



Phase II Geo-Environmental Assessment

Former Knowles Quarry

Barnsley Road
Cudworth
S72 8UU

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FORMER KNOWLES QUARRY, CUDWORTH

NON-TECHNICAL CLIENT SUMMARY




This report presents the findings of a Phase II Intrusive Investigation undertaken to determine ground conditions, and establish if there are any environmental risks associated with the site and its development. Pertinent findings and conclusions may be summarised as follows:

- The land at Former Knowles Quarry consists of a sloping, now partially cleared area of overgrown vegetation with the formerly worked quarry face bordering the north and west of site. The property is accessed off Barnsley Road and is located just outside Cudworth. A number of residential houses border the property to the north, but much of the surrounding land is agricultural.
- A previous Phase I investigation (not undertaken by EPS) identified possible contamination as a result of the historical use as a quarry with the potential for infilled ground. Additionally, a former Coal Mining Risk Assessment (not undertaken by EPS) noted that there was a risk from shallow coal working due to the Sharlston Low coal seam potentially outcropping close to the surface.
- Ground investigation works involved the drilling of two deep rotary boreholes using water flush drilling technique (max. 30m) to assess for mine workings, three shallow rotatory boreholes for installing gas monitoring wells and five trail pits to allow for soil sampling and testing. The deep boreholes that penetrated the coal measures were permitted by The Coal Authority to investigate potential shallow coal workings.
- The ground conditions from the surface level was found to be layers of made ground to a maximum depth of 2.80m overlying sandstones and mudstones of the Pennine Middle Coal Measures. Coal was encountered in both deep boreholes at depths between 15.50m and 20.00m, with a seam thickness up to 1.2m. No evidence of voids or mine workings were recorded during the investigation and therefore risks from the coal mining legacy are considered to be low.
- Environmental testing has established that the made ground materials are not suitable quality for garden areas (due to high PAHs content) and so it has been recommended that a 600mm clean soil cover system be installed over a high viz 'no dig' membrane across all gardens and soft landscaping. In addition, barrier pipework should be installed. No risks associated with ground gas or mine gas were recorded following gas monitoring.

The above points represent a simplified summary of the findings of this assessment and **must not** form the basis for key decisions for the proposed development. A thorough review of the details is contained within the following report, or alternatively get in touch and we'll talk you through it.



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The report has been written, reviewed and authorised by the persons listed above. It has also undergone EPS' in house quality management inspection. Should you require any further assistance regarding the information provided within the report, please do not hesitate to contact us.

The National Planning Policy Framework requires a competent person to prepare site investigation information, which is defined as a person with a recognised relevant qualification, sufficient experience in dealing with the type(s) of pollution or land instability, and membership of a relevant professional organisation. EPS considers that it fulfils these criteria and would welcome any request for staff CVs or case studies to demonstrate it.

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1 INTRODUCTION

In August 2022, EPS (Leeds) Ltd was commissioned by Lisa Hewitt & Darren Craft to complete a Phase II Geo-Environmental Assessment (including a Coal Mining Risk Assessment) at Former Knowles Quarry, Cudworth, S72 8UU ('the site'). A site location plan is presented as Figure 1 and selected site photographs are included as Appendix A.

The work was commissioned to address planning conditions six and eight from Barnsley Metropolitan Borough Council planning reference: 2020/0551, relating to contaminated land and coal mining legacy respectively. The development proposals are for the erection of 6No. dwellings with associated access and parking.

A proposed development plan is presented as Appendix B.

1.1 Background and Previous Reports

Prior to site works, EPS were provided with a Phase I Geo-Environment Assessment and Coal Mining Risk Assessment previously completed for the site by Design It – Structural Solution Ltd in April 2020 and March 2020 respectively and :

- *Phase I Geo-Environmental Assessment at Knowles Quarry, Barnsley Road, Cudworth* Design It – Structural Solutions Ltd, Dated April 2020
- *Coal Mining Risk Assessment at Knowles Quarry, Barnsley Road, Cudworth* Design It – Structural Solutions Ltd, Dated March 2020

The above phase of works identified a number of potential contaminant linkages that required assessment via intrusive investigation (i.e. Phase II investigation). The area of investigation was also highlighted as being at risk of potential shallow coal workings. This formed the basis of the investigation conducted by EPS, the findings of which are summarised within this report. It is recommended that the above reports are reviewed alongside this report.

