

MIDDLETON OLD CEMETERY, MIDDLETON

PHASE 2 GROUND INVESTIGATION AND RISK ASSESSMENT WITH SLOPE STABILITY ASSESSMENT



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LK Consult			
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EXECUTIVE SUMMARY

Site Details

Site Location:	Section of the cemetery wall at the southern end of St Leonard's Street, Middleton (and south of the former entrance) and the section of cemetery immediately behind the wall to the east up to the central high point. Wall section centred at approximate National Grid Reference 387099E 406190N.
Site Area:	Approximately 1,000m ² .
Current Land Use:	Cemetery with associated footpaths.
Proposed Development:	New retaining wall.
Purpose of Report:	Contamination and Geotechnical Assessment.

Ground Investigation Work Undertaken

Date of Investigation:	14 th to 15 th March 2023
Intrusive Investigation Work Undertaken:	5no. window sample boreholes (WS101-WS105). 2no. hand excavated trial pits (HD101-HD102). 3no. hand excavated foundation pits (FP101-FP103).
Monitoring Wells:	Installed in WS102 to WS105.
Soil Sampling:	8no. samples tested for metals, speciated PAHs, pH, sulphate, asbestos and SOM, ammoniacal nitrogen, chloride, nitrate nitrite, phosphate. 2no. samples tested for metals, speciated PAHs, cyanide, pH, sulphate, asbestos, phenol, TPHCWG, BTEX, SOM and WAC.
Groundwater Sampling:	8no. leaching tests for metals / metalloids, pH, sulphate, speciated PAHs, ammoniacal nitrogen, chloride, nitrate nitrite, phosphate and hardness.
Monitoring:	1no. groundwater monitoring visit.
Insitu and Laboratory Geotechnical Testing:	SPTs, PSDs, plasticity, bulk density.

Ground Conditions and Slope Stability Assessment

General Ground Conditions	Slope Stability Risk Assessment	Recommendations
Made Ground and Topsoil to depths of 0.05 to 0.90mbgl. Medium dense SAND to approx. 4.00 to 5.00mbgl. Dense SAND to approx. >5.45 to >9.37mbgl No groundwater encountered on site.	The slope is marginally safe in short and long terms. The wall and the soil wedge immediately behind the wall will fail. Slope risk assessment was undertaken along one profile, considered representative of the slope.	Replace the existing wall with a new one, designed by a structural engineer. Backfilling with granular soils, suitably compacted with a drainage system. Trees above and within the wall may need to be removed, under specialist advise and after consulting the Tree Preservation Order Council list.

Contamination Risk Assessment

No elevated contaminants have been identified with regards to human health or controlled waters.

No further assessment or remediation is recommended with respect to the contamination risk to current/future receptors. However, if unexpected ground conditions are encountered during earthworks, further consultation is recommended. Standard health and safety precautions (as per HSE guidance) should be adopted by all workers involved with site enabling and construction works.

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FIGURES

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Figure 2:	Site Investigation Location Plan
Figure 3:	Slope Profile Location Plan

APPENDICES

Appendix A:	Profile Logs
Appendix B:	Certificate of Analysis – Soil / Leaching Test
Appendix C:	Certificate of Analysis – Geotechnical
Appendix D:	Slope Stability Modelling Report Sheets
Appendix E:	EN1997 (EC7) Partial Factors
Appendix F:	Generic Assessment Criteria Values
Appendix G:	Waste Classification Report

1 Introduction

1.1 Background

LK Consult Ltd (LKC) has been commissioned by Rochdale Borough Council to carry out a Phase 2 Geo-Environmental Investigation and Risk Assessment at Middleton Old Cemetery. The study area comprises the western part of the cemetery and specifically the boundary wall (and possible retained earth behind), south of the former cemetery entrance off St Leonard's Street. It is proposed to replace this section of the cemetery wall.

This investigation has been undertaken to confirm the ground conditions at the study site area and to allow a contamination and slope stability assessment to be undertaken.

The stability risk assessment is to be carried with recourse to UK guidance¹ in order to assist the structural engineer in their retaining wall design.

1.2 Site Details

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

Site Location	Section of the cemetery wall at the southern end of St Leonard's Street, Middleton (and south of the former entrance) and the section of cemetery immediately behind the wall to the east up to the central high point. Wall section centred at approximate National Grid Reference 387099E 406190N.
Approximate Study Site Area	Approximately 1,000m ² .
Topography	92-107 metres Above Ordnance Datum (AOD). Study site slopes down to the west.
Current Site Use	Cemetery with associated footpaths and graves.
Purpose of Report	Contamination and Geotechnical Assessment.
Proposed Development	Replacement cemetery wall.

Table 1-1: Summary of site details.

¹ <https://www.gov.uk/guidance/land-stability>

2 Environmental Setting

2.1 Topography and Geology

A summary of the environmental setting is presented in Table 2-1 based on a review of available environmental information.

Description of Ground Investigation Area	Grave yard over the majority of the site boundary comprising primarily grass with headstones present and unpaved footpaths. Occasional steps down from the central east of the site to the central west of the site to the retaining wall. To the west of the current retaining wall is St Leonards Road below. The retaining wall is noted to be brick built with a slight buttress shape and in poor state of repair. An old entrance to the cemetery appears to have been bricked up at some point in the past. The retaining wall is approximately 2m in height.
Topography	The site slopes down to the west with the graveyard sloping from 106m AOD down to 94m AOD. The road to the west of the retaining wall was recorded to be 92m AOD.
Superficial Deposits^{1,2}	Onsite: Hummocky (moundy) Glacial Deposits (Diamicton). Adjacent to the site: Glaciofluvial Sheet Deposits (Sand and gravel).
Bedrock^{1,2}	Pennine Lower Coal Measures (mudstone, siltstone and sandstone).
BGS Logs (<50m)²	None.
Coal Mining³	Within Coal Reporting Area, not within Development High Risk Area.

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

Data Sources:

1 BGS Sheet 85 1:50,000

2 BGS GeoIndex <http://mapapps2.bgs.ac.uk/geoindex/home.html>

3 The Coal Authority Web Mapping Services (WMS) /

Interactive Map Viewer <http://coal.decc.gov.uk/en/coal/cms/publications/data/map/map.aspx>

2.2 Site Reconnaissance

A site reconnaissance was undertaken by LKC in September 2022 and March 2023. These were undertaken to confirm site conditions, obtain visual geotechnical information, record surface conditions photographically, access and general land use with a view to mobilising ground investigation as well as for a general site reconnaissance of the area.

The cemetery site is located on an area of elevated ground to the northeast of Middleton Town Centre. The central highest part of the cemetery is fairly level and framed by a footpath laid out in a square. Outside of this footpath, site levels drop steeply to the west, south and east. St Leonard's Church to the north is at a similar level.

Gravestones are present within the cemetery boundary and within the study site area. The former footpath and steps can be traced from the former, now bricked up cemetery entrance.

At the toe of the slope within the study site area is a masonry retaining wall with height of approximately 2.00m from the car park ground level to the west. At the rear of the wall ground levels are just below the top of the wall.

It is understood that the wall has been patched over the years by council apprentice bricklayers.

The northern extent of the study area includes the brick columns of the former entrance, now sealed off with brick. The wall to the south comprises brick and is chamfered back near the base. A “return” is noted in the path of the wall and just south of the study area the wall is constructed with more modern, lighter coloured brick.

The retaining wall was covered by vegetation from young and mature trees and low level scrub. The trees appear to be straight, with some very young ones noted to be slightly leaning on the slope.

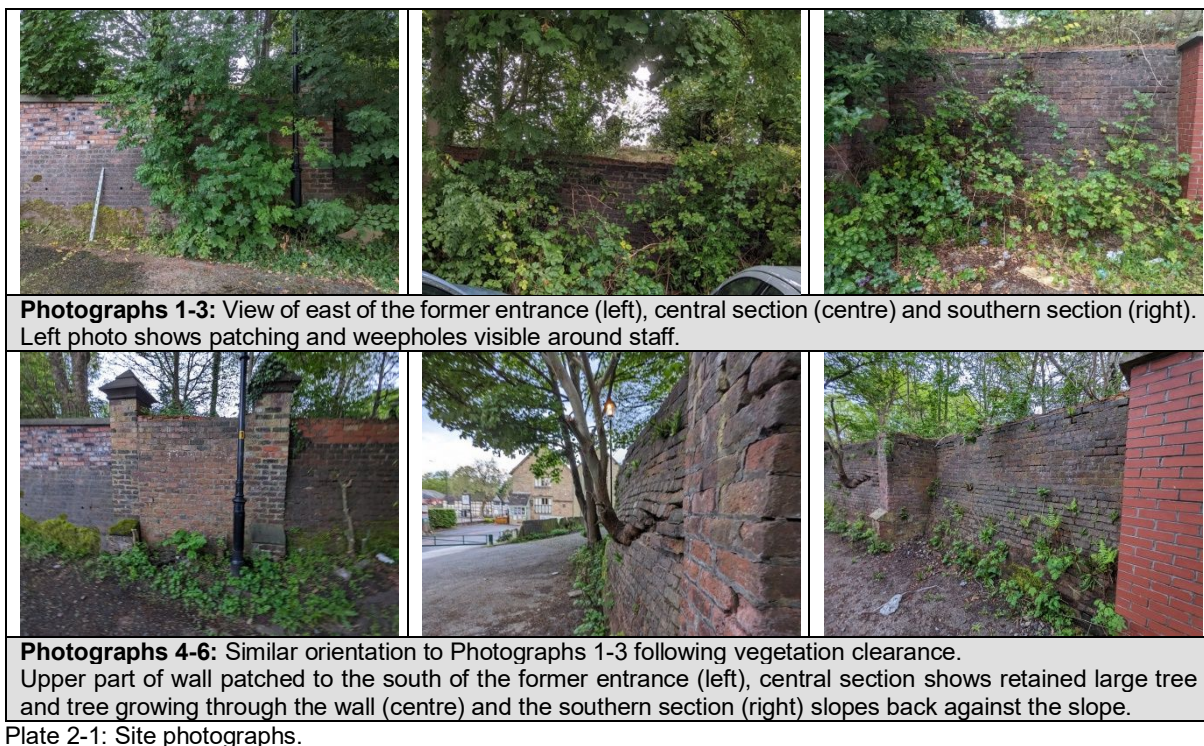
Some trees have grown at base of the wall location, and through the wall.

The upper part of the wall has mortar missing and a substantial crack is noted on one of the columns. At the top corners of the wall columns, the retaining structure is unstable.

Coping stones are missing from the wall and the upper courses appear to be of a more recent type of brick and are highly weathered.

Weepholes are present in the wall to the north of the former entrance.

Relevant photographs are provided in Plate 2-1.



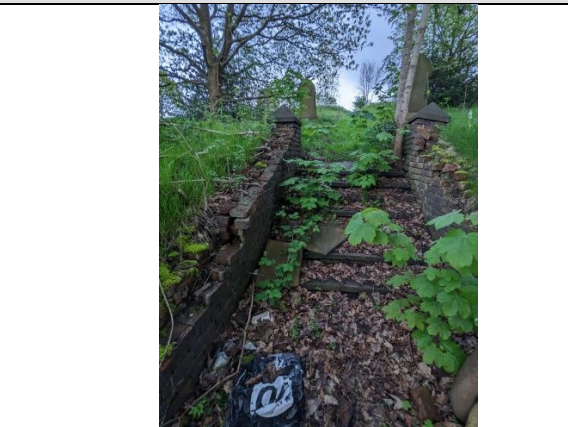


Photographs 7 & 8: View south behind the wall before and after vegetation clearance. Ground profile and slope is visible.



Photograph 9: Uphilling behind the former entrance.

Photograph 10: View west towards the former entrance.



Photograph 11: View east of steps from former cemetery entrance. Gravestones visible.

Photograph 12: View north across the study area. Slope visible and profile cut by footpath.

Plate 2-1 (continued): Site photographs.

	
Photograph 13: Upper area of cemetery.	Photograph 14: Missing bricks within the wall (see Photograph 5).
	
Photograph 15: Missing mortar and cracking.	Photograph 16: Missing mortar.
	
Photograph 17: Weathered upper course of more recent brick – central section.	Photograph 18: View southeast of study area. Shows patching in central area, retained large tree and southern section (right of photo) sloping back.

Plate 2-1 (continued): Site photographs.

3 Ground Investigation

3.1 Site Investigation Design and Methodology

In order to assess the ground conditions at the site an intrusive investigation was undertaken.

The investigation was carried out on 14th to 15th March 2023 and comprised the following:

- 4no. window sample boreholes drilled to 5.45-9.37 metres below ground level (mbgl) (ref. WS101 to WS104).
- 1no. modular window sample borehole drilled to 5.45mbgl (ref. WS105)
- 2no. hand dug pits (using hand auger / spade) excavated to 1.55-1.80mbgl (ref. HD101 to HD102).
- 3no. hand dug foundation pits to 0.50-1.40mbgl (ref. FP101 to FP103).

All profile logs are provided in Appendix A and are in line with BS14688-1² and BS5930³. All site investigation locations are shown in Figure 2.

The works were carried out with recourse to a Ministry of Justice permit and with an archaeologist in attendance in the event that human remains were encountered and would need to be reinterred.

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

Site Investigation Locations	Rationale
FP101-FP103	Hand dug foundation pits at the base of the current cemetery wall to determine existing foundations.
HD101-HD102	Hand dug pits excavated to characterise the material situated behind the cemetery wall and to aid in contamination assessment for potential offsite disposal.
WS101-WS105	Window sample boreholes undertaken in the car park in front of the wall (WS104) and at various locations up the slope to gather ground condition information to feed into the slope stability model.

Table 3-1: Summary of sampling locations.

3.2 Well Installations

In total, 4no. (WS102-WS105) boreholes were installed with monitoring wells for groundwater monitoring and sampling. Monitoring wells were installed in accordance with BS10175⁴ and generally comprised approximately 0.50-1.00m plain pipe over a length of slotted pipe surrounded by pea gravel and sealed at the top with bentonite and concrete.

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

² British Standards (2002) Geotechnical investigation and testing – Identification and Classification of Soil. Part 1: Identification and description. BS EN ISO 14688-1:2002.

³ British Standard (2015). "Code of Practice for Ground Investigations". BS5930:2015.

⁴ British Standard (2017). "Investigation of Potentially Contaminated Sites – Code of Practice." BS10175:2017.

3.3 Sampling Protocol

3.3.1 Soil Sampling (Contamination)

Standard sampling protocol and preservation of samples was undertaken as described in the EA guidance on site investigation⁶.

Soil was collected for onsite testing. A plastic zip bag was half filled with soil allowing a suitably sized headspace. The bag was sealed and stored for at least 20 minutes before being tested for total volatile organic compounds (TVOCs) using a PhoCheck Tiger photoionisation detector (PID). Results of the PID readings are presented on the profile logs (Appendix A). The on-site monitoring was carried out in line CIRIA C665⁷ to aid in screening samples for volatile analysis.

Soil samples of approximately 500g were recovered in amber jars, amber vials for volatile analysis and plastic tubs. All the samples were labelled and stored in cool boxes prior to being collected by courier at the end of the day for delivery to the Chemtest laboratory in Newmarket for chemical testing. If collection was not possible the same day then samples were stored in the sample storage fridge at the LK Group 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 B. Table 3-2 shows the soil testing undertaken.

Suites & Contaminants	No. Samples	Location & Depth	Justification
Metals / metalloids, pH, water soluble sulphate, speciated PAHs, SOM, asbestos screen, ammoniacal nitrogen, chloride, nitrate, nitrite, phosphate.	8	WS101 0.10-0.80m WS103 0.00-0.70m WS103 0.80-1.20m WS105 0.00-0.15m WS105 0.15-1.00m WS105 1.20-2.00m HD101 0.00-0.30m HD101 0.50-1.00m	A basic suite with a broad selection of contaminants that may be present in burial grounds ⁸ . tested on samples across the site where no significant evidence of contamination was identified.
Metals / metalloids, pH, water soluble sulphate, cyanide suite, phenol, TPHCWG, BTEX, MTBE, speciated PAHs, SOM, asbestos screen and 2-stage Waste Acceptance Criteria (WAC).	2	FP101 0.00-0.50m HD102 0.00-0.30m	Although no visual/olfactory evidence of contamination was identified detailed suite undertaken to confirm the absence of contamination and to aid any potential waste disposal offsite.

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.

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

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

⁸ Environment Agency (2004). "Potential Groundwater Pollutants from Cemeteries".

3.3.2 Water Sampling / Leaching Testing

No groundwater was encountered in the boreholes therefore leaching tests were undertaken as an alternative. It should be noted that the leaching test is an aggressive test and may not give results that are truly representative of the groundwater on site.

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

Suites & Contaminants	No. Samples	Location	Justification
Metals / metalloids, pH, sulphate, speciated PAHs, ammoniacal nitrogen, chloride, nitrate nitrite, phosphate and hardness.	8	WS101 0.10-0.80m WS103 0.00-0.70m WS103 0.80-1.20m WS105 0.00-0.15m WS105 0.15-1.00m WS105 1.20-2.00m HD101 0.00-0.30m HD101 0.50-1.00m	No significant contamination risk identified from the investigation and the soil results therefore basic suite with a broad selection of contaminants that may be present in burial grounds ⁹ considered appropriate.

Table 3-3: Summary of leaching sampling tests undertaken.

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

3.4 Geotechnical Testing

3.4.1 In-situ Onsite Geotechnical Testing

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

- Standard Penetration Tests (SPTs) were performed in the window sample boreholes at approximately 1m intervals, generally within the natural strata.

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

3.4.2 Laboratory Geotechnical Testing

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

Many of the tests are UKAS accredited and further details are given in the laboratory report presented in Appendix C. Table 3-4 shows the geotechnical testing undertaken.

Suites & Contaminants	No. Samples	Location	Justification
Particle Size Distribution (PSD)	4	WS102 1.20-2.00m WS104 1.50-2.00m WS105 1.20-2.00m WS105 3.00-4.00m HD102 1.00-1.50m	PSD undertaken to confirm grading of granular material.
Determination of Density (one point compaction 2.5kg rammer test)	2	WS104 1.50-2.00m HD102 1.00-1.50m	Compaction tests undertaken to given bulk density of the granular material.

Table 3-4: Summary of geotechnical testing undertaken.

⁹ Environment Agency (2004). "Potential Groundwater Pollutants from Cemeteries".

4 Ground Conditions

4.1 Geology – Generalised Sequence

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

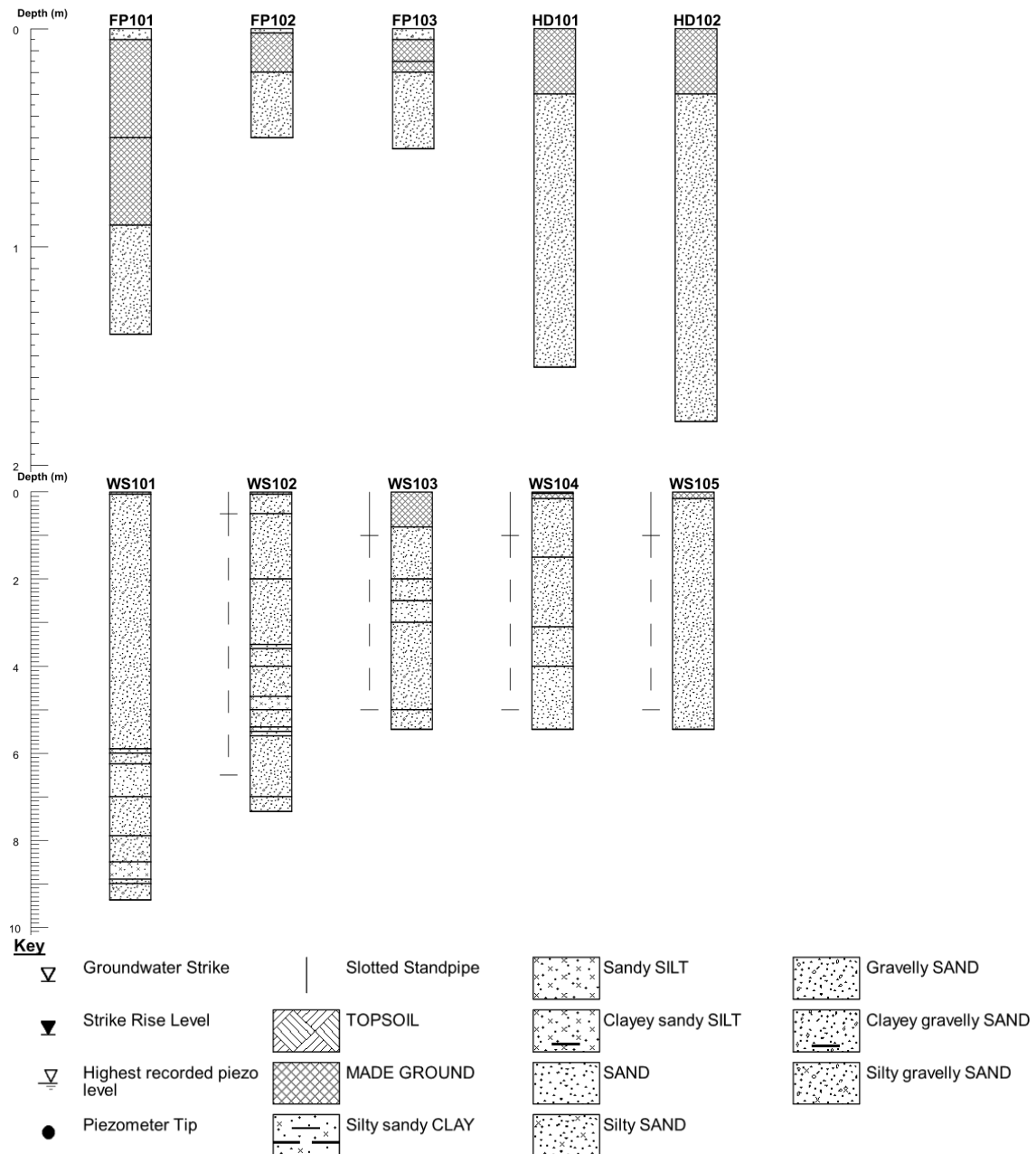


Plate 4-1: Summary of ground conditions.

