Development	16no. back-to-back 3no. storey residential dwellings in 2no. blocks.

Table 1-1. Summary of site details.

2 Review of Previous Work

2.1 Phase 1 Preliminary Risk Assessment (PRA)

A PRA report (Ref: CL-602-LKC 22 1502-01, dated 25th October 2022) has previously been undertaken by LKC.

Table 2-1 summarises the site details, historical review, environmental settings and site reconnaissance.

Main Historical Features	Onsite: unreferenced buildings and roads, brewery, public houses. Surrounding Area: lake, reservoirs, graveyard and laundry.
Geology / Hydrogeology	Artificial: No BGS recorded artificial. Superficial: Till. Secondary Undifferentiated Aquifer. Bedrock: Chester Formation (sandstone). Principal Aquifer.
Landfills / Infilled ground	No recorded landfills. Potentially infilled ground identified.
UXO	Moderate UXO risk identified. Detailed desk study recommended.
Site walkover	Vacant site with hardstanding, some vegetation and fly tipping. Services indicated on site. Site is secure.

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

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

Each pollutant linkage is described along with an assessment of the risk based upon guidance on probabilities and consequences outlined in CIRIA C552⁷. The risk matrix is provided in Appendix A.

The PCCM has been updated to take into account recent LKC changes to omit phytotoxicity, sulphate and potable water pipes pollutant linkages. Justification is provided below.

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

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

⁷ CIRIA (2001). "Contaminated Land Risk Assessment: A Guide to Good Practice". C552.

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.	- Heavy metals. - PAHs. - Petroleum hydrocarbons. - Other inorganic and organic contaminants.	Likely (given site history, site conditions and proposed end use)	Medium	Moderate	Intrusive investigation required. Soil analysis of CoC.
2	- Inhalation of vapours. - Migration via permeable strata and preferential pathways.	- Future site users. - Offsite receptors.	- Volatile contaminants (petroleum hydrocarbons, naphthalene).	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.	- Future site users. - Buildings. - Offsite land users.	- Hazardous gas (carbon dioxide, methane).	Low Likelihood (given limited gas source)	Severe	Moderate	Intrusive investigation to confirm ground conditions. If significant gas source and pathway identified, gas monitoring required.
4	- Surface run-off. - Migration via permeable strata and preferential pathways. - Perched waters migration.	- Groundwater (Principal Aquifer).	- Mobile contaminants such as metals, PAHs, hydrocarbons, other organic / inorganic compounds.	Low Likelihood (only minimal mobile contamination anticipated with limited pathway)	Medium	Moderate / Low (moderate assumed until ground conditions confirmed)	Intrusive investigation required. Groundwater sampling, subject to ground conditions encountered. Analysis of CoC.
5	- Ingestion of tainted water supply.	- Future site users. - Water pipes.	- Organic contaminants such as petroleum hydrocarbons, naphthalene.	Likely (given site history, site conditions and direct contact / pathway)	Medium	Moderate	Intrusive investigation required. Soil analysis of CoC, subject to ground conditions encountered.

Table 2-2.: Preliminary Contamination Conceptual Model.

3 Ground Investigation

3.1 Site Investigation Design and Methodology

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

The investigation was carried out on 25th-27th April 2023 and 20th July 2023 and comprised the following:

- 3no. cable percussion boreholes drilled to 7.60-8.70mbgl (ref. CP101 to CP103).
- 6no. trial pits using JCB 3CX excavated to 2.20-3.30mbgl (ref. TP101 to TP106).
- 2no. soakaway tests in trial pits using JCB 3CX excavated to 2.10mbgl (ref. SA101 to SA102).

All site investigation locations are shown in Figure 3A.

The locations were chosen to allow good coverage 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
TP102-TP103, TP105-TP106, CP101-CP103	General site coverage.
TP101, TP104	Potential basement present
SA101, SA102	Target the proposed parking area where the soakaways are likely to be installed.

Table 3-1: Summary of sampling locations.

The number of site investigation points corresponds to approximately one location per 18m square centres. This is considered to be a conservative sampling density and is in line with BS10175⁸ for a 'main investigation'.

All profile logs are provided in Appendix B and are in line with BS14688-1⁹ and BS5930¹⁰.

3.2 Well Installations

All (CP101-CP103) of the boreholes were installed with monitoring wells for gas and groundwater monitoring. 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.

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

⁸ British Standard (2017). "Investigation of Potentially Contaminated Sites – Code of Practice." BS10175:2017.

⁹ British Standards (2002) Geotechnical investigation and testing – Identification and Classification of Soil. Part 1: Identification and description. BS EN ISO 14688-1:2002.

¹⁰ British Standard (2015). "Code of Practice for Ground Investigations". BS5930:2015.

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.	6	CP101 0.0-0.5m CP102 0.0-0.5m CP103 0.0-0.5m TP102 0.3-1.0m TP103 0.15-1.0m TP104 0.2-1.0m	A basic suite with a broad selection of contaminants tested on samples across the site where no significant evidence of contamination was identified (with the exception of occasional ash and coal) and no TVOCs identified from the PID tests.
Metals / metalloids, pH, water soluble sulphate, cyanide suite, phenol, TPHCWG, BTEX, MTBE, speciated PAHs, SOM and asbestos screen.	2	TP101 0.0-1.0m TP105 0.85-1.1m	More detailed testing to aid waste disposal assessment.

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 six occasions.

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

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

3.5 **Geotechnical Testing**

3.5.1 *In-situ Onsite Geotechnical Testing*

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

- Standard Penetration Tests (SPTs) were performed in the cable percussion boreholes at approximately 1m intervals, generally within the natural strata.
- Hand Shear Vane (HSV) tests (giving undrained shear strength) were performed in the trial pits (to a maximum depth of 3mbgl), within the natural clay strata.

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

3.5.2 *Laboratory Geotechnical Testing*

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

Many of the tests are UKAS accredited and further details are given in the laboratory report presented in Appendix D. Table 3-4 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 & Depth	Justification
Atterberg Limits (plasticity testing)	4	CP101 3.80-4.10m CP102 4.90-5.20m CP103 5.50-5.90m CP103 7.50-7.60m	A selection of clay samples across the site were tested for Atterberg Limits to assess their shrinkability potential associated with current and proposed trees.
Single Stage Triaxial	4	CP101 U8 4.30-4.75m CP101 U12 6.40-6.85m CP102 U7 3.40-3.85m CP103 U10 5.20-5.5m	Undertaken to assess the in-situ undrained shear strength of the clay strata.

Table 3-4.: Summary of geotechnical testing undertaken.

3.6 Soakaway Tests

Soakaway tests were undertaken in SA101-SA102 in accordance with BRE Digest 365¹⁸.

The trial pits were machine excavated to dimensions of 0.6m wide, 1.8m long and 2.1m depth. The arisings were logged in accordance with BS14688-1¹⁹ and BS5930.

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

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

¹⁸ BRE (2003) 'Soakaway Design' British Research Establishment BRE Digest 365 2003

¹⁹ British Standards (2002). Geotechnical investigation and testing – Identification and Classification of Soil. Part 1: Identification and description. BS EN ISO 14688-1:2002.

4 Ground Conditions

4.1 Geology – Generalised Sequence

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

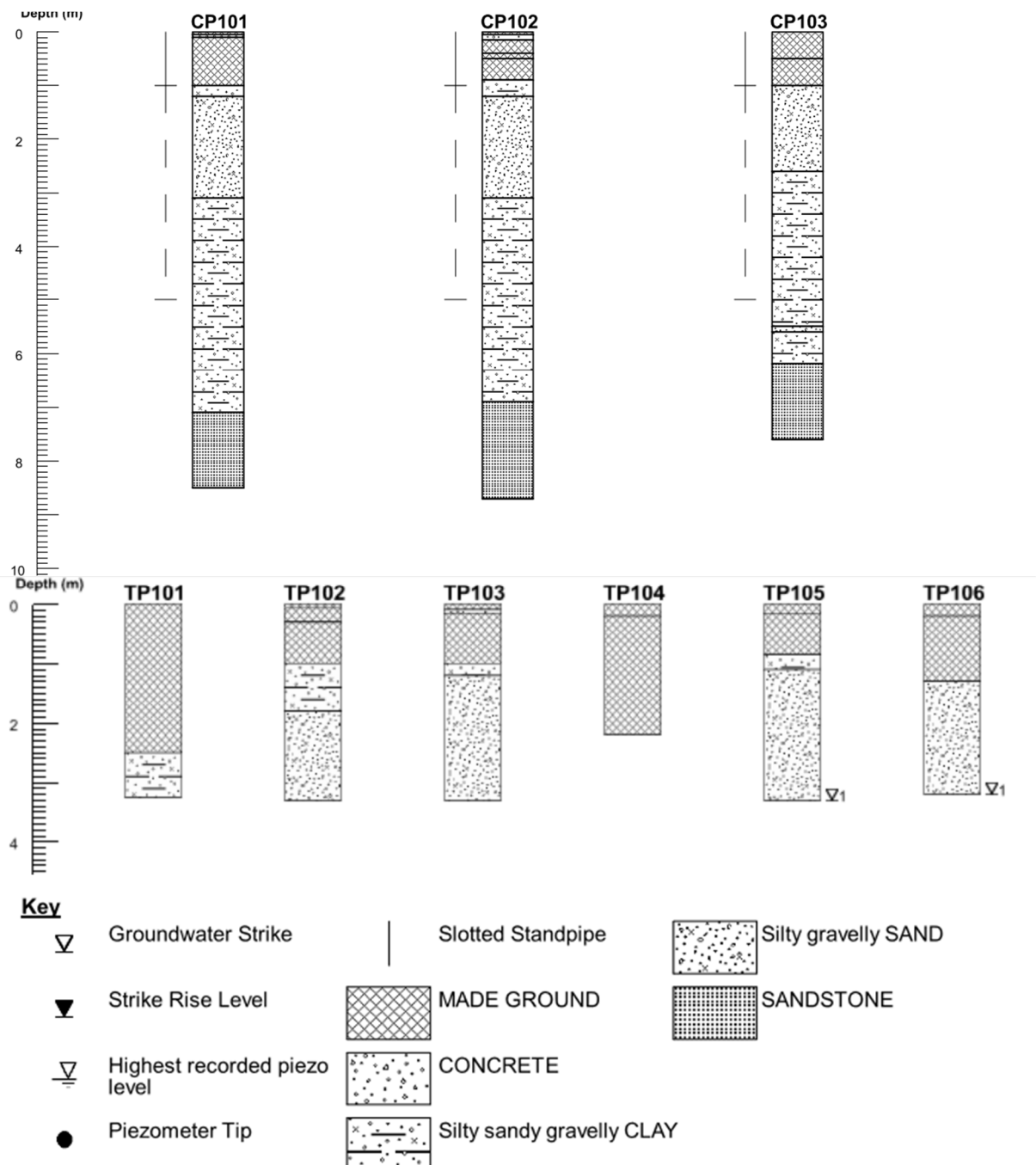


Plate 4-1: Summary of ground conditions.

Additional information on ground conditions:

Made Ground was encountered to depths of 0.85m to 1.30mbgl, except at TP101 and TP104 where the Made Ground extended to depth of 2.50mbgl and >2.20mbgl, respectively. At these locations, it is believed that a basement was present under the building, later infilled with anthropogenic deleterious material. Made Ground comprises granular and cohesive soils with ash, brick fragment, plastic and coal fragments.

Natural strata was encountered to depth of 6.20m to 7.10mbgl at the cable percussive borehole locations and >3.20m to >3.30mbgl at the trial pit locations. Natural strata were not encountered at TP104.

Natural strata comprise interbedded strata of granular and cohesive soils. The granular soils comprise medium dense gravelly silty SAND and the cohesive soils comprise stiff to very stiff consistency high to very high strength slightly gravelly sandy silty CLAY.

Bedrock was encountered at the cable percussive borehole locations from depths of 6.20m to 7.10mbgl. Bedrock comprises red Sandstone recovered as SAND.

With the exception of the anthropogenic material encountered in the made ground (as described above), no further contamination was identified.

There was no visual / olfactory evidence of hydrocarbons or volatile contaminants in any locations. The PID recorded a maximum of 0.4ppm TVOC in the samples.

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 three occasions to date. An oil-water interface probe (approximately 1cm detection limit) was used to detect the presence of free phase hydrocarbons within each borehole.

Results are summarised in Table 4-1.

BH/TP	Water Strike Depths (mbgl)	Well Response Zone (mbgl)	No. of Monitoring Visits	Monitoring Depths (mbgl)			Sample Taken?	Evidence of Contam?
				Min	Max	Base		
CP101	Dry	1.0-5.0 (MG/C/S)	6	2.75	3.05	4.85	N	N
CP102	Dry	1.0-5.0 (MG/S/C)	6	2.45	2.80	4.86	N	N
CP103	Dry	1.0-5.0 (C/S)	6	2.98	dry	4.85	N	N
TP101	Dry	-	-	-	-	-	N	N
TP102	Dry	-	-	-	-	-	N	N
TP103	Dry	-	-	-	-	-	N	N
TP104	Dry	-	-	-	-	-	N	N
TP105	3.3	-	-	-	-	-	N	N
TP106	3.2	-	-	-	-	-	N	N

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

Response Zones:

MG=Made Ground; S/S = Sandstone; S=Sand; C=Clay

4.2.2 Permeability Tests

Soakaway Tests

Soakaway tests were also carried out within the natural clay and sand strata at the request of the drainage engineer. The results of the soakaways are presented in Appendix F and summarised in Table 4-2.

BRE365²⁰ indicates that the calculation of the soil infiltration rate is made from the time taken for the water level to fall from 75% to 25% effective storage depth in each pit.

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

Where:

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

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

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

Due to the slow rate at which water drained, three tests were not carried out in all locations and tests were terminated before the required effective depth.

²⁰ BRE (2003) 'Soakaway Design' British Research Establishment BRE Digest 365 2003

TP	Test No.	Strata at Test Level	Time for outflow between 75% and 25% (mins)	Soil infiltration rate (m/s)
SA101	1	Clay/Sand	62.62	4.11×10^{-5}
	2	Clay/Sand	131.25	1.95×10^{-5}
SA102	1	Clay/Sand	399.80	6.57×10^{-6}

Table 4-2: Summary of soakaway tests and permeability.

Based on the results of the soakaway tests, the permeability of the sandstone has been calculated within an order of magnitude of 10^{-5} to 10^{-6} m/s.

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 4-3 and provided within the profile logs in Appendix B.

Approximate Depth (mbgl)	SPT 'N' Values		
	CP101	CP102	CP103
1-2	20 (C)	14 (C)	11 (S)
2-3	26 (S)	18 (C)	25 (S)
3-4	29 (C)	-	-
4-5	-	31 (C)	24 (C)
5-6	20 (C)	-	50 (S/C)
6-7	-	-	50 (S/S)
7-8	50 (S/S)	50 (S/S)	50 (S/S)
8-9	50 (S/S)	50 (S/S)	-
GW Level	2.75-3.05	2.45-2.80	dry-2.98

Table 4-3: Summary of SPT (N) values.

Notes:

S/S = Sandstone; S=Sand; C=Clay.

Groundwater level based on strikes during investigation and monitoring data.

4.3.2 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	TP102	TP103	TP104	TP105	TP106
0-1	-	-	-	-	-	-
1-2	-	-	63.00	-	45.00	-
2-3	-	60.00	-	-	-	-
3-4	72.20	-	-	-	-	-
GW Level	Dry	Dry	Dry	Dry	3.30	3.20

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 silt.

4.3.3 Single Stage Triaxial Testing

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

Location	Depth (mbgl)	Material Description	Undrained Shear strength (kPa)
CP1	4.30-4.75	Stiff consistency high strength slightly gravelly sandy silty CLAY	141
CP1	6.40-6.85	Stiff consistency very high strength slightly gravelly sandy silty CLAY	160
CP2	3.40-3.85	Stiff consistency very high strength slightly gravelly sandy silty CLAY	220
CP3	5.20-5.50	Stiff consistency very high strength slightly gravelly sandy silty CLAY	230

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

4.3.4 Atterberg Limits

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

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

Location	Depth (mbgl)	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Class	Passing 425 micron (%)	Modified Plasticity Index (%)
CP1	3.80-4.10	14	36	13	23	CIM	81	18.6
CP2	4.90-5.20	13	37	12	25	CIM	88	22.0
CP3	7.50-7.60	12	39	13	26	CIM	76	19.8
CP3	5.50-5.90	14	37	13	24	CIM	84	20.2

Table 4-6: Summary of plasticity index testing.

The CLAY is of intermediate plasticity (CIM). The modified plasticity index is between 18.6% and 22.0%. This characterises the clay as having a low to medium volume change potential.

4.3.5 Sulphate and pH

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

Strata	pH	Sulphate (g/l)
Made Ground	6.4-9.6	0.05-1.54
Natural	7.3	0.04

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

5 Geotechnical Assessment

5.1 Proposed Development

It is understood that the proposed development will comprise a total of 16no back-to-back residential dwelling of 3no storey and organised in 2no blocks. Details of the proposed loadings are not known at this stage and the preliminary geotechnical assessment will be undertaken in terms of undrained shear strength for the cohesive soils and Allowable Bearing Capacity for the granular soils.

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 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 7²¹.

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.

Made Ground was encountered to depths of 0.85m to 1.30mbgl, except at TP101 and TP104 where the Made Ground extended to depth of 2.50mbgl and >2.20mbgl, respectively. At these locations, it is believed that a basement was present under the building, later infilled with anthropogenic deleterious material. Made Ground comprises granular and cohesive soils with ash, brick fragment, plastic and coal fragments.

Natural strata was encountered to depth of 6.20m to 7.10mbgl at the cable percussive borehole locations and >3.20m to >3.30mbgl at the trial pit locations. Natural strata were not encountered at TP104.

Natural strata comprise interbedded strata of granular and cohesive soils. The granular soils comprise medium dense gravelly silty SAND and the cohesive soils comprise stiff to very stiff consistency high to very high strength slightly gravelly sandy silty CLAY.

Bedrock was encountered at the cable percussive borehole locations from depths of 6.20m to 7.10mbgl. Bedrock comprises red Sandstone recovered as SAND.

²¹ British Standard. Eurocode 7: Geotechnical design – Part 1: General rules. BS EN 1997-1:2004+A1:2013

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 Works²². 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 are expected to be present on site due to the past land use of the site. These should be excavated from below the proposed development foot print with the resulting void backfilled.

The near surface soils may potentially be disturbed by weathering and site traffic. Precautions should be taken to avoid this, as excessive disturbance may result in more onerous floor slab design, road cap thickness and increased amount of site disposal etc. Based on site observations the near surface soils are not anticipated to require any treatment or reinforcing for the safe movement of construction plant and labour.

5.4 Foundation Conditions and Bearing Capacity

5.4.1 General

It is considered that the Made Ground is not suitable for a founding material due to the inherent variability of the material. The load of the new two buildings should be transferred to the natural strata of either medium dense SAND or stiff high strength CLAY.

Foundation options are therefore:

- Shallow foundations, pads and strip for the two buildings.

An assessment of the undrained shear strength (s_u) has been undertaken using the data obtained from in-situ geotechnical testing. This data is shown in Graph 5-1.

²² Specification for Highway Works, Volume 1. Series 200 – Site clearance. February 2016.



Graph 5-1: Summary of s_u vs depth from in-situ geotechnical testing.

Note:

Solid yellow and blue lines = linear best fit 'design' lines used for foundation recommendation purposes. See text for explanation.