1.2 Scope of Works

To perform an exploratory assessment of the site in accordance with the principles and requirements of DEFRA's 'Contaminated Land - Statutory Guidance' (2012), BS10175 – 'Investigation of Potentially Contaminated Sites', BS5930:2015 'Code of practice for ground investigations', the following tasks were undertaken.

Intrusive Investigation:

- Review of records held by The Coal Authority & obtaining of a Permit to Enter or Disturb Coal Authority Interests.
- Site walkover/ obtaining photographic records.
- Health and safety briefing / site supervision.
- Drilling of 2No. boreholes to depths of up to 30m bgl using water flush rotary drilling techniques in line with the permit granted by The Coal Authority and in-situ testing, soil sampling and subsequent laboratory testing.

- Drilling of 3No. boreholes to depths of 3m using rotatory drilling techniques for the installation of 3No. monitoring wells to allow for the undertaking of a gas monitoring programme in order to assess ground gas risk to site. This programme was completed over three return visits as part to inform a preliminary coal mining risk assessment .
- Continual logging of ground conditions including inspection of water flush arisings for any evidence of historic coal workings and backfilling / sealing of the drilled boreholes in line with permit granted by The Coal Authority.
- Continuous monitoring of ground / mine gas during the drilling works in line with the permit granted by The Coal Authority and additional monitoring of wells installed as part of a previous phase of works for ground / mine gas.
- Formation of 5No. trail pits to assess the nature of shallow soils onsite through sample collection and subsequent laboratory analysis.

Reporting:

- Data collection and processing.
- Reporting.

The findings of these investigations and their conclusions are presented in the following sections.

1.3 Limitations and Constraints

The purpose of this report is to present the findings of a soil sampling investigation conducted at the location(s) specified. When examining the data collected from the investigations made during the assessment, EPS makes the following statements:

No investigation method is capable of completely identifying all ground conditions that might be present in the soil or groundwater under a site. Where outlined in our report, we have examined the ground beneath a site by constructing a number of boreholes and/or trial pits to recover soil and/or groundwater samples. The locations of these excavations and sampling points are considered to be representative of the condition of the whole site subsurface however, ground conditions are naturally variable and it may be possible that the ground conditions encountered may differ to those encountered during the investigation.

No visible evidence of Japanese Knotweed was identified during the site walkover. However, this plant can be difficult to identify in the early stages of growth and therefore it is not always possible to identify its presence at certain times of the year. For this reason, EPS cannot confirm that Japanese Knotweed rhizomes do not exist and it is recommended that if it is suspected that this species, or other similarly invasive plants are present at the site, a specialist contractor should be commissioned to make a detailed assessment.

The investigation was carried out to assess the significance of contamination resulting from the use of the site as identified in this report. Unless EPS has otherwise indicated, no assessment of potential impact of any other previous uses has been made.

2 SITE CHARACTERISATION

The following section provides a summary of pertinent background information in relation to the site location and geo-environmental context.