Additional information on ground conditions:

Topsoil

Topsoil comprising of slightly gravelly silty SAND with frequent roots was recorded in WS101 and WS102 to depths of 0.05mbgl.

Made Ground

Made Ground was recorded in FP101-FP103, HD101-HD102, and WS103-WS105 to depths of 0.15-0.90mbgl. The Made Ground comprised gravelly silty SAND with anthropogenic material including brick, pottery. Ash clinker, glass, metal and plastic was also recorded in FP101 only. Tarmacadam was recorded at the surface in FP101-FP103 and WS104.

Natural Strata

Natural strata comprised horizons gravelly silty SAND with varying amounts of silt and gravel noted to be loose to medium dense, becoming dense with depth.

Contamination

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

Foundation Pits

3no. hand dug foundation pits were excavated at the base of the wall. Foundation cross sections are provided within the Logs in Appendix A.

FP101 was undertaken at a corner of the wall and a column/pillar and the following was observed: on the wall side, the brick wall extended below ground level and was sat on a sandstone block to a depth of 0.62mbgl. The sandstone block was noted to extend forward by 0.02m with a thickness of 0.18m. Natural gravelly sand was noted below. The column/pillar was found to extend below ground level to 0.40mbgl and was sat on a sandstone block. This sandstone stepped out 3 times by 0.05m, 0.10m and 0.16m at depths of 0.40mbgl, 0.48mbgl and 0.50mbgl respectively, to a maximum depth of 0.90mbgl.

FP102 was excavated at the base of the wall, near to the existing tree. The brick wall did not extend below ground level and was noted to be sat on a sandstone block. This sandstone block extended down from ground level to 0.20mbgl and was flush with the face of the wall.

FP103 was undertaken at the column adjacent to the bricked up former cemetery entrance. The brick wall was noted to extend 0.40mbgl and was sat on a sandstone block. The sandstone extended forward by 0.20m and was 0.15m thick.

4.2 Groundwater

4.2.1 Groundwater Levels

No groundwater was present in any of the sample locations during the intrusive investigation or during the groundwater monitoring visit.

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 4-1 and provided within the profile logs in Appendix A.

Approximate Depth (mbgl)	SPT 'N' Values				
	WS101	WS102	WS103	WS104	WS105
1-2	11 (S)	13 (S)	19 (S)	12 (S)	8 (S)
2-3	23 (S)	15 (S)	20 (S)	13 (S)	13 (S)
3-4	16 (S)	25 (S)	32 (S)	14 (S)	17 (S)
4-5	28 (S)	37 (S)	22 (S)	27 (S)	20 (S)
5-6	42 (S)	50 (S)	30 (S)	41 (S)	25 (S)
6-7	50 (Si/S)	50/190mm (S)	-	-	-
7-8	39 (S)	-	-	-	-
8-9	29 (S)	-	-	-	-
9-10	50/220mm (S)	-	-	-	-
GW Level	Dry	Dry	Dry	Dry	Dry

Table 4-1: Summary of SPT (N) values.

Notes:

S=Sand; Si=Silt.

Groundwater level based on strikes during investigation and monitoring data.

4.4 Geotechnical Laboratory Testing

4.4.1 Particle Size Distribution

Particle size distribution (PSDs) test was carried out on granular soils to confirm the description. Full results are presented in Appendix C and summarised below in Table 4-2.

Location	Depth (mbgl)	Material	Percent passing through sieve (%)		
			63mm	2mm	0.063mm
WS102	1.20-2.00	Slightly gravelly clayey / silty SAND.	100	94	19
WS104	1.50-2.00	Slightly gravelly clayey / silty SAND.	100	96	8
WS105	1.20-2.00	Slightly clayey / silty gravelly SAND.	100	68	4
WS105	3.00-4.00	Sandy clayey / silty GRAVEL.	100	39	7

Table 4-2: Summary of particle size distribution results.

Notes:

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

4.4.2 Bulk and Dry Density

Table 4-3 shows the bulk and dry density values determined by the laboratory from sample at WS102 borehole location within the cohesive soils.

Location	Depth (mbgl)	Moisture Content (%)	Bulk Density (mg/m ³)	Dry Density (mg/m ³)
WS104	1.50-2.00	3.4	1.73	1.67
HD102	1.00-1.50	8.3	2.00	1.84

Table 4-3: Summary of bulk density testing.

5 Stability Modelling and Results

5.1 Methodology

A slope stability risk assessment has been undertaken for the slope located within the Old Cemetery located to the south of St Leonard Road, in Middleton. The aim of the slope stability assessment is to evaluate the stability of the slope with regard to the proposed structure to be constructed present at the slope toe.

The slope is on the northern side of the graveyard mound with a brick retaining wall at the toe. A section of this masonry retaining wall showed displacement, in particular along the southern section. Rochdale Council own the Old Cemetery. At this stage it is unknown if the Council may repair the damaged section of the retaining wall or replace the same wall with a completely new one.

Modelling of the site's existing condition and with the proposed modifications have been undertaken using the software Limitstate:GEO, a general purpose software program which is designed to analyse the ultimate limit state (ULS) for a range of geotechnical scenarios. The software determines the ULS using a computational limit analysis technique called Discontinuity Layout Optimization to find critical failure mechanism.

5.2 Ground Model and Geometry

The slope geometry was based on topographic survey, provided by the client (ref. SSL:20365:100:1:1, dated December 2020). The ground model and geology were based on borehole logs generated during the site investigation works and data obtained during the site visits.

The alignment of the slope profile for the slope stability assessment is shown in Figure 3. The slope profile was considered along the section of the retaining wall, which was considered mostly damaged and representative of the site.

Available geotechnical information including borehole logs, geological maps, findings of site reconnaissance and findings of the laboratory testing results were used for the slope stability modelling.

No surcharge loading on the slope or retaining structure has been used in the slope stability risk assessment.

5.3 Parameters Used in Stability Calculations

The design parameters of the individual soil units used in the ground model are presented in Table 5-1. Ground conditions are presented in Section 4. The Topsoil layer was not taken into account in this slope risk assessment due to its small thickness in the order of 0.05mbgl.

For this slope stability risk assessment, Made Ground and the natural strata of granular soils were considered in drained conditions.

Soil Unit	Dry Unit Weight (kN/m ³)	Saturated Unit Weight (kN/m ³)	Drained Shear Strength Values	
			Φ' (°)	c' (kN/m ²)
Made Ground – Granular Soils	17.0 [^]	19.0 [^]	25 [^]	0 [^]
Superficial Deposits – Medium dense SAND.	18.0 ⁺	19.6 ⁺	29 ^{&}	0 [^]
Superficial Deposits – Dense SAND.	18.0 [^]	21.0 [^]	36 ^{&}	0 [^]

Table 5-1: Parameters Used in Stability Modelling

Note: [^]=Assumed in all models, based on LKC experience; ⁺= Derived from laboratory testing; [&]=Derived from in-situ testing.

Geotechnical parameters for design have been derived from the in-situ and laboratory testing results. Where no data were available, the parameters were assumed based on the LKC experience on similar types of soils. Table 5-2 lists the derivation of the design parameters for the Made Ground and natural strata.

Parameter	Symbol	Units	Coarse Soils
Bulk unit weight	γ_b	kN/m ³	Laboratory Testing or if not available taken from Figures 1 and 2 in BS 8004:2015 ¹⁰ .
Effective angle of shearing resistance	Φ'	°	Based on SPT N values (Peck et al, 1974) ¹¹ or if not available it is assumed.
Effective cohesion	c'	kPa	Assumed to be zero.

Table 5-2: Derivation of Geotechnical Parameters used in the Stability Modelling.

Unit Weight

Any assumed values to represent dry and saturated unit weight for the encountered soils of the Made Ground have been based on the conservative characteristic unit weight density values presented in British Standard BS 8004:2015 for the soils, where laboratory testing was not available.

Laboratory testing of bulk and dry density was undertaken on samples of the granular soils of the natural strata. The derived unit weight values are presented in Table 5-1.

Drained Angle of Shearing Resistance

No SPT testing was undertaken within the granular soils of the Made Ground. The angle of shearing resistance is assumed as characteristic of a very loose sand. The resulting angle of shearing resistance is 25°.

The SPT 'N' value (uncorrected) was recorded as values ranging between N11 and N32 for the medium dense SAND of the natural strata. Based on the relationship between SPT 'N' values and angle of shearing resistance (after Peck et al, 1974) the SPT 'N' values correlates to angles of shearing resistance between of 29° and 35°. A characteristic value of 29° has been used for this slope stability for the worst case scenario.

For the dense SAND of the natural strata, the SPT 'N' value (uncorrected) was recorded as values ranging between N37 and N50. The SPT derived angle of shearing resistance ranged between 36° and 39°. A characteristic value of 36° has been used for this slope stability for the worst case scenario.

¹⁰ British Standard (2015). Code of practice for foundations. BS EN 8004:2015.

¹¹ Peck R.E., Hanson W.E., Thornburn T.H. (1974). Foundation Engineering. Second Edition. John Wiley & Sons.

Cohesion

The effective cohesion value was assumed zero in the granular soils of the Made Ground and natural strata.

Parameters for the Backfilling

The parameters in Table 5-3 are used for the brick retaining wall in the slope stability risk assessment.

Structure	γ (Kn/m ³)	ϕ' (°)	c' (kPa)	c_u (kPa)	Comments
Masonry retaining wall	15	0	0	250	Assumed

Table 5-3: Retaining wall Parameters.

For this slope stability risk assessment, the parameters for the retaining wall has been assumed.

The dimensions and the depth of the retaining wall foundation at the column location on the southern stretch of the retaining wall is presented in the logs FP101 and FP102 in Appendix A.

5.4 Piezometric Conditions

5.4.1 Existing Piezometric Profile

Groundwater levels are interpreted from site investigation water strikes and inflows, and borehole/trial pit logs. During the site investigation, groundwater was not encountered.

5.5 Factors of Safety

The partial factors used are according to EC7 1997¹² (EC7) using Design Approach DA1 using Combinations 1 and 2 (reduction of actions and strength parameters): in Combination 1, factors are applied to actions or loads, while in Combination 2 the factors are applied to the soil strength or resistances. In slope stability assessment, the Combination 2 is the most conservative approach compared to Combination 1. Based on the EC7, the most important risk of failure on slope is that primarily controlled by the strength of the soils, indicated by the geotechnical parameters and presence of groundwater, if any present. The list of the Partial Factors used for this slope stability risk assessment is presented in Appendix E.

In addition, in parallel with EC7 utilisation outputs, limit state factors of safety have been calculated based on total restoring forces divided by the destabilising forces. The cut-off for unacceptability of slope stability as a factor of safety of 1.0. The software LimitState:GEO define the factor of safety as the Adequacy factor (A_f). An A_f above 1.0 is considered acceptable and the slope would be considered marginally safe (A_f around 1.0) to safe (A_f largely above 1.0) for the slope stability assessment.

The short and long term stress analysis were undertaken for the slope profile. The behaviour of the soils present at the site was modelled as drained in short term and long term.

¹² Eurocode 7: Geotechnical design - Part 1: General rules. EN 1997-1:2004.

5.6 Findings of Slope Stability Modelling

The summary of modelling results are presented in Appendix D. Only the worst case scenario is taking into consideration when reporting on the stability and instability of the slope. Recommendation on stabilisation or additional preventive measures on the slope are listed in Section 8.

For the current slope, the determined A_f is 1.08, which indicates that the slope is marginally safe in the short and long terms.

It is considered that the slope is safe if the wall strength is improved by replacing with a new retaining structure designed by a structural engineer and by using a backfilling suitably compacted behind the retaining wall.

This slope stability risk assessment has been undertaken only for a section of the slope located immediately south of the former masonry gate. It is considered that this risk assessment is representative of the whole slope along the retaining wall at the Old Cemetery.

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 (LCRM¹³).

6.2 Soil Risk Assessment

6.2.1 Methodology

With regards to the soil risk assessment LKC will use the following hierarchy:

- Category 4 Screening Levels (C4SLs).
- LQM Suitable 4 Use Levels (S4ULs).
- ATRISK Soil Screening Values (SSVs) and CL:AIRE Generic Assessment Criteria (GACs).

C4SLs were published in 2013^{14,15}. The change to the contaminated land guidance has changed the evaluation of risk from 'minimal' (referred to as Health Criteria values (HCVs))¹⁶ used to generate Soil Guideline Values (SGVs) to 'low' (referred to as Lowest Level of Toxicological Concern (LLTCs)). The policy companion document and supporting letter by Defra, dated 3rd September 2014, states that C4SLs *'could be used under the planning regime, as well as within Part 2A'*. Based on these comments LKC considers the justifications and assumptions used to generate 'low' risk are suitable for the planning regime.

Where no C4SLs have been generated LKC will use the LQM S4ULs¹⁷. Similar assumptions and land uses to C4SLs have been used. However, toxicological information has been based on 'minimal risk' as per previous guidelines and assumptions^{18,19,20,21}.

If contaminants are not present as C4SLs and S4ULs then LKC will use ATRISK SSVs or CL:AIRE GACs²². These follow the 'minimal' risk principle and more stringent exposure parameters and will be conservative.

As the site is currently a graveyard, as a non-standard land use, the assessment criteria for POS(park) has been used (see Appendix F).

¹³ Land Contamination Risk Management (LCRM) <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

¹⁴ Defra (2014). "SP1010: Development of Category 4 Screening Levels and Assessment of Land Affected by Contamination – Policy Companion Document."

¹⁵ CL:AIRE (2013). "SP1010: Development of Category 4 Screening Levels and Assessment of Land Affected by Contamination – Final project Report."

¹⁶ EA (2008). "Human Health Toxicological Assessment of Contaminants in Soils." Science Report – SC050021/SR2.

¹⁷ LQM (2014). "The LQM/CIEH S4ULs for Human Health Risk Assessment."

¹⁸ EA (2008). "Updated Technical Background to the CLEA Model." Science Report – SC050021/SR3.

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

²⁰ EA (2008). "A Review of Body Weight and Height Data used within the Contaminated Land Exposure Assessment Model (CLEA)." Project SC050021/Technical Review 1.

²¹ EA (2009). "Compilation of Data for Priority Organic Pollutants for Derivation of Soil Guideline Values." Science report SC050021/SR7.

²² CL:AIRE (2009). "The Soil Generic Assessment Criteria for Human Health Risk Assessment."

All criteria have been generated using the CLEA V1.06 model²³ based either on 1%, 2.5% and 6% Soil Organic matter (SOM). Results will be compared to the nearest appropriate SOM.

6.2.2 Soil Results Comparison against Assessment Criteria

Results have been compared to the relevant assessment criteria and no elevated contaminants were identified with respect to human health. No ACM was recorded within the made ground.

If unexpected contamination is identified during groundworks, further assessment may be required.

Standard health and safety precautions (as per HSE guidance²⁴) should be adopted by all workers involved with site enabling and construction works.

6.3 Controlled Water Assessment

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

- River Basin District Standards²⁵ and updated Water Framework Directive²⁶ for Annual Average / Maximum Allowable Concentration Environmental Quality Standards (AA-MAC-EQS) for priority substances (surface water risk).
- 2016 private water supply standards (UKDWS potable)²⁷.
- 2001 Environment Agency Values for Environmental Quality Standards (EQS) and UK Drinking Water Standard (UKDWS)²⁸.

It should be noted that the leaching test is aggressive (de-ionised water) and is not in aqueous equilibrium (steady state) with the solid sample. This may cause rapid dissolution and overestimation of the aqueous phase concentrations compared to groundwater in contact with contaminated soils. Although dissolution may be reduced for highly hydrophobic contaminants²⁹, such as B(a)P it is likely that the initial leaching will remove the most readily available hydrocarbons and subsequent flushing would reduce the leachable concentrations³⁰. Traditionally the leaching test was developed for inorganic constituents and the leaching of organics is poorly understood³¹.

No elevated contaminants when compared to the assessment criteria were identified in any leachate sample, and therefore, the site is not considered to pose a significant risk to controlled waters.

²³ EA (2008). "CLEA Software (Version 1.05) Handbook." Science Report – SC050021/SR4.

²⁴ HSE (1991). "Protection of Workers and the General Public During Development of Contaminated Land" London HMSO.

²⁵ Defra (2010). "The River Basin Districts Typology, Standards and Groundwater Threshold Values". Water Framework Directive (England and Wales) Directions 2010.

²⁶ Defra (2015). "Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015".

²⁷ Statutory Instruments (2016). "The Private Water Supplies Regulation 2016." No. 614

²⁸ EA (2002). "Environment Agency technical advice to third parties on Pollution of Controlled Waters for Part IIA of the Environment Protection Act 1990."

²⁹ EA (1999). "Methodology for the Derivation of Remedial Targets for the Soil and Groundwater to Protect Water Resources." R&D Technical Report, P20

³⁰ EA (2006). "Remedial targets Methodology: Hydrological Risk Assessment for Land Contamination."

³¹ EA (2009). "Petroleum Hydrocarbons in Groundwater: Supplementary Guidance for Hydrological Risk Assessment."

7 Waste Disposal Assessment

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

As an initial screen the soil results were inputted into HazWaste Online™. This is a web-based facility that allows an assessment waste as either hazardous or non-hazardous waste based on relevant guidance and legislation^{32, 33, 34, 35, 36, 37, 38, 39, 40}.

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 G.

7.1 Waste Acceptance Criteria (WAC) Testing

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

The WAC limits cannot be used to make an assessment of whether a waste is non-hazardous or hazardous. It is recommended that waste assessment and WAC data is forwarded to a licensed waste disposal operator.

³² EA (2018). "Guidance on the Classification and Assessment of Waste (1st Edition v1.1)". Technical Guidance WM3.

³³ CLP Regulation - Regulation 1272/2008/EC of 16 December 2008.

³⁴ 1st ATP - Regulation 790/2009/EC of 10 August 2009

³⁵ Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013

³⁶ WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014

³⁷ Revised List of Wastes 2014 - Decision 2014/955/EU of 18 December 2014

³⁸ 13th ATP - Regulation (EU) 2018/1480 of 4 October 2018

³⁹ POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004

⁴⁰ 2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010

8 Conclusions

8.1 Ground Conditions

The ground conditions were found to be:

- The ground profile comprises Made Ground at the toe (to the east) of the retaining wall and, where present, on two other locations on the slopes;
- Natural strata comprise granular soils of medium dense SAND becoming dense with depth;
- No groundwater was encountered at any of the trial pits or boreholes.

8.2 Slope and Site Stability

The study area includes a section of cemetery wall which is damaged, as recorded during the site observations. Bricks as well as mortar are missing along the wall and evidence of bulging and cracking is noted. The risk assessment was based on the findings of the intrusive investigation, site reconnaissance, results from the geotechnical laboratory testing and conservative assumptions where required.

From the slope stability risk assessment, the conclusions are:

- The slope stability assessment indicates that the slope in its current state is metastable in the short and long terms;
- The slope stability risk assessment indicates that the soils wedge behind the wall and the retaining wall will fail;
- Mature trees are growing within the retaining wall and pushing the wall outward;

During the development of the site, the following mitigation measures should be considered:

- Excavation for the development of the site should not remove the toe of the slope without appropriately designed and implemented mitigation measures in place, in particular during temporary works;
- The existing vegetation and trees generally provide support to the slope; however, the mature hanging trees above the wall and within the wall are of concern and they should be removed following a specialist advise should be sought with regard their health and stability. It is not known is any of these trees have a preservation order.
- It is recommended to stabilise the slope with the design and build of a new retaining structure. The new wall should have a suitable granular backfilling with drainage system.
- If any spring is encountered during construction works, they should not be removed or obstructed. Water from any existing springs will need to be canalised and discharged at approved locations.

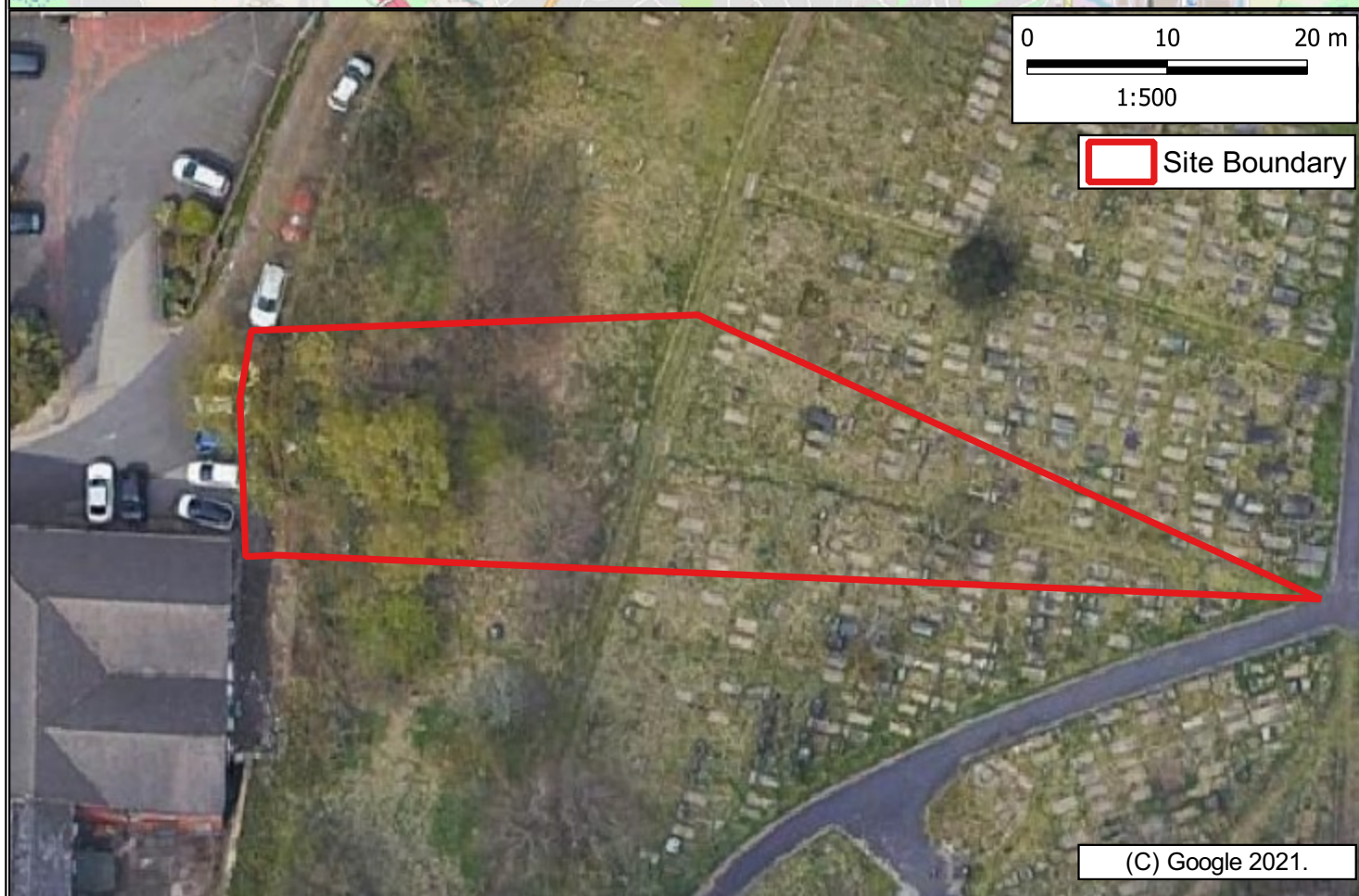
8.3 Contamination Assessment

No elevated contaminants have been identified with regards to human health or controlled waters.