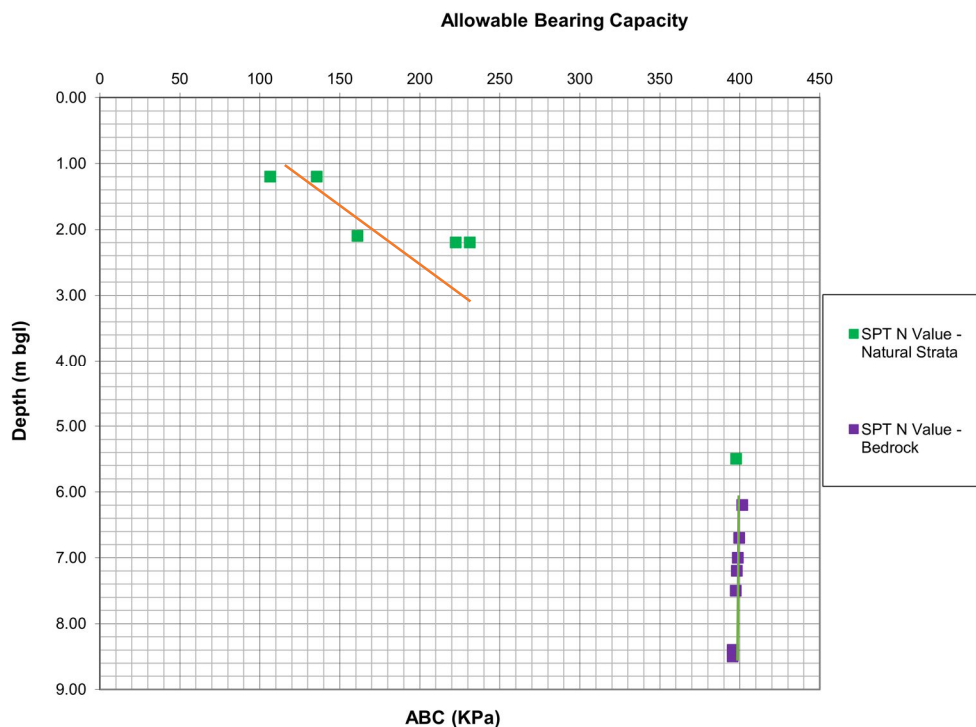
From Graph 5-1, the strength of the cohesive deposits is consistent to a depth of approximately 3.00mbgl and increases after this depth. The in-situ testing results of the hand shear vane (HSV), undertaken only in the trial pits, are consistent. The SPT-derived s_u values are lower than the s_u value obtained from undrained triaxial testing, undertaken only on samples from the cable percussive boreholes.

The s_u values from HSV average readings ranged between 45kPa and 115kPa, while those from triaxial testing ranged between 141kPa and 230kPa.

The SPT N values for the cohesive soils are from N20 to N31 from a depth of approximately 3.30m to 5.40mbgl, returning a s_u between 76kPa to 120kPa.

A conservative s_u value of 60kPa is assigned to the natural stiff sandy silty CLAY from depths of approximately 0.90m to 3.00mbgl (blue design line in Graph 5-1), increasing to 120kPa at 3.50mbgl and 130kPa at 4.00mbgl (best fit 'design' yellow in blue in Graph 5-1).

For granular material, an assessment of the ABC has been undertaken using data obtained from in-situ geotechnical tests. This data is shown in Graph 5-2.



Graph 5-2: Summary of ABC vs depth from in-situ geotechnical testing for granular material.

Note:

Solid red and green lines = linear best fit 'design' lines used for foundation recommendation purposes. See text for explanation.

The SPT N values increase with depth within the granular soils of the medium dense gravelly silty SAND. The SPT N values ranged between N11 and N26, returning an Allowable Bearing Capacity (ABC) between 106kN/m² and 231kN/m². Only at CP103 at a depth of 5.50mbgl, one SPT N value recorded N50 (at refusal) within the dense sand, returning an ABC of 398kN/m².

A conservative ABC value of 110kN/m² is assigned to the natural medium dense gravelly silty SAND at depth of approximately 1.00mbgl increasing to 170kN/m² at 2.00mbgl.

Based on the results of the SPT tests the average angle of internal friction (ϕ) for the medium dense gravelly silty SAND has been calculated at 32°.

Groundwater was encountered at depth of 3.20m to 3.30mbgl at TP105 and TP106, respectively during site investigation, and at depths of 2.76m to 4.82mbgl during the subsequent monitoring.

In granular soils, if groundwater is encountered as perched water, the bearing capacity is reduced by as much as 50%.

The SPT N values for the weathered bedrock, recovered as sand, are N50 (at refusal within the cable percussive boreholes) from a depth of 6.20mbgl. A conservative ABC of 400kPa has been considered representative of the weathered bedrock (solid green best fit 'design' line).

Foundation options are discussed in the following sections.

5.4.2 Strip Foundations

Strip foundations should be constructed into either the stiff sandy CLAY or the medium dense gravelly silty SAND.

Within the cohesive strata, at a depth of approximately 1.50mbgl, with a standard foundation width of 0.75m, an allowable bearing capacity (ABC) of 103kN/m² has been calculated using a Factor of Safety (FoS) of 3 and an undrained shear strength of 60kN/m² taken from Graph 5-1 within the stiff sandy CLAY.

Atterberg limits determinations, summarised in Table 4-5 show the cohesive soils to be of intermediate plasticity and low to medium volume change potential and as such the sides of the foundations may require protection.

Foundation depths should take account of the presence of existing and proposed trees with foundations deepened locally in accordance with the requirements of NHBC Standards²³ for a clay of intermediate plasticity and with low to medium volume change potential. 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.

For the granular SAND, present at a depth of 1.50mbgl, the ABC is approximately 169kN/m² based on an average SPT N value of 18 recorded between depths of 1.20m and 2.20mbgl.

5.4.3 Pad Foundations

A preliminary assessment has been made on pad foundations in order to assess the load supported by this type of shallow foundation. For preliminary assessment purposes, two size pads of 1m² and 2m² have been considered at depth of 1.50mbgl both on a granular and cohesive soils, as founding material.

The Bearing Capacity values were calculated applying Design Approach 1 of Eurocode 7²⁴ with Combinations 1 and 2, where partial factors were applied to actions and ground parameters, respectively. For the partial factor R_v on bearing capacity, the value used is 1.5 instead of 1.0 for a more conservative value.

No additional loads (live or static or horizontal) have been added as surcharge into the analysis.

The following analysis are for assessment purposes only and foundation design should be undertaken by a specialist contractor.

In the preliminary analysis for the cohesive soils, undrained shear strength value of 60kPa is used at depth of 1.50mbgl. Groundwater is assumed to be present at a depth of 3.00mbgl. The assumed unit weight of 19kN/m³ for the CLAY, above the groundwater level, and 21kN/m³ for saturated conditions.

Pad Size	Pad Depth (mbgl)	Bearing Capacity (kN/m ²)	
		Combination 1	Combination 2
1m ² (1.00m x 1.00m)	1.50	272	202

Table 5-1: Summary of Bearing Resistance at the proposed building.

²³ National House Building Council (2022). Building near trees. Part 4.2.

²⁴ Eurocode 7: Geotechnical design - Part 1: General rules. EN 1997-1:2004.

Table 5-1 shows that a bearing capacity of approximately 202kN/m² is achieved at depth of 1.50mbgl using the more conservative Combination 2 of EC7 Design Approach.

For the medium dense gravelly silty SAND, an ABC value of 262kN/m² can be achieved using a 1m² pad at 1.50mbgl.

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

5.4.4 Ground Improvement

The use of ground improvement techniques, such as vibro stone columns or controlled modulus columns, will allow shallow foundations to be utilised within the Made Ground and natural strata and will depend on the proposed loads. The ground improvement techniques should provide a bearing capacity of around 150kN/m² but will also remove variability within the ground. Specialist advice should be sought from a suitably experienced contractor with regard to allowable bearing capacity and settlements and advising on the suitability of the technique.

As a general rule the NHBC²⁵ recommend that these columns should not be used in granular soils with more than 10% of fine soils of clay or silt, CLAY's with plasticity index above 40%, or undrained shear strength lower than 30kPa. It is recommended that this is discussed with a specialist contractor should this option be considered.

5.4.5 Piled Foundations

Consideration could be given to a mini-piled foundation solution for the proposed building to transfer loadings through any Made Ground / poor ground conditions and bear upon more competent strata.

For preliminary purposes the following initial pile capacities have been calculated.

For this analysis, the Made Ground was considered up to 1.00m thick. It has been assumed that the pile is driven within the firm to stiff sandy CLAY to a depth of 7mbgl. Weathered bedrock is present from a depth of 7.00mbgl.

The assessment has been made using the properties of the predominantly cohesive strata encountered and granular soils, as encountered at borehole location CP101, have not been taken into account for this preliminary pile assessment.

When undertaking these preliminary calculations the following parameters have been used:

- Unit weight value of 21kN/m³ for the CLAY, assumed from Table 1 of BS8004²⁶;
- Undrained shear strength of 60kPa for the firm sandy CLAY to a depth of 3.00mbgl and increasing to 150kPa to a depth of 5.50mbgl;
- No groundwater table present;
- Factors of safety of 1.5 on side resistance and 3 on base resistance; and,
- Global Factor of safety of 2.5.

²⁵ National Housing Board Council (2022). Foundations. Part 4.

²⁶ British Standard (2015). Code of practice for foundations. BS8004:2015.

Depth (mbgl)	Pile Carrying Capacity (kN)	
	300mm dia	600mm dia
2.0	22	74
4.0	74	212
6.0	123	322

Table 5-2: Preliminary Pile Capacity.

The preliminary pile capacity assessment, undertaken to the depth of the investigated ground at approximately 6.00mbgl, shows that a load of 322kN can be supported on a pile of 0.60m diameter driven to 6.00mbgl. If a higher load is proposed for the building, additional investigations are required to determine the depth where the required bearing capacity is achieved.

The Made Ground has been recorded up to 1.00mbgl at CP101 and >2.50mbgl at the former basement. Consideration must be given to the potential for negative skin friction to have an adverse effect upon the piles.

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.

5.4.6 Recommendations

Strip and pad foundation are normally cost-effective and would be suitable for the proposed building block located to the southern area of the site.

Due to the presence of a former basement, which is expected to be infilled with engineered material, the building block on the northern side of the site should be supported by deep foundations such as piles or ground improvement.

5.5 Ground Floor Slabs

At the proposed residential development, Made Ground was recorded up to a depth of 1.30mbgl across the site and up to 2.50m at the location of the former basement. Warranty providers, such as NHBC, require suspended floors to be utilised where Made Ground is in excess of 600mm thickness.

At the location of the former basement (trial pits TP101 and TP104), the Made Ground should be excavated to its full depth and replaced with engineered fill material up to the founding level. Suspended floors will still be required.

5.6 Drainage

The presence of Made Ground to depths of 0.85m to 1.30mbgl across the site, and up to 2.50m at the location of the former basements 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.

5.7 Concrete Durability

Based upon the results of the chemical analyses summarised in Table 4-6 it is considered that subsurface concrete can be designed in accordance with Design Sulphate Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1 in accordance with the recommendations provided in BRE Special Digest 1 (2005) for the soils of the natural strata and DS-2 AC-2, except at TP101 location.

At trial pit TP101, the soil has a high water-soluble sulphate concentration and the concrete design class is DS-3 AC-3 within the Made Ground. It is understood that at the location where TP101 was excavated, a basement was present and later infilled with deleterious material. It is considered that if this Made ground is excavated at the basement location and replaced with engineered granular fill, a lower concrete design class can be used.

5.8 Excavations

Site observations indicated that excavations should be feasible in the near surface with normal plant.

Groundwater was encountered at depth of 3.20m and 3.30mbgl at trial pits TP105 and TP106, respectively during site investigation and at depths between 2.76m and 4.82mbgl during the subsequent monitoring.

Due to the variability of the Made Ground it is recommended that all excavations are supported or battered back in accordance with guidance contained in CIRIA R97²⁷.

5.9 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).

²⁷ CIRIA Report 97 – Trenching Practice – Second Edition (2001 revision).

6 Generic Risk Assessment

6.1 Introduction

Current good practice requires that the findings from a site investigation should be evaluated on a site-specific basis, using a risk-based approach. Risk assessment involves identification and evaluation of the hazards presented by the concentrations of contaminants measured followed by an evaluation of the risks which are associated with these hazards (LCRM²⁸). 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).

LKC consider the main risk drivers for PAHs are benzo(a)pyrene (B(a)P) and naphthalene. This is due to B(a)P possibly being a carcinogen and most toxic of the PAHs^{38,39} and naphthalene the most volatile and soluble⁴⁰. 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 negligible⁴¹. For B(a)P to be used as a surrogate marker it should follow the profile described by the HPA (2008)⁴² and CL:AIRE (2013). Naphthalene will be treated separately using the LQM S4ULs.

The proposed development is for residential houses with gardens, therefore the assessment criteria for residential with plant uptake has been used.

All criteria have been generated using the CLEA V1.06 model⁴³ based either on 1%, 2.5% and 6% Soil Organic matter (SOM). Results will be compared to the nearest appropriate SOM.

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

B(a)P as Surrogate Marker

Based on the above assumption for PAHs, LKC undertook an assessment of the data for the site with regards to using B(a)P as a surrogate marker for carcinogenic PAHs

²⁸ Land Contamination Risk Management (LCRM) <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

³⁸ EA (2002). "Contaminants in Soils: Collation of Toxicological Data and Intake Values for Humans. Benzo[a]pyrene." R&D Publication TOX2.

³⁹ USEPA (1984). "Health Effects Assessment of Polycyclic Aromatic Hydrocarbons (PAHs). EPA 540/1-86-013."

⁴⁰ EA (2003). "Review of the Fate and Transport of Selected Contaminants in the Soil Environment." Draft technical report P5- 079/TR1.

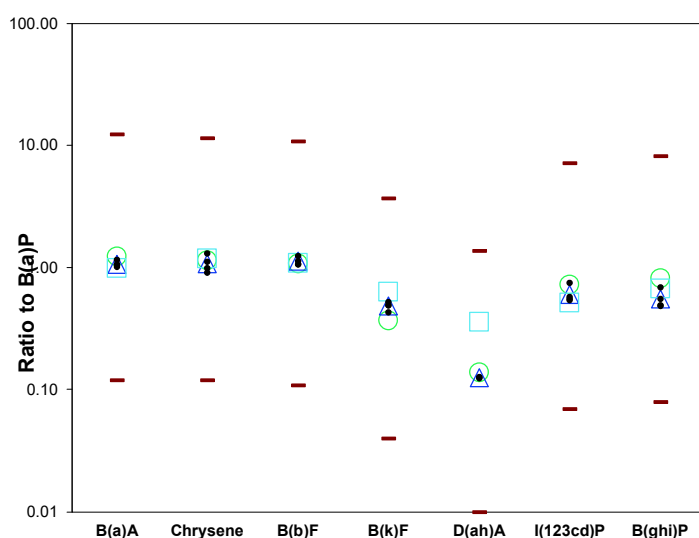
⁴¹ CL:AIRE (2013). "SP1010: Development of Category 4 Screening Levels and Assessment of Land Affected by Contamination – Final project Report."

⁴² HPA (2010). "HPA Contaminated Land Information Sheet: Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs)." Version 3.

⁴³ EA (2008). "CLEA Software (Version 1.05) Handbook." Science Report – SC050021/SR4.

as per HPA and CL:AIRE guidelines. The primary toxicological study related to Culp *et al.*⁴⁴, which was based on coal tar mixtures (>80,000mg/kg of total PAHs) fed in food to mice over a two-year carcinogenicity study.

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



Graph 6-1: The ratio of PAH to B(a)P in soil for all available data at the site based on 8 samples (where values were >LOD to allow the calculation of a ratio).

Notes:

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

●=Ratio to B(a)P for all data; ○=Mean ratio to B(a)P for Culp data; △=Mean ratio to B(a)P from all data at the site
□=Mean ratio to B(a)P for UK data presented by HPA; ■=Upper and Lower limits (order of magnitude from Culp data)

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

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

6.2.2 Soil Results Comparison against Assessment Criteria

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

Contaminant	Units	No. of samples	Elevated Results	Sample Location	Criteria	Source of Criteria
Metals						
Lead	mg/kg	8	1750	TP103 (0.15-1.0m)	200	C4SL
			374	TP104 (0.20-1.0m)		
			446	CP102 (0.00-0.50m)		
GENERAL						
pH	pH	8	Range 6.4 to 9.6			
SOM	%	8	Range 0.2 to 8.4			
Asbestos	N/A	8	None Detected			

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

⁴⁴ 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.

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.

No asbestos was identified in any soil samples analysed.

6.2.3 *Direct Contact Risk – Pollutant Linkage 1*

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

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 home-grown produce. The principal pathways are the ingestion pathways (soil, dust and home-grown produce) and dermal contact.

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

No PAHs were recorded at concentrations above screening criteria and no visual or olfactory evidence of hydrocarbons was recorded. The probability of PAH and hydrocarbon contamination affecting site users is considered to be unlikely. With a medium consequence, the risk is low and remediation is not required.

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 9.2).

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

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

LKC therefore consider the probability of volatile contaminants affecting site users as unlikely. The consequence is expected to be medium, giving a low risk and no remediation is required with respect to pollutant linkage 2.

6.3 **Gas Risk Assessment**

Three 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 C665⁶⁰ and BS8485⁶¹ 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.

⁶⁰ CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665.

⁶¹ 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.

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)
CP101	1	<0.1	2.8	18.1	<0.1	9	<0.1	2.97	1007 (r)
	2	<0.1	3.0	18.0	<0.1	5	<0.1	3.02	1028 (s)
	3	<0.1	2.9	18.5	<0.1	5	<0.1	3.05	1018 (s)
	4	<0.1	3.9	17.2	<0.1	8	<0.1	3.05	1010 (r)
	5	<0.1	5.7	16.3	<0.1	11	<0.1	3.02	1004 (s)
	6	<0.1	6.6	15.2	<0.1	7	<0.1	2.75	981 (r)
CP102	1	<0.1	3.3	16.6	<0.1	4	<0.1	2.71	1008 (r)
	2	<0.1	3.9	15.9	1.0	4	<0.1	2.76	1028 (s)
	3	<0.1	1.8	19.7	<0.1	2	<0.1	2.80	1018 (s)
	4	<0.1	3.8	16.0	<0.1	6	<0.1	2.76	1010 (r)
	5	<0.1	6.3	14.4	<0.1	3	-0.1	2.75	1004 (s)
	6	<0.1	6.9	12.3	<0.1	5	<0.1	2.45	982 (r)
CP103	1	<0.1	4.3	16.4	<0.1	2	<0.1	2.97	1007 (r)
	2	<0.1	3.9	16.5	1.0	3	<0.1	4.74	1028 (s)
	3	<0.1	1.8	19.7	<0.1	2	<0.1	Dry	1018 (s)
	4	<0.1	4.2	17.9	<0.1	2	<0.1	4.53	1010 (r)
	5	<0.1	4.6	17.7	<0.1	2	<0.1	4.48	1004 (s)
	6	<0.1	6.0	14.5	<0.1	4	<0.1	2.98	983 (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): r=rising, f=falling, s=steady

Methane concentrations were all extremely low (<0.1%v/v). Carbon dioxide concentrations were also low (max. 6.9%v/v) although most readings were below 5%v/v. Flow rates were very low (<0.1l/hr).

Carbon monoxide and hydrogen sulphide were detected on occasion but at very low concentrations.

Gas Screening Value

In accordance with CIRIA C665⁶², 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 (CP101-CP103) has also been included (worst case values across the site).

⁶² CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665.

Boreholes	Max GSV (l/hr)	CS / TL
CP101	0.0066	CS1 / Green
CP102	0.0069	CS1 / Green
CP103	0.0060	CS1 / Green
CP101-103	0.0001 (CH ₄) 0.0069(CO ₂)	CS1 / Green

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

Notes:

CS – Characteristic Situation; TL= Traffic Light.

In addition, in accordance with CIRIA C665⁶³, if carbon dioxide and methane are recorded above 5%v/v and 1%v/v respectively, you should consider upgrading the characteristic situation from CS1 to CS2.

Although there were occurrences where carbon dioxide concentrations were over 5%v/v, this was a minimal exceedance and most of the readings were below 5%v/v. Taking this into account the absence of methane, relatively low carbon dioxide concentrations and the very low flow rates recorded, LKC consider that CS1 would be appropriate for the site.

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

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, although a Principal Aquifer is present below the site, no abstractions have been identified within influencing distance. The surface water is not considered to be a significant receptor.