Detail	Description
Location	The site lies to the north of Barnsley Road, to the west of the residential dwelling of 80 Barnsley Road, Cudworth. The site is ~150m south of the A628 road, approximately 750m south west of Cudworth town centre.
National Grid Reference	NGR 438250, 408700.
Topographic Elevation	Levels vary across site. Access is currently from the south east corner of site which site at approximately 49m Above Ordnance Datum (AOD), along with the majority of east of site. The site then slopes down to the central area before levelling out to approximately 45m AOD. The quarry face borders the site to the north and east, rising vertically from the quarry floor up to heights of approximately 55m AOD.
Description of Site	<p>The land is accessed from the south east corner of site with an area of hardstanding off of Barnsley Road.</p> <p>The majority of the site is vegetated and overgrown with grasses, nettles and trees. During site works it was necessary to clear a significant portion of this vegetation for access, exposing the made ground across the property. General litter and rubbish (likely fly-tipped) are also noted throughout the area, including suitcases, bottles and domestic waste. The borders of the area are marked by the quarry face to the north and west, a pavement to the south and the residential property of 80 Barnsley Road to the east of site.</p>
Surrounding Land Use	Barnsley Road leading to the centre of Cudworth town is located to the immediate south of site. The north of site is open grassland, possibly previously agricultural fields. Further north of site runs the A628 road. To the east / southeast is Valley Park playing fields and residential housing.
Geology	<p>Geological maps indicate that the site lies directly onto the bedrock geology mapped as sandstone of the Pennine Middle Coal Measures Formation.</p> <p>The geology within the surrounding area is dominated by mudstones and sandstones of the Pennine Middle Coal Measures. Some superficial alluvium deposits of clays, silts, sands and gravels are mapped in the surrounding area. The area has some faulting mapped, generally aligned south west to north east. The nearest of these faults is located within 100m to the south of site. A number of other different geologies are also indicated within the wider surrounding area including superficial Till Deposits and further bedrock mudstone and sandstones of the Pennine Middle Coal Measures Formation.</p> <p>There is also an abundance of artificial ground within the surrounding area, including areas of made ground (undivided) approximately 20m to the west and area of infilled land approximately 400m west of site.</p>



<p>Coal Mining</p>	<p>Due to the location of the site within an area where historical coal mining / working has taken place, a previous Coal Mining Risk Assessment was undertaken and included a consultant’s coal mining report from The Coal Authority.</p> <p>This former report highlights that past underground coal mining has taken place within the wider surrounding area and those unrecorded shallow workings are probable. According to the report, there are no records of spine roadways recorded at shallow depths although there are five possible coal seams within the site boundary, these are the Winter, Kent Thick, Barnsley, Top Haigh Moor and Fenton seams.</p> <p>No opencast coal mines of coal authority managed tips are located within 500m. No site investigations nor remediations relating to coal are recorded within 50m of the site. No mine entries are recorded by The Coal Authority within 100m of site.</p> <p>No damage notices or claims associated with coal mining subsidence are recorded within 50m of the site and there are no records of mine gas or mine water treatment schemes within 500m.</p> <p>In addition to the consultant’s coal mining report provided by The Coal Authority, EPS has also reviewed the interactive map from The Coal Authority hosted by the BGS. This interactive map is consistent with the consultant’s coal mining reports</p> <p>Given that the site is within an area of historical coal mining activity with probable shallow workings, the site will require further investigation in regard to coal mining risk assessment. This ground investigation and the associated site works have been completed to further assess these identified risks.</p>
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3 SUMMARY OF INTRUSIVE INVESTIGATIONS

The intrusive ground investigation was undertaken on 16th & 20th September 2022.

The works were undertaken in accordance with EPS standard operating procedures, copies of which will be made available on request. A summary of the site activities is presented in the following sections:

3.1 Exploratory Hole Locations

Borehole and trial pit locations were selected through consideration of the proposed layout of the scheme, the location of below ground utilities as well as operational and health and safety considerations.

A key objective of the intrusive works was to gather information on the nature of the ground conditions in order to assess whether contamination could present an unacceptable risk to future site users. Another key objective was to investigate potentially worked coal seams beneath the footprint of the proposed residential developments

A number of exploratory holes were formed as part of this assessment. Two deep boreholes (BH01 & BH02) were drilled to a maximum depth of 30m using a rotary rig to determine whether shallow mine workings were present. In addition, three shallow supplementary boreholes (BH03 – BH05) were drilled to 3m to allow the installation of monitoring wells. In addition, trial pits (TP01 - TP05) were undertaken to investigate the presence and nature of any contamination that may persist onsite from its previous industrial use as a quarry.

Boreholes were formed in accordance with standard EPS methodologies and drilling operations were supervised by an EPS engineer. The deep boreholes were undertaken in line with the Permit to Enter or Disturb Coal Authority Interests granted by The Coal Authority, this permit (Ref 25607) is included as Appendix C. Upon completion the deep boreholes were sealed to the surface within bentonite.