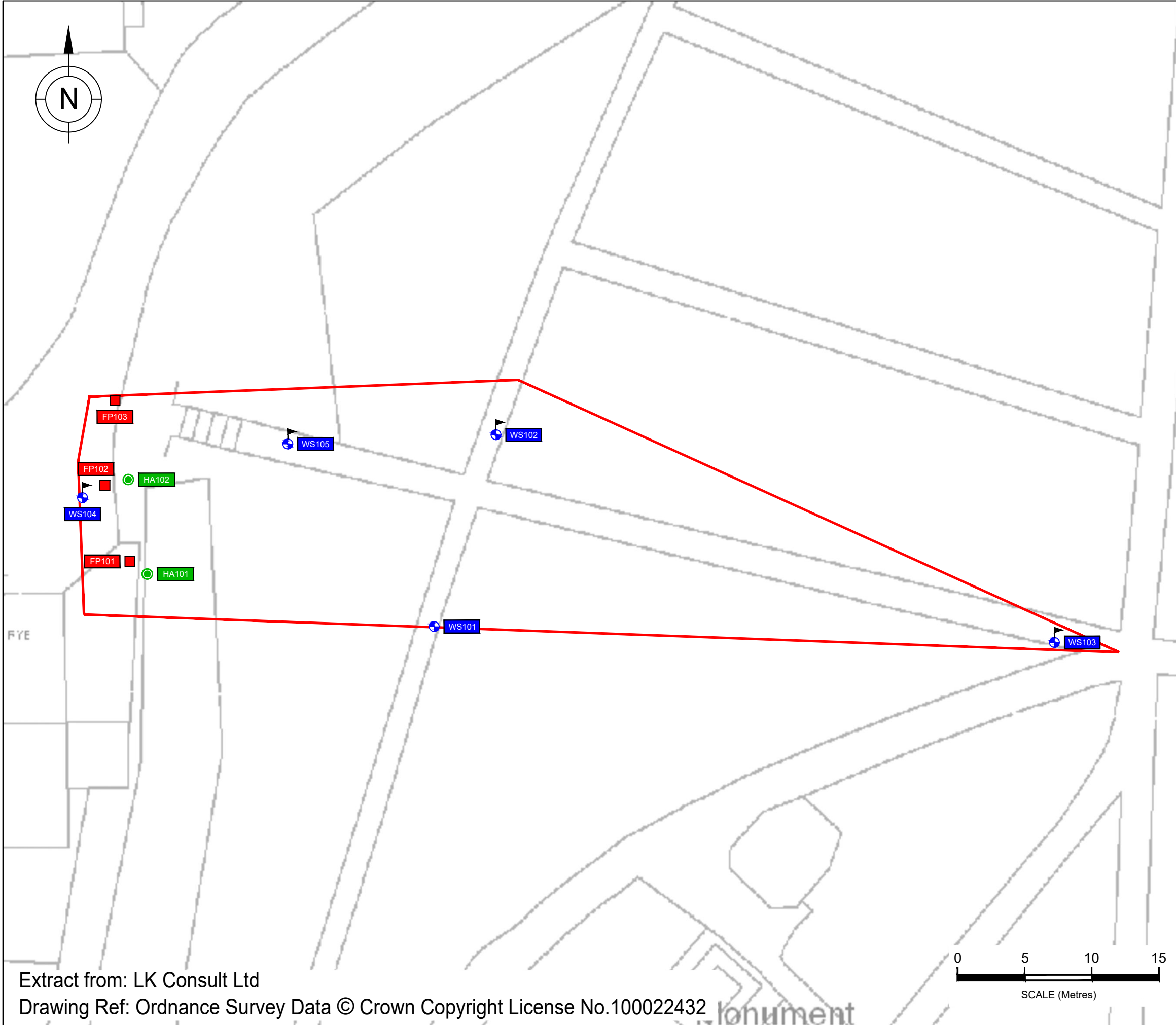
No further assessment or remediation is recommended with respect to the contamination risk to current/future receptors. However, if unexpected ground conditions are encountered during earthworks, further consultation is recommended.

Standard health and safety precautions (as per HSE guidance) should be adopted by all workers involved with site enabling and construction works.

Figures



Client: Rochdale Borough Council				Title: Site Location & Boundary Plan		
Site: Middleton Old Cemetery				Scale (see scale bar): 1:25,000 & 1:500 @ A4		
Job No.: LKC 22 1558	Drawn By: RP	Checked By: CC	Drawn: March 2023	Figure: 1	Revision:	



KEY

- Site Boundary
- Window Sample Borehole (WS)
- Foundation Inspection Pit (FP)
- Hand Auger Location (HA)
- Installation

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

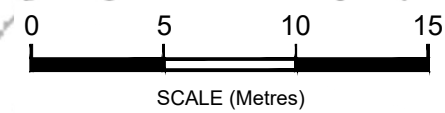
Client:
Rochdale Borough Council

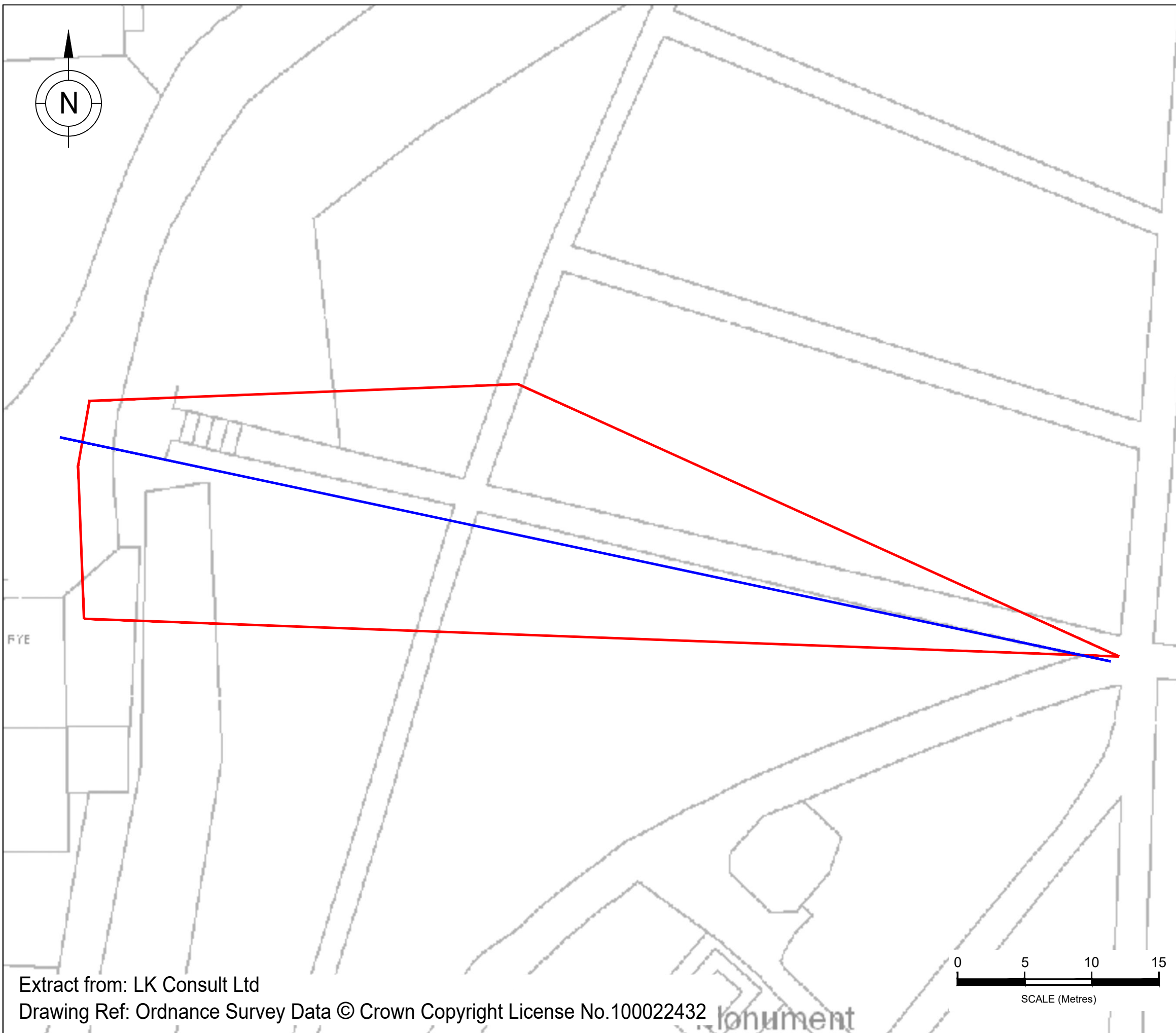
Site:
Middleton Old Cemetery

Title:
Site Investigation Location Plan

Job No.: LKC 22 1558	Scale (See Scale Bar): See Scale Bar	Figure: 2	Revision:
Drawn By: AC	Checked By: RP	Drawn: Apr 2023	

Extract from: LK Consult Ltd
Drawing Ref: Ordnance Survey Data © Crown Copyright License No.100022432





Site Boundary

Slope Profile

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: **Rochdale Borough Council**

Site: Middleton Old Cemetery

Title: **Slope Profile Location Plan**

Job No.: LKC 22 1558		Scale (See Scale Bar): See Scale Bar		Figure: 3	Revision:
Drawn By: AC	Checked By: AT	Drawn: May 2023			

Extract from: LK Consult Ltd
Drawing Ref: Ordnance Survey Data © Crown Copyright License No.100022432

Appendix A

Profile Logs

Excavation Method

Hand excavated foundation pit
to 1.40mbgl.

Dimensions
Location (dGPS)

387100.1 E 406181.3 N

Ground Level (mOD)

93.25

Client

Rochdale Borough Council

**Job
Number**

LKC 22 1558

Dates

14/03/2023-
15/03/2023

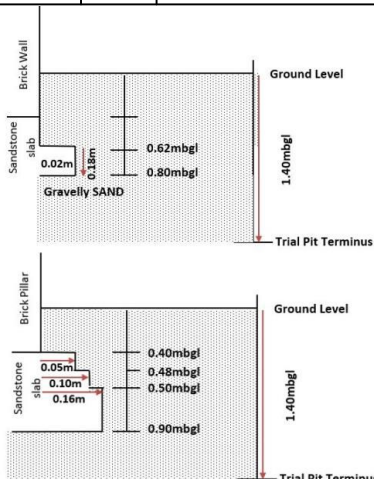
Project Contractor

D&I

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10-0.50	ES 0.0ppm			93.20	0.05	MADE GROUND: Tarmacadam.		
					(0.45)	MADE GROUND: Dark greyish brown very gravelly silty SAND with frequent brick fragments, ash, occasional clinker, whole bricks, rootlets, rare glass, metal, plastic fragments and roots. Sand is fine to coarse. Gravel is fine to coarse and subangular to subrounded of sandstone and mudstone.		
				92.75	0.50	Brick wall sat on sandstone slab at 0.40mbgl. Slab does not extend outwards from wall. On side wall, sandstone slab at 0.40mbgl, which steps out 0.05mbgl from wall, then steps down 0.08mbgl, and steps out again 0.16m from wall.		
					(0.40)	MADE GROUND: Brown gravelly SAND with occasional brick fragments, ash and rare rootlets. Sand is fine to coarse. Gravel is fine to coarse and subrounded to subangular of sandstone and mudstone.		
				92.35	0.90	Sandstone slab extends 0.16m from wall and extends down to 0.90mbgl. Sandstone slab at 0.60mbgl, extending 0.02m from the brick wall, and 0.20mbgl thick.		
					(0.50)	Light brown gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse and subrounded to subangular comprising sandstone and quartzite.		
				91.85	1.40	Complete at 1.40m		


Remarks

Pit dry and stable.
See FP101 cross section.

Scale (approx)

1:20

Logged By

HM

Figure No.

LKC 22 1558.FP101

Excavation Method

Hand excavated foundation pit
to 0.50mbgl.

Dimensions
Ground Level (mOD)

92.57

Client

Rochdale Borough Council

**Job
Number**

LKC 22 1558

Location (dGPS)

387098.2 E 406186.9 N

Dates

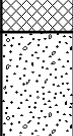
14/03/2023-
15/03/2023

Project Contractor

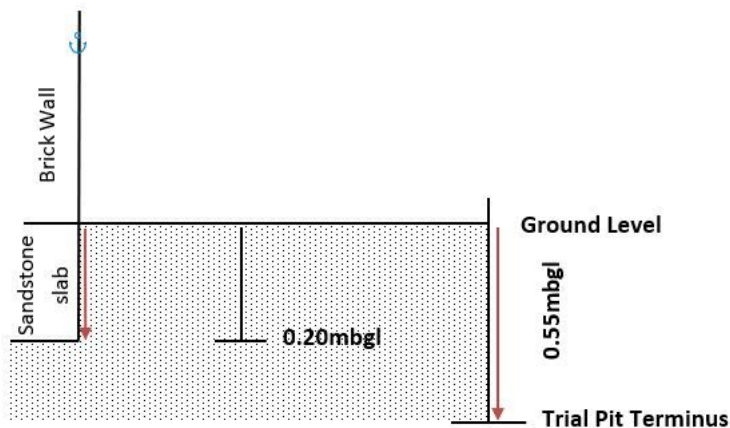
D&I

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				92.55	0.02 (0.18)	MADE GROUND: Tarmacadam.		
				92.37	0.20 (0.30)	MADE GROUND: Dark greyish brown slightly gravelly silty SAND with frequent rootlets and rare brick. Sand is fine to coarse. Gravel is fine to medium and subrounded comprising mudstone. Sandstone slab at base of wall at 0.10mbgl, 0.10m thick.		
				92.07	0.50	Light brown gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse and subrounded to subangular comprising sandstone and quartzite. Large tree root running across pit at 0.20mbgl. Complete at 0.50m		

Remarks

Pit dry and stable.
See FP102 cross section.

Scale (approx)

1:20

Logged By

HM

Figure No.

lkc 22 1558.FP102

Excavation Method

Hand excavated foundation pit
to 0.55mbgl.

Dimensions
Location (dGPS)

387099 E 406193.3 N

Ground Level (mOD)

92.95

Client

Rochdale Borough Council

**Job
Number**

LKC 22 1558

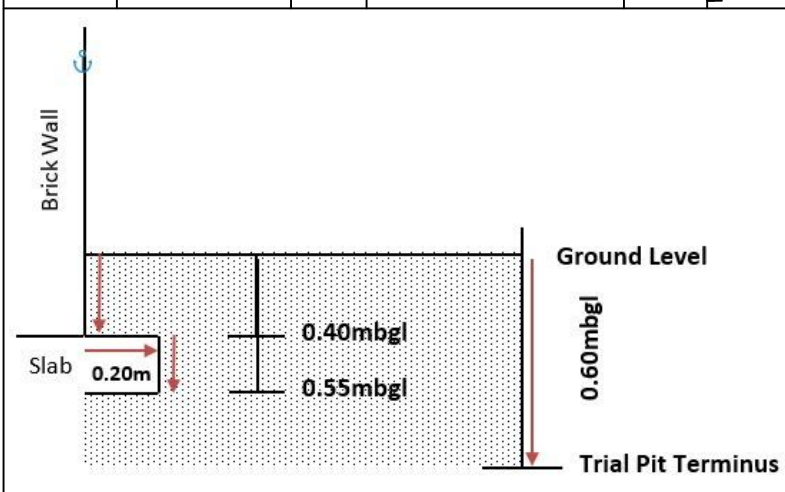
Project Contractor

D&I

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				92.90	0.05 (0.10)	MADE GROUND: Tarmacadam.		
				92.80	0.15	MADE GROUND: Sandstone cobble sets.		
				92.75	0.20	MADE GROUND: Dark greyish brown slightly gravelly silty SAND. Sand is fine to coarse. Gravel is fine to medium and subrounded to subangular comprising sandstone and mudstone.		
					(0.35)			
				92.40	0.55	Dark brown gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse. Ceramic drain at 0.40mbgl. Sandstone slab foundation at 0.40mbgl, stepping out 0.20mbgl from the brick wall, and 0.15m thick.		
						Complete at 0.55m		


Remarks

Pit dry and stable.
See FP103 cross section.

Scale (approx)

1:20

Logged By

HM

Figure No.

LKC 22 1558.FP103

Excavation Method

Hand excavated trial hole to 1.55mbgl.

Dimensions
Ground Level (mOD)

94.73

Client

Rochdale Borough Council

**Job
Number**

LKC 22 1558

Location (dGPS)

387101.4 E 406180.3 N

Dates

14/03/2023-
15/03/2023

Project Contractor

D&I

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.30	ES 0.0ppm				(0.30)	MADE GROUND: Dark greyish brown gravelly very silty SAND with frequent rootlets, brick fragments, rare pottery fragments. Sand is fine to coarse. Gravel is fine to coarse and subrounded of mudstone.		
0.50-1.00	ESD 0.0ppm			94.43	0.30	Brown becoming light orangish brown gravelly SAND with low subrounded sandstone cobble content. Sand is fine to coarse. Gravel is fine to coarse and subrounded to subangular of sandstone and quartzite.		
1.00-1.50	D				(1.25)			
				93.18	1.55	Unable to excavate beyond 1.55mbgl due to presence of cobbles. Complete at 1.55m		


Remarks

Trial hole dry and stable.
Unable to excavate beyond 1.55mbgl due to presence of cobbles.

Scale (approx)

1:20

Logged By

HM

Figure No.

LKC 22 1558.HD101

Excavation Method

Hand excavated trial hole to 1.80mbgl.

Dimensions
Ground Level (mOD)

94.45

Client

Rochdale Borough Council

**Job
Number**

LKC 22 1558

Location (dGPS)

387099.9 E 406187.4 N

Dates

14/03/2023-
15/03/2023

Project Contractor

D&I

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.30	ES 0.0ppm				(0.30)	MADE GROUND: Dark greyish brown gravelly very silty SAND with frequent rootlets, brick fragments, rare pottery fragments. Sand is fine to coarse. Gravel is fine to coarse and subrounded of mudstone.		
0.50-1.00	ESD 0.0ppm			94.15	0.30	Brown becoming light orangish brown gravelly SAND with low subrounded sandstone cobble content. Sand is fine to coarse. Gravel is fine to coarse and subrounded to subangular of sandstone and quartzite.		
1.00-1.50	D				(1.50)			
				92.65	1.80	Unable to excavate beyond 1.80mbgl due to presence of cobbles. Complete at 1.80m		

Remarks

Trial hole dry and stable.
Unable to excavate beyond 1.80mbgl due to presence of cobbles.

Scale (approx)

1:20

Logged By

HM

Figure No.

LKC 22 1558.HD102



Excavation Method

Drive-in Windowless Sampler

Dimensions
Location (dGPS)

387122.8 E 406176.4 N

Ground Level (mOD)

101.12

Client

Rochdale Borough Council

Job
Number
LKC 22 1558

Project Contractor

D&I

Sheet

1/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10-0.80	ES 0.0ppm			101.07	0.05	TOPSOIL: Dark greyish brown slightly gravelly silty SAND with frequent rootlets. Sand is fine to coarse. Gravel is fine to medium and subrounded of mudstone. Medium dense to dense light orangish brown very gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse and subrounded to subangular of sandstone, mudstone and quartzite. Gravel content decreasing with depth. Rare rootlets between 0.10-1.00mbgl.		
1.20-1.65 1.20-2.00	SPT(C) N=11 D 0.0ppm		2,2/2,3,3,3					
2.00-2.45 2.00-3.00	SPT(C) N=23 D		5,5/5,6,6,6			Occasional coal fragments between 1.80-2.00mbgl.		
3.00-3.45 3.00-4.00	SPT(C) N=16 D		4,4/4,4,4,4		(5.85)			
4.00-4.45 4.00-5.00	SPT(C) N=28 D		6,6/6,7,7,8			Slightly gravelly below 3.80mbgl.		
5.00-5.45	SPT(C) N=42		8,8/10,10,11,11			Dense sand below 5.00mbgl.		
5.90-6.00 6.00-6.45	D SPT(C) N=50		10,10/13,13,16,8	95.22 95.12	5.90 (0.10) 6.00 (0.25)	Brown laminated slightly sandy clayey SILT. Sand is fine to medium. Very dense brown very gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse and subrounded to subangular of sandstone and quartzite.		
				94.87	6.25 (0.75)	Light brown fine to medium SAND.		
7.00-7.45 7.00-7.50	SPT(C) N=39 D		7,5/10,11,8,10	94.12	7.00 (0.90)	Dense light brown to brown slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse and subrounded to subangular of sandstone and quartzite.		
7.90-8.00	D			93.22	7.90	Brown gravelly slightly silty SAND. Sand is fine to coarse.		

Remarks

Borehole dry and stable.
SPT refusal at 9.37mbgl on assumed very dense SAND.

Scale
(approx)

1:40

Logged
By

HM

Figure No.