The site investigation did not identify any significant sources of likely mobile contamination within the soils. Clay was predominantly present across the site above the sandstone which will prevent vertical migration. 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 Potable Water Supply (Pollutant Linkage 5)

Soil results were compared to United Utilities (UU) guidelines for the selection of potable water pipes in land potentially affected by contamination⁶⁴. Only contaminants of concern, based on the preliminary conceptual model and ground conditions encountered, were analysed. The following contaminants were not considered to be a risk and therefore not included in the analysis suites: chlorinated compounds, BTEX compounds, phenols, cresols, ethers, nitrobenzene, ketones, aldehydes and amines.

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

⁶³ CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665.

⁶⁴ UU(2011). "United Utilities Water Supplementary Guidance for the Selection of Water Pipes in Land Potentially Affected by Contamination."

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

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

6.6 Revised Contamination Conceptual Model

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

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

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

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

Further details of the remedial proposals and a remedial option appraisal are given in Section 7.

Pollutant Linkage	Pathway	Receptor	Contaminant	Probability	Consequence	Risk	Assessment
PL1	-Dermal contact. -Inhalation of soil, fibres and dust. -Ingestion of soils, dust, home-grown produce, soil attached to home-grown produce. -Windblown dust.	-Future site users. -Offsite receptors.	Heavy metals: lead	Likely	Medium	Moderate	-Likely probability as elevated metals (lead) 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.
			PAHs, asbestos and Petroleum hydrocarbons: none identified. Other organic or inorganic compounds: none identified.	Unlikely	Medium	Low	-Unlikely probability as no elevated PAHs, petroleum hydrocarbons, asbestos or other compounds. -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 and Methane	Unlikely	Severe	Moderate / Low	-No significant methane concentrations (<0.1%v/v) or carbon dioxide (identified (max. 6.9%v/v) and low flow (max. 0.1l/hr). -Low risk assumed as GSV for methane classified as CS1. -Recommendation: No remediation required.
PL4	-Surface Run-off. -Migration through permeable strata and preferential pathways -Perched waters migration.	-Groundwater (Principal Aquifer).	Mobile contaminants	Unlikely	Medium	Low	-Low risk identified in the PRA no water testing required. -Unlikely probability as no mobile contamination identified. -Recommendation: No remediation required.
PL5	-Ingestion of tainted water supply.	-Future site users (via potable water).	Organic Contaminants: -None identified.	Unlikely	Medium	Low	-No elevated contaminants identified. -Recommendation: Barrier piping unlikely to be required. However, this will need to be confirmed once UU risk assessment undertaken.

Table 6-4: Revised Contamination Conceptual Model.

Notes

*¹ Although no ACM identified, contractors should be vigilant during earthworks of any potential ACM. This is discussed further in Section 9.

*² The conceptual model only takes into consideration the future use of the site and long-term exposure. Consideration should also be given to the short-term exposure of construction workers and nearby land users to ACM containing soils during groundworks. This is discussed further in Section 9.

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^{65, 66, 67, 68, 69, 70, 71, 72, 73}.

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

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

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

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

⁶⁵ EA (2018). "Guidance on the Classification and Assessment of Waste (1st Edition v1.1)". Technical Guidance WM3.

⁶⁶ CLP Regulation - Regulation 1272/2008/EC of 16 December 2008.

⁶⁷ 1st ATP - Regulation 790/2009/EC of 10 August 2009

⁶⁸ Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013

⁶⁹ WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014

⁷⁰ Revised List of Wastes 2014 - Decision 2014/955/EU of 18 December 2014

⁷¹ 13th ATP - Regulation (EU) 2018/1480 of 4 October 2018

⁷² POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004

⁷³ 2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010

8 Conclusions

8.1 Geotechnical

It is considered that the Made Ground is not suitable for a founding material due to the inherent variability of the material and its thickness. The loading should be transferred to either the medium dense SAND or the stiff CLAY.

A conservative s_u value of 60kPa is assigned to the stiff sandy silty CLAY of the natural strata from depths of approximately 0.90m to 3.00mbgl, increasing to 120kPa at 3.50mbgl and 130kPa at 4.00mbgl.

A conservative ABC value of 110kN/m² is assigned to the medium dense gravelly silty SAND at depth of approximately 1.00mbgl increasing to 170kN/m² at 2.00mbgl.

In granular soils, if groundwater is encountered as perched water, the bearing capacity is reduced by as much as 50%.

A conservative ABC of 400kPa has been considered representative of the weathered bedrock.

The strip foundations show a bearing capacity of 103kN/m² at 1.50mbgl within the stiff CLAY and 169kN/m² within the medium dense SAND.

If pad foundations are deemed suitable, a bearing capacity of 202kN/m² and 286kN/m² within the medium dense SAND and stiff CLAY, respectively, at 1.50mbgl.

For the northern building block, ground improvement or pile foundation may be the most suitable foundation options, due to the presence of a former basement. A pile capacity of 322kN is achieved at approximately 6.00mbgl for a pile diameter of 0.60m.

Groundwater was encountered at depth of 3.20m and 3.30mbgl at trial pits TP105 and TP106, respectively, during site investigation and at depths between 2.76m and 4.82mbgl during the subsequent monitoring

The concrete classification in accordance with BRE Special Digest 1 (2005) is DS-1 AC-1 for the Made Ground and DS-2 and AC-2 for the natural strata.

Sulphate Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1 in accordance with the recommendations provided in BRE Special Digest 1 (2005) for the soils of the natural strata and DS-2 AC-2, except at TP101 location where class DS-3 and AC-3 was obtained within the Made Ground.

8.2 Contamination Assessment

A revised contamination conceptual model has been produced by LKC which is summarised in Table 8-1 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 home-grown produce).	Moderate	- Elevated lead identified across the site. Recommendations: Remediation required in garden areas.
		Low	- No elevated ACM, PAHs, petroleum hydrocarbons identified. Recommendations: No remediation required.
2	Volatile contaminants posing a risk to site users via the inhalation of vapours.	Low	- No 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.	Moderate / Low	- Low gas concentrations and flow rates. Classified as CS1. Recommendations: No remediation required.
4	Mobile contamination posing a risk to controlled waters via the migration through permeable strata.	Low	- Low risk identified in PRA. No groundwater testing required. No mobile contamination identified. Recommendations: No remediation required.
5	Organic contaminants posing a risk to water pipes.	Low	- No organic contamination identified at potable pipe depth. Recommendations: UU risk assessment to be completed. The site is unlikely to require barrier piping.

Table 8-1: Summary Risk Table.

Remedial recommendations are presented in Section 9.

9 Recommendations and Remedial Strategy

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

9.1 Remediation and Validation Recommendations

Table 9-1 details the 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 C733⁷⁴.	Log of work undertaken including photographs. Details of any sampling undertaken and validation of any potential additional remedial work.

⁷⁴ CIRIA (2014). "Asbestos in Soil and Made Ground: A Guide to Understanding and Managing Risks". C733.

Build-Phase Construction	1 and 7	As the made ground is relatively shallow 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 I.	<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.
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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 northeast of the site associated with cellars of the former pub.
	<u>Re-use of site won material</u> 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 ⁷⁵): 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 before material movement starts onsite. If an MMP is required, this needs to be registered by a Qualified Person (QP) and there must be 'certainty of use' for any material re-used onsite or exported to site to ensure there is no 'sham recovery'. For all the above material will need to be tested at the rate and analytical suites presented in Table 9-2. <u>Health and Safety Considerations</u> 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 guidance⁷⁶) should be adopted by all workers involved with site enabling and construction works.

Table 9-1: Remediation and Validation Requirements

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

9.2 Validation of Subsoil / Topsoil

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

A summary of the required imported material sampling requirements is presented in Table 9-2, based on MCC 'Guidelines to Developer' (2021)⁷⁹. 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.

⁷⁵ <https://www.gov.uk/guidance/waste-exemptions-using-waste>

⁷⁶ HSE (1991). "Protection of Workers and the General Public During Development of Contaminated Land" London HMSO.

⁷⁹ YALPAG (2021). "Verification Requirements for Cover Systems: Technical Guidance for Developers, Landowners and Consultants." Yorkshire and Lincolnshire Pollution Advisory Group. V. 4.1-June 2021.

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 and site won soils.

Notes:

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

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

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

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

9.3 Site Completion Report

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

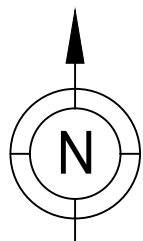
- Provision of waste transfer documents.
- If option 1 (source removal): Validation of any made ground removal (photographic evidence that natural strata was reached).
- If option 2 (environmental capping layer): Validation of environmental cover system.
- Verification testing of all imported soil for garden and soft landscaping areas.
- Details of any unexpected contamination identified onsite, suitably risk assessed and / or validated.

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

Figures



Client: Church Inn (Ardwick) Ltd				Title: Site Location & Boundary Plan			
Site: Church Inn, Ardwick Green North				Scale (see scale bar): 1:25,000 & 1:1,000 @ A4			
Job No.: LKC 22 1502	Drawn By: HF	Checked By: MT	Drawn: Oct 2022	Figure: 1	Revision:		



KEY

 Site Boundary

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



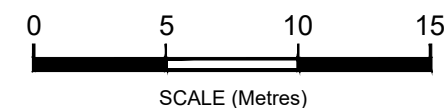
Client: Church Inn (Ardwick) Ltd

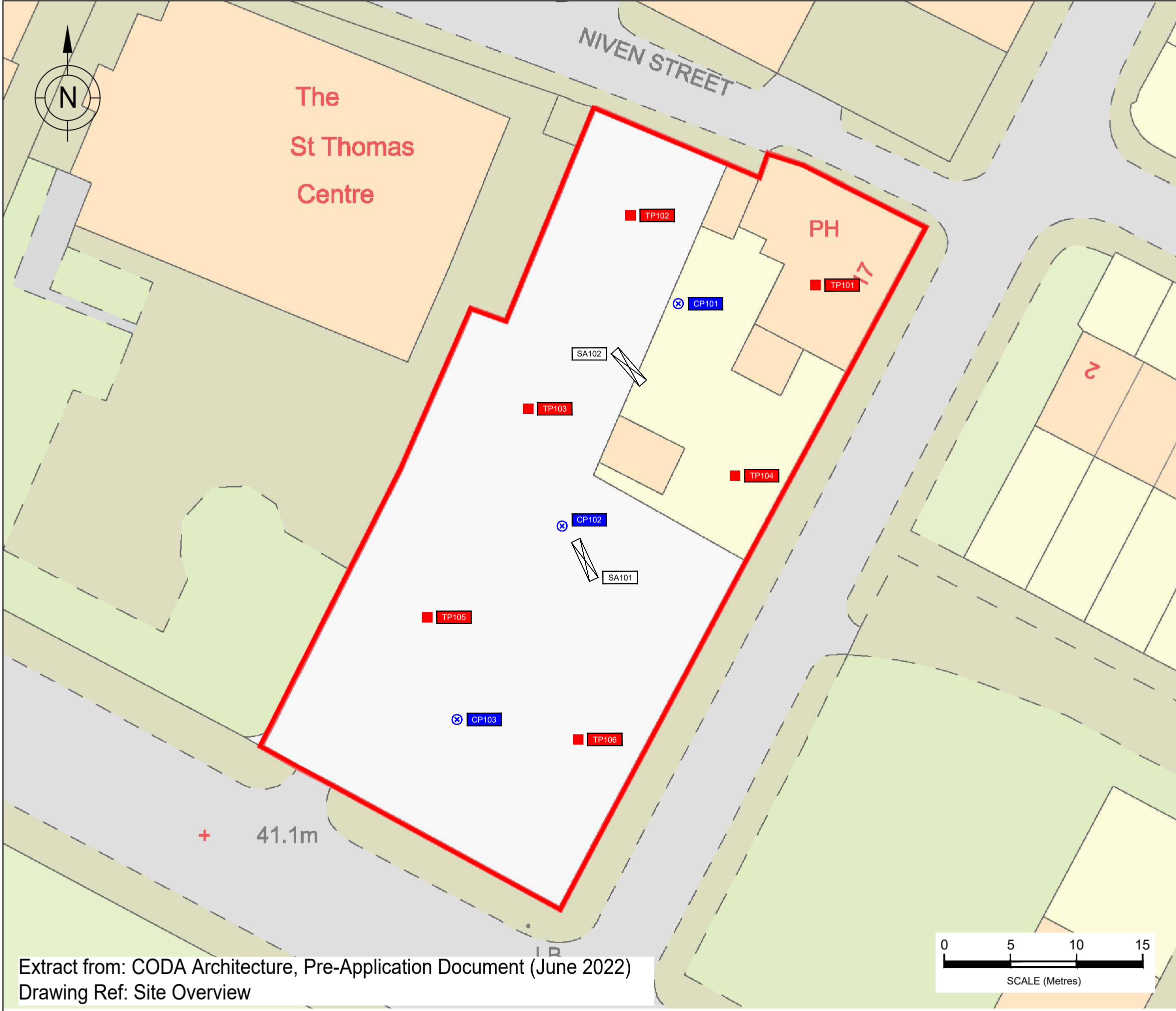
Site: Church Inn, Ardwick Green North, Manchester

Title: Proposed Development Plan

Job No.: LKC 22 1502	Scale (See Scale Bar): See Scale Bar	Figure: 2	Revision:
Drawn By: AC	Checked By: MT	Drawn: Oct 2022	

Extract from: CODA Architecture, Pre-Application Document (June 2022)
Drawing Ref: Design & Development: Use, 3 - Proposed Housing Scheme





KEY

- Site Boundary
- Trial Pit (TP)
- Cable Percussive Borehole (CP)
- Soakaway Test (SA)

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: Church Inn (Ardwick) Ltd			
Site: Church Inn, Ardwick Green North, Manchester			
Title: Site Investigation Location Plan			
Job No.: LKC 22 1502	Scale (See Scale Bar): See Scale Bar	Figure: 3	Revision: A
Drawn By: AC	Checked By: RP	Drawn: Jul 2023	

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 552⁸⁰. 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.

⁸⁰ 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

Cable Percussion Logs Trial Pit Logs Soakaway Pit Logs

Boring Method

Broke out tarmac, hand excavated trial pit to 1.20mbgl with follow on cable percussion to 8.50mbgl.

Casing Diameter
Ground Level (mOD)
Client

Church Inn (Ardwick) Ltd

Job Number

LKC 22 1502

Location (Observed measurements)

Dates

25/04/2023-
27/04/2023

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.20	D					0.05 0.10	MADE GROUND: TARMACADAM.			
						(0.90)	MADE GROUND: Black sandy GRAVEL with frequent ash, occasional coal fragments. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising sandstone.			
1.10 1.20-1.65 1.20-1.65	D SPT N=20 D			4,4/5,5,5,5		1.00 (0.20) 1.20	MADE GROUND: Firm consistency gravelly sandy silty CLAY with frequent brick fragments, occasional coal and concrete fragments, rare glass and plastic. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising sandstone.			
1.70-2.00	B					(1.90)	Firm consistency light brown with grey mottling gravelly sandy silty CLAY with rare coal fragments. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising sandstone.			
2.20-2.65 2.20-2.65	SPT N=26 D			3,6/6,6,7,7			Medium dense light brown gravelly silty SAND with pockets of clay with rare coal fragments. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising sandstone.			
3.30-3.75 3.30-3.75	SPT N=29 D			4,5/6,6,7,10		3.10	Stiff consistency grey slightly gravelly sandy silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising mudstone.			
3.80-4.10	B									
4.30-4.80	U									
4.80	D					(4.00)				
5.40-5.85 5.40-5.85	SPT N=20 D			3,4/4,5,5,6						
5.90-6.20	B									
6.40-6.85	U									
6.90	D									
7.20-7.37 7.20-7.65	SPT 25*/85 50/85 D			18,7/38,12		7.10 (1.40)	Red SANDSTONE.			
8.40-8.49 8.40-8.50	SPT 25*/50 50/40 D			25/50		8.50	Complete at 8.50m			

Remarks

Borehole dry and stable.
Chiselling from 7.10m to 8.50m for 1.5 hours.
Chiselling from 7.10m to 8.40m for 1.5 hours.

Scale (approx)

1:50

Logged By

LD

Figure No.

LKC 22 1502.CP101

Boring Method

Broke out tarmacadam, hand
duf trial pit to 1.20mbgl with
follow on cable percussion to
8.70mbgl.

Casing Diameter
Ground Level (mOD)
Client

Church Inn (Ardwick) Ltd

**Job
Number**

LKC 22 1502

Location (Observed measurements)

Dates

25/04/2023-
27/04/2023

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.50 0.00-0.50	D ES PID: 0.2ppm					0.05 0.15 (0.25) 0.40 0.50	MADE GROUND: TARMACADAM.			
							MADE GROUND: CONCRETE.			
0.60	D					0.50 (0.40)	MADE GROUND: Light brown very gravelly SAND with frequent cobbles. Sand is fine to coarse. Gravel is fine to coarse and sub-angular to rounded comprising sandstone.			
1.00	D					0.90 (0.30)	MADE GROUND: Sandstone paving slab.			
1.20-1.65 1.20-1.65	SPT N=14 D			3,3/3,3,4,4		1.20	MADE GROUND: Light brown very gravelly sandy silty CLAY with frequent brick fragments, occasional coal and concrete fragments, rare metal and plastic. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising sandstone.			
1.70-2.00	B									
2.10-2.55 2.10-2.55	SPT N=18 D			2,3/4,4,5,5		(1.90)	Stiff consistency light brown with grey motling slightly gravelly sandy silty CLAY with rare coal fragments. Sand is fine to coarse. gravel is fine to coarse, sub-angular to sub-rounded comprising mudstone.			
3.10-3.40	B					3.10	Medium dense light brown very gravelly silty SAND with pockets of clay with rare coal fragments. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising mudstone and sandstone.			
3.40-3.85	U									
3.90	D						Stiff consistency grey slightly gravelly sandy silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising mudstone.			
4.40-4.85 4.40-4.85	SPT N=31 D			5,6/7,7,8,9						
4.90-5.20	B					(3.80)				
5.40-5.85	U									
5.90	D									
7.00-7.21 7.00-7.20	SPT 25*/125 50/85 D			9,16/41,9		6.90	Extremely weak red SANDSTONE.			
						(1.80)				
8.50-8.95 8.50-8.70	SPT N=50 D			17,8/50		8.70	Complete at 8.70m			

Remarks

Borehole dry and stable.
Borehole terminated due to sandstone bedrock at 8.70mbgl.
Chiselling from 6.90 to 8.70 for 1.75 hours.
Chiselling from 6.90m to 8.50m for 1.75 hours.

**Scale
(approx)**

1:50

**Logged
By**

LD

Figure No.

LKC 22 1502.CP102

Boring Method

Hand excavated trial pit to 1.20mbgl with follow on cable percussion to 7.60mbgl.

Casing Diameter
Ground Level (mOD)
Client

Church Inn (Ardwick) Ltd

Job Number

LKC 22 1502

Location (Observed measurements)

Dates

27/04/2023

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.50 0.00-0.50 0.20	D ES PID: 0.2ppm D					(0.50)	MADE GROUND: Dark brown gravelly sandy SILT with frequent rootlets and brick fragments, occasional coal and concrete fragments. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising sandstone.			
0.50-1.00 0.50-1.00	D ES PID: 0.1ppm					(0.50)	MADE GROUND: Firm consistency dark brown gravelly sandy silty CLAY with occasional brick and coal fragments, rare ceramic. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising sandstone.			
1.00-2.00 1.00-2.00 1.10 1.20-1.65 1.20-1.65	D ES PID: 0.1ppm D SPT N=11 D			2,2/2,3,3,3		1.00	Medium dense light brown very gravelly silty SAND with clay pockets. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising sandstone.			
1.70-2.00	B					(1.60)				
2.20-2.65 2.20-2.65	SPT N=25 D			4,4/7,7,6,5		2.60	Stiff consistency grey to dark brown slightly gravelly sandy silty CLAY with rare coal fragments. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising mudstone.			
2.70-3.00	B									
3.30-3.75	U									
3.80	D					(2.90)				
4.30-4.75 4.30-4.75	SPT N=24 D			3,3/5,5,7,7						
5.20-5.50	U									
5.50-5.85 5.50-5.90	SPT 50/200 D			8,8/12,21,17		5.50 5.60 (0.60)	Dense light brown slightly gravelly silty SAND. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising sandstone and mudstone.			
6.20-6.31 6.20-6.30	SPT 25*/70 50/40 D			25/50		6.20	Very stiff consistency grey slightly gravelly sandy silty CLAY. Sand is fine to coarse, Gravel is fine to coarse, sub-angular to sub-rounded comprising mudstone.			
6.70-6.80 6.70-6.80	SPT 25*/70 50/30 D			25/50		(1.40)	Red SANDSTONE.			
7.50-7.57 7.50-7.60	SPT 25*/40 50/30 D			25/50		7.60	Complete at 7.60m			

Remarks

Borehole terminated due to bedrock at 7.60mbgl.
Chiselling from 5.50m to 7.60m for 1.5 hours.
Borehole dry and stable.
Chiselling from 5.50m to 7.50m for 1.5 hours.