Monitoring wells were installed in BH03, BH04 and BH05 to allow ground gas monitoring to be undertaken. These wells were installed using 50mm diameter HDPE well casing and fitted with a gas tap. Slotted HDPE casing (1mm slot) was installed at each location from the base of the borehole to approximately 1.0m below the surface. The installations were completed to ground surface using plain casing. A filter pack of 2-3mm of washed gravel extended from the base of the boreholes to approximately 0.1m above the slotted section with a bentonite seal to surface. All installations were finished with flush-mounted, bolt-down headworks.

An exploratory hole location plan is presented as Figure 2.

3.2 In-Situ Testing & Soil Sampling

Each exploratory hole location was logged for ground conditions encountered and inspected for any physical evidence of contamination, such as soil staining, odour and the presence of separate phase

liquids on a precautionary basis. Deep boreholes were logged through assessment of water flush arisings.

3.3 Laboratory Testing

Samples obtained for analysis of identified contaminants of concern were submitted to Element Materials Technology of Flintshire, who hold appropriate UKAS / MCERT accreditation for the required testing. Samples were transported in laboratory supplied containers and delivered to the laboratory by approved courier.

3.4 Ground / Mine Gas Monitoring

The presence and extent of ground / mine gases including carbon monoxide (CO), methane (CH₄), carbon dioxide (CO₂), oxygen (O₂) and hydrogen sulphide (H₂S) were recorded continuously during the drilling of the boreholes using a rig-mounted gas analyser. Additionally, the monitoring wells installed within BH03 – BH05 were also monitored over the course of three return visits following the completion of site work in order to assess the gas regime of the site. Results of the ground gas monitoring along with calculated ground gas screening values (GSV's) are presented in Table 2.

4 FINDINGS OF THE INVESTIGATION

This section of the report provides a summary of the findings of the various aspects of the ground investigation.

4.1 Ground Conditions

The ground conditions encountered, from surface level, have been interpreted to comprise:

- Made Ground
- Pennine Middle Coal Measures Formation

Site-specific exploratory hole logs are included as Appendix D and give descriptions and depths of strata encountered. A summary of the general strata encountered across the site is provided in the table below, with more detailed description given in the following sub-sections.

Geological Strata	Maximum Depth to Base of Strata (m bgl)	Strata Thickness (m)
Made Ground	2.80	0.80 – 2.80
Pennine Middle Coal Measures Formation	Not Proven (>30.00)	Not Proven (>18.4m->27.2m)

4.1.1 Made Ground

Made ground materials were encountered to depths ranging from approximately 0.80m in TP01 to approximately 2.80m within BH01. The made ground encountered onsite was generally a brown slightly sandy gravelly clay with significant debris included, particularly at the surface of site. This included brick, glass, ash and plastic fragments as well as larger household debris such as suitcases, shoes and litter.

The made ground is interpreted to be a fill material resulting from the historical industrial use of the site as a quarry. Additionally, the site had remained disused for a significant period allowing for significant vegetation growth and accumulation of waste as a result of fly-tipping.

4.1.2 Pennine Middle Coal Measures Formation

Material representative of the Pennine Middle Coal Measures Formation were identified below the made ground. These materials comprised cyclical sandstone and mudstone units of various thicknesses. One seam of coal was identified to exist beneath site, found within BH01 and BH02 at a depth of 18.80m and 15.50m respectively and a thickness ranging from 0.90-1.20m.

The recovered sandstones were generally brown-beige to yellow-orange in colour, persisting in beds of up to 10.0m in thickness. Significant portions of the sandstone was found to be fractured, causing the drilling rig to lose water flush. The mudstones were found to be thinner beds of brown/grey silty material found sporadically from 7m onwards.