LKC 22 1558.WS101



LK CONSULT LTD

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

Site

Middleton Old Cemetery

Number
WS101

Excavation Method Drive-in Windowless Sampler	Dimensions	Ground Level (mOD) 101.12	Client Rochdale Borough Council	Job Number LKC 22 1558
	Location (dGPS) 387122.8 E 406176.4 N	Dates 14/03/2023- 15/03/2023	Project Contractor D&I	Sheet 2/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
8.00-8.45	SPT(C) N=29		8,8/8,7,7,7		(0.60)	Gravel is fine to coarse and subrounded to subangular of sandstone.		
				92.62	8.50 (0.40)	Light brown sandy SILT. Sand is fine to medium.		
				92.22	8.90 (0.40)			
9.00-9.37	SPT(C) 50/220		8,10/15,15,20	92.12	9.00 (0.37)	Brown slightly gravelly very silty SAND. Sand is fine to coarse. Gravel is fine to coarse and subrounded to subangular of sandstone.		
				91.75	9.37	SPT Cone used therefore no recovery. Assumed very dense brown gravelly slightly silty SAND. Sand is fine to coarse. Gravel is fine to coarse and subrounded to subangular of sandstone. SPT refusal at 9.37mbgl on assumed very dense SAND. Complete at 9.37m		

Remarks Borehole dry and stable. SPT refusal at 9.37mbgl on assumed very dense SAND.	Scale (approx) 1:40	Logged By HM
	Figure No. LKC 22 1558.WS101	

Excavation Method

Drive-in Windowless Sample
driven to 7.34mbgl.

Dimensions
Location (dGPS)

387127.3 E 406190.7 N

Ground Level (mOD)

101.40

Client

Rochdale Borough Council

Job
Number
LKC 22 1558

Project Contractor

D&I

Sheet

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Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.10-0.50	ES 0.0ppm			101.35	0.05 (0.45)	TOPSOIL: Dark greyish brown slightly gravelly silty SAND with frequent rootlets. Sand is fine to coarse. Gravel is fine to medium and subrounded of mudstone.			
				100.90	0.50	Dark brown becoming brown gravelly slightly silty SAND with occasional coal fragments. Sand is fine to coarse. Gravel is fine to coarse and rounded to subangular of sandstone and quartzite.			
1.20-1.65 1.20-2.00	SPT(C) N=13 D 0.0ppm		1,2/2,3,4,4		(1.50)	Medium dense light orangish brown slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse and rounded to subangular of sandstone, mudstone and quartzite.			
2.00-2.45 2.00-3.00	SPT(C) N=15 D		3,3/3,2,4,6	99.40	2.00	Medium dense dark brown very gravelly SAND with occasional coal fragments and rare clay inclusions. Sand is fine to coarse. Gravel is fine to coarse and subrounded to subangular of sandstone			
					(1.50)				
3.00-3.45	SPT(C) N=25		6,6/6,6,6,7						
3.50-3.60 3.50-3.60 3.60-4.00	D PP =102.31kPa D			97.90 97.80	3.50 (0.60)	Stiff consistency high strength light brown slightly sandy silty CLAY. Sand is fine to medium.			
					(0.40)	Dense light brown very silty SAND. Sand is fine to medium.			
4.00-4.45 4.00-4.70	SPT(C) N=37 D		7,9/10,9,9,9	97.40	4.00	Brown slightly gravelly slightly silty SAND. Sand is fine to coarse. Gravel is fine to medium and subrounded of sandstone and quartzite.			
					(0.70)				
				96.70	4.70	Light brown very sandy clayey SILT. Sand is fine to medium. Friable.			
				96.40	5.00	Medium dense light brown gravelly slightly silty SAND. Sand is fine to coarse. Gravel is fine to coarse and subrounded to subangular of sandstone, mudstone and quartzite.			
					(0.40)				
5.40-5.50 5.50-5.60 5.50-5.60 5.60-6.00	D D PP =68.51kPa D			96.00 95.90 95.80	5.40 (0.40) (0.50) (0.60)	Light brown very sandy SILT. Sand is fine to medium. Friable.			
						Firm consistency medium strength brown very sandy silty CLAY. Sand is fine to medium. Wet. Wet strata noted at 5.50mbgl.			
6.00-6.45	SPT(C) N=50		9,9/11,12,15,12		(1.40)	Dense to very dense light brown gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse and rounded to subangular of sandstone, mudstone and quartzite. Becoming less gravelly with depth.			
7.00-7.34	SPT(C) 50/190		12,13/16,20,14	94.40	7.00	SPT Cone used therefore no recovery. Assumed very dense light brown gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse and rounded to subangular of sandstone, mudstone and quartzite. Becoming less gravelly with depth.			
				94.06	7.34	SPT refusal at 7.34mbgl on assumed very dense SAND.			
						Complete at 7.34m			

Remarks

Borehole stable.
Strata noted as wet.
Monitoring installation to 6.50mbgl.
SPT refusal at 7.34mbgl on assumed very dense SAND.

Scale (approx)

1:40

Logged By

HM

Figure No.

LKC 22 1558.WS102

Excavation Method

Drive-in Windowless Sample
driven to 5.45mbgl.

Dimensions
Location (dGPS)

387169 E 406175.3 N

Ground Level (mOD)

106.92

Client

Rochdale Borough Council

Job
Number
LKC 22 1558

Project Contractor

D&I

Sheet

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Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.70	ES 0.0ppm				(0.80)	MADE GROUND: Dark greyish brown gravelly silty SAND with rare brick fragments. Sand is fine to coarse. Gravel is fine to coarse and subrounded to subangular of sandstone and mudstone.			
0.80-1.20	ESD			106.12	0.80	Medium dense light orangish brown gravelly SAND with rare coal fragments. Sand is fine to coarse. Gravel is fine to coarse and rounded to subangular of sandstone and quartzite.			
1.20-1.65 1.20-1.65 1.20-2.00	SPT N=19 D D		2,4/4,5,5,5		(1.20)				
2.00-2.45	SPT(C) N=20		3,4/4,5,5,6	104.92	2.00	Medium dense light brown very gravelly slightly clayey SAND with rare silty clay inclusions and coal fragments. Sand is fine to coarse. Gravel is fine to coarse and rounded to subrounded of sandstone, mudstone and quartzite.			
2.50-3.00	D			104.42	2.50	Light brown fine to medium SAND.			
3.00-3.45 3.00-4.00	SPT(C) N=32 D		8,8/8,8,8,8	103.92	3.00	Medium dense to dense light brown gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse and rounded to subangular comprising sandstone, mudstone and quartzite. Slightly gravelly between 3.00-4.00mbgl. Dense below 3.00mbgl.			
4.00-4.45 4.00-5.00	SPT(C) N=22 D		4,4/5,5,5,7		(2.00)	Medium dense below 4.00mbgl. Gravel content decreases below 4.50mbgl.			
5.00-5.45	SPT(C) N=30		6,7/8,8,8,6	101.92	5.00	SPT cone used therefore no recovery. Assumed medium dense to dense light brown gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse and rounded to subangular comprising sandstone, mudstone and quartzite.			
				101.47	5.45	Complete at 5.45m			

Remarks

Borehole dry and stable.
Monitoring well installed to 5.00mbgl.

Scale
(approx)

1:40

Logged
By

HM

Figure No.

LKC 22 1558.WS103

Excavation Method

Hand dug inspection pit to 1.2mbgl followed on by window sampler.

Dimensions
Location (dGPS)

387096.5 E 406186 N

Ground Level (mOD)

92.38

Dates

15/03/2023

Client

Rochdale Borough Council

Project Contractor

D&I

Job Number
LKC 22 1558

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.15-1.00	ESD 0.0ppm			92.35 92.23	0.03 (0.12)	MADE GROUND: Tarmacadam. MADE GROUND: Dark grey sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse subangular to angular of limestone (sub-base). Medium dense orange gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded of mudstone and sandstone.			
1.20-1.65	SPT(C) N=12		3,3/3,3,3,3		(1.35)				
1.50-2.00	ESD 0.0ppm			90.88	1.50	Medium dense light orange slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to medium subangular to rounded of mudstone and sandstone.			
2.00-2.45	SPT(C) N=13		3,3/3,3,3,4		(1.60)				
3.00-3.45 3.10-4.00 3.20	SPT(C) N=14 ESD PP 14.7kPa		2,2/3,3,4,4	89.28	3.10	Medium dense orangish brown very silty SAND. Sand is fine to medium. Strata noted to be damp. 3.20-3.30mbgl brownish orange slightly sandy clayey SILT. Sand is fine to medium.			
4.00-4.45 4.00-5.00	SPT(C) N=27 D		3,5/6,7,7,7	88.38	4.00	Medium dense to dense orange SAND. Sand is fine to coarse.			
5.00-5.45	SPT(C) N=41		7,7/10,10,10,11	86.93	5.45	Complete at 5.45m			

Remarks

Borehole stable and dry.

Scale (approx)

1:40

Logged By

RP

Figure No.

LKC 22 1558.WS104

Excavation Method

Hand dug pit to 1.2mbgl followed on by modular window sample borehole.

Dimensions
Location (dGPS)

387111.8 E 406190 N

Ground Level (mOD)

97.62

Dates

14/03/2023

Client

Rochdale Borough Council

Project Contractor

D&I

Job Number
LKC 22 1558

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.15	ESD 0.0ppm			97.47	(0.15)	MADE GROUND: Dark brown gravelly silty SAND with frequent rootlets, rare brick and paving slab. Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded of mudstone and sandstone. Loose to medium dense orange becoming brownish orange gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded of mudstone, sandstone, quartz and coal.			
0.15-1.00	ESD 0.0ppm								
1.20-1.65	SPT N=8		2,2/2,2,2,2						
1.20-2.00	ESD 0.0ppm								
2.00-2.45	SPT(C) N=13		2,3/3,3,3,4						
3.00-3.45	SPT(C) N=17		4,3/3,5,5,4		(5.30)				
3.00-4.00	D								
4.00-4.45	SPT(C) N=20		0,5/6,6,4,4						
5.00-5.45	SPT(C) N=25		5,7/7,6,6,6						
				92.17	5.45	Complete at 5.45m			

Remarks

Borehole stable and dry.

Scale (approx)

1:40

Logged By

RP

Figure No.

LKC 22 1558.WS105

Appendix B

Certificates of Analysis – Soil / Leaching Test



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

DETS Report No: 23-03979

Site Reference: Middleton Old Cemetery

Project / Job Ref: LKC 22 1558

Order No: LKC 22 1558-RP

Sample Receipt Date: 20/03/2023

Sample Scheduled Date: 21/03/2023

Report Issue Number: 1

Reporting Date: 11/04/2023

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.

For Topsoil and WAC analysis the expanded uncertainty measurement should be considered while evaluating results against compliance values.



DETS Ltd
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Soil Analysis Certificate					
DETS Report No: 23-03979	Date Sampled	14/03/23	14/03/23	14/03/23	14/03/23
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Middleton Old Cemetery	TP / BH No	WS101	WS101	WS103	WS103
Project / Job Ref: LKC 22 1558	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied
Order No: LKC 22 1558-RP	Depth (m)	0.10 - 0.80	0.10 - 0.80	0.00 - 0.70	0.80 - 1.20
Reporting Date: 11/04/2023	DETS Sample No	642237	642238	642239	642240

Determinand	Unit	RL	Accreditation				
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected		Not Detected	Not Detected
pH	pH Units	N/a	MCERTS	6.1		7.0	7.1
Total Cyanide	mg/kg	< 1	NONE				
Free Cyanide	mg/kg	< 1	NONE				
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	< 10		< 10	< 10
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	< 0.01		< 0.01	< 0.01
Organic Matter (SOM)	%	< 0.1	MCERTS	0.9		1.6	0.5
Ammoniacal Nitrogen as NH ₄	mg/kg	< 0.5	MCERTS	3.5		2.7	2.7
Total Chloride	%	< 0.01	NONE	0.03		< 0.01	0.05
W/S Chloride (2:1)	mg/kg	< 1	MCERTS	3		3	3
W/S Chloride (2:1)	mg/l	< 0.5	MCERTS	1.7		1.5	1.7
Water Soluble Nitrate (2:1) as NO ₃	mg/kg	< 3	MCERTS	< 3		7	< 3
Water Soluble Nitrate (2:1) as NO ₃	mg/l	< 1.5	MCERTS	< 1.5		3.3	< 1.5
Water Soluble Nitrite (2:1) as NO ₂	mg/kg	< 4	NONE	< 4		< 4	< 4
W/S Phosphate as PO ₄ (2:1)	mg/kg	< 3	NONE	< 3		< 3	< 3
Arsenic (As)	mg/kg	< 2	MCERTS	4		10	6
W/S Boron	mg/kg	< 1	NONE				
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2		< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	5		9	8
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2		< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	6		13	10
Lead (Pb)	mg/kg	< 3	MCERTS	6		30	14
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1		< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	4		6	10
Selenium (Se)	mg/kg	< 2	MCERTS	< 2		< 2	< 2
Vanadium (V)	mg/kg	< 1	MCERTS	7		13	11
Zinc (Zn)	mg/kg	< 3	MCERTS	20		29	47
Total Phenols (monohydric)	mg/kg	< 2	NONE				

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)



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Soil Analysis Certificate					
DETS Report No: 23-03979	Date Sampled	14/03/23	14/03/23	14/03/23	14/03/23
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Middleton Old Cemetery	TP / BH No	WS103	WS105	WS105	WS105
Project / Job Ref: LKC 22 1558	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied
Order No: LKC 22 1558-RP	Depth (m)	0.80 - 1.20	0.00 - 0.15	0.00 - 0.15	0.15 - 1.00
Reporting Date: 11/04/2023	DETS Sample No	642242	642243	642244	642245

Determinand	Unit	RL	Accreditation			
Asbestos Screen ^(S)	N/a	N/a	ISO17025		Not Detected	Not Detected
pH	pH Units	N/a	MCERTS		6.0	5.3
Total Cyanide	mg/kg	< 1	NONE			
Free Cyanide	mg/kg	< 1	NONE			
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS		< 10	< 10
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS		< 0.01	< 0.01
Organic Matter (SOM)	%	< 0.1	MCERTS		3.1	0.6
Ammoniacal Nitrogen as NH ₄	mg/kg	< 0.5	MCERTS		17.7	2.5
Total Chloride	%	< 0.01	NONE		< 0.01	0.11
W/S Chloride (2:1)	mg/kg	< 1	MCERTS		10	6
W/S Chloride (2:1)	mg/l	< 0.5	MCERTS		5.2	2.8
Water Soluble Nitrate (2:1) as NO ₃	mg/kg	< 3	MCERTS		9	< 3
Water Soluble Nitrate (2:1) as NO ₃	mg/l	< 1.5	MCERTS		4.5	< 1.5
Water Soluble Nitrite (2:1) as NO ₂	mg/kg	< 4	NONE		< 4	< 4
W/S Phosphate as PO ₄ (2:1)	mg/kg	< 3	NONE		< 3	< 3
Arsenic (As)	mg/kg	< 2	MCERTS		12	5
W/S Boron	mg/kg	< 1	NONE			
Cadmium (Cd)	mg/kg	< 0.2	MCERTS		< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS		8	7
Chromium (hexavalent)	mg/kg	< 2	NONE		< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS		17	8
Lead (Pb)	mg/kg	< 3	MCERTS		56	11
Mercury (Hg)	mg/kg	< 1	MCERTS		< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS		8	6
Selenium (Se)	mg/kg	< 2	MCERTS		< 2	< 2
Vanadium (V)	mg/kg	< 1	MCERTS		16	10
Zinc (Zn)	mg/kg	< 3	MCERTS		51	32
Total Phenols (monohydric)	mg/kg	< 2	NONE			

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)



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Soil Analysis Certificate					
DETS Report No: 23-03979	Date Sampled	14/03/23	14/03/23	15/03/23	15/03/23
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Middleton Old Cemetery	TP / BH No	WS105	WS105	FP101	HD101
Project / Job Ref: LKC 22 1558	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied
Order No: LKC 22 1558-RP	Depth (m)	1.20 - 2.00	1.20 - 2.00	0.00 - 0.50	0.00 - 0.30
Reporting Date: 11/04/2023	DETS Sample No	642247	642248	642249	642250

Determinand	Unit	RL	Accreditation				
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected		Not Detected	Not Detected
pH	pH Units	N/a	MCERTS	5.5		8.9	7.2
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	19		1550	60
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.02		1.55	0.06
Organic Matter (SOM)	%	< 0.1	MCERTS	0.1		6.1	1
Ammoniacal Nitrogen as NH ₄	mg/kg	< 0.5	MCERTS	2.5			36.1
Total Chloride	%	< 0.01	NONE	0.09			0.02
W/S Chloride (2:1)	mg/kg	< 1	MCERTS	6			3
W/S Chloride (2:1)	mg/l	< 0.5	MCERTS	3.1			1.3
Water Soluble Nitrate (2:1) as NO ₃	mg/kg	< 3	MCERTS	< 3			< 3
Water Soluble Nitrate (2:1) as NO ₃	mg/l	< 1.5	MCERTS	< 1.5			< 1.5
Water Soluble Nitrite (2:1) as NO ₂	mg/kg	< 4	NONE	< 4			< 4
W/S Phosphate as PO ₄ (2:1)	mg/kg	< 3	NONE	< 3			< 3
Arsenic (As)	mg/kg	< 2	MCERTS	4		9	4
W/S Boron	mg/kg	< 1	NONE			1.5	
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2		< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	4		21	3
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2		< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	8		68	8
Lead (Pb)	mg/kg	< 3	MCERTS	6		307	25
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1		< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	4		12	< 3
Selenium (Se)	mg/kg	< 2	MCERTS	< 2		< 2	< 2
Vanadium (V)	mg/kg	< 1	MCERTS	6		22	6
Zinc (Zn)	mg/kg	< 3	MCERTS	26		171	15
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)



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Maidstone
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Soil Analysis Certificate						
DETS Report No: 23-03979	Date Sampled	15/03/23	15/03/23	15/03/23		
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Middleton Old Cemetery	TP / BH No	HD101	HD101	HD102		
Project / Job Ref: LKC 22 1558	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: LKC 22 1558-RP	Depth (m)	0.50 - 1.00	0.50 - 1.00	0.00 - 0.30		
Reporting Date: 11/04/2023	DETS Sample No	642252	642253	642254		

Determinand	Unit	RL	Accreditation			
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected		Not Detected
pH	pH Units	N/a	MCERTS	4.9		5.8
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	12		< 10
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.01		< 0.01
Organic Matter (SOM)	%	< 0.1	MCERTS	0.6		4.4
Ammoniacal Nitrogen as NH ₄	mg/kg	< 0.5	MCERTS	3.2		
Total Chloride	%	< 0.01	NONE	0.03		
W/S Chloride (2:1)	mg/kg	< 1	MCERTS	4		
W/S Chloride (2:1)	mg/l	< 0.5	MCERTS	1.9		
Water Soluble Nitrate (2:1) as NO ₃	mg/kg	< 3	MCERTS	< 3		
Water Soluble Nitrate (2:1) as NO ₃	mg/l	< 1.5	MCERTS	< 1.5		
Water Soluble Nitrite (2:1) as NO ₂	mg/kg	< 4	NONE	< 4		
W/S Phosphate as PO ₄ (2:1)	mg/kg	< 3	NONE	< 3		
Arsenic (As)	mg/kg	< 2	MCERTS	5		18
W/S Boron	mg/kg	< 1	NONE			< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2		< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	5		10
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2		< 2
Copper (Cu)	mg/kg	< 4	MCERTS	11		27
Lead (Pb)	mg/kg	< 3	MCERTS	21		105
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1		< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	3		10
Selenium (Se)	mg/kg	< 2	MCERTS	< 2		< 2
Vanadium (V)	mg/kg	< 1	MCERTS	9		19
Zinc (Zn)	mg/kg	< 3	MCERTS	20		63
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)



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-03979	Date Sampled	14/03/23	14/03/23	14/03/23	14/03/23	14/03/23
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Middleton Old Cemetery	TP / BH No	WS101	WS103	WS103	WS105	WS105
Project / Job Ref: LKC 22 1558	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: LKC 22 1558-RP	Depth (m)	0.10 - 0.80	0.00 - 0.70	0.80 - 1.20	0.00 - 0.15	0.15 - 1.00
Reporting Date: 11/04/2023	DETS Sample No	642237	642239	642241	642243	642245

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	0.63	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	2.13	0.17	0.15	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	2.13	0.17	0.14	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.94	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	1.17	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	1.34	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.44	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	1.13	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.74	< 0.1	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.13	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	0.69	< 0.1	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	11.5	< 1.6	< 1.6	< 1.6



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-03979	Date Sampled	14/03/23	15/03/23	15/03/23	15/03/23	15/03/23
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Middleton Old Cemetery	TP / BH No	WS105	FP101	HD101	HD101	HD102
Project / Job Ref: LKC 22 1558	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: LKC 22 1558-RP	Depth (m)	1.20 - 2.00	0.00 - 0.50	0.00 - 0.30	0.50 - 1.00	0.00 - 0.30
Reporting Date: 11/04/2023	DETS Sample No	642247	642249	642250	642252	642254

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	0.20	0.28	< 0.1	0.38
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.12
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.21	0.54	< 0.1	0.96
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.20	0.52	< 0.1	0.88
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.25	< 0.1	0.44
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.31	< 0.1	0.59
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.35	< 0.1	0.69
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.22
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.26	< 0.1	0.50
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.15	< 0.1	0.29
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.13	< 0.1	0.25
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	2.8	< 1.6	5.3



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Soil Analysis Certificate - TPH LQM Banded					
DETS Report No: 23-03979	Date Sampled	15/03/23	15/03/23		
LK Consult Limited	Time Sampled	None Supplied	None Supplied		
Site Reference: Middleton Old Cemetery	TP / BH No	FP101	HD102		
Project / Job Ref: LKC 22 1558	Additional Refs	None Supplied	None Supplied		
Order No: LKC 22 1558-RP	Depth (m)	0.00 - 0.50	0.00 - 0.30		
Reporting Date: 11/04/2023	DETS Sample No	642249	642254		

Determinand	Unit	RL	Accreditation					
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	< 10	< 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	< 30	< 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	< 2	< 2			
Aromatic >C16 - C21 : EH CU 1D AR	mg/kg	< 3	MCERTS	< 3	< 3			
Aromatic >C21 - C35 : EH CU 1D AR	mg/kg	< 10	MCERTS	< 10	< 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	< 30	< 30			
Total >C5 - C44 : HS 1D MS+EH CU 1D Total	mg/kg	< 60	NONE	< 60	< 60			