Scale (approx)

1:50

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Figure No.

LKC 22 1502.CP103

Excavation Method

Machine excavated trial pit to 3.25mbgl.

Dimensions

2.50m x 0.90m x 3.25m

Ground Level (mOD)
Client

Church Inn (Ardwick) Ltd

**Job
Number**

LKC 22 1502

Location (Observed measurements)

Dates

27/04/2023

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00 0.00-1.00	D ES PID: 0.2ppm					MADE GROUND: Dark brown very gravelly sandy SILT with frequent brick fragments, occasional coal and concrete fragments, plastic and ceramic, rare clinker and metal. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising sandstone.		
1.00-2.00	D PID: 0.1ppm				(2.50)			
2.50-3.50 2.50 2.50-3.50	D HSV 90kPa ES PID: 0.1ppm		75, 95, 115, 75, 90/Av. 90.00		2.50 (0.75) 3.25	Stiff consistency high strength dark brown to light brown slightly gravelly sandy silty CLAY with rare coal fragments. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising sandstone.		
						Complete at 3.25m		


Remarks

Trial pit dry and stable.

Scale (approx)

1:50

Logged By

LD

Figure No.

LKC 22 1502.TP101

Excavation Method

Machine excavated trial pit to 3.30mbgl.

Dimensions

2.20m x 0.90m x 3.30m

Ground Level (mOD)
Dates

27/04/2023

Client

Church Inn (Ardwick) Ltd

**Job
Number**

LKC 22 1502

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.15-0.85	D				(0.15)	MADE GROUND: TARMACADAM.		
0.15-0.85	ES PID: 0.2ppm				(0.70)	MADE GROUND: Dark brown very gravelly SAND with frequent brick and concrete fragments, occasional coal, clinker and plastic, rare glass and metal. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising sandstone.		
0.85-1.10	D				0.85			
0.85-1.10	ES PID: 0.1ppm				(0.25)	Firm consistency medium strength light brown gravelly sandy silty CLAY with rare coal fragments. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising sandstone.		
1.00	HSV 45kPa				1.10			
1.10-2.00	D							
1.10-2.00	ES PID: 0.0ppm							
2.00-3.00	D				(2.20)			
			40, 45, 55, 40, 45/Av. 45.00					
					3.30	Terminated at 3.30m		▽1
			Slow(1) at 3.30m.					


Remarks

Trial pit stable.
Water strike at 3.30mbgl.

Scale (approx)

1:40

Logged By

LD

Figure No.

LKC 22 1502.TP105

Excavation Method

Machine excavated trial pit to
3.20mbgl.

Dimensions

2.10m x 0.90m x 3.20m

Ground Level (mOD)
Dates

27/04/2023

Client

Church Inn (Ardwick) Ltd

**Job
Number**

LKC 22 1502

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.20 0.00-0.20 0.20-1.30 0.20-1.30	D ES PID: 0.2ppm D ES PID: 0.1ppm				(0.20) 0.20	MADE GROUND: Dark brown very gravelly sandy SILT with frequent rootlets, occasional brick and coal fragments, rare ceramic and clinker. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising sandstone.		
					(1.10)	MADE GROUND: Very gravelly sandy SILT with frequent whole brick, brick and concrete fragments, occasional coal fragments and plastic, rare glass, ceramic and metal. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising sandstone.		
1.30-2.00 1.30-2.00	D ES PID: 0.0ppm				1.30	Loose light brown very gravelly silty SAND with rare coal fragments. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising sandstone.		
2.00-3.00 2.00-3.00	B D				(1.90)			
			Slow(1) at 3.20m.		3.20	Terminated at 3.20m		▽ ₁


Remarks

Trial pit stable.
Water strike at 3.20mbgl.

Scale (approx)

1:40

Logged By

LD

Figure No.

LKC 22 1502.TP106

Excavation Method

JCB 3CX

Dimensions

0.60m x 1.80m x 2.10m

Ground Level (mOD)
Client

Church Inn (Ardwick) Ltd

**Job
Number**

LKC 22 1502

Location
Dates

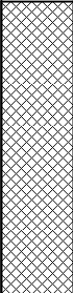
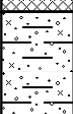
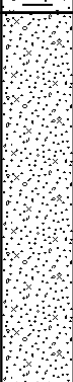
20/07/2023

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.80)	MADE GROUND: Dark brown gravelly silty SAND with frequent brick, concrete and ash. Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded of mudstone and sandstone.		
					0.80 (0.30)	Firm consistency orange and brown mottled gravelly sandy silty CLAY with rare coal fragments. Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded of mudstone and sandstone.		
					1.10 (1.00)	Light brownish orange very gravelly silty SAND with rare coal fragments. Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded of mudstone.		
					2.10	Complete at 2.10m		


Remarks

Trial Pit stable and dry.

Scale (approx)

1:20

Logged By

RP

Figure No.

LKC 22 1502.SA101

Excavation Method

JCB 3CX

Dimensions

0.60m x 1.80m x 2.10m

Ground Level (mOD)
Client

Church Inn (Ardwick) Ltd

**Job
Number**

LKC 22 1502

Location
Dates

20/07/2023

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.10) 0.10	MADE GROUND: Tarmacdam.		
					(0.80)	MADE GROUND: Dark brown gravelly silty SAND with frequent brick, concrete, ash and occasional glass.. Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded of mudstone and sandstone.		
					0.90 (0.20) 1.10	Firm consistency orange and brown mottled gravelly sandy silty CLAY with rare coal fragments. Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded of mudstone and sandstone.		
					(1.00)	Light brownish orange very gravelly silty SAND with rare coal fragments. Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded of mudstone.		
					2.10	Complete at 2.10m		


Remarks

Trial Pit stable and dry.

Scale (approx)

1:20

Logged By

RP

Figure No.

LKC 22 1502.SA102

Appendix C

Certificates of Analysis – Soil



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

Derwentside Environmental Testing Services Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 23-05840

Site Reference: Ardwick Green North, Manchester

Project / Job Ref: LKC 22 1502

Order No: LKC221502-RC

Sample Receipt Date: 28/04/2023

Sample Scheduled Date: 04/05/2023

Report Issue Number: 1

Reporting Date: 17/05/2023

Authorised by:

Kevin Old
Operations Director

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

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



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



Soil Analysis Certificate						
DETS Report No: 23-05840	Date Sampled	27/04/23	27/04/23	27/04/23	27/04/23	27/04/23
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Ardwick Green North, Manchester	TP / BH No	TP101	CP103	TP102	TP103	TP104
Project / Job Ref: LKC 22 1502	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: LKC221502-RC	Depth (m)	0.00 - 1.00	0.00 - 0.50	0.30 - 1.00	0.15 - 1.00	0.20 - 1.00
Reporting Date: 17/05/2023	DETS Sample No	650051	650052	650053	650054	650055

Determinand	Unit	RL	Accreditation	(n)	(n)	(n)	(n)	(n)
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	MCERTS	9.6	8.0	6.8	7.8	7.9
Total Cyanide	mg/kg	< 1	NONE	< 1				
Free Cyanide	mg/kg	< 1	NONE	< 1				
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	1540	550	229	244	45
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	1.54	0.55	0.23	0.24	0.05
Organic Matter (SOM)	%	< 0.1	MCERTS	3.3	0.3	7.7	8.4	0.4
Arsenic (As)	mg/kg	< 2	MCERTS	13	18	17	25	20
W/S Boron	mg/kg	< 1	NONE	< 1				
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	3.1	0.3	0.8	1.1
Chromium (Cr)	mg/kg	< 2	MCERTS	15	18	13	16	17
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	38	66	145	686	164
Lead (Pb)	mg/kg	< 3	MCERTS	110	191	113	1750	374
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	13	11	13	15	12
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Vanadium (V)	mg/kg	< 1	MCERTS	29	25	27	28	31
Zinc (Zn)	mg/kg	< 3	MCERTS	100	593	359	591	408
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2				

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion

Subcontracted analysis (S)

(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation



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



Soil Analysis Certificate						
DETS Report No: 23-05840	Date Sampled	27/04/23	25/04/23	26/04/23		
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Ardwick Green North, Manchester	TP / BH No	TP105	CP101	CP102		
Project / Job Ref: LKC 22 1502	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: LKC221502-RC	Depth (m)	0.85 - 1.10	0.00 - 0.50	0.00 - 0.50		
Reporting Date: 17/05/2023	DETS Sample No	650056	650057	650058		

Determinand	Unit	RL	Accreditation				
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	
pH	pH Units	N/a	MCERTS	7.3	6.4	8.5	
Total Cyanide	mg/kg	< 1	NONE	< 1			
Free Cyanide	mg/kg	< 1	NONE	< 1			
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	39	47	118	
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.04	0.05	0.12	
Organic Matter (SOM)	%	< 0.1	MCERTS	2.3	0.2	0.3	
Arsenic (As)	mg/kg	< 2	MCERTS	6	10	34	
W/S Boron	mg/kg	< 1	NONE	< 1			
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	0.5	
Chromium (Cr)	mg/kg	< 2	MCERTS	19	8	14	
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	
Copper (Cu)	mg/kg	< 4	MCERTS	11	27	176	
Lead (Pb)	mg/kg	< 3	MCERTS	34	62	446	
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	1.4	
Nickel (Ni)	mg/kg	< 3	MCERTS	9	8	15	
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2	
Vanadium (V)	mg/kg	< 1	MCERTS	30	17	32	
Zinc (Zn)	mg/kg	< 3	MCERTS	50	33	606	
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)



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



Soil Analysis Certificate - Speciated PAHs					
DETS Report No: 23-05840	Date Sampled	27/04/23	27/04/23	27/04/23	27/04/23
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Ardwick Green North, Manchester	TP / BH No	TP101	CP103	TP102	TP103
Project / Job Ref: LKC 22 1502	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied
Order No: LKC221502-RC	Depth (m)	0.00 - 1.00	0.00 - 0.50	0.30 - 1.00	0.15 - 1.00
Reporting Date: 17/05/2023	DETS Sample No	650051	650052	650053	650054

Determinand	Unit	RL	Accreditation	(n)	(n)	(n)	(n)	(n)
Naphthalene	mg/kg	< 0.1	MCERTS	0.20	< 0.1	< 0.1	< 0.1	0.27
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	0.45	0.72	< 0.1	0.23	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	0.31	0.35	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	3.02	5.06	0.12	1.13	0.78
Anthracene	mg/kg	< 0.1	MCERTS	0.89	1.34	< 0.1	0.28	0.25
Fluoranthene	mg/kg	< 0.1	MCERTS	3.89	8.06	0.20	1.37	1.83
Pyrene	mg/kg	< 0.1	MCERTS	3.40	7.77	0.19	1.49	1.81
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	1.65	3.76	0.14	0.63	1.17
Chrysene	mg/kg	< 0.1	MCERTS	1.58	3.67	0.14	0.78	1.02
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	1.52	3.94	0.17	0.67	1.40
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.70	1.60	< 0.1	0.31	0.55
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	1.41	3.69	< 0.1	0.59	1.11
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.77	2.15	< 0.1	0.33	0.84
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	0.18	0.46	< 0.1	< 0.1	0.14
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.69	1.83	< 0.1	0.33	0.77
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	20.6	44.4	< 1.6	8.1	12

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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-05840	Date Sampled	27/04/23	25/04/23	26/04/23		
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Ardwick Green North, Manchester	TP / BH No	TP105	CP101	CP102		
Project / Job Ref: LKC 22 1502	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: LKC221502-RC	Depth (m)	0.85 - 1.10	0.00 - 0.50	0.00 - 0.50		
Reporting Date: 17/05/2023	DETS Sample No	650056	650057	650058		

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	0.13	0.26		
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.18	0.35		
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.16	0.37		
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.17		
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6		



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Soil Analysis Certificate - TPH LQM Banded

DETS Report No: 23-05840	Date Sampled	27/04/23	27/04/23			
LK Consult Limited	Time Sampled	None Supplied	None Supplied			
Site Reference: Ardwick Green North, Manchester	TP / BH No	TP101	TP105			
Project / Job Ref: LKC 22 1502	Additional Refs	None Supplied	None Supplied			
Order No: LKC221502-RC	Depth (m)	0.00 - 1.00	0.85 - 1.10			
Reporting Date: 17/05/2023	DETS Sample No	650051	650056			

Determinand	Unit	RL	Accreditation	(n)		
Aliphatic >C5 - C6 : HS_1D_MS_AL	mg/kg	< 0.01	NONE	< 0.01	< 0.01	
Aliphatic >C6 - C8 : HS_1D_MS_AL	mg/kg	< 0.05	NONE	< 0.05	< 0.05	
Aliphatic >C8 - C10 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2	< 2	
Aliphatic >C10 - C12 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2	< 2	
Aliphatic >C12 - C16 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3	< 3	
Aliphatic >C16 - C35 : EH_CU_1D_AL	mg/kg	< 10	MCERTS	156	< 10	
Aliphatic >C35 - C44 : EH_CU_1D_AL	mg/kg	< 10	NONE	< 10	< 10	
Aliphatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 30	NONE	156	< 30	
Aromatic >C5 - C7 : HS_1D_MS_AR	mg/kg	< 0.01	NONE	< 0.01	< 0.01	
Aromatic >C7 - C8 : HS_1D_MS_AR	mg/kg	< 0.05	NONE	< 0.05	< 0.05	
Aromatic >C8 - C10 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	
Aromatic >C10 - C12 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	
Aromatic >C12 - C16 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	4	< 2	
Aromatic >C16 - C21 : EH_CU_1D_AR	mg/kg	< 3	MCERTS	20	< 3	
Aromatic >C21 - C35 : EH_CU_1D_AR	mg/kg	< 10	MCERTS	101	< 10	
Aromatic >C35 - C44 : EH_CU_1D_AR	mg/kg	< 10	NONE	< 10	< 10	
Aromatic (>C5 - C44) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 30	NONE	125	< 30	
Total >C5 - C44 : HS_1D_MS+EH_CU_1D_Total	mg/kg	< 60	NONE	281	< 60	

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Soil Analysis Certificate - BTEX / MTBE					
DETS Report No: 23-05840	Date Sampled	27/04/23	27/04/23		
LK Consult Limited	Time Sampled	None Supplied	None Supplied		
Site Reference: Ardwick Green North, Manchester	TP / BH No	TP101	TP105		
Project / Job Ref: LKC 22 1502	Additional Refs	None Supplied	None Supplied		
Order No: LKC221502-RC	Depth (m)	0.00 - 1.00	0.85 - 1.10		
Reporting Date: 17/05/2023	DETS Sample No	650051	650056		

Determinand	Unit	RL	Accreditation	(n)			
Benzene : HS 1D MS	ug/kg	< 2	MCERTS	< 2	< 2		
Toluene : HS 1D MS	ug/kg	< 5	MCERTS	< 5	< 5		
Ethylbenzene : HS 1D MS	ug/kg	< 2	MCERTS	< 2	< 2		
p & m-xylene : HS 1D MS	ug/kg	< 2	MCERTS	< 2	< 2		
o-xylene : HS 1D MS	ug/kg	< 2	MCERTS	< 2	< 2		
MTBE : HS 1D MS	ug/kg	< 5	MCERTS	< 5	< 5		

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Soil Analysis Certificate - Sample Descriptions

DETS Report No: 23-05840	
LK Consult Limited	
Site Reference: Ardwick Green North, Manchester	
Project / Job Ref: LKC 22 1502	
Order No: LKC221502-RC	
Reporting Date: 17/05/2023	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
650051	TP101	None Supplied	0.00 - 1.00	9.7	Brown sandy gravel with stones and concrete
650052	CP103	None Supplied	0.00 - 0.50	12.5	Brown sandy gravel with stones and concrete
650053	TP102	None Supplied	0.30 - 1.00	16.5	Brown sandy gravel with stones and concrete
650054	TP103	None Supplied	0.15 - 1.00	17.4	Black sandy gravel with stones and concrete
650055	TP104	None Supplied	0.20 - 1.00	17	Brown sandy gravel with stones and concrete
650056	TP105	None Supplied	0.85 - 1.10	18.3	Black sandy clay with stones and concrete
650057	CP101	None Supplied	0.00 - 0.50	16.6	Light brown sandy clay
650058	CP102	None Supplied	0.00 - 0.50	18.3	Brown sandy clay with stones

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

Insufficient Sample ^{U/S}

Unsuitable Sample ^{U/S}



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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 23-05840

LK Consult Limited

Site Reference: Ardwick Green North, Manchester

Project / Job Ref: LKC 22 1502

Order No: LKC221502-RC

Reporting Date: 17/05/2023

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

D Dried
AR As Received



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List of HWOL Acronyms and Operators	
DETS Report No:	23-05840
LK Consult Limited	
Site Reference:	Ardwick Green North, Manchester
Project / Job Ref:	LKC 22 1502
Order No:	LKC221502-RC
Reporting Date:	17/05/2023

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

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

Appendix D

Certificates of Analysis - Geotechnical

TEST REPORT

Client LK Consult Ltd

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

Contract LKC 22 1502 -
Ardwick Green

Job Number MRN 4606/60
Date of Issue 20 June 2023
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.