Coal was encountered in both deep boreholes, at depths of 18.80-20.0m bgl in BH01 and 15.50-16.40m bgl in BH02. The difference in depths between these two locations is considered to be due to the variability in the site's topography, with the coal seam interpreted to be consistent and unbroken between the two boreholes with negligible variation in seam thickness. Flush was maintained throughout both coal seams indicating that no voids were present.

4.1.3 Evidence of Worked Coal & Coal Risk Discussions

The approximate depths and thickness of the coal seams recorded at both borehole locations are summarised in the below table.

Borehole Location	Depth of Coal Seam (m bgl)	Thickness of Coal Seam (m)
BH01	18.80 – 20.0	1.20
BH02	15.50– 16.40	0.90

The coal layer at each borehole location was found to range from 0.90m to 1.20m thick. Based on the Consultants Coal Mining Report, provided to EPS from an earlier phase of works, and consultation with The Coal Authority, the coal seams identified as part of this phase of works are likely to be associated with the Sharlston Low coal seam which is mapped to run on a bearing of approximately 331 degrees (approximately north / south trending) through the land immediately west of Former Knowles Quarry.

While the coal identified within this ground investigation is likely to fall within the definition of 'workable' (which is typically defined as coal within 30m to 50m of rock head and around 0.30m and thicker), no evidence of the identified coal being worked has been identified as part of this investigation.

Typically, evidence of coal seams being worked would be observed in the form of subsurface voids (identified through rotary drilling by the loss of flush (or change in flush characteristics if the void/s are flooded) of drilling fluid (water)) and / or waste filled, collapsed or partially collapsed coal / soil / rock (identified through weaker layers of material (broken ground) which would be apparent during the drilling) however no such evidence has been encountered as part of this ground investigation and hence all evidence suggests that the shallow coal beneath the area of investigation has not been worked and subsequently, the risk of coal mining related subsidence is considered to be low.

Furthermore, the results of gas monitoring which was undertaken continuously during the drilling of the boreholes do not highlight any significant concentrations of carbon monoxide (CO), methane (CH₄), carbon dioxide (CO₂) or hydrogen sulphide (H₂S) with levels of oxygen (O₂) being recorded at relatively consistent values throughout the monitoring of gas.

4.2 Groundwater

Groundwater was recorded between 12.00m and 23.00m bgl across the two deep boreholes (BH01 - BH02) and otherwise not encountered whilst onsite. It should be appreciated however that the method of drilling used to drill the boreholes involved water flush drilling whereby water is continuously flushed and recirculated through the boreholes to remove soil arisings and as such, any groundwater strikes may have been missed or true groundwater levels been slightly skewed. Given that no wells were installed, additional monitoring of groundwater levels was not possible.

4.3 Physical Evidence of Contamination

Aside from the made ground materials, no other physical evidence of contamination such as separate phase liquids, hydrocarbon odours, waste or putrefiable material were recorded in the water flush arisings or the samples of soil from in-situ testing.

4.4 Laboratory Analysis – Soil

An environmental laboratory analysis testing schedule is presented as Table 1 and all environmental soil analysis results obtained from the laboratory are included as Appendix E. The key results of laboratory testing on environmental soil samples are summarised below.

Contaminant	No. of Samples	No of Detections	Range of Detections (mg/kg)		Highest Location & Depth (m bgl)
			Min	Max	
Arsenic	5	5	3.3	25.7	TP02 ES2 (0.1-0.3)
Cadmium	5	0	-		
Chromium III	5	5	38.4	68.0	TP02 ES2 (0.1-0.3)
Copper	5	5	7	75	TP02 ES2 (0.1-0.3)
Lead	5	5	6	181	TP02 ES2 (0.1-0.3)
Mercury	5	1	0.2		TP02 ES2 (0.1-0.3)
Nickel	5	5	15.3	63.6	TP02 ES2 (0.1-0.3)
Selenium	5	3	1	2	TP01 ES2 (1.4-1.6) TP05 ES2 (2.0-2.2)
Zinc	5	5	22	567	TP02 ES2 (0.1-0.3)
Benzo(a)pyrene	5	3	0.11	18.56	TP02 ES2 (0.1-0.3)
Naphthalene	5	2	0.07	0.56	TP02 ES2 (0.1-0.3)
Benz(a)anthracene	5	4	0.14	15.37	TP02 ES2 (0.1-0.3)
Benzo(b)fluoranthene	5	4	0.21	31.10	TP02 ES2 (0.1-0.3)
Dibenzo(a,h)anthracene	5	3	0.04	3.14	TP02 ES2 (0.1-0.3)
PAH (Total of 17)	5	4	1.21	193.29	TP02 ES2 (0.1-0.3)
Aliphatics (Total)	8	0	-		
Aromatics (Total)	8	4	20	560	TP02 ES2 (0.1-0.3)
ACM (mass %)	5	0	-		