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Soil Analysis Certificate - BTEX / MTBE							
DETS Report No: 23-03979	Date Sampled	15/03/23	15/03/23				
LK Consult Limited	Time Sampled	None Supplied	None Supplied				
Site Reference: Middleton Old Cemetery	TP / BH No	FP101	HD102				
Project / Job Ref: LKC 22 1558	Additional Refs	None Supplied	None Supplied				
Order No: LKC 22 1558-RP	Depth (m)	0.00 - 0.50	0.00 - 0.30				
Reporting Date: 11/04/2023	DETS Sample No	642249	642254				

Determinand	Unit	RL	Accreditation				
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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Leachate Analysis Certificate					
DETS Report No: 23-03979	Date Sampled	14/03/23	14/03/23	14/03/23	14/03/23
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Middleton Old Cemetery	TP / BH No	WS101	WS103	WS103	WS105
Project / Job Ref: LKC 22 1558	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied
Order No: LKC 22 1558-RP	Depth (m)	0.10 - 0.80	0.00 - 0.70	0.80 - 1.20	0.00 - 0.15
Reporting Date: 11/04/2023	DETS Sample No	642238	642240	642242	642244

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	ISO17025	7.9	7.7	7.8	7.8	7.2
Sulphate as SO ₄	mg/l	< 1	ISO17025	3	< 1	2	1	1
Ammoniacal Nitrogen as NH ₄	ug/l	< 50	ISO17025	< 50	< 50	50	165	< 50
Chloride	mg/l	< 1	ISO17025	1	< 1	< 1	2	< 1
Nitrate as NO ₃	mg/l	< 0.5	ISO17025	< 0.5	< 0.5	< 0.5	0.8	< 0.5
Nitrite as NO ₂	mg/l	< 0.5	NONE	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Phosphate as PO ₄	mg/l	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Dissolved Organic Carbon (DOC)	mg/l	< 0.1	ISO17025	4	5.5	4.2	6	2.5
Arsenic	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Boron	ug/l	< 5	ISO17025	10	11	10	16	10
Cadmium	ug/l	< 0.4	ISO17025	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Chromium (hexavalent)	ug/l	< 20	NONE	< 20	< 20	< 20	< 20	< 20
Copper	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Lead	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Mercury	ug/l	< 0.05	ISO17025	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Selenium	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Vanadium	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Zinc	ug/l	< 2	ISO17025	55	48	64	61	81
Calcium	mg/l	< 0.2	ISO17025	3.9	7.7	8.8	2.7	1.6

Subcontracted analysis ⁽⁵⁾



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Leachate Analysis Certificate						
DETS Report No: 23-03979	Date Sampled	14/03/23	15/03/23	15/03/23	15/03/23	15/03/23
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Middleton Old Cemetery	TP / BH No	WS105	FP101	HD101	HD101	HD102
Project / Job Ref: LKC 22 1558	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: LKC 22 1558-RP	Depth (m)	1.20 - 2.00	0.00 - 0.50	0.00 - 0.30	0.50 - 1.00	0.00 - 0.30
Reporting Date: 11/04/2023	DETS Sample No	642248	642249	642251	642253	642254

Determinand	Unit	RL	Accreditation				
pH	pH Units	N/a	ISO17025	7.5		7.6	7.9
Sulphate as SO ₄	mg/l	< 1	ISO17025	1		1	2
Ammoniacal Nitrogen as NH ₄	ug/l	< 50	ISO17025	< 50		< 50	< 50
Chloride	mg/l	< 1	ISO17025	1		1	1
Nitrate as NO ₃	mg/l	< 0.5	ISO17025	< 0.5		< 0.5	< 0.5
Nitrite as NO ₂	mg/l	< 0.5	NONE	< 0.5		< 0.5	< 0.5
Phosphate as PO ₄	mg/l	< 1	NONE	< 1		< 1	< 1
Dissolved Organic Carbon (DOC)	mg/l	< 0.1	ISO17025	2.8		4.1	4
Arsenic	ug/l	< 5	ISO17025	< 5		< 5	< 5
Boron	ug/l	< 5	ISO17025	9		10	11
Cadmium	ug/l	< 0.4	ISO17025	< 0.4		< 0.4	< 0.4
Chromium	ug/l	< 5	ISO17025	< 5		< 5	< 5
Chromium (hexavalent)	ug/l	< 20	NONE	< 20		< 20	< 20
Copper	ug/l	< 5	ISO17025	< 5		< 5	< 5
Lead	ug/l	< 5	ISO17025	< 5		< 5	< 5
Mercury	ug/l	< 0.05	ISO17025	< 0.05		< 0.05	< 0.05
Nickel	ug/l	< 5	ISO17025	< 5		< 5	< 5
Selenium	ug/l	< 5	ISO17025	< 5		< 5	< 5
Vanadium	ug/l	< 5	ISO17025	< 5		< 5	< 5
Zinc	ug/l	< 2	ISO17025	46		70	57
Calcium	mg/l	< 0.2	ISO17025	2		2.4	3

Subcontracted analysis ⁽⁵⁾



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Leachate Analysis Certificate - Speciated PAH						
DETS Report No: 23-03979	Date Sampled	14/03/23	14/03/23	14/03/23	14/03/23	14/03/23
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Middleton Old Cemetery	TP / BH No	WS101	WS103	WS103	WS105	WS105
Project / Job Ref: LKC 22 1558	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: LKC 22 1558-RP	Depth (m)	0.10 - 0.80	0.00 - 0.70	0.80 - 1.20	0.00 - 0.15	0.15 - 1.00
Reporting Date: 11/04/2023	DETS Sample No	642238	642240	642242	642244	642246

Determinand	Unit	RL	Accreditation					
Naphthalene	ug/l	< 0.01	NONE	< 0.01	0.10	0.06	0.56	0.06
Acenaphthylene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	ug/l	< 0.01	NONE	< 0.01	0.14	0.18	0.09	0.09
Fluorene	ug/l	< 0.01	NONE	1.56	< 0.01	0.12	< 0.01	< 0.01
Phenanthrene	ug/l	< 0.01	NONE	2.15	< 0.01	< 0.01	0.09	< 0.01
Anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	ug/l	< 0.01	NONE	0.57	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	ug/l	0.008	NONE	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008
Total EPA-16 PAHs	ug/l	< 0.16	NONE	4.28	0.24	0.36	0.74	< 0.16



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Leachate Analysis Certificate - Speciated PAH					
DETS Report No: 23-03979	Date Sampled	14/03/23	15/03/23	15/03/23	
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied	
Site Reference: Middleton Old Cemetery	TP / BH No	WS105	HD101	HD101	
Project / Job Ref: LKC 22 1558	Additional Refs	None Supplied	None Supplied	None Supplied	
Order No: LKC 22 1558-RP	Depth (m)	1.20 - 2.00	0.00 - 0.30	0.50 - 1.00	
Reporting Date: 11/04/2023	DETS Sample No	642248	642251	642253	

Determinand	Unit	RL	Accreditation				
Naphthalene	ug/l	< 0.01	NONE	0.05	< 0.01	0.14	
Acenaphthylene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	
Acenaphthene	ug/l	< 0.01	NONE	0.25	< 0.01	0.08	
Fluorene	ug/l	< 0.01	NONE	0.10	< 0.01	< 0.01	
Phenanthrene	ug/l	< 0.01	NONE	0.10	< 0.01	< 0.01	
Anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	
Fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	
Pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	
Benzo(a)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	
Chrysene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	
Benzo(b)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	
Benzo(k)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	
Benzo(a)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	
Indeno(1,2,3-cd)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	
Dibenz(a,h)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	
Benzo(ghi)perylene	ug/l	0.008	NONE	< 0.008	< 0.008	< 0.008	
Total EPA-16 PAHs	ug/l	< 0.16	NONE	0.50	< 0.16	0.22	



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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3																																							
DETS Report No: 23-03979		Date Sampled	15/03/23		<table border="1"> <thead> <tr> <th colspan="3">Landfill Waste Acceptance Criteria Limits</th> </tr> <tr> <th>Inert Waste Landfill</th> <th>Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill</th> <th>Hazardous Waste Landfill</th> </tr> </thead> <tbody> <tr> <td>3%</td> <td>5%</td> <td>6%</td> </tr> <tr> <td>--</td> <td>--</td> <td>10%</td> </tr> <tr> <td>6</td> <td>--</td> <td>--</td> </tr> <tr> <td>1</td> <td>--</td> <td>--</td> </tr> <tr> <td>500</td> <td>--</td> <td>--</td> </tr> <tr> <td>100</td> <td>--</td> <td>--</td> </tr> <tr> <td>--</td> <td>>6</td> <td>--</td> </tr> <tr> <td>--</td> <td>To be evaluated</td> <td>To be evaluated</td> </tr> </tbody> </table>					Landfill Waste Acceptance Criteria Limits			Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill	3%	5%	6%	--	--	10%	6	--	--	1	--	--	500	--	--	100	--	--	--	>6	--	--	To be evaluated	To be evaluated
Landfill Waste Acceptance Criteria Limits																																							
Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill																																					
3%	5%	6%																																					
--	--	10%																																					
6	--	--																																					
1	--	--																																					
500	--	--																																					
100	--	--																																					
--	>6	--																																					
--	To be evaluated	To be evaluated																																					
LK Consult Limited		Time Sampled	None Supplied																																				
Site Reference: Middleton Old Cemetery		TP / BH No	FP101																																				
Project / Job Ref: LKC 22 1558		Additional Refs	None Supplied																																				
Order No: LKC 22 1558-RP		Depth (m)	0.00 - 0.50																																				
Reporting Date: 11/04/2023		DETS Sample No	642249																																				
Determinand	Unit	MDL																																					
TOC ^{MU}	%	< 0.1	3.6																																				
Loss on Ignition ^{MU}	%	< 0.01	11.20																																				
BTEX ^{MU}	mg/kg	< 0.05	< 0.05																																				
Sum of PCBs	mg/kg	< 0.1	< 0.1																																				
Mineral Oil ^{MU}	mg/kg	< 10	< 10																																				
Total PAH ^{MU}	mg/kg	< 1.7	< 1.7																																				
pH ^{MU}	pH Units	N/a	8.9																																				
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.3																																				
Eluate Analysis			2:1 mg/l	8:1 mg/l		Cumulative 10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)																																
Arsenic ^U		< 0.01	< 0.01		< 0.2	0.5	2	25																															
Barium ^U		0.10	0.05		0.6	20	100	300																															
Cadmium ^U		< 0.0005	< 0.0005		< 0.02	0.04	1	5																															
Chromium ^U		< 0.005	< 0.005		< 0.20	0.5	10	70																															
Copper ^U		< 0.01	< 0.01		< 0.5	2	50	100																															
Mercury ^U		< 0.0005	< 0.0005		< 0.005	0.01	0.2	2																															
Molybdenum ^U		0.003	0.002		< 0.1	0.5	10	30																															
Nickel ^U		< 0.007	< 0.007		< 0.2	0.4	10	40																															
Lead ^U		< 0.005	0.007		< 0.2	0.5	10	50																															
Antimony ^U		< 0.005	< 0.005		< 0.05	0.06	0.7	5																															
Selenium ^U		< 0.005	< 0.005		< 0.05	0.1	0.5	7																															
Zinc ^U		0.011	0.011		< 0.2	4	50	200																															
Chloride ^U		4	1		17	800	15000	25000																															
Fluoride ^U		< 0.5	< 0.5		< 1	10	150	500																															
Sulphate ^U		424	40		808	1000	20000	50000																															
TDS		537	141		1835	4000	60000	100000																															
Phenol Index		< 0.01	< 0.01		< 0.5	1	-	-																															
DOC		24.8	14.4		155	500	800	1000																															
Leach Test Information																																							
Sample Mass (kg)			0.20																																				
Dry Matter (%)			85.4																																				
Moisture (%)			17.2																																				
Stage 1																																							
Volume Eluate L2 (litres)			0.32																																				
Filtered Eluate VE1 (litres)			0.19																																				
Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Samples Descriptions page describes if the test is performed on the dried or as-received portion Stated limits are for guidance only and DETS Ltd cannot be held responsible for any discrepancies with current legislation M Denotes MCERTS accredited test U Denotes ISO17025 accredited test																																							



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4480

Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3																																							
DETS Report No: 23-03979		Date Sampled	15/03/23		<table border="1"> <thead> <tr> <th colspan="3">Landfill Waste Acceptance Criteria Limits</th> </tr> <tr> <th>Inert Waste Landfill</th> <th>Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill</th> <th>Hazardous Waste Landfill</th> </tr> </thead> <tbody> <tr> <td>3%</td> <td>5%</td> <td>6%</td> </tr> <tr> <td>--</td> <td>--</td> <td>10%</td> </tr> <tr> <td>6</td> <td>--</td> <td>--</td> </tr> <tr> <td>1</td> <td>--</td> <td>--</td> </tr> <tr> <td>500</td> <td>--</td> <td>--</td> </tr> <tr> <td>100</td> <td>--</td> <td>--</td> </tr> <tr> <td>--</td> <td>>6</td> <td>--</td> </tr> <tr> <td>--</td> <td>To be evaluated</td> <td>To be evaluated</td> </tr> </tbody> </table>					Landfill Waste Acceptance Criteria Limits			Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill	3%	5%	6%	--	--	10%	6	--	--	1	--	--	500	--	--	100	--	--	--	>6	--	--	To be evaluated	To be evaluated
Landfill Waste Acceptance Criteria Limits																																							
Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill																																					
3%	5%	6%																																					
--	--	10%																																					
6	--	--																																					
1	--	--																																					
500	--	--																																					
100	--	--																																					
--	>6	--																																					
--	To be evaluated	To be evaluated																																					
LK Consult Limited		Time Sampled	None Supplied																																				
Site Reference: Middleton Old Cemetery		TP / BH No	HD102																																				
Project / Job Ref: LKC 22 1558		Additional Refs	None Supplied																																				
Order No: LKC 22 1558-RP		Depth (m)	0.00 - 0.30																																				
Reporting Date: 11/04/2023		DETS Sample No	642254																																				
Determinand	Unit	MDL																																					
TOC ^{MU}	%	< 0.1	2.5																																				
Loss on Ignition ^{MU}	%	< 0.01	5.80																																				
BTEX ^{MU}	mg/kg	< 0.05	< 0.05																																				
Sum of PCBs	mg/kg	< 0.1	< 0.1																																				
Mineral Oil ^{MU}	mg/kg	< 10	< 10																																				
Total PAH ^{MU}	mg/kg	< 1.7	5.4																																				
pH ^{MU}	pH Units	N/a	5.8																																				
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	< 1																																				
Eluate Analysis			2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)																																
			mg/l	mg/l		mg/kg																																	
Arsenic ^U			< 0.01	< 0.01		< 0.2	0.5	2	25																														
Barium ^U			< 0.02	< 0.02		0.1	20	100	300																														
Cadmium ^U			< 0.0005	< 0.0005		< 0.02	0.04	1	5																														
Chromium ^U			< 0.005	< 0.005		< 0.20	0.5	10	70																														
Copper ^U			< 0.01	< 0.01		< 0.5	2	50	100																														
Mercury ^U			< 0.0005	< 0.0005		< 0.005	0.01	0.2	2																														
Molybdenum ^U			< 0.001	< 0.001		< 0.1	0.5	10	30																														
Nickel ^U			< 0.007	< 0.007		< 0.2	0.4	10	40																														
Lead ^U			0.008	0.006		< 0.2	0.5	10	50																														
Antimony ^U			< 0.005	< 0.005		< 0.05	0.06	0.7	5																														
Selenium ^U			< 0.005	< 0.005		< 0.05	0.1	0.5	7																														
Zinc ^U			< 0.005	< 0.005		< 0.2	4	50	200																														
Chloride ^U			2	< 1		< 12	800	15000	25000																														
Fluoride ^U			< 0.5	< 0.5		< 1	10	150	500																														
Sulphate ^U			3	< 1		< 20	1000	20000	50000																														
TDS			30	13		150	4000	60000	100000																														
Phenol Index			< 0.01	< 0.01		< 0.5	1	-	-																														
DOC			13.4	7.1		78.9	500	800	1000																														
Leach Test Information																																							
Sample Mass (kg)			0.20																																				
Dry Matter (%)			86.5																																				
Moisture (%)			15.8																																				
Stage 1																																							
Volume Eluate L2 (litres)			0.32																																				
Filtered Eluate VE1 (litres)			0.21																																				

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Samples Descriptions page describes if the test is performed on the dried or as-received portion
 Stated limits are for guidance only and DETS Ltd cannot be held responsible for any discrepancies with current legislation
 M Denotes MCERTS accredited test
 U Denotes ISO17025 accredited test



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Soil Analysis Certificate - Sample Descriptions

DETS Report No: 23-03979

LK Consult Limited

Site Reference: Middleton Old Cemetery

Project / Job Ref: LKC 22 1558

Order No: LKC 22 1558-RP

Reporting Date: 11/04/2023

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
642237	WS101	None Supplied	0.10 - 0.80	7.7	Brown sandy clay with stones
642239	WS103	None Supplied	0.00 - 0.70	10.4	Brown sandy clay with stones
642241	WS103	None Supplied	0.80 - 1.20	7.9	Brown sandy clay with stones
642243	WS105	None Supplied	0.00 - 0.15	21.5	Black loamy sand with stones and vegetation
642245	WS105	None Supplied	0.15 - 1.00	10.2	Light brown sandy clay with stones
642247	WS105	None Supplied	1.20 - 2.00	5.3	Light brown sandy clay with stones
642249	FP101	None Supplied	0.00 - 0.50	14.6	Black loamy sand with stones and brick
642250	HD101	None Supplied	0.00 - 0.30	9.1	Black loamy sand with stones
642252	HD101	None Supplied	0.50 - 1.00	8.7	Brown sandy clay with stones
642254	HD102	None Supplied	0.00 - 0.30	13.6	Black loamy sand with stones and vegetation

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

Insufficient Sample ^{1/S}

Unsuitable Sample ^{U/S}



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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 23-03979

LK Consult Limited

Site Reference: Middleton Old Cemetery

Project / Job Ref: LKC 22 1558

Order No: LKC 22 1558-RP

Reporting Date: 11/04/2023

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 diphenylcarbazide 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 @ 450oC	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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Water Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 23-03979

LK Consult Limited

Site Reference: Middleton Old Cemetery

Project / Job Ref: LKC 22 1558

Order No: LKC 22 1558-RP

Reporting Date: 11/04/2023

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	F	Ammoniacal Nitrogen	Determination of ammoniacal nitrogen by discrete analyser.	E126
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR detection	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	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 liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	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 liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered



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List of HWOL Acronyms and Operators
DETS Report No: 23-03979
LK Consult Limited
Site Reference: Middleton Old Cemetery
Project / Job Ref: LKC 22 1558
Order No: LKC 22 1558-RP
Reporting Date: 11/04/2023

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
Mineral Oil (C10 - C40) (BS EN 12457-3) - EH_CU_1D_AL
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
Total BTEX (BS EN 12457-3) - HS_1D_MS_Total
m & p-xylene - HS_1D_MS
o-Xylene - HS_1D_MS

Parameter	Matrix Type	Suite Reference	Expanded Uncertainty Measurement	Unit
TOC	Soil	BS EN 12457	10.4	%
Loss on Ignition	Soil	BS EN 12457	16.9	%
BTEX	Soil	BS EN 12457	14.0	%
Sum of PCBs	Soil	BS EN 12457	21.1	%
Mineral Oil	Soil	BS EN 12457	9.0	%
Total PAH	Soil	BS EN 12457	17.9	%
pH	Soil	BS EN 12457	0.282	Units
Acid Neutralisation Capacity	Soil	BS EN 12457	18.0	%
Arsenic	Leachate	BS EN 12457	19.5	%
Barium	Leachate	BS EN 12457	12.2	%
Cadmium	Leachate	BS EN 12457	17.2	%
Chromium	Leachate	BS EN 12457	20.7	%
Copper	Leachate	BS EN 12457	14.1	%
Mercury	Leachate	BS EN 12457	16.7	%
Molybdenum	Leachate	BS EN 12457	13.3	%
Nickel	Leachate	BS EN 12457	14.0	%
Lead	Leachate	BS EN 12457	12.1	%
Antimony	Leachate	BS EN 12457	16.1	%
Selenium	Leachate	BS EN 12457	15.5	%
Zinc	Leachate	BS EN 12457	14.0	%
Chloride	Leachate	BS EN 12457	15.7	%
Fluoride	Leachate	BS EN 12457	19.1	%
Sulphate	Leachate	BS EN 12457	27.6	%
TDS	Leachate	BS EN 12457	10.0	%
Phenol Index	Leachate	BS EN 12457	12.9	%
DOC	Leachate	BS EN 12457	20.4	%
Clay Content	Soil	BS 3882: 2015	15.0	%
Silt Content	Soil	BS 3882: 2015	14.0	%
Sand Content	Soil	BS 3882: 2015	13.0	%
Loss on Ignition	Soil	BS 3882: 2015	16.9	%
pH	Soil	BS 3882: 2015	0.282	Units
Carbonate	Soil	BS 3882: 2015	12.0	%
Total Nitrogen	Soil	BS 3882: 2015	12.0	%
Phosphorus (Extractable)	Soil	BS 3882: 2015	24.0	%
Potassium (Extractable)	Soil	BS 3882: 2015	20.0	%
Magnesium (Extractable)	Soil	BS 3882: 2015	26.0	%
Zinc	Soil	BS 3882: 2015	19.8	%
Copper	Soil	BS 3882: 2015	23.2	%
Nickel	Soil	BS 3882: 2015	32.6	%
Available Sodium	Soil	BS 3882: 2015	23.0	%
Available Calcium	Soil	BS 3882: 2015	23.0	%
Electrical Conductivity	Soil	BS 3882: 2015	10.0	%

Appendix C

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 1558 -
Middleton Old Cemetery