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Also at: London: 020 8523 1999

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MURRAY RIX

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



TEST CERTIFICATE

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

BS EN ISO 17892-8:2018

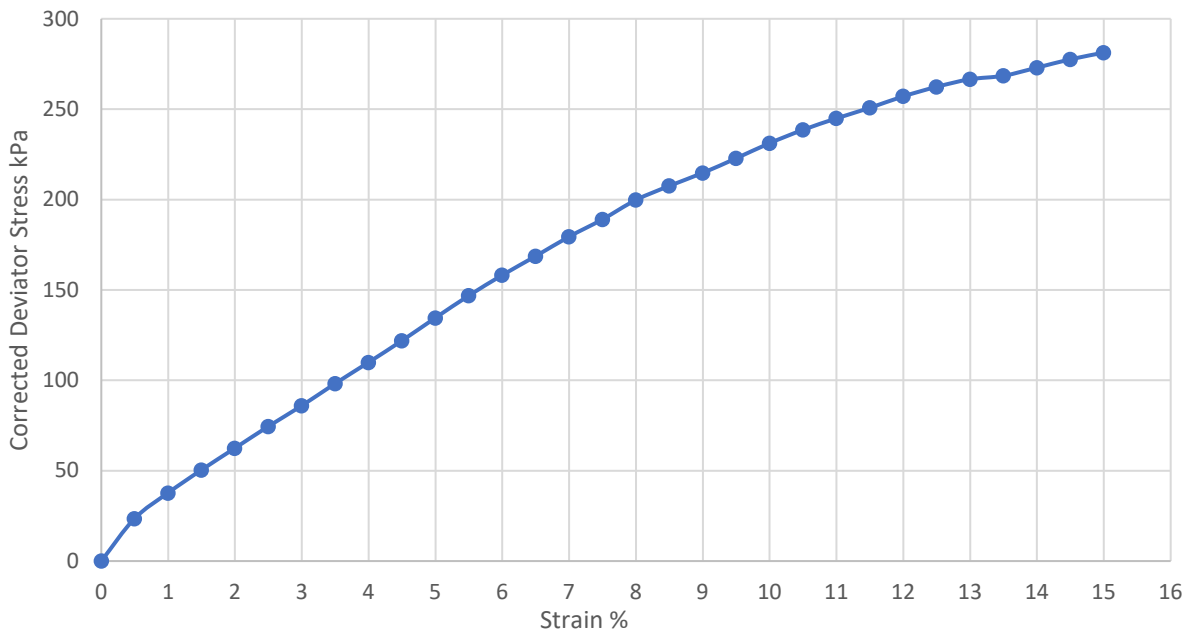
CLIENT	LK Consult Ltd
SITE	LKC 22 1502 - Ardwick Green
JOB NUMBER	MRN 4606/60

SAMPLE LABEL	CP1 U8 4.3-4.75	DATE SAMPLED	Not advised
LAB SAMPLE No.	125249	DATE RECEIVED	12-May-23
DATE TESTED	25-May-23	SAMPLED BY	Client
MATERIAL	Brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample		

INITIAL CONDITIONS

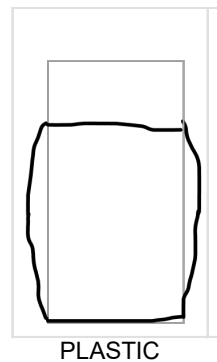
Specimen Location	Sample Length (mm)	450	Specimen depth from top of Sample (mm)	100
	Sample Orientation	Vertical	Specimen Condition	Undisturbed
	Specimen Length (mm)	203	Specimen Water Content (%)	11.6
	Specimen Diameter (mm)	100	Specimen Bulk Density (Mg/m3)	2.19
	Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	1.96
	Membrane Correction	3.39		

CORRECTED DEVIATOR STRESS vs AXIAL STRAIN



TEST TYPE
SINGLE STAGE

SKETCH OF
SPECIMEN AT
FAILURE



Cell Pressure (kPa)	Failure Strain (%)	Rate of Strain (%/min)	Corrected Deviator Stress (kPa)	Shear Strength Cu (kPa)
90	15.0	2.0	281	141

Remarks/Abnormalities

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

Signed

Date 20 June 2023

MURRAY RIX

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



TEST CERTIFICATE

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

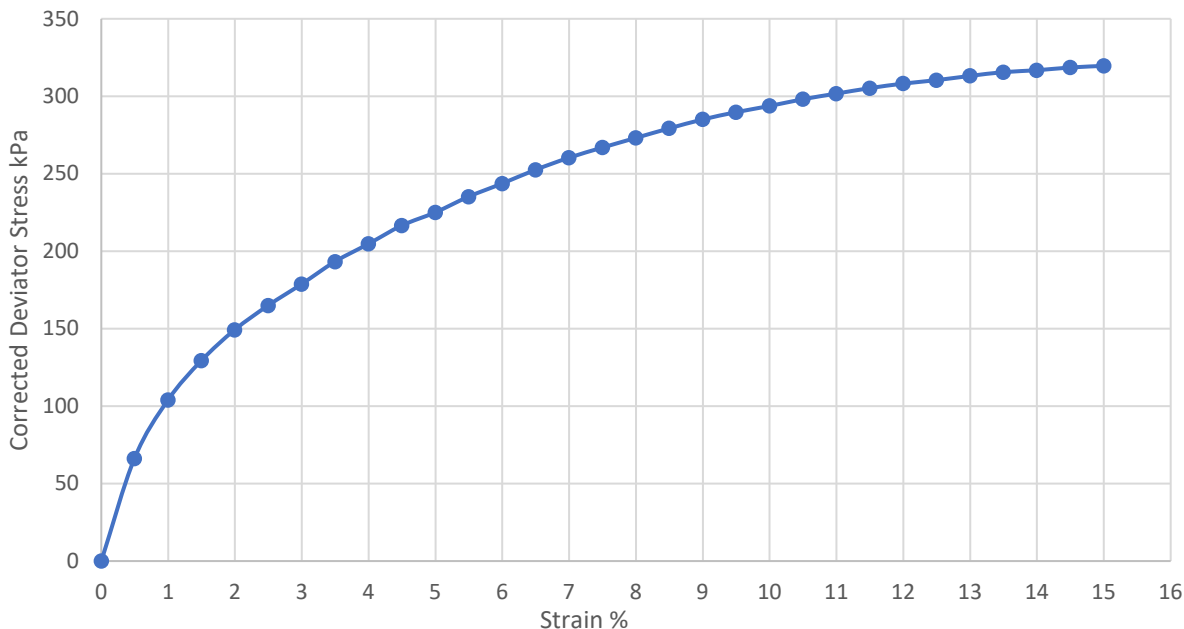
CLIENT	LK Consult Ltd
SITE	LKC 22 1502 - Ardwick Green
JOB NUMBER	MRN 4606/60

SAMPLE LABEL	CP1 U12 6.4-6.85	DATE SAMPLED	Not advised
LAB SAMPLE No.	125250	DATE RECEIVED	12-May-23
DATE TESTED	25-May-23	SAMPLED BY	Client
MATERIAL	Brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample		

INITIAL CONDITIONS

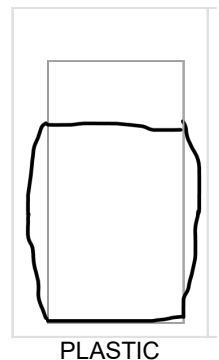
Specimen Location	Sample Length (mm)	220	Specimen depth from top of Sample (mm)	10
	Sample Orientation	Vertical	Specimen Condition	Undisturbed
	Specimen Length (mm)	203	Specimen Water Content (%)	10.3
	Specimen Diameter (mm)	100	Specimen Bulk Density (Mg/m ³)	2.23
	Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m ³)	2.02
	Membrane Correction	3.39		

CORRECTED DEVIATOR STRESS vs AXIAL STRAIN



TEST TYPE
SINGLE STAGE

SKETCH OF
SPECIMEN AT
FAILURE



Cell Pressure (kPa)	Failure Strain (%)	Rate of Strain (%/min)	Corrected Deviator Stress (kPa)	Shear Strength Cu (kPa)
130	15.0	2.0	320	160

Remarks/Abnormalities

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

Signed

Date 20 June 2023

MURRAY RIX

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



TEST CERTIFICATE

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

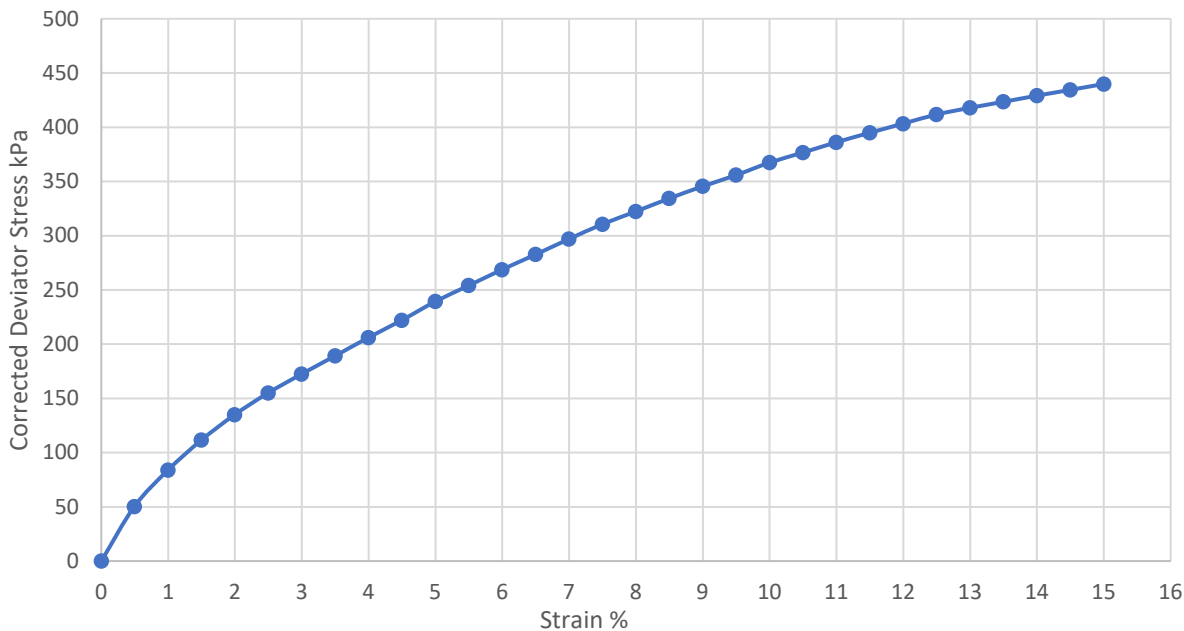
CLIENT	LK Consult Ltd
SITE	LKC 22 1502 - Ardwick Green
JOB NUMBER	MRN 4606/60

SAMPLE LABEL	CP2 U7 3.4-3.85	DATE SAMPLED	Not advised
LAB SAMPLE No.	125251	DATE RECEIVED	12-May-23
DATE TESTED	25-May-23	SAMPLED BY	Client
MATERIAL	Brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample		

INITIAL CONDITIONS

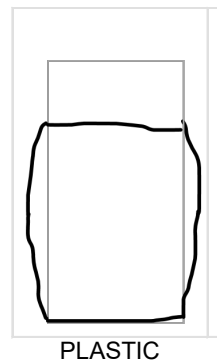
Specimen Location	Sample Length (mm)	350	Specimen depth from top of Sample (mm)	50
	Sample Orientation	Vertical	Specimen Condition	Undisturbed
	Specimen Length (mm)	203	Specimen Water Content (%)	10.7
	Specimen Diameter (mm)	100	Specimen Bulk Density (Mg/m ³)	2.25
	Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m ³)	2.03
	Membrane Correction	3.39		

CORRECTED DEVIATOR STRESS vs AXIAL STRAIN



TEST TYPE
SINGLE STAGE

SKETCH OF
SPECIMEN AT
FAILURE



Cell Pressure (kPa)	Failure Strain (%)	Rate of Strain (%/min)	Corrected Deviator Stress (kPa)	Shear Strength Cu (kPa)
70	15.0	2.0	440	220

Remarks/Abnormalities

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

Signed

Date 20 June 2023

MURRAY RIX

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



TEST CERTIFICATE

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

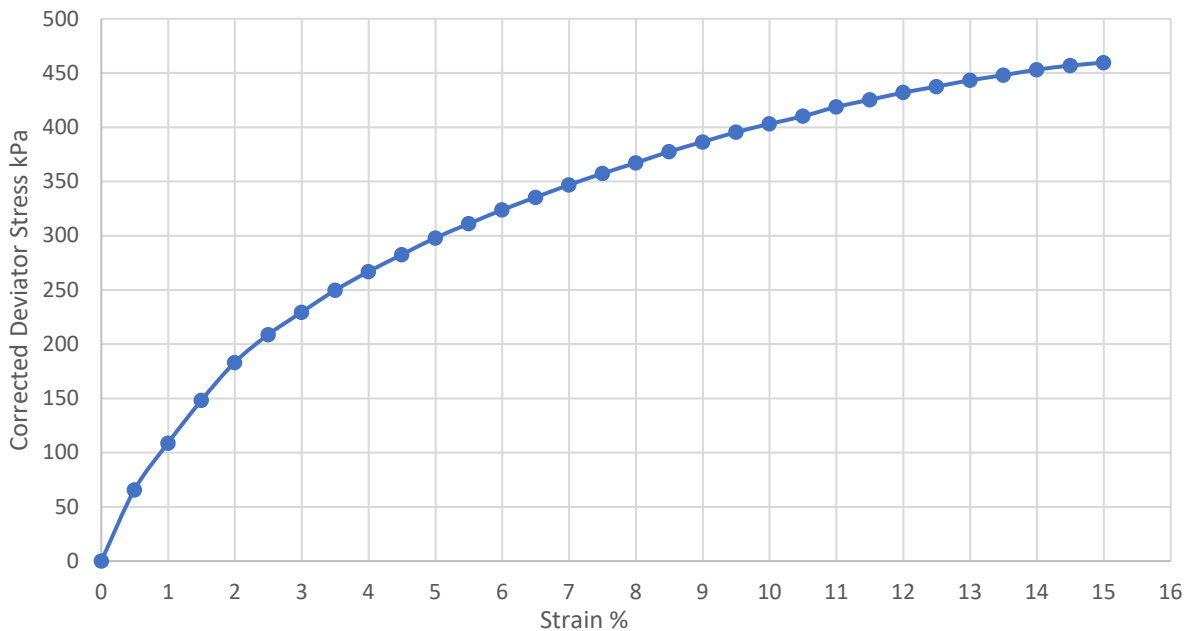
CLIENT	LK Consult Ltd
SITE	LKC 22 1502 - Ardwick Green
JOB NUMBER	MRN 4606/60

SAMPLE LABEL	CP3 U10 5.2-5.5	DATE SAMPLED	Not advised
LAB SAMPLE No.	125252	DATE RECEIVED	12-May-23
DATE TESTED	25-May-23	SAMPLED BY	Client
MATERIAL	Brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample		

INITIAL CONDITIONS

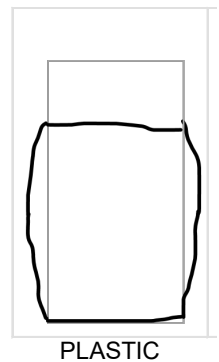
Specimen Location	Sample Length (mm)	250	Specimen depth from top of Sample (mm)	30
	Sample Orientation	Vertical	Specimen Condition	Undisturbed
	Specimen Length (mm)	202	Specimen Water Content (%)	11.1
	Specimen Diameter (mm)	102	Specimen Bulk Density (Mg/m ³)	2.16
	Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m ³)	1.94
	Membrane Correction	3.39		

CORRECTED DEVIATOR STRESS vs AXIAL STRAIN



TEST TYPE
SINGLE STAGE

SKETCH OF
SPECIMEN AT
FAILURE



Cell Pressure (kPa)	Failure Strain (%)	Rate of Strain (%/min)	Corrected Deviator Stress (kPa)	Shear Strength Cu (kPa)
105	15.0	2.0	460	230

Remarks/Abnormalities

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

Signed

Date 20 June 2023

MURRAY RIX

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



TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD

PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5

WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

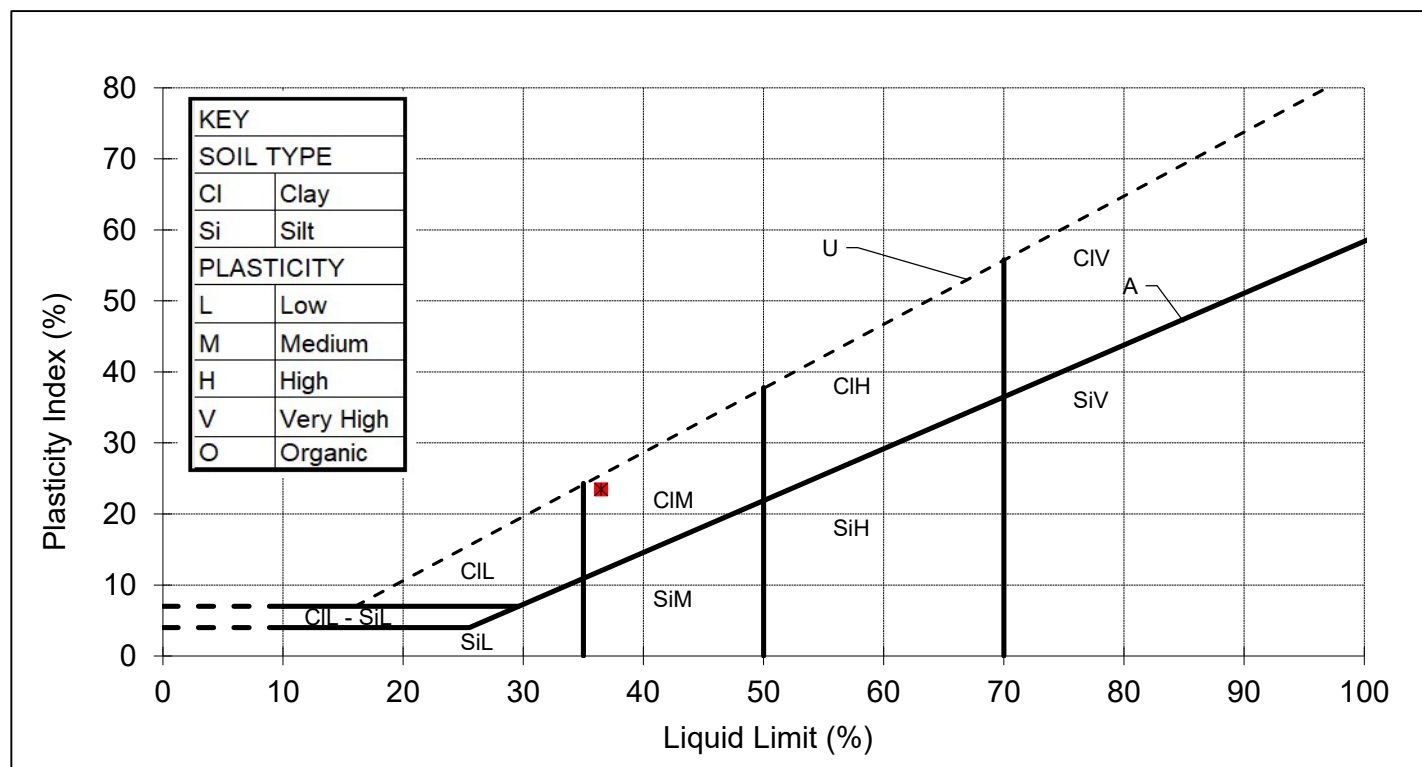
CLIENT	LK Consult Ltd
SITE	LKC 22 1502 - Ardwick Green
JOB NUMBER	MRN 4606/60

SAMPLE LABEL	CP1 3.8-4.1	DATE SAMPLED	Not advised
SAMPLE No.	125253	DATE RECEIVED	12-May-23
DATE TESTED	25-May-23	SAMPLED BY	Client

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

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	19.7	36.2	1.005	
Determination 2 (avg)	19.8	36.4		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
13.6	36	13	23	81



REMARKS

SIGNED

NAME

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

DATE

20-Jun-23

MURRAY RIX

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



TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD

PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5

WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

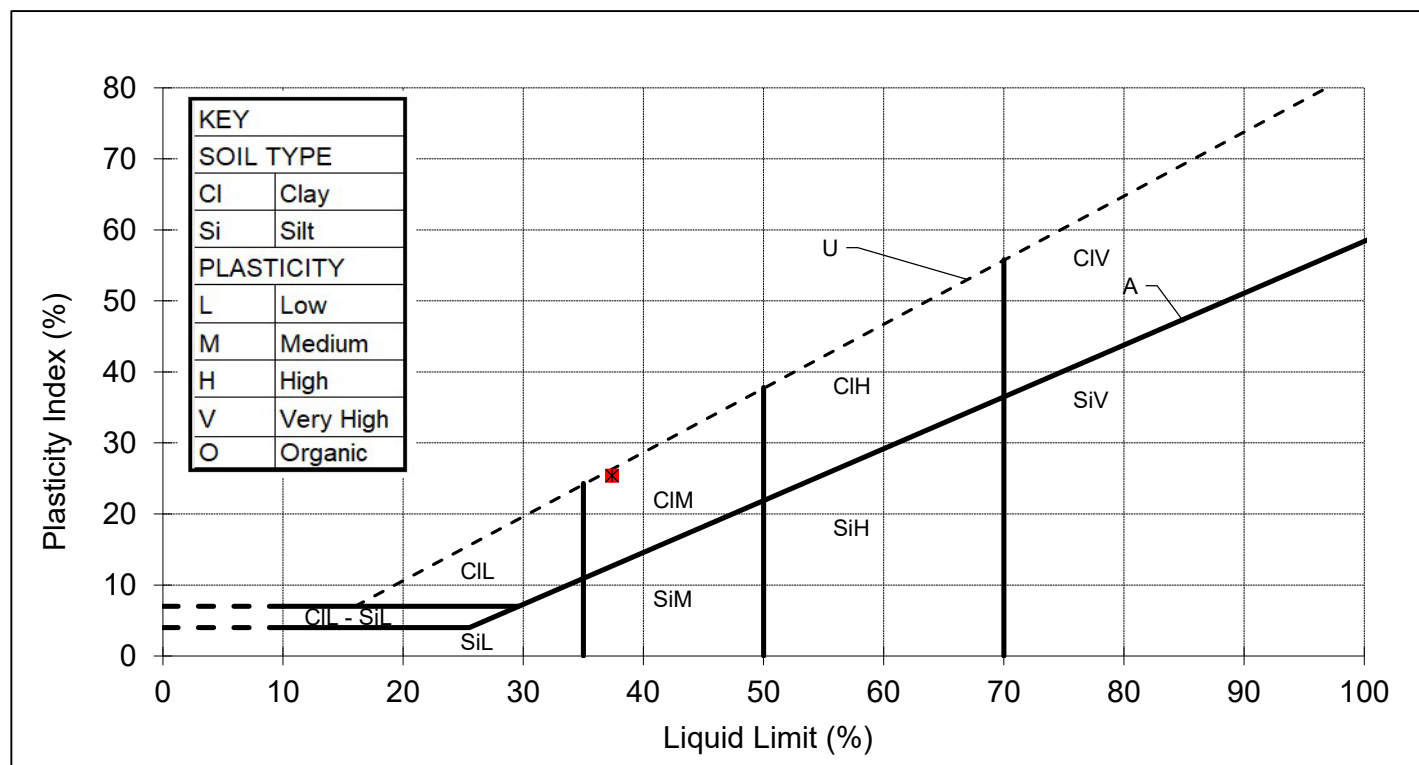
CLIENT	LK Consult Ltd
SITE	LKC 22 1502 - Ardwick Green
JOB NUMBER	MRN 4606/60