Contaminant	No. of Samples	No. of Detections	Range of Detections (ug/kg)		Highest Location & Depth (m bgl)
			Min	Max	
MTBE	8	0	-		
Benzene	8	1	7		TP05 ES1 (0.2-0.5)
Toluene	8	1	7		TP05 ES2 (2.0-2.2)
Ethylbenzene	8	0	-		
Xylene (Combined)	8	0	-		

Notes: PAH Polycyclic Aromatic Hydrocarbons
MTBE Methyl Tertiary Butyl Ether
BTX Benzene, Toluene & Xylenes
ACM Asbestos Containing Material

4.5 Soil Gas and Organic Vapour Results

Ground gas and organic vapour monitoring has been conducted on 3 occasions following the initial intrusive investigation on the 28th September, 4th October and 10th October 2022.

Results of soil gas monitoring are summarised below and presented in full in Table 2, along with calculated gas screening values, set out in CIRIA guidance 'Assessing Risks Posed by Hazardous Ground Gases to Buildings'.

Borehole	Flow Range of Detections (l/hr)	CH ₄ Range of Detections (%v/v)	CO ₂ Range of Detections (%v/v)	O ₂ Range of Detections (%v/v)	Organic Vapour Range of Detections (ppmV)
BH03	<0.1	<0.1	<0.1-0.2	20.1-21.0	<0.1
BH04	<0.1	<0.1	0.3-1.2	19.2-21.3	<0.1
BH05	<0.1	<0.1	0.8-1.0	19.7-20.9	<0.1

Notes: CH₄ Methane CO₂ Carbon Dioxide O₂ Oxygen

Overall, there was no detection of methane (CH₄) and only very limited detections of carbon dioxide (CO₂) during the monitoring visits. No carbon monoxide was detected in any location during any of the three monitoring visits. No flow rate was recorded within any of the locations. Volatile organic compounds (VOCs) were not detected within any of the locations.

4.6 Waste Analysis

Waste analysis has been undertaken on soils representative of the made ground. Waste Acceptance Criteria (WAC) testing was subsequently undertaken on five samples of these potential waste streams to provide further information on the most appropriate method of off-site disposal for these materials.

The results of this analysis, together with the results of the WAC testing, are summarised within the table below and presented as part of Appendix E and the Waste Classification Report output from the HazWaste Online™ software are included as Appendix F.

Strata	Typical Depth (m bgl) and Description	Is it Hazardous?	Waste Acceptance Criteria	Appropriate Landfill
Made Ground	0.00 - 2.80 –Sandy gravelly clays with MG fragments	No (0 of 8)	Fails Criteria for Inert Landfill*	NON HAZRADOUS

Based on the above, the made ground can be classified as **NON-HAZARDOUS** for the purposes of off-site disposal, under the waste code **17 05 04**.

However, it should be noted that all but one of the samples passed WAC thresholds for inert landfill but a minor fluoride exceedance was recorded within the WAC testing within TP01 ES2 (1.4m-1.6m bgl). Therefore, a conservative classification of Non-Hazardous has been deemed appropriate.

For made ground present on a brownfield site such as this, although the soil sampling process did not identify potentially hazardous concentrations of Asbestos Containing Material (ACM) within the soil, it must be acknowledged that the material may exist within areas which were not sampled or accessible during the investigation. Any visually identifiable fragments of ACM can invalidate any non-hazardous waste classification, as such, the above waste classifications are made on the proviso that any visually identifiable fragments of ACM are removed from the material prior to its disposal off-site. The subsequent ACM must then be disposed of in accordance with the Control of Asbestos Regulations 2012.