Job Number MRN 4606/36

Date of Issue 19 April 2023

Page 1 of 6

Approved Signatories

S J Hutchings, O P Davies

Notes

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



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

Also at: London: 020 8523 1999

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

TEST CERTIFICATE
PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

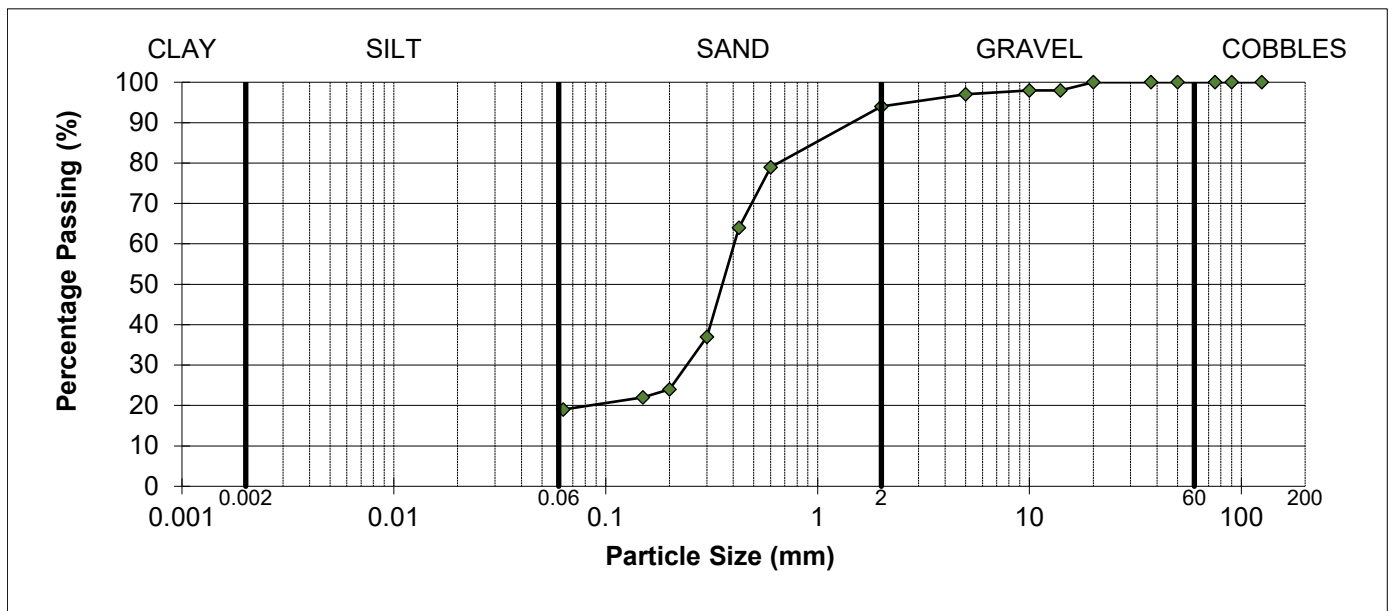
Determination of Water Content in accordance with BS EN ISO 17892-1:2014 (Oven Dry)

CLIENT	LK Consult Ltd		
SITE	LKC 22 1558 - Middleton Old Cemetery		
JOB NUMBER	MRN 4606/36		

SAMPLE LABEL	WS102 / 1.20-2.00m	DATE SAMPLED	14-15-Mar-23
LAB SAMPLE No	122996	DATE RECEIVED	30-Mar-23
DATE TESTED	03-Apr-23	SAMPLED BY	Client

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

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	97	
90	100		2	94	
75	100		0.6	79	
50	100		0.425	64	
37.5	100		0.3	37	
20	100		0.2	24	
14	98		0.15	22	
10	98		0.063	19	



REMARKS

As received water content = 12.4%

SIGNED



NAME

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

DATE

19-Apr-23

TEST CERTIFICATE
PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

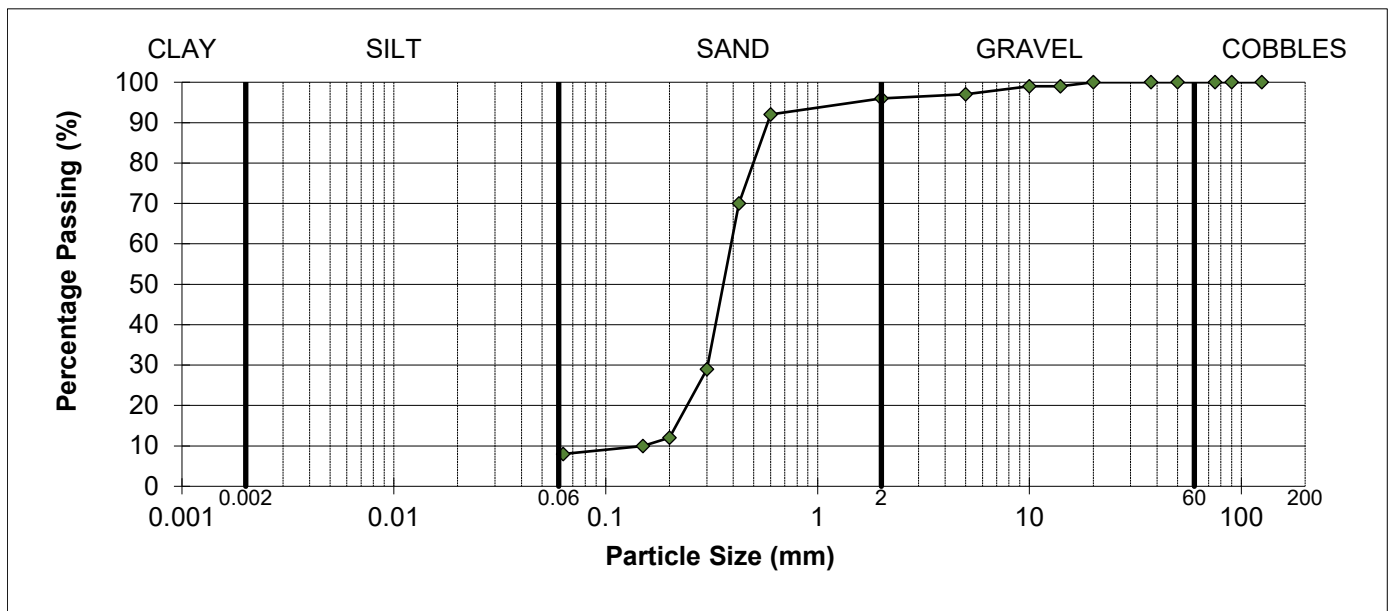
Determination of Water Content in accordance with BS EN ISO 17892-1:2014 (Oven Dry)

CLIENT	LK Consult Ltd
SITE	LKC 22 1558 - Middleton Old Cemetery
JOB NUMBER	MRN 4606/36

SAMPLE LABEL	WS104 / 1.50-2.00m	DATE SAMPLED	14-15-Mar-23
LAB SAMPLE No	122997	DATE RECEIVED	30-Mar-23
DATE TESTED	03-Apr-23	SAMPLED BY	Client

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

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	97	
90	100		2	96	
75	100		0.6	92	
50	100		0.425	70	
37.5	100		0.3	29	
20	100		0.2	12	
14	99		0.15	10	
10	99		0.063	8	



REMARKS

As received water content = 3.4%

SIGNED



NAME

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

DATE

19-Apr-23

TEST CERTIFICATE
PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

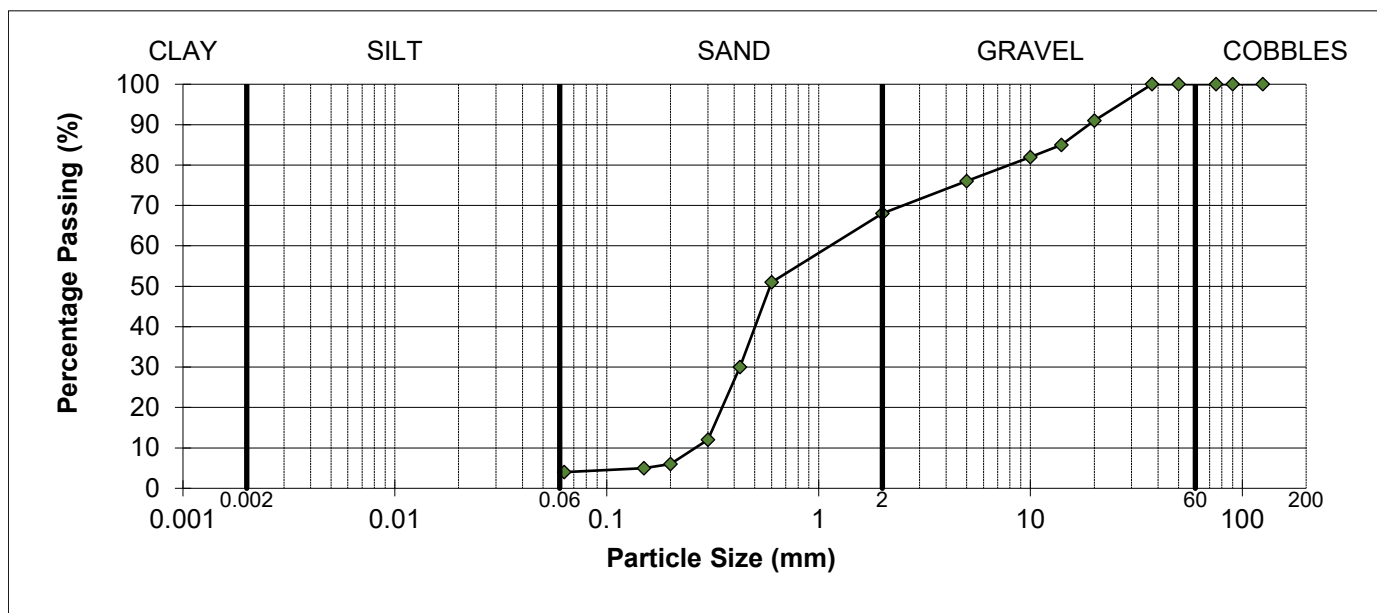
Determination of Water Content in accordance with BS EN ISO 17892-1:2014 (Oven Dry)

CLIENT	LK Consult Ltd
SITE	LKC 22 1558 - Middleton Old Cemetery
JOB NUMBER	MRN 4606/36

SAMPLE LABEL	WS105 / 1.20-2.00m	DATE SAMPLED	14-15-Mar-23
LAB SAMPLE No	122998	DATE RECEIVED	30-Mar-23
DATE TESTED	03-Apr-23	SAMPLED BY	Client

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

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	76	
90	100		2	68	
75	100		0.6	51	
50	100		0.425	30	
37.5	100		0.3	12	
20	91		0.2	6	
14	85		0.15	5	
10	82		0.063	4	



REMARKS

As received water content = 7.9%

SIGNED



NAME

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

DATE

19-Apr-23

TEST CERTIFICATE
PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

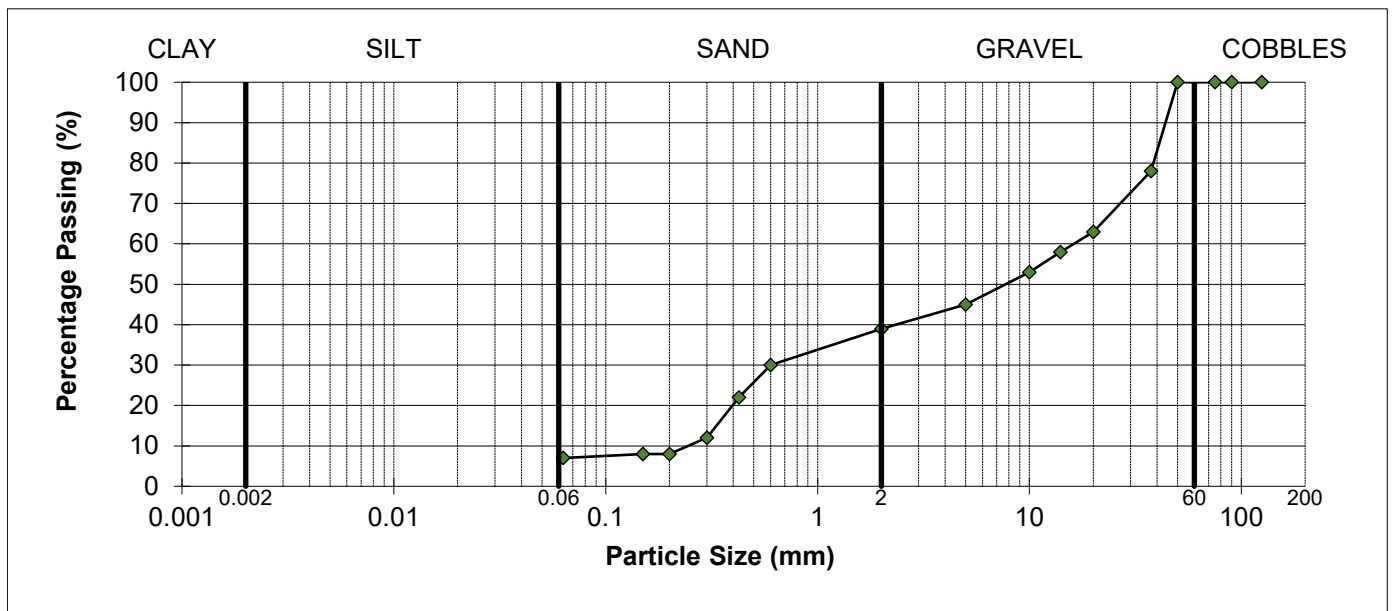
Determination of Water Content in accordance with BS EN ISO 17892-1:2014 (Oven Dry)

CLIENT	LK Consult Ltd
SITE	LKC 22 1558 - Middleton Old Cemetery
JOB NUMBER	MRN 4606/36

SAMPLE LABEL	WS105 / 3.00-4.00m	DATE SAMPLED	14-15-Mar-23
LAB SAMPLE No	122999	DATE RECEIVED	30-Mar-23
DATE TESTED	03-Apr-23	SAMPLED BY	Client

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

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	45	
90	100		2	39	
75	100		0.6	30	
50	100		0.425	22	
37.5	78		0.3	12	
20	63		0.2	8	
14	58		0.15	8	
10	53		0.063	7	



REMARKS

As received water content = 7.3%

SIGNED



NAME

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

DATE

19-Apr-23

MURRAY RIX

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

TEST CERTIFICATE

DETERMINATION OF DENSITY, ONE POINT COMPACTION 2.5kg RAMMER METHOD

MOISTURE CONTENT METHOD BS 1377 : Part 2 CLAUSE 3.2 : 1990 (OVEN DRY)

CLIENT	LK Consult Ltd
SITE	LKC 22 1558 - Middleton Old Cemetery
JOB NUMBER	MRN 4606/36

DATE SAMPLED	14-15-Mar-23	DATE RECEIVED	30-Apr-23
DATE TESTED	03-Apr-23	SAMPLED BY	Client
SAMPLE LOCATION	See Sample Label	MATERIAL SOURCE	Site Investigation Sample

Sample Number	Sample Label	Material	Bulk Density (Mg/m ³)	Moisture Content (%)	Dry Density (Mg/m ³)
122997	WS104 / 1.50-2.00m	Yellowish brown silty slightly gravelly SAND	1.73	3.4	1.67
122300	HD102 / 1.00-1.50m	Yellowish brown silty slightly sandy GRAVEL	2.00	8.3	1.84

REMARKS/ABNORMALITIES

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

SIGNED



DATE

19-Apr-23

Appendix D

Slope Stability Modelling Report Sheets

About this Report

This report has been generated using LimitState:GEO, a software application capable of directly identifying the critical collapse mechanism for a wide variety of geotechnical stability problems, including those involving slopes, retaining walls, footings etc.

The software utilizes the Discontinuity Layout Optimization (DLO) procedure to obtain a solution (Smith and Gilbert 2007). The main steps involved are: (i) distribution of nodes across the problem domain; (ii) connection of every node to every other node with potential discontinuities (e.g. slip-lines); (iii) application of rigorous optimization techniques to identify the critical subset of potential discontinuities, and hence also the critical failure mechanism and margin of safety.

The accuracy of the DLO solution is controlled by the specified nodal density. Within the set of all possible discontinuities linking pairs of nodes, all potential translational failure mechanisms are considered, whether anticipated or not by the engineer. Failure mechanisms involving rotations along the edges of solid bodies in the problem can also be identified. Thus in this case the solution identified by the DLO procedure is guaranteed to be the most critical solution for the problem posed. This means that there is no need to prescribe any aspect of the collapse mechanism prior to an analysis, or to separately consider different failure modes. The critical mechanism and collapse load factor are determined according to the well established upper bound theorem of plasticity.

LimitState:GEO reports the solution to a problem both visually as a collapse mechanism and numerically in terms of an Adequacy Factor, which is defined as the factor by which specified loads must be increased, or material strengths decreased, in order for the system under consideration to reach a collapse state.

REFERENCE

Smith, C.C. and Gilbert, M. (2007) Application of discontinuity layout optimization to plane plasticity problems, Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences, Vol. 463, 2086, pp 2461-2484.

Summary

Name	Date of Analysis	Name of Engineer	Organization
Middleton Old Cemetery	Fri May 12 2023	AT	LK GROUP

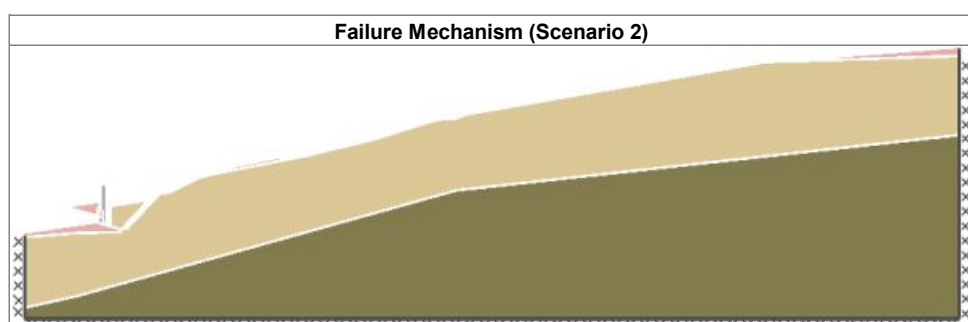
Reference #	Location	Map Reference	Tags
LKC 22 1558	Middleton, Manchester		

Comments

Target Nodal Density	Nodal Spacing Scale Factor	Water	Model Translational Failures?	Model Rotational Failures?	Seismic Accelerations: Horiz. / Vert. (g)
Medium (500 nodes)	0.421788	Enabled	True	Along edges	None

Scenario	Partial Factor Set	Short / Long Term?**	Analysis Type	Adequacy Factor
1	EC7 DA1/1	Long Term	Factor Strength(s)	1.349
2*	EC7 DA1/2	Long Term	Factor Strength(s)	1.082
3	Unity	Long Term	Factor Strength(s)	1.349

*This report provides details of this scenario, which has been identified as the most critical. **For Mohr Coulomb materials with Drainage Behaviour specified as 'drained/undrained', undrained properties are used in a short term analysis, and drained properties are used in a long term analysis.



Analysis Options

Factor Strength(s)

Solution Tolerance (%)	Automatic Adequacy on Load(s)	Factor on Load(s)	Artificial Cohesion (kN/m ² (kPa))
1	True	1	0.1

Geometry

(all distances in m)

All Geometrical Objects

No. of Vertices (V)	No. of Boundaries (B)	No. of Solids (S)
34	40	7

Boundary Objects

ID	Start Vertex ID (x, y)	End Vertex ID (x, y)	Baseline Nodal Spacing	Support Type	Material(s)
B1	V1 (0, 92)	V5 (8, 93)	0.5	Free	-
B2	V20 (76, 110)	V34 (76, 110)	0.5	Fixed	-
B3	V2 (76, 85)	V4 (0, 85)	0.5	Fixed	-
B4	V1 (0, 92)	V32 (-0.00031, 92)	0.5	Free	-
B5	V5 (8, 93)	V27 (8, 93)	0.5	Free	-
B6	V6 (8, 95)	V7 (8.3, 95)	0.5	Free	-
B7	V7 (8.3, 95)	V8 (8.3, 95)	0.5	Free	-
B8	V8 (8.3, 95)	V9 (12, 95)	0.5	Free	-
B9	V9 (12, 95)	V10 (14, 96)	0.5	Free	-
B10	V10 (14, 96)	V11 (15, 97)	0.5	Free	-
B11	V11 (15, 97)	V12 (17, 97)	0.5	Free	-
B12	V12 (17, 97)	V13 (20, 98)	0.5	Free	-
B13	V13 (20, 98)	V14 (23, 98)	0.5	Free	-
B14	V14 (23, 98)	V15 (29, 99)	0.5	Free	-
B15	V15 (29, 99)	V16 (33, 100)	0.5	Free	-
B16	V16 (33, 100)	V17 (34, 100)	0.5	Free	-
B17	V17 (34, 100)	V18 (35, 100)	0.5	Free	-
B18	V18 (35, 100)	V19 (36, 100)	0.5	Free	-
B19	V19 (36, 100)	V35 (60, 110)	0.5	Free	-
B21	V8 (8.3, 95)	V24 (8.3, 94)	0.5	Free	-
B22	V21 (8, 92)	V27 (8, 93)	0.5	Free	-
B23	V22 (8.3, 92)	V21 (8, 92)	0.5	Free	-
B24	V23 (8.3, 94)	V22 (8.3, 92)	0.5	Free	-
B25	V24 (8.3, 94)	V23 (8.3, 94)	0.5	Free	-
B29	V27 (8, 93)	V6 (8, 95)	0.5	Free	-
B30	V28 (0, 86)	V30 (4.2, 87)	0.5	Free	-
B31	V28 (0, 86)	V4 (0, 85)	0.5	Fixed	-
B32	V29 (76, 100)	V2 (76, 85)	0.5	Fixed	-
B33	V30 (4.2, 87)	V31 (35, 96)	0.5	Free	-
B34	V31 (35, 96)	V29 (76, 100)	0.5	Free	-
B35	V21 (8, 92)	V36 (7.8, 92)	0.5	Free	-
B36	V32 (-0.00031, 92)	V28 (0, 86)	0.5	Fixed	-
B37	V33 (4.1, 92)	V32 (-0.00031, 92)	0.5	Free	-
B38	V14 (23, 98)	V11 (15, 97)	0.5	Free	-
B39	V34 (76, 110)	V35 (60, 110)	0.5	Free	-
B40	V34 (76, 110)	V29 (76, 100)	0.5	Fixed	-
B41	V35 (60, 110)	V20 (76, 110)	0.5	Free	-
B42	V27 (8, 93)	V37 (7.8, 93)	0.5	Free	-

B43	V36 (7.8, 92)	V33 (4.1, 92)	0.5	Free	-
B44	V37 (7.8, 93)	V36 (7.8, 92)	0.5	Free	-

* Loaded boundary.