SAMPLE LABEL	CP2 4.9-5.2	DATE SAMPLED	Not advised
SAMPLE No.	125254	DATE RECEIVED	12-May-23
DATE TESTED	25-May-23	SAMPLED BY	Client

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

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	20.2	37.5	0.998	
Determination 2 (avg)	20.1	37.4		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
13.3	37	12	25	88



REMARKS

SIGNED

NAME

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

DATE

20-Jun-23

MURRAY RIX

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



TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD

PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5

WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

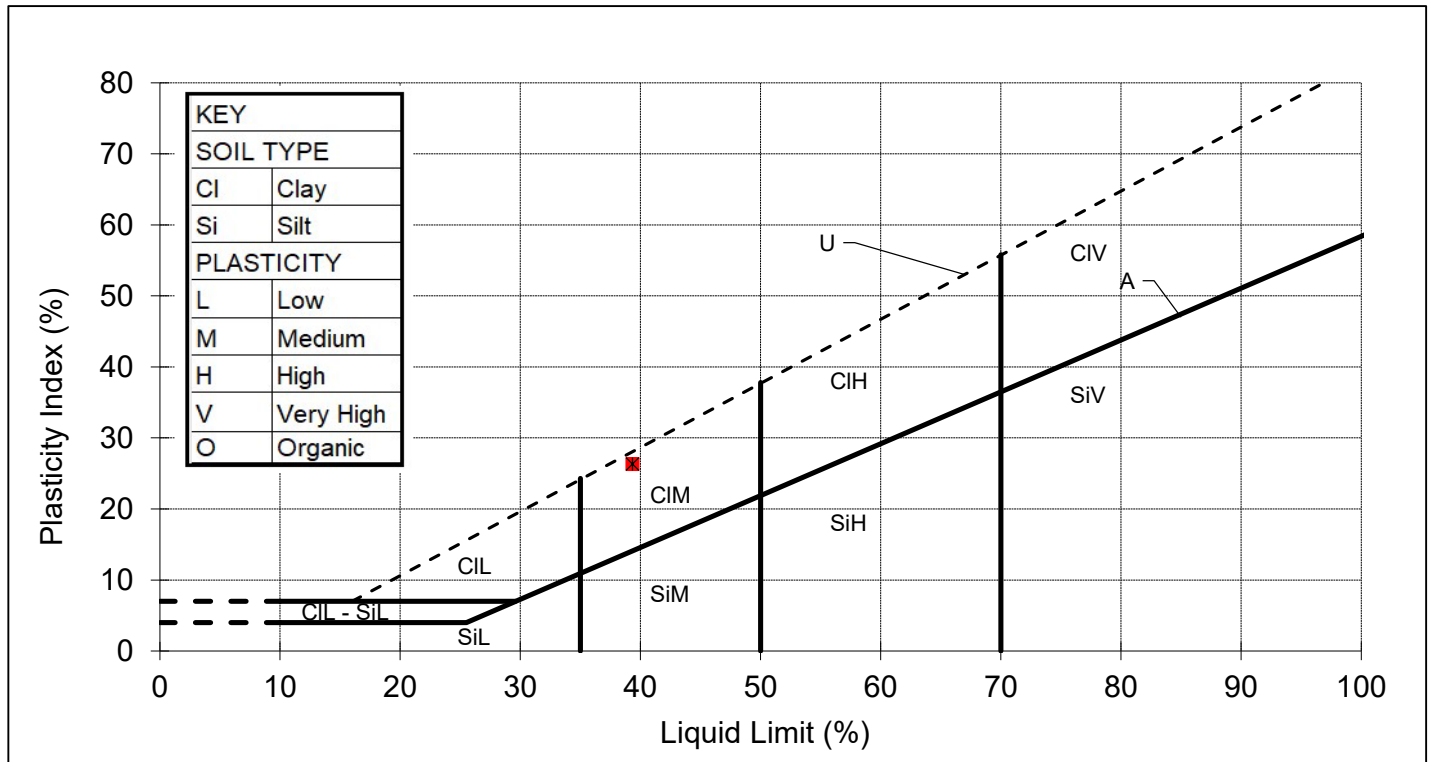
CLIENT	LK Consult Ltd
SITE	LKC 22 1502 - Ardwick Green
JOB NUMBER	MRN 4606/60

SAMPLE LABEL	CP3 7.5-7.6	DATE SAMPLED	Not advised
SAMPLE No.	125255	DATE RECEIVED	12-May-23
DATE TESTED	25-May-23	SAMPLED BY	Client

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

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	18.4	38.2	1.028	
Determination 2 (avg)	18.5	38.3		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
12.1	39	13	26	76



REMARKS

SIGNED

NAME

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

DATE

20-Jun-23

MURRAY RIX

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



TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD

PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5

WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

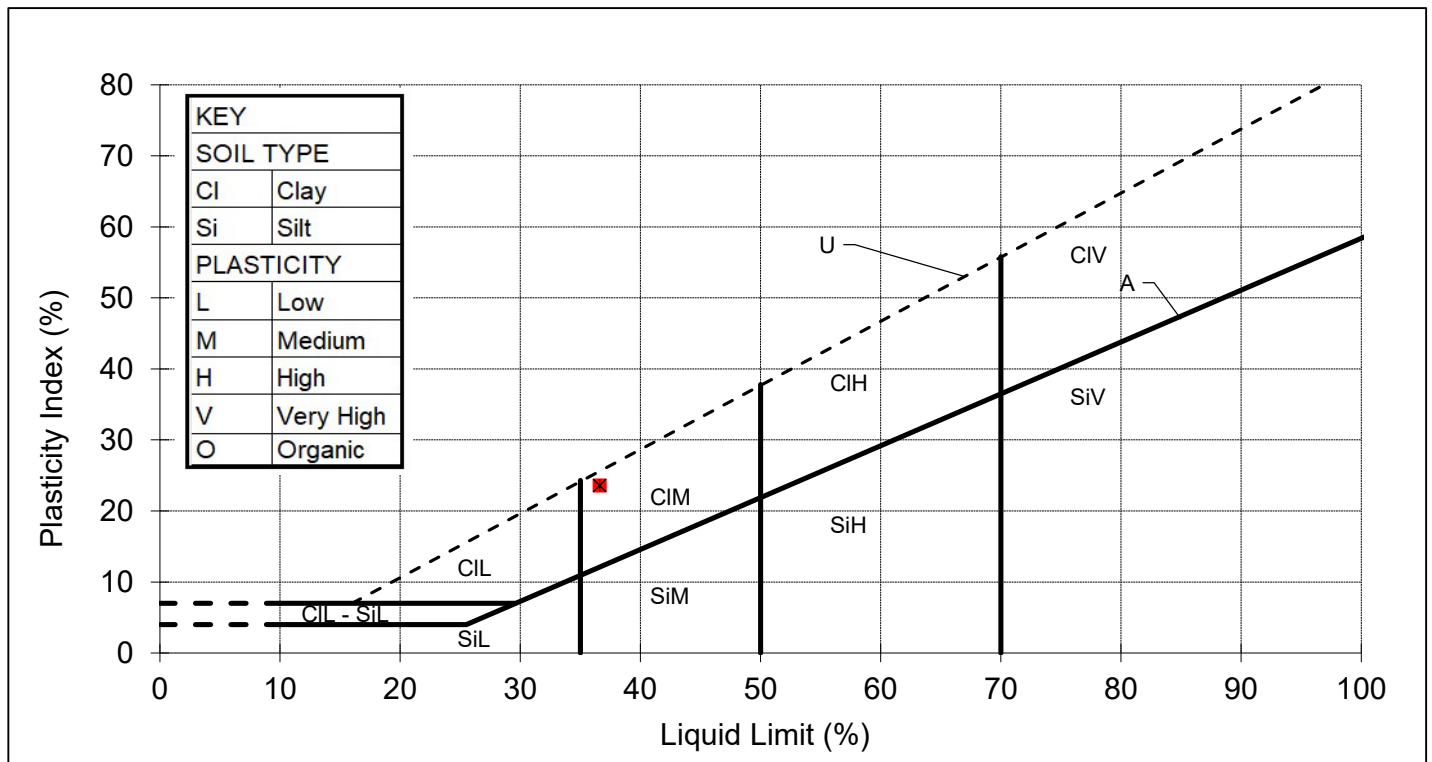
CLIENT	LK Consult Ltd
SITE	LKC 22 1502 - Ardwick Green
JOB NUMBER	MRN 4606/60

SAMPLE LABEL	CP3 5.5-5.9	DATE SAMPLED	Not advised
SAMPLE No.	125256	DATE RECEIVED	12-May-23
DATE TESTED	25-May-23	SAMPLED BY	Client

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

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	19.4	36.1	1.014	
Determination 2 (avg)	19.2	36.1		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
13.7	37	13	24	84



REMARKS

SIGNED

NAME

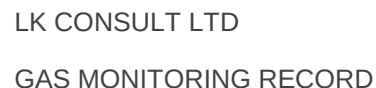
O.P. Davies BA (Hons)
(Laboratory Manager)

DATE

20-Jun-23

Appendix E

Gas Monitoring Results



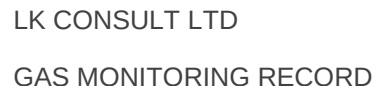
Equipment ¹		
Instrument	Serial Number	Comments
Gas Analyser GA5000	G502417	Serviced, calibrated, gas checked.
Geotech Oil-in-Water Interface Meter	81454-14	Operating normally.
Pho-Check Tiger	T-106802	Serviced, calibrated.

Atmospheric / Ground Conditions	
Atmospheric pressure trend onsite	Rising
Atmospheric pressure (prev 24hrs)	Variable
Weather Conditions	Cool, intermittent heavy showers, humid
Ground Conditions	Wet

[illegible]

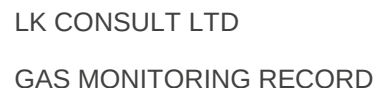
ABBREVIATIONS	
ND	Not detected
NR	Not recorded
UR	Unable to record
OS	Off recordable scale
N/A	Not applicable
ppm	Parts per million
mb	Millibars
l/hr	Litres per hour
mbgl	Metres below ground level
LEL	Lower explosive limit in air

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).



Atmospheric / Ground Conditions					
	Atmospheric pressure trend onsite		Steady		
	Atmospheric pressure (prev 24hrs)		Steady		
	Weather Conditions		Dry, Clear, Light Wind, Warm		
	Ground Conditions		Dry		

[illegible][illegible]



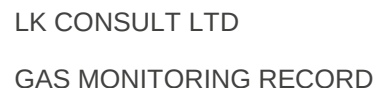
Equipment ¹		
Instrument	Serial Number	Comments
Gas Analyser GA5000	G507783	Serviced, calibrated, gas checked.
HydroTechnik	HT-03	Operating normally.
-	-	Serviced, calibrated.

Atmospheric / Ground Conditions	
Atmospheric pressure trend onsite	Steady
Atmospheric pressure (prev 24hrs)	Steady
Weather Conditions	Sunny, Dry, Slight Wind, Warm
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).

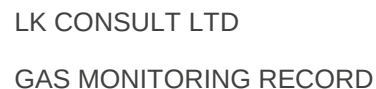


Equipment ¹		
Instrument	Serial Number	Comments
Gas Analyser GA5000	G507783	Serviced, calibrated, gas checked.
HydroTechnik	HT-04	Operating normally.
-	-	Serviced, calibrated.

[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).	

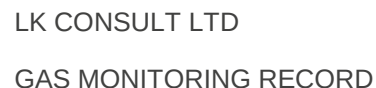


Equipment ¹		
Instrument	Serial Number	Comments
Gas Analyser GA5000	G507783	Serviced, calibrated, gas checked.
HydroTechnik	HT-01	Operating normally.
-	-	Serviced, calibrated.

[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	G507783	Serviced, calibrated, gas checked.
HydroTechnik	HT-01	Operating normally.
-	-	Serviced, calibrated.

[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

Soakaway Test Results

Site : Ardwick Green North, Manchester

Client : Church Inn (Ardwick) Ltd

Engineer : LKC

Job Number

LKC 22 1502

Sheet

1 / 2

Location	Date	Level	Location
SA101	20/07/2023		

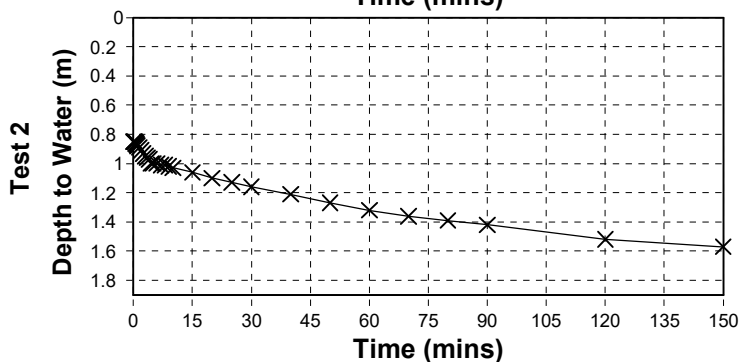
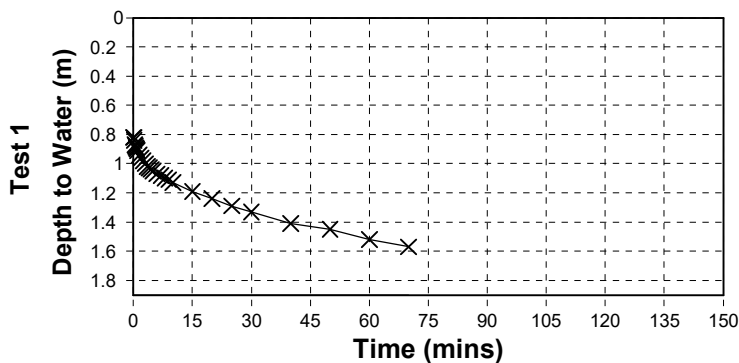
Pit Width (m)	0.60
Pit Depth (m)	1.81
Pit Length (m)	1.80

Soil type at test level	CLAY/SAND
Groundwater	Dry
Drain discharge depth	1.81
Sidewall stability	Stable
Stone filled or open pit	Open pit

	1	2
Effective depth (m)	0.99	0.96
Volume outflowing between 75% & 25% (m3)	0.53	0.52
Mean surface area through which outflow occurs (m2)	3.46	3.38
Time for outflow between 75% & 25% (min)	62.62	131.25
SOIL INFILTRATION RATE (ms-1), f	4.11E-5	1.95E-5

Remarks

Elapsed time (hh:mm:ss)	Depth to Water Test 1	Depth to Water Test 2
00:00:00	0.82	0.85
00:00:05	0.82	0.85
00:00:10	0.84	0.85
00:00:20	0.87	0.85
00:00:30	0.88	0.86
00:00:40	0.89	0.86
00:00:50	0.90	0.87
00:01:00	0.91	0.88
00:01:30	0.94	0.89
00:02:00	0.96	0.91
00:02:30	0.98	0.93
00:03:00	1.00	0.95
00:03:30	1.02	0.96
00:04:00	1.03	0.97
00:04:30	1.04	1.00
00:05:00	1.05	1.00
00:06:00	1.07	1.00
00:07:00	1.08	1.01
00:08:00	1.10	1.01
00:09:00	1.11	1.02
00:10:00	1.13	1.03
00:15:00	1.19	1.06
00:20:00	1.24	1.10
00:25:00	1.29	1.13
00:30:00	1.33	1.16
00:40:00	1.41	1.21
00:50:00	1.45	1.27
01:00:00	1.52	1.32
01:10:00	1.57	1.36
01:20:00		1.39
01:30:00		1.42
02:00:00		1.52
02:30:00		1.57



Site : Ardwick Green North, Manchester

Client : Church Inn (Ardwick) Ltd

Engineer : LKC

Job Number

LKC 22 1502

Sheet

2 / 2

Location	Date	Level	Location
SA102	20/07/2023		

Pit Width (m)	0.60
Pit Depth (m)	2.00
Pit Length (m)	1.80

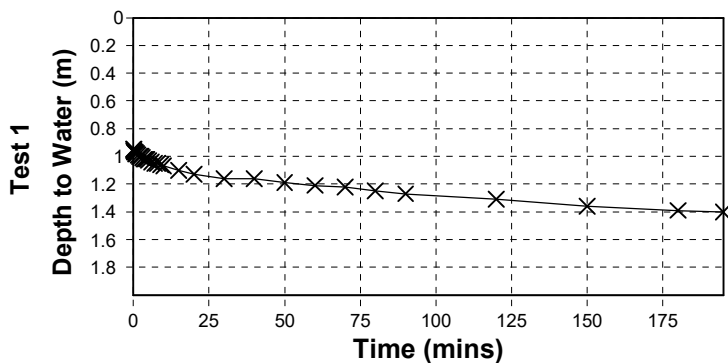
Soil type at test level	CLAY/SAND
Groundwater	Dry
Drain discharge depth	2.00
Sidewall stability	Stable
Stone filled or open pit	Open pit

	1
Effective depth (m)	1.05
Volume outflowing between 75% & 25% (m3)	0.57
Mean surface area through which outflow occurs (m2)	3.60
Time for outflow between 75% & 25% (min)	399.80
SOIL INFILTRATION RATE (ms-1), f	6.57E-6

Remarks

Readings extrapolated due to slow drainage.

Elapsed time (hh:mm:ss)	Depth to Water Test 1
00:00:00	0.95
00:00:05	0.95
00:00:10	0.96
00:00:20	0.97
00:00:30	0.97
00:00:40	0.97
00:00:50	0.98
00:01:00	0.98
00:01:30	0.99
00:02:00	1.00
00:02:30	1.00
00:03:00	1.01
00:03:30	1.02
00:04:00	1.02
00:04:30	1.02
00:05:00	1.03
00:06:00	1.04
00:07:00	1.05
00:08:00	1.05
00:09:00	1.06
00:10:00	1.07
00:15:00	1.10
00:20:00	1.13
00:30:00	1.16
00:40:00	1.16
00:50:00	1.19
01:00:00	1.21
01:10:00	1.22
01:20:00	1.25
01:30:00	1.27
02:00:00	1.31
02:30:00	1.36
03:00:00	1.39
03:15:00	1.40



Appendix G

Generic Assessment Criteria Values

CATEGORY 4 SCREENING LEVELS

Substance	Residential (with home- grown produce)	Residential (without home- grown produce)	Allotments	Commercial	Public Open Space 1	Public Open Space 2
Arsenic	37 mg/kg	40 mg/kg	49 mg/kg	640 mg/kg	79 mg/kg	170 mg/kg
Benzene	0.87 mg/kg	3.3 mg/kg	0.18 mg/kg	98 mg/kg	140 mg/kg	230 mg/kg
Benzo(a)pyrene	5.0 mg/kg	5.3 mg/kg	5.7 mg/kg	77 mg/kg	10 mg/kg	21 mg/kg
Cadmium	22 mg/kg	150 mg/kg	3.9 mg/kg	410 mg/kg	220 mg/kg	880 mg/kg
Chromium VI	21 mg/kg	21 mg/kg	170 mg/kg	49 mg/kg	21 mg/kg	250 mg/kg
Lead	200 mg/kg	310 mg/kg	80 mg/kg	2300 mg/kg	630 mg/kg	1300 mg/kg

Tetrachlorethene (PCE) – 1% SOM	0.31 mg/kg	0.32 mg/kg	2.0 mg/kg	24 mg/kg	3,200 mg/kg	1,400 mg/kg
Tetrachlorethene (PCE) – 2.5% SOM	0.70 mg/kg	0.71 mg/kg	4.8 mg/kg	55 mg/kg	3,300 mg/kg	1,900 mg/kg
Tetrachlorethene (PCE) – 6% SOM	1.6 mg/kg	1.6 mg/kg	11 mg/kg	130 mg/kg	3,400 mg/kg	2,500 mg/kg
Trichlorethene (TCE) – 1% SOM	0.0093 mg/kg	0.0097 mg/kg	0.032 mg/kg	0.73 mg/kg	76 mg/kg	41 mg/kg
Trichlorethene (TCE) – 2.5% SOM	0.020 mg/kg	0.020 mg/kg	0.072 mg/kg	1.5 mg/kg	78 mg/kg	54 mg/kg
Trichlorethene (TCE) – 6% SOM	0.043 mg/kg	0.045 mg/kg	0.16 mg/kg	3.4 mg/kg	79 mg/kg	69 mg/kg
Vinyl Chloride (VC) – 1%SOM	0.0064 mg/kg	0.015 mg/kg	0.0017 mg/kg	1.1 mg/kg	7.8 mg/kg	18 mg/kg
Vinyl Chloride (VC) – 2.5%SOM	0.010 mg/kg	0.019 mg/kg	0.0031 mg/kg	1.4 mg/kg	7.8 mg/kg	19 mg/kg
Vinyl Chloride (VC) – 6%SOM	0.017 mg/kg	0.029 mg/kg	0.0058 mg/kg	2.2 mg/kg	7.8 mg/kg	19 mg/kg

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

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

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.

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 H

Hazwaste Assessment

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)



J3D0J-2VESP-4FBCX

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

Job name

LKC 22 1502

Description/Comments

Project

LKC 22 1502

Site

Ardwick Green, Manchester

Classified by

Name: **Colin Crompton**
 Date: **04 Jul 2023 10:58 GMT**
 Telephone: **0161 763 7200**
 Company: **LK Group**
Unit 29, Eton Business Park
Eton Hill Rd, Radcliffe
Greater Manchester
M26 2ZS

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

08 Oct 2020

Next 3 year Refresher due by Oct 2023

Purpose of classification

2 - Material Characterisation

Address of the waste

Church Inn, Ardwick Green North, Manchester

Post Code M12 6FZ

SIC for the process giving rise to the waste

41202 Construction of domestic buildings

Description of industry/producer giving rise to the waste

Redevelopment of derelict site

Description of the specific process, sub-process and/or activity that created the waste

Waste created during enabling and construction

Description of the waste

Made ground

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	TP101-0.00 - 1.00-27/04/2023	0.00 - 1.00	Non Hazardous		3
2	CP103-0.00 - 0.50-27/04/2023	0.00 - 0.50	Non Hazardous		6
3	TP102-0.30 - 1.00-27/04/2023	0.30 - 1.00	Non Hazardous		8
4	TP103-0.15 - 1.00-27/04/2023	0.15 - 1.00	Non Hazardous		10
5	TP104-0.20 - 1.00-27/04/2023	0.20 - 1.00	Non Hazardous		12
6	TP105-0.85 - 1.10-27/04/2023	0.85 - 1.10	Non Hazardous		14
7	CP101-0.00 - 0.50-25/04/2023	0.00 - 0.50	Non Hazardous		17
8	CP102-0.00 - 0.50-26/04/2023	0.00 - 0.50	Non Hazardous		19

Related documents

#	Name	Description
1	23-05840.1.hwol	DETS South .hwol file used to populate the Job
2	LK SUITE 1 - 5	waste stream template used to create this Job

Report

Created by: Colin Crompton

Created date: 04 Jul 2023 10:58 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	21
Appendix B: Rationale for selection of metal species	23
Appendix C: Version	23

Classification of sample: TP101-0.00 - 1.00-27/04/2023

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

Sample details

Sample name:	LoW Code:
TP101-0.00 - 1.00-27/04/2023	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.00 - 1.00 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
9.7%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 9.7% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1		arsenic { arsenic trioxide }				13 mg/kg	1.32	15.499 mg/kg	0.00155 %	✓	
		033-003-00-0	215-481-4	1327-53-3							
2		cadmium { cadmium oxide }				<0.2 mg/kg	1.142	<0.228 mg/kg	<0.0000228 %		<LOD
		048-002-00-0	215-146-2	1306-19-0							
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				15 mg/kg	1.462	19.797 mg/kg	0.00198 %	✓	
			215-160-9	1308-38-9							
4		copper { dicopper oxide; copper (I) oxide }				38 mg/kg	1.126	38.634 mg/kg	0.00386 %	✓	
		029-002-00-X	215-270-7	1317-39-1							
5		mercury { mercury dichloride }				<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
		080-010-00-X	231-299-8	7487-94-7							
6		nickel { nickel(II) oxide (nickel monoxide) }				13 mg/kg	1.273	14.939 mg/kg	0.00149 %	✓	
		028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]							
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	110 mg/kg		99.33 mg/kg	0.00993 %	✓	
		082-001-00-6									
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<2 mg/kg	1.405	<2.81 mg/kg	<0.000281 %		<LOD
		034-002-00-8									
9		vanadium { divanadium pentaoxide; vanadium pentoxide }				29 mg/kg	1.785	46.749 mg/kg	0.00467 %	✓	
		023-001-00-8	215-239-8	1314-62-1							
10		zinc { zinc oxide }				100 mg/kg	1.245	112.398 mg/kg	0.0112 %	✓	
		030-013-00-7	215-222-5	1314-13-2							
11		chromium in chromium(VI) compounds { chromium(VI) oxide }				<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %		<LOD
		024-001-00-0	215-607-8	1333-82-0							
12		boron { diboron trioxide; boric oxide }				<1 mg/kg	3.22	<3.22 mg/kg	<0.000322 %		<LOD
		005-008-00-8	215-125-8	1303-86-2							
13		TPH (C6 to C40) petroleum group				281 mg/kg		253.743 mg/kg	0.0254 %	✓	
				TPH							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
14	confirm TPH has NOT arisen from diesel or petrol				☒						
15	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %			<LOD
	603-181-00-X	216-653-1	1634-04-4								
16	benzene				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %			<LOD
	601-020-00-8	200-753-7	71-43-2								
17	toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %			<LOD
	601-021-00-3	203-625-9	108-88-3								
18	ethylbenzene				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %			<LOD
	601-023-00-4	202-849-4	100-41-4								
19	xylene				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %			<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]								
20	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 }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %			<LOD
	006-007-00-5										
21	pH				9.6 pH		9.6 pH	9.6 pH			
			PH								
22	naphthalene				0.2 mg/kg		0.181 mg/kg	0.0000181 %		✓	
	601-052-00-2	202-049-5	91-20-3								
23	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
		205-917-1	208-96-8								
24	acenaphthene				0.45 mg/kg		0.406 mg/kg	0.0000406 %		✓	
		201-469-6	83-32-9								
25	fluorene				0.31 mg/kg		0.28 mg/kg	0.000028 %		✓	
		201-695-5	86-73-7								
26	phenanthrene				3.02 mg/kg		2.727 mg/kg	0.000273 %		✓	
		201-581-5	85-01-8								
27	anthracene				0.89 mg/kg		0.804 mg/kg	0.0000804 %		✓	
		204-371-1	120-12-7								
28	fluoranthene				3.89 mg/kg		3.513 mg/kg	0.000351 %		✓	
		205-912-4	206-44-0								
29	pyrene				3.4 mg/kg		3.07 mg/kg	0.000307 %		✓	
		204-927-3	129-00-0								
30	benzo[a]anthracene				1.65 mg/kg		1.49 mg/kg	0.000149 %		✓	
	601-033-00-9	200-280-6	56-55-3								
31	chrysene				1.58 mg/kg		1.427 mg/kg	0.000143 %		✓	
	601-048-00-0	205-923-4	218-01-9								
32	benzo[b]fluoranthene				1.52 mg/kg		1.373 mg/kg	0.000137 %		✓	
	601-034-00-4	205-911-9	205-99-2								
33	benzo[k]fluoranthene				0.7 mg/kg		0.632 mg/kg	0.0000632 %		✓	
	601-036-00-5	205-916-6	207-08-9								
34	benzo[a]pyrene; benzo[def]chrysene				1.41 mg/kg		1.273 mg/kg	0.000127 %		✓	
	601-032-00-3	200-028-5	50-32-8								
35	indeno[123-cd]pyrene				0.77 mg/kg		0.695 mg/kg	0.0000695 %		✓	
		205-893-2	193-39-5								
36	dibenz[a,h]anthracene				0.18 mg/kg		0.163 mg/kg	0.0000163 %		✓	
	601-041-00-2	200-181-8	53-70-3								
37	benzo[ghi]perylene				0.69 mg/kg		0.623 mg/kg	0.0000623 %		✓	
		205-883-8	191-24-2								
38	monohydric phenols				<2 mg/kg		<2 mg/kg	<0.0002 %			<LOD
			P1186								
Total:									0.0635 %		

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
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 TPH source from ash within sample. Laboratory identifies PAHs which are unlikely to be flammable. No free draining liquid, no olfactory evidence, no anticipated sources identified and no other evidence of hydrocarbon contamination in samples. Concentrations at less than 1.0% are "unlikely to be flammable". Flammability of soils is unlikely to result in a hazardous classification in soils (AGS Waste Classification – A Practitioner's Guide).

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0254%)

Classification of sample: CP103-0.00 - 0.50-27/04/2023

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

Sample details

Sample name:	LoW Code:
CP103-0.00 - 0.50-27/04/2023	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.00 - 0.50 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
12.5%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 12.5% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				18 mg/kg	1.32	20.795 mg/kg	0.00208 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				3.1 mg/kg	1.142	3.099 mg/kg	0.00031 %	✓	
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				18 mg/kg	1.462	23.02 mg/kg	0.0023 %	✓	
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				66 mg/kg	1.126	65.02 mg/kg	0.0065 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
5	mercury { mercury dichloride }				<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
6	nickel { nickel(II) oxide (nickel monoxide) }				11 mg/kg	1.273	12.249 mg/kg	0.00122 %	✓	
	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]							
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	191 mg/kg		167.125 mg/kg	0.0167 %	✓	
	082-001-00-6									
8	selenium { selenium compounds with the exception of cadmium selenide and those specified elsewhere in this Annex }				<2 mg/kg	1.405	<2.81 mg/kg	<0.000281 %		<LOD
	034-002-00-8									
9	vanadium { divanadium pentaoxide; vanadium pentoxide }				25 mg/kg	1.785	39.051 mg/kg	0.00391 %	✓	
	023-001-00-8	215-239-8	1314-62-1							
10	zinc { zinc oxide }				593 mg/kg	1.245	645.851 mg/kg	0.0646 %	✓	
	030-013-00-7	215-222-5	1314-13-2							
11	chromium in chromium(VI) compounds { chromium(VI) oxide }				<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
12	pH		PH		8 pH		8 pH	8pH		
13	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
14	● acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15	● acenaphthene	201-469-6	83-32-9		0.72 mg/kg		0.63 mg/kg	0.000063 %	✓	
16	● fluorene	201-695-5	86-73-7		0.35 mg/kg		0.306 mg/kg	0.0000306 %	✓	
17	● phenanthrene	201-581-5	85-01-8		5.06 mg/kg		4.427 mg/kg	0.000443 %	✓	
18	● anthracene	204-371-1	120-12-7		1.34 mg/kg		1.173 mg/kg	0.000117 %	✓	
19	● fluoranthene	205-912-4	206-44-0		8.06 mg/kg		7.053 mg/kg	0.000705 %	✓	
20	● pyrene	204-927-3	129-00-0		7.77 mg/kg		6.799 mg/kg	0.00068 %	✓	
21	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	3.76 mg/kg		3.29 mg/kg	0.000329 %	✓	
22	chrysene	601-048-00-0	205-923-4	218-01-9	3.67 mg/kg		3.211 mg/kg	0.000321 %	✓	
23	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	3.94 mg/kg		3.448 mg/kg	0.000345 %	✓	
24	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	1.6 mg/kg		1.4 mg/kg	0.00014 %	✓	
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	3.69 mg/kg		3.229 mg/kg	0.000323 %	✓	
26	indeno[123-cd]pyrene	205-893-2	193-39-5		2.15 mg/kg		1.881 mg/kg	0.000188 %	✓	
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	0.46 mg/kg		0.403 mg/kg	0.0000403 %	✓	
28	benzo[ghi]perylene	205-883-8	191-24-2		1.83 mg/kg		1.601 mg/kg	0.00016 %	✓	
Total:								0.102 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP102-0.30 - 1.00-27/04/2023

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

Sample details

Sample name:	LoW Code:
TP102-0.30 - 1.00-27/04/2023	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.30 - 1.00 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
16.5%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 16.5% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	17 mg/kg	1.32	18.742 mg/kg	0.00187 %	✓	
2	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0	0.3 mg/kg	1.142	0.286 mg/kg	0.0000286 %	✓	
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		13 mg/kg	1.462	15.865 mg/kg	0.00159 %	✓	
4	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	145 mg/kg	1.126	136.317 mg/kg	0.0136 %	✓	
5	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7	<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
6	nickel { nickel(II) oxide (nickel monoxide) }	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]	13 mg/kg	1.273	13.814 mg/kg	0.00138 %	✓	
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			113 mg/kg		94.355 mg/kg	0.00944 %	✓	
8	selenium { selenium compounds with the exception of cadmium selenosulfide and those specified elsewhere in this Annex }	034-002-00-8			<2 mg/kg	1.405	<2.81 mg/kg	<0.000281 %		<LOD
9	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1	27 mg/kg	1.785	40.247 mg/kg	0.00402 %	✓	
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2	359 mg/kg	1.245	373.122 mg/kg	0.0373 %	✓	
11	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %		<LOD
12	pH		PH		6.8 pH		6.8 pH	6.8 pH		
13	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
14	● acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15	● acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	● fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	● phenanthrene	201-581-5	85-01-8		0.12 mg/kg		0.1 mg/kg	0.00001 %	✓	
18	● anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	● fluoranthene	205-912-4	206-44-0		0.2 mg/kg		0.167 mg/kg	0.0000167 %	✓	
20	● pyrene	204-927-3	129-00-0		0.19 mg/kg		0.159 mg/kg	0.0000159 %	✓	
21	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.14 mg/kg		0.117 mg/kg	0.0000117 %	✓	
22	chrysene	601-048-00-0	205-923-4	218-01-9	0.14 mg/kg		0.117 mg/kg	0.0000117 %	✓	
23	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.17 mg/kg		0.142 mg/kg	0.0000142 %	✓	
24	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	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
26	● indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	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
28	● benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
Total:								0.0703 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP103-0.15 - 1.00-27/04/2023

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

Sample details

Sample name:	LoW Code:
TP103-0.15 - 1.00-27/04/2023	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)
0.15 - 1.00 m	
Moisture content:	
17.4%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 17.4% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				25 mg/kg	1.32	27.265 mg/kg	0.00273 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				0.8 mg/kg	1.142	0.755 mg/kg	0.0000755 %	✓	
	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	19.316 mg/kg	0.00193 %	✓	
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				686 mg/kg	1.126	637.969 mg/kg	0.0638 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
5	mercury { mercury dichloride }				<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
6	nickel { nickel(II) oxide (nickel monoxide) }				15 mg/kg	1.273	15.767 mg/kg	0.00158 %	✓	
	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]							
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	1750 mg/kg		1445.5 mg/kg	0.145 %	✓	
	082-001-00-6									
8	selenium { selenium compounds with the exception of cadmium selenosulfide and those specified elsewhere in this Annex }				<2 mg/kg	1.405	<2.81 mg/kg	<0.000281 %		<LOD
	034-002-00-8									
9	vanadium { divanadium pentaoxide; vanadium pentoxide }				28 mg/kg	1.785	41.288 mg/kg	0.00413 %	✓	
	023-001-00-8	215-239-8	1314-62-1							
10	zinc { zinc oxide }				591 mg/kg	1.245	607.627 mg/kg	0.0608 %	✓	
	030-013-00-7	215-222-5	1314-13-2							
11	chromium in chromium(VI) compounds { chromium(VI) oxide }				<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
12	pH		PH		7.8 pH		7.8 pH	7.8 pH		
13	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
14	acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15	acenaphthene	201-469-6	83-32-9		0.23 mg/kg		0.19 mg/kg	0.000019 %	✓	
16	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	phenanthrene	201-581-5	85-01-8		1.13 mg/kg		0.933 mg/kg	0.0000933 %	✓	
18	anthracene	204-371-1	120-12-7		0.28 mg/kg		0.231 mg/kg	0.0000231 %	✓	
19	fluoranthene	205-912-4	206-44-0		1.37 mg/kg		1.132 mg/kg	0.000113 %	✓	
20	pyrene	204-927-3	129-00-0		1.49 mg/kg		1.231 mg/kg	0.000123 %	✓	
21	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.63 mg/kg		0.52 mg/kg	0.000052 %	✓	
22	chrysene	601-048-00-0	205-923-4	218-01-9	0.78 mg/kg		0.644 mg/kg	0.0000644 %	✓	
23	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.67 mg/kg		0.553 mg/kg	0.0000553 %	✓	
24	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.31 mg/kg		0.256 mg/kg	0.0000256 %	✓	
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.59 mg/kg		0.487 mg/kg	0.0000487 %	✓	
26	indeno[123-cd]pyrene	205-893-2	193-39-5		0.33 mg/kg		0.273 mg/kg	0.0000273 %	✓	
27	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
28	benzo[ghi]perylene	205-883-8	191-24-2		0.33 mg/kg		0.273 mg/kg	0.0000273 %	✓	
Total:								0.281 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP104-0.20 - 1.00-27/04/2023

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

Sample details

Sample name:	LoW Code:
TP104-0.20 - 1.00-27/04/2023	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.20 - 1.00 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
		EU CLP index number	EC Number	CAS Number								
1		arsenic { arsenic trioxide }				20 mg/kg	1.32	21.917 mg/kg	0.00219 %		✓	
		033-003-00-0	215-481-4	1327-53-3								
2		cadmium { cadmium oxide }				1.1 mg/kg	1.142	1.043 mg/kg	0.000104 %		✓	
		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	20.623 mg/kg	0.00206 %		✓	
			215-160-9	1308-38-9								
4		copper { dicopper oxide; copper (I) oxide }				164 mg/kg	1.126	153.256 mg/kg	0.0153 %		✓	
		029-002-00-X	215-270-7	1317-39-1								
5		mercury { mercury dichloride }				<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %			<LOD
		080-010-00-X	231-299-8	7487-94-7								
6		nickel { nickel(II) oxide (nickel monoxide) }				12 mg/kg	1.273	12.675 mg/kg	0.00127 %		✓	
		028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]								
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	374 mg/kg		310.42 mg/kg	0.031 %		✓	
		082-001-00-6										
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<2 mg/kg	1.405	<2.81 mg/kg	<0.000281 %			<LOD
		034-002-00-8										
9		vanadium { divanadium pentaoxide; vanadium pentoxide }				31 mg/kg	1.785	45.933 mg/kg	0.00459 %		✓	
		023-001-00-8	215-239-8	1314-62-1								
10		zinc { zinc oxide }				408 mg/kg	1.245	421.51 mg/kg	0.0422 %		✓	
		030-013-00-7	215-222-5	1314-13-2								
11		chromium in chromium(VI) compounds { chromium(VI) oxide }				<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %			<LOD
		024-001-00-0	215-607-8	1333-82-0								
12		pH		PH		7.9 pH		7.9 pH	7.9 pH			
13		naphthalene				0.27 mg/kg		0.224 mg/kg	0.0000224 %		✓	
		601-052-00-2	202-049-5	91-20-3								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
14	acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15	acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	phenanthrene	201-581-5	85-01-8		0.78 mg/kg		0.647 mg/kg	0.0000647 %	✓	
18	anthracene	204-371-1	120-12-7		0.25 mg/kg		0.208 mg/kg	0.0000208 %	✓	
19	fluoranthene	205-912-4	206-44-0		1.83 mg/kg		1.519 mg/kg	0.000152 %	✓	
20	pyrene	204-927-3	129-00-0		1.81 mg/kg		1.502 mg/kg	0.00015 %	✓	
21	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	1.17 mg/kg		0.971 mg/kg	0.0000971 %	✓	
22	chrysene	601-048-00-0	205-923-4	218-01-9	1.02 mg/kg		0.847 mg/kg	0.0000847 %	✓	
23	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	1.4 mg/kg		1.162 mg/kg	0.000116 %	✓	
24	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.55 mg/kg		0.457 mg/kg	0.0000457 %	✓	
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	1.11 mg/kg		0.921 mg/kg	0.0000921 %	✓	
26	indeno[123-cd]pyrene	205-893-2	193-39-5		0.84 mg/kg		0.697 mg/kg	0.0000697 %	✓	
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	0.14 mg/kg		0.116 mg/kg	0.0000116 %	✓	
28	benzo[ghi]perylene	205-883-8	191-24-2		0.77 mg/kg		0.639 mg/kg	0.0000639 %	✓	
Total:								0.101 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP105-0.85 - 1.10-27/04/2023