Solid Objects

ID	Vertex IDs (x, y)	Boundary IDs	Baseline Nodal Spacing (x / y)	Material(s)/Water Regime(s)
S19*	V21 (8,92) V27 (8,93) V6 (8,95) V7 (8.3,95) V8 (8.3,95) V24 (8.3,94) V23 (8.3,94) V22 (8.3,92)	B22 B29 B6 B7 B21 B25 B24 B23	1 / 1	Brick Wall
S28*	V29 (76,100) V2 (76,85) V4 (0,85) V28 (0,86) V30 (4.2,87) V31 (35,96)	B32 B3 B31 B30 B33 B34	1 / 1	Dense Sand
S34*	V11 (15,97) V12 (17,97) V13 (20,98) V14 (23,98)	B11 B12 B13 B38	1 / 1	Made Ground
S36*	V35 (60,110) V20 (76,110) V34 (76,110)	B41 B2 B39	1 / 1	Made Ground
S37*	V34 (76,110) V29 (76,100) V31 (35,96) V30 (4.2,87) V28 (0,86) V32 (-0.00031,92) V33 (4.1,92) V36 (7.8,92) V21 (8,92) V22 (8.3,92) V23 (8.3,94) V24 (8.3,94) V8 (8.3,95) V9 (12,95) V10 (14,96) V11 (15,97) V14 (23,98) V15 (29,99) V16 (33,100) V17 (34,100) V18 (35,100) V19 (36,100) V35 (60,110)	B40 B34 B33 B30 B36 B37 B43 B35 B23 B24 B25 B21 B8 B9 B10 B38 B14 B15 B16 B17 B18 B19 B39	1 / 1	NS Medium-Dense Sand
S38*	V27 (8,93) V21 (8,92) V36 (7.8,92) V37 (7.8,93)	B22 B35 B44 B42	1 / 1	Brick Wall
S39*	V36 (7.8,92) V33 (4.1,92) V32 (-0.00031,92) V1 (0,92) V5 (8,93) V27 (8,93) V37 (7.8,93)	B43 B37 B4 B1 B5 B42 B44	1 / 1	Made Ground

* Loaded solid (self weight).

Water Table (all distances in m)

Water Table Status	Vertices (x, y)
Enabled	(No water table points defined)

Water Regimes (potentials in m, pressures in kN/m² (kPa))
(No water regime defined)

Materials (unit weights (weight densities) in kN/m³, strengths in kN/m² (kPa), angles in degrees, datum level in m, undrained strength gradient in kN/m² (kPa)/m)

Mohr-Coulomb Material(s)

Key	Name	Unit Weight (Saturated Unit Weight)	Drainage Behaviour	c' (φ')	c _u (datum) (gradient) (grid)
	Brick Wall	15 (15)	Always undrained	0.1 (0)	250* (0*) (0*) (-)
	Dense Sand	18 (21)	Always drained	0* (45*)	0 (0) (0) (-)
	Made Ground	17 (19)	Always drained	0.1* (25*)	0 (0) (0) (-)
	NS Medium-Dense Sand	18 (19.6)	Always drained	0.1* (29*)	0 (0) (0) (-)

*Property used in Scenario 2 (described in this report).

Partial Factors

Factor	EC7 DA1/1	EC7 DA1/2*	Unity	
Unfavourable: permanent	1.35	1	1	
Unfavourable: variable	1.5	1.3	1	
Unfavourable: accidental	1	1	1	
Favourable: permanent	1	1	1	
Favourable: variable	0	0	1	
Favourable: accidental	0	0	1	
c'	1	1.25	1	
tanφ'	1	1.25	1	
c _u	1	1.4	1	

*These partial factors were used in Scenario 2 (described in this report).

Loads (normal and shear loads in kN/m² (kPa))

Solid Objects

Loaded Object	Type	Loading Type	Adequacy?
S19	Permanent (unfactored self weight: 15 kN/m ³)	neutral	true
S28	Permanent (unfactored self weight: 18 kN/m ³)	neutral	true
S34	Permanent (unfactored self weight: 17 kN/m ³)	neutral	true
S36	Permanent (unfactored self weight: 17 kN/m ³)	neutral	true
S37	Permanent (unfactored self weight: 18 kN/m ³)	neutral	true
S38	Permanent (unfactored self weight: 15 kN/m ³)	neutral	true
S39	Permanent (unfactored self weight: 17 kN/m ³)	neutral	true

About this Report

This report has been generated using LimitState:GEO, a software application capable of directly identifying the critical collapse mechanism for a wide variety of geotechnical stability problems, including those involving slopes, retaining walls, footings etc.

The software utilizes the Discontinuity Layout Optimization (DLO) procedure to obtain a solution (Smith and Gilbert 2007). The main steps involved are: (i) distribution of nodes across the problem domain; (ii) connection of every node to every other node with potential discontinuities (e.g. slip-lines); (iii) application of rigorous optimization techniques to identify the critical subset of potential discontinuities, and hence also the critical failure mechanism and margin of safety.

The accuracy of the DLO solution is controlled by the specified nodal density. Within the set of all possible discontinuities linking pairs of nodes, all potential translational failure mechanisms are considered, whether anticipated or not by the engineer. Failure mechanisms involving rotations along the edges of solid bodies in the problem can also be identified. Thus in this case the solution identified by the DLO procedure is guaranteed to be the most critical solution for the problem posed. This means that there is no need to prescribe any aspect of the collapse mechanism prior to an analysis, or to separately consider different failure modes. The critical mechanism and collapse load factor are determined according to the well established upper bound theorem of plasticity.

LimitState:GEO reports the solution to a problem both visually as a collapse mechanism and numerically in terms of an Adequacy Factor, which is defined as the factor by which specified loads must be increased, or material strengths decreased, in order for the system under consideration to reach a collapse state.

REFERENCE

Smith, C.C. and Gilbert, M. (2007) Application of discontinuity layout optimization to plane plasticity problems, Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences, Vol. 463, 2086, pp 2461-2484.

Summary

Name	Date of Analysis	Name of Engineer	Organization
Middleton Old Cemetery	Fri May 12 2023	AT	LK GROUP

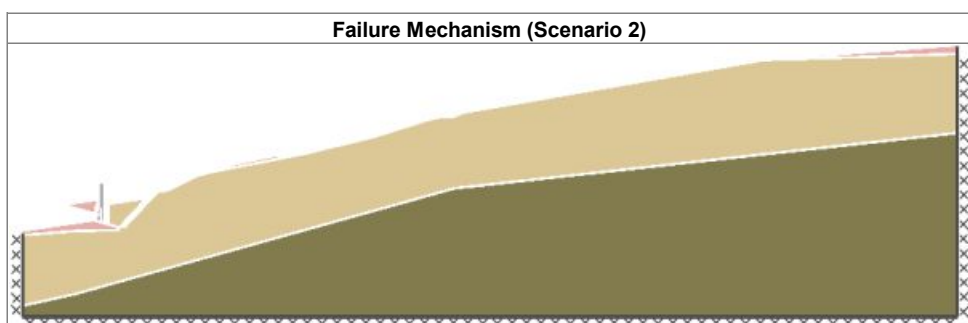
Reference #	Location	Map Reference	Tags
LKC 22 1558	Middleton, Manchester		

Comments

Target Nodal Density	Nodal Spacing Scale Factor	Water	Model Translational Failures?	Model Rotational Failures?	Seismic Accelerations: Horiz. / Vert. (g)
Medium (500 nodes)	0.421788	Enabled	True	Along edges	None

Scenario	Partial Factor Set	Short / Long Term?**	Analysis Type	Adequacy Factor
1	EC7 DA1/1	Short Term	Factor Strength(s)	1.349
2*	EC7 DA1/2	Short Term	Factor Strength(s)	1.082
3	Unity	Short Term	Factor Strength(s)	1.349

*This report provides details of this scenario, which has been identified as the most critical. **For Mohr Coulomb materials with Drainage Behaviour specified as 'drained/undrained', undrained properties are used in a short term analysis, and drained properties are used in a long term analysis.



Analysis Options

Factor Strength(s)

Solution Tolerance (%)	Automatic Adequacy on Load(s)	Factor on Load(s)	Artificial Cohesion (kN/m ² (kPa))
1	True	1	0.1

Geometry

(all distances in m)

All Geometrical Objects

No. of Vertices (V)	No. of Boundaries (B)	No. of Solids (S)
34	40	7

Boundary Objects

ID	Start Vertex ID (x, y)	End Vertex ID (x, y)	Baseline Nodal Spacing	Support Type	Material(s)
B1	V1 (0, 92)	V5 (8, 93)	0.5	Free	-
B2	V20 (76, 110)	V34 (76, 110)	0.5	Fixed	-
B3	V2 (76, 85)	V4 (0, 85)	0.5	Fixed	-
B4	V1 (0, 92)	V32 (-0.00031, 92)	0.5	Free	-
B5	V5 (8, 93)	V27 (8, 93)	0.5	Free	-
B6	V6 (8, 95)	V7 (8.3, 95)	0.5	Free	-
B7	V7 (8.3, 95)	V8 (8.3, 95)	0.5	Free	-
B8	V8 (8.3, 95)	V9 (12, 95)	0.5	Free	-
B9	V9 (12, 95)	V10 (14, 96)	0.5	Free	-
B10	V10 (14, 96)	V11 (15, 97)	0.5	Free	-
B11	V11 (15, 97)	V12 (17, 97)	0.5	Free	-
B12	V12 (17, 97)	V13 (20, 98)	0.5	Free	-
B13	V13 (20, 98)	V14 (23, 98)	0.5	Free	-
B14	V14 (23, 98)	V15 (29, 99)	0.5	Free	-
B15	V15 (29, 99)	V16 (33, 100)	0.5	Free	-
B16	V16 (33, 100)	V17 (34, 100)	0.5	Free	-
B17	V17 (34, 100)	V18 (35, 100)	0.5	Free	-
B18	V18 (35, 100)	V19 (36, 100)	0.5	Free	-
B19	V19 (36, 100)	V35 (60, 110)	0.5	Free	-
B21	V8 (8.3, 95)	V24 (8.3, 94)	0.5	Free	-
B22	V21 (8, 92)	V27 (8, 93)	0.5	Free	-
B23	V22 (8.3, 92)	V21 (8, 92)	0.5	Free	-
B24	V23 (8.3, 94)	V22 (8.3, 92)	0.5	Free	-
B25	V24 (8.3, 94)	V23 (8.3, 94)	0.5	Free	-
B29	V27 (8, 93)	V6 (8, 95)	0.5	Free	-
B30	V28 (0, 86)	V30 (4.2, 87)	0.5	Free	-
B31	V28 (0, 86)	V4 (0, 85)	0.5	Fixed	-
B32	V29 (76, 100)	V2 (76, 85)	0.5	Fixed	-
B33	V30 (4.2, 87)	V31 (35, 96)	0.5	Free	-
B34	V31 (35, 96)	V29 (76, 100)	0.5	Free	-
B35	V21 (8, 92)	V36 (7.8, 92)	0.5	Free	-
B36	V32 (-0.00031, 92)	V28 (0, 86)	0.5	Fixed	-
B37	V33 (4.1, 92)	V32 (-0.00031, 92)	0.5	Free	-
B38	V14 (23, 98)	V11 (15, 97)	0.5	Free	-
B39	V34 (76, 110)	V35 (60, 110)	0.5	Free	-
B40	V34 (76, 110)	V29 (76, 100)	0.5	Fixed	-
B41	V35 (60, 110)	V20 (76, 110)	0.5	Free	-
B42	V27 (8, 93)	V37 (7.8, 93)	0.5	Free	-

B43	V36 (7.8, 92)	V33 (4.1, 92)	0.5	Free	-
B44	V37 (7.8, 93)	V36 (7.8, 92)	0.5	Free	-

* Loaded boundary.

Solid Objects

ID	Vertex IDs (x, y)	Boundary IDs	Baseline Nodal Spacing (x / y)	Material(s)/Water Regime(s)
S19*	V21 (8,92) V27 (8,93) V6 (8,95) V7 (8.3,95) V8 (8.3,95) V24 (8.3,94) V23 (8.3,94) V22 (8.3,92)	B22 B29 B6 B7 B21 B25 B24 B23	1 / 1	Brick Wall
S28*	V29 (76,100) V2 (76,85) V4 (0,85) V28 (0,86) V30 (4.2,87) V31 (35,96)	B32 B3 B31 B30 B33 B34	1 / 1	Dense Sand
S34*	V11 (15,97) V12 (17,97) V13 (20,98) V14 (23,98)	B11 B12 B13 B38	1 / 1	Made Ground
S36*	V35 (60,110) V20 (76,110) V34 (76,110)	B41 B2 B39	1 / 1	Made Ground
S37*	V34 (76,110) V29 (76,100) V31 (35,96) V30 (4.2,87) V28 (0,86) V32 (-0.00031,92) V33 (4.1,92) V36 (7.8,92) V21 (8,92) V22 (8.3,92) V23 (8.3,94) V24 (8.3,94) V8 (8.3,95) V9 (12,95) V10 (14,96) V11 (15,97) V14 (23,98) V15 (29,99) V16 (33,100) V17 (34,100) V18 (35,100) V19 (36,100) V35 (60,110)	B40 B34 B33 B30 B36 B37 B43 B35 B23 B24 B25 B21 B8 B9 B10 B38 B14 B15 B16 B17 B18 B19 B39	1 / 1	NS Medium-Dense Sand
S38*	V27 (8,93) V21 (8,92) V36 (7.8,92) V37 (7.8,93)	B22 B35 B44 B42	1 / 1	Brick Wall
S39*	V36 (7.8,92) V33 (4.1,92) V32 (-0.00031,92) V1 (0,92) V5 (8,93) V27 (8,93) V37 (7.8,93)	B43 B37 B4 B1 B5 B42 B44	1 / 1	Made Ground

* Loaded solid (self weight).

Water Table (all distances in m)

Water Table Status	Vertices (x, y)
Enabled	(No water table points defined)

Water Regimes (potentials in m, pressures in kN/m² (kPa))
(No water regime defined)

Materials (unit weights (weight densities) in kN/m³, strengths in kN/m² (kPa), angles in degrees, datum level in m, undrained strength gradient in kN/m² (kPa)/m)

Mohr-Coulomb Material(s)

Key	Name	Unit Weight (Saturated Unit Weight)	Drainage Behaviour	c' (φ')	c _u (datum) (gradient) (grid)
	Brick Wall	15 (15)	Always undrained	0.1 (0)	250* (0*) (0*) (-)
	Dense Sand	18 (21)	Always drained	0* (45*)	0 (0) (0) (-)
	Made Ground	17 (19)	Always drained	0.1* (25*)	0 (0) (0) (-)
	NS Medium-Dense Sand	18 (19.6)	Always drained	0.1* (29*)	0 (0) (0) (-)

*Property used in Scenario 2 (described in this report).

Partial Factors

Factor	EC7 DA1/1	EC7 DA1/2*	Unity	
Unfavourable: permanent	1.35	1	1	
Unfavourable: variable	1.5	1.3	1	
Unfavourable: accidental	1	1	1	
Favourable: permanent	1	1	1	
Favourable: variable	0	0	1	
Favourable: accidental	0	0	1	
c'	1	1.25	1	
tanφ'	1	1.25	1	
c _u	1	1.4	1	

*These partial factors were used in Scenario 2 (described in this report).

Loads (normal and shear loads in kN/m² (kPa))

Solid Objects

Loaded Object	Type	Loading Type	Adequacy?
S19	Permanent (unfactored self weight: 15 kN/m ³)	neutral	true
S28	Permanent (unfactored self weight: 18 kN/m ³)	neutral	true
S34	Permanent (unfactored self weight: 17 kN/m ³)	neutral	true
S36	Permanent (unfactored self weight: 17 kN/m ³)	neutral	true
S37	Permanent (unfactored self weight: 18 kN/m ³)	neutral	true
S38	Permanent (unfactored self weight: 15 kN/m ³)	neutral	true
S39	Permanent (unfactored self weight: 17 kN/m ³)	neutral	true

Appendix E

EN1997 (EC7) Partial Factors

Design approach : 1 - reduction of actions and soil parameters

Partial factors on actions (A)					
Permanent design situation					
		Combination 1		Combination 2	
		Unfavourable	Favourable	Unfavourable	Favourable
Permanent actions :	$\gamma_G =$	1.35 [-]	1.00 [-]	1.00 [-]	1.00 [-]
Variable actions :	$\gamma_Q =$	1.50 [-]	0.00 [-]	1.30 [-]	0.00 [-]
Water load :	$\gamma_w =$	1.35 [-]		1.00 [-]	

Partial factors for soil parameters (M)			
Permanent design situation			
		Combination 1	Combination 2
Partial factor on internal friction :	$\gamma_\phi =$	1.00 [-]	1.25 [-]
Partial factor on effective cohesion :	$\gamma_c =$	1.00 [-]	1.25 [-]
Partial factor on undrained shear strength :	$\gamma_{cu} =$	1.00 [-]	1.40 [-]

Appendix F

Generic Assessment Criteria Values

Summary of Category 4 Screening Levels: 2015

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

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

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

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

NOTES

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

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

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

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

NOTES

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

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

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

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

Contaminant	SOM	Res +	Res -	Allot.	Comm.	POS _{resi}	POS _{park}
Aliphatic							
EC 5-6	1%	42	42	730	3,200 (304) ^{sol}	570,000(304) ^{sol}	95,000 (304) ^{sol}
EC>6-8	1%	100	100	2,300	7,800 (144) ^{sol}	600,000	150,000 (144) ^{sol}
EC>8-10	1%	27	27	320	2,000 (78) ^{sol}	13,000	14,000 (78) ^{vap}
EC>10-12	1%	130 (48) ^{vap}	130 (48) ^{vap}	2,200	9,700 (48) ^{sol}	13,000	21,000 (48) ^{vap}
EC>12-16	1%	1,100 (24) ^{sol}	1,100 (24) ^{sol}	11,000	59,000 (24) ^{sol}	13,000	25,000 (24) ^{sol}
EC>16-35	1%	65,000 (8.48) ^{f, sol}	65,000 (8.48) ^{f, sol}	260,000 ^f	160,000 ^f	250,000 ^f	450,000 ^f
EC>35-44	1%	65,000 (8.48) ^{f, sol}	65,000 (8.48) ^{f, sol}	260,000 ^f	160,000 ^f	250,000 ^f	450,000 ^f
Aliphatic							
EC 5-6	2.5%	78	78	1,700	5,900 (558) ^{sol}	590,000	130,000 (558) ^{sol}
EC>6-8	2.5%	230	230	5,600	17,000 (322) ^{sol}	610,000	220,000 (322) ^{sol}
EC>8-10	2.5%	65	65	770	4,800 (190) ^{vap}	13,000	18,000 (190) ^{vap}
EC>10-12	2.5%	330 (118) ^{vap}	330 (118) ^{vap}	4,400	23,000 (118) ^{vap}	13,000	23,000 (118) ^{vap}
EC>12-16	2.5%	2,400 (59) ^{sol}	2,400 (59) ^{sol}	13,000	82,000 (59) ^{sol}	13,000	25,000 (59) ^{sol}
EC>16-35	2.5%	92,000 (21) ^{f, sol}	92,000 (21) ^{f, sol}	270,000 ^f	1,700,000 ^f	250,000 ^f	480,000 ^f
EC>35-44	2.5%	92,000 (21) ^{f, sol}	92,000 (21) ^{f, sol}	270,000 ^f	1,700,000 ^f	250,000 ^f	480,000 ^f
Aliphatic							
EC 5-6	6%	160	160	3,900	12,000 (1,150) ^{sol}	600,000	180,000 (1,150) ^{sol}
EC>6-8	6%	530	530	13,000	40,000 (736) ^{sol}	620,000	320,000 (736) ^{sol}
EC>8-10	6%	150	150	1,700	11,000 (451) ^{vap}	13,000	21,000 (451) ^{vap}
EC>10-12	6%	760 (283) ^{vap}	760 (283) ^{vap}	7,300	47,000 (283) ^{vap}	13,000	24,000 (283) ^{vap}
EC>12-16	6%	4,300 (142) ^{sol}	4,400 (142) ^{sol}	13,000	90,000 (142) ^{sol}	13,000	26,000 (142) ^{sol}
EC>16-35	6%	110,000 ^f	110,000 ^f	270,000 ^f	1,800,000 ^f	250,000 ^f	490,000 ^f
EC>35-44	6%	110,000 ^f	110,000 ^f	270,000 ^f	1,800,000 ^f	250,000 ^f	490,000 ^f
Aromatic							
EC5-7(benzene as non-threshold)	1%	70	370	13	26,000 (1,220) ^{sol}	56,000	76,000 (1,220) ^{sol}
EC>7-8(toluene)	1%	130	860	22	56,000 (869) ^{vap}	56,000	87,000 (869) ^{vap}
EC>8-10	1%	34	47	8.6	3,500 (613) ^{vap}	5,000	7,200 (613) ^{vap}
EC>10-12	1%	74	250	13	16,000 (364) ^{sol}	5,000	9,200 (364) ^{sol}
EC>12-16	1%	140	1,800	23	36,000 (169) ^{sol}	5,100	10,000
EC>16-21	1%	260 ^f	1,900 ^f	46 ^f	28,000 ^f	3,800 ^f	7,600 ^f
EC>21-35	1%	1,100 ^f	1,900 ^f	370 ^f	28,000 ^f	3,800 ^f	7,800 ^f
EC>35-44	1%	1,100 ^f	1,900 ^f	370 ^f	28,000 ^f	3,800 ^f	7,800 ^f
Aromatic							
EC5-7(benzene as non-threshold)	2.5%	140	690	27	46,000 (2,260) ^{sol}	56,000	84,000 (2,260) ^{sol}
EC>7-8(toluene)	2.5%	290	1,800	51	110,000 (1,920) ^{sol}	56,000	95,000 (1,920) ^{sol}
EC>8-10	2.5%	83	110	21	8,100 (1,500) ^{vap}	5,000	8,500 (1,500) ^{vap}
EC>10-12	2.5%	180	590	31	28,000 (899) ^{sol}	5,000	9,700 (899) ^{sol}
EC>12-16	2.5%	330	2,300 (419) ^{sol}	57	37,000	5,100	10,000
EC>16-21	2.5%	540 ^f	1,900 ^f	110 ^f	28,000 ^f	3,800 ^f	7,700 ^f
EC>21-35	2.5%	1,500 ^f	1,900 ^f	820 ^f	28,000 ^f	3,800 ^f	7,800 ^f
EC>35-44	2.5%	1,500 ^f	1,900 ^f	820 ^f	28,000 ^f	3,800 ^f	7,800 ^f
Aromatic							
EC5-7(benzene as non-threshold)	6%	300	1,400	57	86,000 (4,710) ^{sol}	56,000	92,000 (4,710) ^{sol}
EC>7-8(toluene)	6%	660	3,900	120	180,000 (4,360) ^{vap}	56,000	100,000 (4,360) ^{vap}
EC>8-10	6%	190	270	51	17,000 (3,580) ^{vap}	5,000	9,300 (3,580) ^{vap}
EC>10-12	6%	380	1,200	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	1%	1,600 ^f	1,900 ^f	1,200 ^f	28,000 ^f	3,800 ^f	7,800 ^f
+Aromatic	2.5%	1,800 ^f	1,900 ^f	2,100 ^f	28,000 ^f	3,800 ^f	7,800 ^f
>EC44	6%	1,900 ^f	1,900 ^f	3,000 ^f	28,000 ^f	3,800 ^f	7,900 ^f