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

Sample details

Sample name:	LoW Code:
TP105-0.85 - 1.10-27/04/2023	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)
0.85 - 1.10 m	
Moisture content:	
18.3%	
(wet weight correction)	

Hazard properties

None identified

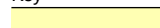
Determinands

Moisture content: 18.3% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	6 mg/kg	1.32	6.472 mg/kg	0.000647 %	✓	
2	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0	<0.2 mg/kg	1.142	<0.228 mg/kg	<0.0000228 %		<LOD
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		19 mg/kg	1.462	22.688 mg/kg	0.00227 %	✓	
4	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	11 mg/kg	1.126	10.118 mg/kg	0.00101 %	✓	
5	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7	<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
6	nickel { nickel(II) oxide (nickel monoxide) }	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]	9 mg/kg	1.273	9.357 mg/kg	0.000936 %	✓	
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			34 mg/kg		27.778 mg/kg	0.00278 %	✓	
8	selenium { selenium compounds with the exception of cadmium selenosulfide and those specified elsewhere in this Annex }	034-002-00-8			<2 mg/kg	1.405	<2.81 mg/kg	<0.000281 %		<LOD
9	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1	30 mg/kg	1.785	43.755 mg/kg	0.00438 %	✓	
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2	50 mg/kg	1.245	50.847 mg/kg	0.00508 %	✓	
11	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %		<LOD
12	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2	<1 mg/kg	3.22	<3.22 mg/kg	<0.000322 %		<LOD
13	TPH (C6 to C40) petroleum group		TPH		<60 mg/kg		<60 mg/kg	<0.006 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value		MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number										
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD	
		603-181-00-X	216-653-1	1634-04-4										
15		benzene				<0.002	mg/kg		<0.002	mg/kg	<0.0000002 %		<LOD	
		601-020-00-8	200-753-7	71-43-2										
16		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD	
		601-021-00-3	203-625-9	108-88-3										
17	●	ethylbenzene				<0.002	mg/kg		<0.002	mg/kg	<0.0000002 %		<LOD	
		601-023-00-4	202-849-4	100-41-4										
18		xylene				<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD	
		601-022-00-9	202-422-2 [1]	95-47-6 [1]										
			203-396-5 [2]	106-42-3 [2]										
			203-576-3 [3]	108-38-3 [3]										
			215-535-7 [4]	1330-20-7 [4]										
19		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD	
		006-007-00-5												
20	●	pH				7.3	pH		7.3	pH	7.3 pH			
				PH										
21		naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD	
		601-052-00-2	202-049-5	91-20-3										
22	●	acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD	
			205-917-1	208-96-8										
23	●	acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD	
			201-469-6	83-32-9										
24	●	fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD	
			201-695-5	86-73-7										
25	●	phenanthrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD	
			201-581-5	85-01-8										
26	●	anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD	
			204-371-1	120-12-7										
27	●	fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD	
			205-912-4	206-44-0										
28	●	pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD	
			204-927-3	129-00-0										
29		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD	
		601-033-00-9	200-280-6	56-55-3										
30		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD	
		601-048-00-0	205-923-4	218-01-9										
31		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD	
		601-034-00-4	205-911-9	205-99-2										
32		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD	
		601-036-00-5	205-916-6	207-08-9										
33		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD	
		601-032-00-3	200-028-5	50-32-8										
34	●	indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD	
			205-893-2	193-39-5										
35		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD	
		601-041-00-2	200-181-8	53-70-3										
36	●	benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD	
			205-883-8	191-24-2										
37	●	monohydric phenols				<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD	
				P1186										
Total:												0.0248 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: CP101-0.00 - 0.50-25/04/2023

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

Sample details

Sample name:	LoW Code:
CP101-0.00 - 0.50-25/04/2023	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.00 - 0.50 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
16.6%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 16.6% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number								
1		arsenic { arsenic trioxide }				10 mg/kg	1.32	11.012 mg/kg	0.0011 %	✓		
		033-003-00-0	215-481-4	1327-53-3								
2		cadmium { cadmium oxide }				<0.2 mg/kg	1.142	<0.228 mg/kg	<0.0000228 %		<LOD	
		048-002-00-0	215-146-2	1306-19-0								
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				8 mg/kg	1.462	9.752 mg/kg	0.000975 %	✓		
			215-160-9	1308-38-9								
4		copper { dicopper oxide; copper (I) oxide }				27 mg/kg	1.126	25.353 mg/kg	0.00254 %	✓		
		029-002-00-X	215-270-7	1317-39-1								
5		mercury { mercury dichloride }				<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD	
		080-010-00-X	231-299-8	7487-94-7								
6		nickel { nickel(II) oxide (nickel monoxide) }				8 mg/kg	1.273	8.491 mg/kg	0.000849 %	✓		
		028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]								
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	62 mg/kg		51.708 mg/kg	0.00517 %	✓		
		082-001-00-6										
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<2 mg/kg	1.405	<2.81 mg/kg	<0.000281 %		<LOD	
		034-002-00-8										
9		vanadium { divanadium pentaoxide; vanadium pentoxide }				17 mg/kg	1.785	25.31 mg/kg	0.00253 %	✓		
		023-001-00-8	215-239-8	1314-62-1								
10		zinc { zinc oxide }				33 mg/kg	1.245	34.257 mg/kg	0.00343 %	✓		
		030-013-00-7	215-222-5	1314-13-2								
11		chromium in chromium(VI) compounds { chromium(VI) oxide }				<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %		<LOD	
		024-001-00-0	215-607-8	1333-82-0								
12		pH				6.4 pH		6.4 pH	6.4 pH			
				PH								
13		naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD	
		601-052-00-2	202-049-5	91-20-3								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
14	● acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15	● acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	● fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	● phenanthrene	201-581-5	85-01-8		0.13 mg/kg		0.108 mg/kg	0.0000108 %	✓	
18	● anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	● fluoranthene	205-912-4	206-44-0		0.18 mg/kg		0.15 mg/kg	0.000015 %	✓	
20	● pyrene	204-927-3	129-00-0		0.16 mg/kg		0.133 mg/kg	0.0000133 %	✓	
21	benzo[a]anthracene	601-033-00-9	200-280-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	chrysene	601-048-00-0	205-923-4		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
23	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	● indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	● benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
Total:								0.0176 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: CP102-0.00 - 0.50-26/04/2023

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

Sample details

Sample name:	LoW Code:
CP102-0.00 - 0.50-26/04/2023	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.00 - 0.50 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
18.3%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 18.3% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used		
		EU CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				34	mg/kg	1.32	36.676	mg/kg	0.00367 %	✓	
	033-003-00-0	215-481-4	1327-53-3										
2		cadmium { cadmium oxide }				0.5	mg/kg	1.142	0.467	mg/kg	0.0000467 %	✓	
	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	16.717	mg/kg	0.00167 %	✓	
		215-160-9	1308-38-9										
4		copper { dicopper oxide; copper (I) oxide }				176	mg/kg	1.126	161.894	mg/kg	0.0162 %	✓	
	029-002-00-X	215-270-7	1317-39-1										
5		mercury { mercury dichloride }				1.4	mg/kg	1.353	1.548	mg/kg	0.000155 %	✓	
	080-010-00-X	231-299-8	7487-94-7										
6		nickel { nickel(II) oxide (nickel monoxide) }				15	mg/kg	1.273	15.596	mg/kg	0.00156 %	✓	
	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]										
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	446	mg/kg		364.382	mg/kg	0.0364 %	✓	
	082-001-00-6												
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<2	mg/kg	1.405	<2.81	mg/kg	<0.000281 %		<LOD
	034-002-00-8												
9		vanadium { divanadium pentaoxide; vanadium pentoxide }				32	mg/kg	1.785	46.672	mg/kg	0.00467 %	✓	
	023-001-00-8	215-239-8	1314-62-1										
10		zinc { zinc oxide }				606	mg/kg	1.245	616.26	mg/kg	0.0616 %	✓	
	030-013-00-7	215-222-5	1314-13-2										
11		chromium in chromium(VI) compounds { chromium(VI) oxide }				<2	mg/kg	1.923	<3.846	mg/kg	<0.000385 %		<LOD
	024-001-00-0	215-607-8	1333-82-0										
12		pH				8.5	pH		8.5	pH	8.5 pH		
			PH										
13		naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3										

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
14	• acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15	• acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	• fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	• phenanthrene	201-581-5	85-01-8		0.26 mg/kg		0.212 mg/kg	0.0000212 %	✓	
18	• anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	• fluoranthene	205-912-4	206-44-0		0.35 mg/kg		0.286 mg/kg	0.0000286 %	✓	
20	• pyrene	204-927-3	129-00-0		0.37 mg/kg		0.302 mg/kg	0.0000302 %	✓	
21	benzo[a]anthracene	601-033-00-9	200-280-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	chrysene	601-048-00-0	205-923-4		0.17 mg/kg		0.139 mg/kg	0.0000139 %	✓	
23	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	• indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	• benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
Total:								0.127 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non GB MCL determinands

■ **chromium(III) oxide (worst case)** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database

Data source: <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806>

Data source date: 17 Jul 2015

Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **lead compounds with the exception of those specified elsewhere in this Annex**

GB MCL index number: 082-001-00-6

Description/Comments: Least-worst case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following MCL protocols, considers many simple lead compounds to be Carcinogenic category 2

Additional Hazard Statement(s): Carc. 2; H351

Reason for additional Hazards Statement(s):

20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium

www.reach-lead.eu/substanceinformation.html. Review date 29/09/2015

■ **divanadium pentaoxide; vanadium pentoxide** (EC Number: 215-239-8, CAS Number: 1314-62-1)

GB MCL index number: 023-001-00-8

Description/Comments: Hazard statements H301, H330, H350 added by HazWasteOnline due to ATP 18 (Regulation (EU) 2022/692) considers vanadium pentoxide to be Carc. 1B; H350. The GB MCL Agency has reached the same opinion [but is yet to formerly make this change to the MCL List]. Substance has therefore been self-classified.

Additional Hazard Statement(s): Carc. 1B; H350 , Acute Tox. 3; H301 , Acute Tox. 2; H330

Reason for additional Hazards Statement(s):

20 Sep 2022 - Carc. 1B; H350 hazard statement sourced from: ATP 18 (Regulation (EU) 2022/692) considers vanadium pentoxide to be Carc. 1B; H350. The GB MCL Agency has reached the same opinion [but is yet to formerly make this change to the MCL List].

Substance has therefore been self-classified.

28 Sep 2022 - Acute Tox. 3; H301 hazard statement sourced from: ATP 18 (Regulation (EU) 2022/692) considers vanadium pentoxide to be "Acute tox 3; H301". The GB MCL Agency has reached the same opinion [but is yet to formerly make this change to the MCL List].

Substance has therefore been self-classified.

28 Sep 2022 - Acute Tox. 2; H330 hazard statement sourced from: ATP 18 (Regulation (EU) 2022/692) considers vanadium pentoxide to be "Acute tox 2; H330". The GB MCL Agency has reached the same opinion [but is yet to formerly make this change to the MCL List].

Substance has therefore been self-classified.

■ **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

■ **confirm TPH has NOT arisen from diesel or petrol**

Description/Comments: Chapter 3, section 4b requires a positive confirmation for benzo[a]pyrene to be used as a marker in evaluating Carc. 1B; H350 (HP 7) and Muta. 1B; H340 (HP 11)

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: None.

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

GB MCL index number: 601-023-00-4

Description/Comments:

Additional Hazard Statement(s): Carc. 2; H351

Reason for additional Hazards Statement(s):

20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

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

GB MCL index number: 006-007-00-5

Description/Comments: Conversion factor based on a worst case compound: sodium cyanide

Additional Hazard Statement(s): EUH032 >= 0.2 %

Reason for additional Hazards Statement(s):

20 Nov 2021 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

■ **pH** (CAS Number: PH)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

▪ **monohydric phenols** (CAS Number: P1186)

Description/Comments: Combined hazards statements from harmonised entries in CLP for phenol, cresols and xylenols (604-001-00-2, 604-004-00-9, 604-006-00-X)

Data source: CLP combined data

Data source date: 26 Mar 2019

Hazard Statements: Muta. 2; H341, Acute Tox. 3; H331, Acute Tox. 3; H311, Acute Tox. 3; H301, STOT RE 2; H373, Skin Corr. 1B; H314, Skin Corr. 1B; H314 >= 3 %, Skin Irrit. 2; H315 1 £ conc. < 3 %, Eye Irrit. 2; H319 1 £ conc. < 3 %, Aquatic Chronic 2; H411

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides.

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

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

copper {dicopper oxide; copper (I) oxide}

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

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight

nickel {nickel(II) oxide (nickel monoxide)}

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

lead {lead compounds with the exception of those specified elsewhere in this Annex}

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

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil.

vanadium {divanadium pentaoxide; vanadium pentoxide}

Most conservative species.

zinc {zinc oxide}

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

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight. Industrial sources include: production stainless steel, electroplating, wood preservation, anti-corrosion agents or coatings, pigments

boron {diboron trioxide; boric oxide}

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

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

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

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.2.GB - Oct 2021

HazWasteOnline Classification Engine Version: 2023.178.5649.10417 (27 Jun 2023)

HazWasteOnline Database: 2023.178.5649.10417 (27 Jun 2023)

This classification utilises the following guidance and legislation:

WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021

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

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

2nd ATP - Regulation 286/2011/EC of 10 March 2011

3rd ATP - Regulation 618/2012/EU of 10 July 2012

4th ATP - Regulation 487/2013/EU of 8 May 2013

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

5th ATP - Regulation 944/2013/EU of 2 October 2013

6th ATP - Regulation 605/2014/EU of 5 June 2014

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

Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014

7th ATP - Regulation 2015/1221/EU of 24 July 2015

8th ATP - Regulation (EU) 2016/918 of 19 May 2016

9th ATP - Regulation (EU) 2016/1179 of 19 July 2016

10th ATP - Regulation (EU) 2017/776 of 4 May 2017

HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017

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

14th ATP - Regulation (EU) 2020/217 of 4 October 2019

15th ATP - Regulation (EU) 2020/1182 of 19 May 2020

The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit)

Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020

The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK:

2020 No. 1540 of 16th December 2020

GB MCL List - version 1.1 of 09 June 2021

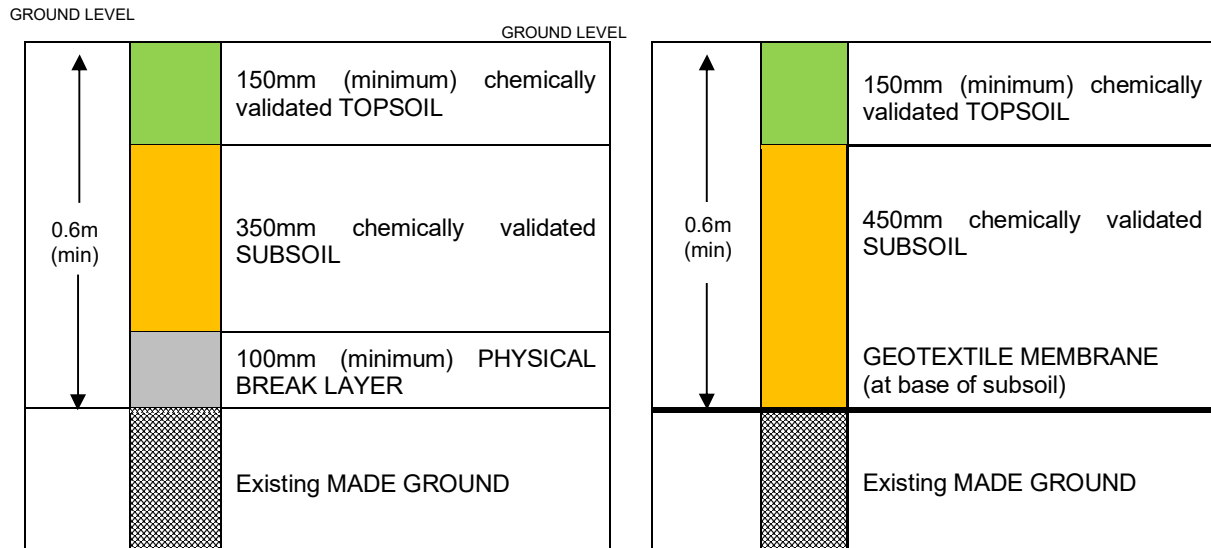
Appendix I

Typical Environmental Cover System

Private Gardens
Shared Landscaping

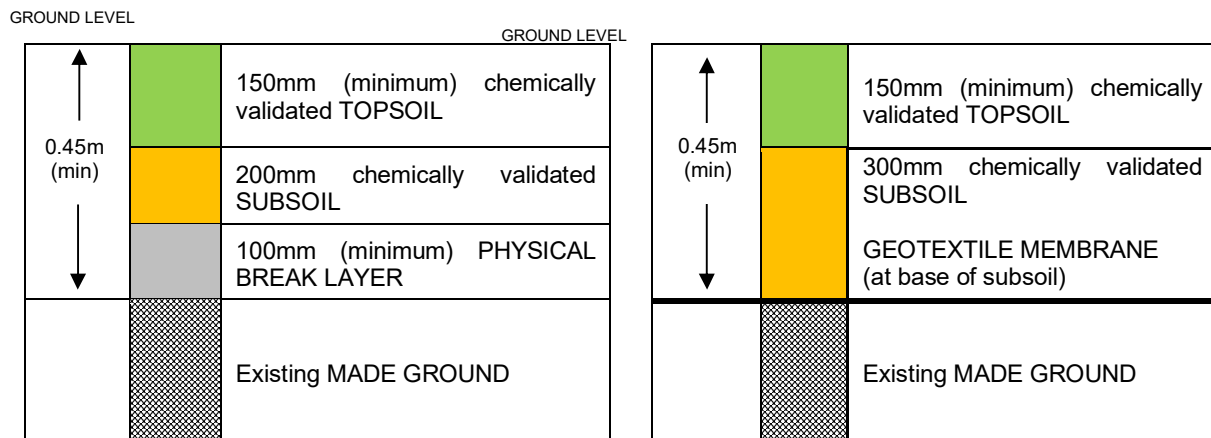
PRIVATE BACK GARDENS:

Either (physical break layer)
Or (geotextile membrane)



PRIVATE FRONT GARDENS / SHARED LANDSCAPING:

Either (physical break layer)
Or (geotextile membrane)



Hardstood Areas – No Remediation Required

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- » Asbestos
- » Invasive Species
- » Land Remediation
- » Project Management
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