NOTES

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

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

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

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

NOTES

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

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

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

NOTES

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

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

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

Appendix G

Waste Classification Report

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)



JRLE2-TMUIH-4QL9Y

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

Job name

LKC 22 1558

Description/Comments

Project

LKC 22 1558

Site

Middleton Cemetery

Classified by

Name: **Peter Dunn**
Date: **12 May 2023 08:26 GMT**
Telephone: **0161 763 7200**
Company: **LK Group**

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

HazWasteOnline™ Certification:

CERTIFIED

Course

Hazardous Waste Classification
Most recent 3 year Refresher

Date

18 Sep 2019
02 Aug 2022

Next 3 year Refresher due by Aug 2025

Purpose of classification

2 - Material Characterisation

Address of the waste

Middleton Old Cemetery, Cemetery Street, Middleton

Post Code **M24 6UP**

SIC for the process giving rise to the waste

Description of industry/producer giving rise to the waste

Development of brownfield land

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

Construction

Description of the waste

Made Ground and soil

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS101-0.10 - 0.80-14/03/2023	0.10 - 0.80	Non Hazardous		3
2	WS103-0.00 - 0.70-14/03/2023	0.00 - 0.70	Non Hazardous		5
3	WS103-0.80 - 1.20-14/03/2023	0.80 - 1.20	Non Hazardous		7
4	WS105-0.00 - 0.15-14/03/2023	0.00 - 0.15	Non Hazardous		9
5	WS105-0.15 - 1.00-14/03/2023	0.15 - 1.00	Non Hazardous		11
6	WS105-1.20 - 2.00-14/03/2023	1.20 - 2.00	Non Hazardous		13
7	FP101-0.00 - 0.50-15/03/2023	0.00 - 0.50	Non Hazardous		15
8	HD101-0.00 - 0.30-15/03/2023	0.00 - 0.30	Non Hazardous		18
9	HD101-0.50 - 1.00-15/03/2023	0.50 - 1.00	Non Hazardous		20
10	HD102-0.00 - 0.30-15/03/2023	0.00 - 0.30	Non Hazardous		22

Related documents

#	Name	Description
1	23-03979.1.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: Peter Dunn

Created date: 12 May 2023 08:26 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	25
Appendix B: Rationale for selection of metal species	27
Appendix C: Version	27

Classification of sample: WS101-0.10 - 0.80-14/03/2023

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

Sample details

Sample name:	LoW Code:
WS101-0.10 - 0.80-14/03/2023	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.10 - 0.80 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
7.7%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 7.7% 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 }				4 mg/kg	1.32	4.875 mg/kg	0.000487 %	✓	
	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) }				5 mg/kg	1.462	6.745 mg/kg	0.000675 %	✓	
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				6 mg/kg	1.126	6.235 mg/kg	0.000624 %	✓	
	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) }				4 mg/kg	1.273	4.698 mg/kg	0.00047 %	✓	
	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	6 mg/kg		5.538 mg/kg	0.000554 %	✓	
	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 }				7 mg/kg	1.785	11.534 mg/kg	0.00115 %	✓	
	023-001-00-8	215-239-8	1314-62-1							
10	zinc { zinc oxide }				20 mg/kg	1.245	22.977 mg/kg	0.0023 %	✓	
	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				6.1 pH		6.1 pH	6.1 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		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
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		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
20	pyrene	204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
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
29	ammonia%	215-647-6	1336-21-6		3.5 mg/kg		3.231 mg/kg	0.000323 %	✓	
Total:								0.00757 %		

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: WS103-0.00 - 0.70-14/03/2023

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

Sample details

Sample name:	LoW Code:
WS103-0.00 - 0.70-14/03/2023	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.00 - 0.70 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
10.4%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 10.4% 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 }				10 mg/kg	1.32	11.83	mg/kg	0.00118 %	✓	
	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) }				9 mg/kg	1.462	11.786	mg/kg	0.00118 %	✓	
		215-160-9	1308-38-9								
4	copper { dicopper oxide; copper (I) oxide }				13 mg/kg	1.126	13.114	mg/kg	0.00131 %	✓	
	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) }				6 mg/kg	1.273	6.841	mg/kg	0.000684 %	✓	
	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	30 mg/kg		26.88	mg/kg	0.00269 %	✓	
	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 }				13 mg/kg	1.785	20.794	mg/kg	0.00208 %	✓	
	023-001-00-8	215-239-8	1314-62-1								
10	zinc { zinc oxide }				29 mg/kg	1.245	32.343	mg/kg	0.00323 %	✓	
	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				7 pH		7	pH	7pH		
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		0.63 mg/kg		0.564 mg/kg	0.0000564 %	✓	
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		2.13 mg/kg		1.908 mg/kg	0.000191 %	✓	
20	pyrene	204-927-3	129-00-0		2.13 mg/kg		1.908 mg/kg	0.000191 %	✓	
21	benzo[a]anthracene	601-033-00-9	200-280-6		0.94 mg/kg		0.842 mg/kg	0.0000842 %	✓	
22	chrysene	601-048-00-0	205-923-4		1.17 mg/kg		1.048 mg/kg	0.000105 %	✓	
23	benzo[b]fluoranthene	601-034-00-4	205-911-9		1.34 mg/kg		1.201 mg/kg	0.00012 %	✓	
24	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.44 mg/kg		0.394 mg/kg	0.0000394 %	✓	
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		1.13 mg/kg		1.012 mg/kg	0.000101 %	✓	
26	indeno[123-cd]pyrene	205-893-2	193-39-5		0.74 mg/kg		0.663 mg/kg	0.0000663 %	✓	
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.13 mg/kg		0.116 mg/kg	0.0000116 %	✓	
28	benzo[ghi]perylene	205-883-8	191-24-2		0.69 mg/kg		0.618 mg/kg	0.0000618 %	✓	
29	ammonia%	215-647-6	1336-21-6		2.7 mg/kg		2.419 mg/kg	0.000242 %	✓	
Total:								0.0145 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated 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: WS103-0.80 - 1.20-14/03/2023

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

Sample details

Sample name:	LoW Code:
WS103-0.80 - 1.20-14/03/2023	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.80 - 1.20 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
7.9%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 7.9% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1		arsenic { arsenic trioxide }				6 mg/kg	1.32	7.296 mg/kg	0.00073 %	✓	
		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	10.769 mg/kg	0.00108 %	✓	
			215-160-9	1308-38-9							
4		copper { dicopper oxide; copper (I) oxide }				10 mg/kg	1.126	10.369 mg/kg	0.00104 %	✓	
		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) }				10 mg/kg	1.273	11.721 mg/kg	0.00117 %	✓	
		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	14 mg/kg		12.894 mg/kg	0.00129 %	✓	
		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 }				11 mg/kg	1.785	18.086 mg/kg	0.00181 %	✓	
		023-001-00-8	215-239-8	1314-62-1							
10		zinc { zinc oxide }				47 mg/kg	1.245	53.88 mg/kg	0.00539 %	✓	
		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				7.1 pH		7.1 pH	7.1 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		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
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		0.17 mg/kg		0.157 mg/kg	0.0000157 %	✓	
20	pyrene	204-927-3	129-00-0		0.17 mg/kg		0.157 mg/kg	0.0000157 %	✓	
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
29	ammonia%	215-647-6	1336-21-6		2.7 mg/kg		2.487 mg/kg	0.000249 %	✓	
Total:								0.0137 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated 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: WS105-0.00 - 0.15-14/03/2023

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

Sample details

Sample name:	LoW Code:
WS105-0.00 - 0.15-14/03/2023	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.00 - 0.15 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
21.5%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 21.5% 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 }				12 mg/kg	1.32	12.437 mg/kg	0.00124 %	✓	
		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	9.179 mg/kg	0.000918 %	✓	
			215-160-9	1308-38-9							
4		copper { dicopper oxide; copper (I) oxide }				17 mg/kg	1.126	15.025 mg/kg	0.0015 %	✓	
		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	7.992 mg/kg	0.000799 %	✓	
		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	56 mg/kg		43.96 mg/kg	0.0044 %	✓	
		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 }				16 mg/kg	1.785	22.422 mg/kg	0.00224 %	✓	
		023-001-00-8	215-239-8	1314-62-1							
10		zinc { zinc oxide }				51 mg/kg	1.245	49.832 mg/kg	0.00498 %	✓	
		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		6 pH		6 pH	6pH		
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		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
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		0.15 mg/kg		0.118 mg/kg	0.0000118 %	✓	
20	pyrene	204-927-3	129-00-0		0.14 mg/kg		0.11 mg/kg	0.000011 %	✓	
21	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	chrysene	601-048-00-0	205-923-4	218-01-9	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
23	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
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
29	ammonia%	215-647-6	1336-21-6		17.7 mg/kg		13.895 mg/kg	0.00139 %	✓	
Total:								0.0185 %		

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: WS105-0.15 - 1.00-14/03/2023

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

Sample details

Sample name:	LoW Code:
WS105-0.15 - 1.00-14/03/2023	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.15 - 1.00 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
10.2%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 10.2% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				5 mg/kg	1.32	5.928 mg/kg	0.000593 %	✓	
	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) }				7 mg/kg	1.462	9.187 mg/kg	0.000919 %	✓	
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				8 mg/kg	1.126	8.088 mg/kg	0.000809 %	✓	
	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) }				6 mg/kg	1.273	6.857 mg/kg	0.000686 %	✓	
	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	11 mg/kg		9.878 mg/kg	0.000988 %	✓	
	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 }				10 mg/kg	1.785	16.031 mg/kg	0.0016 %	✓	
	023-001-00-8	215-239-8	1314-62-1							
10	zinc { zinc oxide }				32 mg/kg	1.245	35.768 mg/kg	0.00358 %	✓	
	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				5.3 pH		5.3 pH	5.3 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		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
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		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
20	pyrene	204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
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
29	ammonia%	215-647-6	1336-21-6		2.5 mg/kg		2.245 mg/kg	0.000225 %	✓	
Total:								0.0104 %		

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: WS105-1.20 - 2.00-14/03/2023

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

Sample details

Sample name:	LoW Code:
WS105-1.20 - 2.00-14/03/2023	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
1.20 - 2.00 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
5.3%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 5.3% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1		arsenic { arsenic trioxide }			4	mg/kg	1.32	5.001 mg/kg	0.0005 %	✓	
		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) }			4	mg/kg	1.462	5.536 mg/kg	0.000554 %	✓	
			215-160-9	1308-38-9							
4		copper { dicopper oxide; copper (I) oxide }			8	mg/kg	1.126	8.53 mg/kg	0.000853 %	✓	
		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) }			4	mg/kg	1.273	4.821 mg/kg	0.000482 %	✓	
		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 }			6	mg/kg		5.682 mg/kg	0.000568 %	✓	
		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 }			6	mg/kg	1.785	10.143 mg/kg	0.00101 %	✓	
		023-001-00-8	215-239-8	1314-62-1							
10		zinc { zinc oxide }			26	mg/kg	1.245	30.647 mg/kg	0.00306 %	✓	
		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			5.5	pH		5.5 pH	5.5 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		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
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		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
20	pyrene	204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
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
29	ammonia%	215-647-6	1336-21-6		2.5 mg/kg		2.368 mg/kg	0.000237 %	✓	
Total:								0.00826 %		

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: FP101-0.00 - 0.50-15/03/2023

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

Sample details

Sample name:	LoW Code:
FP101-0.00 - 0.50-15/03/2023	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)
14.6%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 14.6% 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 }			9	mg/kg	1.32	10.148	mg/kg	0.00101 %	✓	
		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) }			21	mg/kg	1.462	26.212	mg/kg	0.00262 %	✓	
			215-160-9	1308-38-9								
4		copper { dicopper oxide; copper (I) oxide }			68	mg/kg	1.126	65.383	mg/kg	0.00654 %	✓	
		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	13.042	mg/kg	0.0013 %	✓	
		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	307	mg/kg	262.178	mg/kg	0.0262 %	✓	
		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 }			22	mg/kg	1.785	33.54	mg/kg	0.00335 %	✓	
		023-001-00-8	215-239-8	1314-62-1								
10		zinc { zinc oxide }			171	mg/kg	1.245	181.771	mg/kg	0.0182 %	✓	
		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 }			1.5	mg/kg	3.22	4.125	mg/kg	0.000412 %	✓	
		005-008-00-8	215-125-8	1303-86-2								
13		TPH (C6 to C40) petroleum group			<60	mg/kg		<60	mg/kg	<0.006 %		<LOD
				TPH								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 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] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]								
19	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %			<LOD
	006-007-00-5										
20	pH				8.9 pH		8.9 pH	8.9 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				0.2 mg/kg		0.171 mg/kg	0.0000171 %	✓		
		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				0.21 mg/kg		0.179 mg/kg	0.0000179 %	✓		
		205-912-4	206-44-0								
28	pyrene				0.2 mg/kg		0.171 mg/kg	0.0000171 %	✓		
		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	polychlorobiphenyls; PCB				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	602-039-00-4	215-648-1	1336-36-3								
38	monohydric phenols				<2 mg/kg		<2 mg/kg	<0.0002 %			<LOD
			P1186								
Total:									0.067 %		

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: HD101-0.00 - 0.30-15/03/2023

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

Sample details

Sample name:	LoW Code:
HD101-0.00 - 0.30-15/03/2023	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)
0.00 - 0.30 m	
Moisture content:	
9.1%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 9.1% 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	4 mg/kg	1.32	4.801 mg/kg	0.00048 %	✓	
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		3 mg/kg	1.462	3.986 mg/kg	0.000399 %	✓	
4	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	8 mg/kg	1.126	8.187 mg/kg	0.000819 %	✓	
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]	<3 mg/kg	1.273	<3.818 mg/kg	<0.000382 %		<LOD
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			25 mg/kg		22.725 mg/kg	0.00227 %	✓	
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	6 mg/kg	1.785	9.736 mg/kg	0.000974 %	✓	
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2	15 mg/kg	1.245	16.972 mg/kg	0.0017 %	✓	
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		7.2 pH		7.2 pH	7.2 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		0.28 mg/kg		0.255 mg/kg	0.0000255 %	✓	
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		0.54 mg/kg		0.491 mg/kg	0.0000491 %	✓	
20	pyrene	204-927-3	129-00-0		0.52 mg/kg		0.473 mg/kg	0.0000473 %	✓	
21	benzo[a]anthracene	601-033-00-9	200-280-6		0.25 mg/kg		0.227 mg/kg	0.0000227 %	✓	
22	chrysene	601-048-00-0	205-923-4		0.31 mg/kg		0.282 mg/kg	0.0000282 %	✓	
23	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.35 mg/kg		0.318 mg/kg	0.0000318 %	✓	
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		0.26 mg/kg		0.236 mg/kg	0.0000236 %	✓	
26	indeno[123-cd]pyrene	205-893-2	193-39-5		0.15 mg/kg		0.136 mg/kg	0.0000136 %	✓	
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		0.13 mg/kg		0.118 mg/kg	0.0000118 %	✓	
29	ammonia ...%	007-001-01-2	215-647-6		36.1 mg/kg		32.815 mg/kg	0.00328 %	✓	
Total:								0.0115 %		

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: HD101-0.50 - 1.00-15/03/2023

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

Sample details

Sample name:	LoW Code:
HD101-0.50 - 1.00-15/03/2023	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.50 - 1.00 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
8.7%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 8.7% 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 }				5 mg/kg	1.32	6.027 mg/kg	0.000603 %	✓	
	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) }				5 mg/kg	1.462	6.672 mg/kg	0.000667 %	✓	
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				11 mg/kg	1.126	11.307 mg/kg	0.00113 %	✓	
	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) }				3 mg/kg	1.273	3.486 mg/kg	0.000349 %	✓	
	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	21 mg/kg		19.173 mg/kg	0.00192 %	✓	
	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 }				9 mg/kg	1.785	14.669 mg/kg	0.00147 %	✓	
	023-001-00-8	215-239-8	1314-62-1							
10	zinc { zinc oxide }				20 mg/kg	1.245	22.728 mg/kg	0.00227 %	✓	
	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		4.9 pH		4.9 pH	4.9 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		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
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		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
20	pyrene	204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
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
29	ammonia ...%	007-001-01-2	215-647-6		3.2 mg/kg		2.922 mg/kg	0.000292 %	✓	
Total:								0.00968 %		

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: HD102-0.00 - 0.30-15/03/2023

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

Sample details

Sample name:	LoW Code:
HD102-0.00 - 0.30-15/03/2023	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)
0.00 - 0.30 m	
Moisture content:	
13.6%	
(wet weight correction)	

Hazard properties

None identified

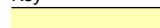
Determinands

Moisture content: 13.6% 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 }	033-003-00-0	215-481-4	1327-53-3	18 mg/kg	1.32	20.534 mg/kg	0.00205 %	✓	
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	10 mg/kg	1.462	12.628 mg/kg	0.00126 %	✓	
4	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	27 mg/kg	1.126	26.265 mg/kg	0.00263 %	✓	
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]	10 mg/kg	1.273	10.995 mg/kg	0.0011 %	✓	
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			105 mg/kg		90.72 mg/kg	0.00907 %	✓	
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	19 mg/kg	1.785	29.306 mg/kg	0.00293 %	✓	
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2	63 mg/kg	1.245	67.752 mg/kg	0.00678 %	✓	
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] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]								
19	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %			<LOD
	006-007-00-5										
20	pH				5.8 pH		5.8 pH	5.8 pH			
			P1186								
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				0.38 mg/kg		0.328 mg/kg	0.0000328 %		✓	
		201-581-5	85-01-8								
26	anthracene				0.12 mg/kg		0.104 mg/kg	0.0000104 %		✓	
		204-371-1	120-12-7								
27	fluoranthene				0.96 mg/kg		0.829 mg/kg	0.0000829 %		✓	
		205-912-4	206-44-0								
28	pyrene				0.88 mg/kg		0.76 mg/kg	0.000076 %		✓	
		204-927-3	129-00-0								
29	benzo[a]anthracene				0.44 mg/kg		0.38 mg/kg	0.000038 %		✓	
	601-033-00-9	200-280-6	56-55-3								
30	chrysene				0.59 mg/kg		0.51 mg/kg	0.000051 %		✓	
	601-048-00-0	205-923-4	218-01-9								
31	benzo[b]fluoranthene				0.69 mg/kg		0.596 mg/kg	0.0000596 %		✓	
	601-034-00-4	205-911-9	205-99-2								
32	benzo[k]fluoranthene				0.22 mg/kg		0.19 mg/kg	0.000019 %		✓	
	601-036-00-5	205-916-6	207-08-9								
33	benzo[a]pyrene; benzo[def]chrysene				0.5 mg/kg		0.432 mg/kg	0.0000432 %		✓	
	601-032-00-3	200-028-5	50-32-8								
34	indeno[123-cd]pyrene				0.29 mg/kg		0.251 mg/kg	0.0000251 %		✓	
		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				0.25 mg/kg		0.216 mg/kg	0.0000216 %		✓	
		205-883-8	191-24-2								
37	polychlorobiphenyls; PCB				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	602-039-00-4	215-648-1	1336-36-3								
38	monohydric phenols				<2 mg/kg		<2 mg/kg	<0.0002 %			<LOD
			P1186								
Total:									0.0339 %		

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 formally 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 formally 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 formally 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 formally make this change to the MCL List].

Substance has therefore been self-classified.

■ **pH** (CAS Number: PH)

Description/Comments: Appendix C4

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: None.

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319, STOT SE 3; H335, Skin Irrit. 2; H315, Skin Sens. 1; H317, Aquatic Acute 1; H400, Aquatic Chronic 1; H410

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 21 Aug 2015

Hazard Statements: Acute Tox. 4; H302, Aquatic Acute 1; H400, Aquatic Chronic 1; H410

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

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 21 Aug 2015

Hazard Statements: Skin Irrit. 2; H315, Eye Irrit. 2; H319, STOT SE 3; H335, Aquatic Acute 1; H400, Aquatic Chronic 1; H410

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Carc. 2; H351

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

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 23 Jul 2015

Hazard Statements: Aquatic Acute 1; H400, Aquatic Chronic 1; H410

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

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: Flam. Liq. 3; H226, Asp. Tox. 1; H304, STOT RE 2; H373, Muta. 1B; H340, Carc. 1B; H350, Repr. 2; H361d, Aquatic Chronic 2; H411

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

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

Description/Comments:

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

Reason for additional Hazards Statement(s):

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

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

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

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

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

Reason for additional Hazards Statement(s):

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

■ **polychlorobiphenyls; PCB** (EC Number: 215-648-1, CAS Number: 1336-36-3)

GB MCL index number: 602-039-00-4

Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans;

POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.

Additional Hazard Statement(s): Carc. 1A; H350

Reason for additional Hazards Statement(s):

20 Nov 2021 - Carc. 1A; H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

▪ **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: 2023.111.5569.10274 (22 Apr 2023)

HazWasteOnline Database: 2023.111.5569.10274 (22 Apr 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

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- » Geotechnical
- » Contaminated Land
- » Flood Risk and Drainage
- » Asbestos
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- » Land Remediation
- » Project Management
- » Land Drilling