The final decision on waste acceptance criteria will lie with the chosen waste receiver.

5 ENVIRONMENTAL APPRAISAL

The following section outlines the approach applied to assessing the risks posed to human health and controlled waters through a Generic Quantitative Risk Assessment, then identifies any sample results found by this investigation which warrant further consideration.

5.1 Human Health

Land Use Setting & Generic Screening Criteria

In order to screen laboratory data for concentrations of contaminants in soil with potential to cause harm to human health, a land use setting of Residential – with homegrown produce has been adopted as it is considered the most representative of the current/ future setting.

The technical framework used to derive the assessment criteria and the documents in which they are published are summarised as follows:

- *EA Science Reports* (SC050021/SR2, SC050021/SR3, and SC050021/SR7)
- *EA Soil Guideline Value Science Reports*
- *Suitable For Use Levels (S4ULs) for Human Health Risk Assessment* – LQM and CIEH (2015)
- *Soil Generic Assessment Criteria for Human Health Risk Assessment* - EIC/AGS/CL:AIRE (2010)
- *Development of Category 4 Screening Levels for assessment of land affected by contamination* – SP1010 – DEFRA (2013)

Category 4 Screening Levels (C4SLs) provide generic suitable for use screening values for common contaminants in a variety of land uses and are also utilised as appropriate generic screening criteria. For concentrations of Arsenic, Lead and BaP in soil, EPS has used DEFRA's C4SL as an appropriate guide for professional judgement with respect to reasonable 'low risk' levels in the context of this site and its suitability for use.

A summary of the screening criteria and the methodology used to derive them is included in Appendix G.

5.1.2 Assessment of Soil Results – Human Health

The results of the screening process for on-site human receptors showed that generic screening criteria representative of risks to future site users were exceeded for 4 contaminants outlined in the table below:

Contaminant	Screening Value (mg/kg)	Detection (mg/kg)	Location (m bgl)
Benzo(a)pyrene	5.0*	18.56	TP02 ES2 (0.1-0.3m)
Benz(a)anthracene	7.2	15.37	
Benzo(b)fluoranthene	2.6	31.10	
Dibenz(a,h)anthracene	0.24	3.14	

*C4SL value

These samples relate to a single sample (TP02 ES2) taken from within the made ground. All exceeding contaminants are Polyaromatic Hydrocarbons (PAHs) and thus pose a risk to future site users via direct contact in garden areas and via plant uptake from homegrown produce.

It is considered reasonable to utilise Benzo(a)pyrene (BaP) as a risk driver or marker representative of genotoxic PAHs (i.e. including dibenzo(ah)anthracene and benzo(b)fluoranthene) given the absence of any 'low risk' (C4SL) equivalent screening values for these compounds.

The C4SL value of 5.0mg/kg has been exceeded considerably in TP02 (0.10m-0.30m) and therefore plausible risks to future site users is considered to exist. These risks will principally involve direct contact, inhalation and potential ingestion of contaminated soils. However, risks associated with ingress to potable water pipes should also be considered. Due to the relative immobility of B(a)P and low potential for creating organic vapour, no associated risks of vapour ingress are considered to exist. As a result of the above, remedial measures will be required to ensure the property is suitable for use, as discussed in the recommendations section.

5.2 Controlled Waters

Neither groundwater nor surface water-controlled waters are considered at plausible risk from contaminants deriving from this site. Groundwater has been proven to be at significant depth from ground level at approximately 13m. Additionally, mudstones of the Pennine Middle Coal Measures have a very low permeability, reducing the possibility of lateral or vertical migration of contaminants.

The nearest surface water feature lies over 100m away from site with local topography rendering any overland or shallow basal flow from site to this watercourse as extremely unlikely.

5.3 Preliminary Ground Gas Risk Assessment

An assessment of the risks posed by ground gas and organic vapour generation has been undertaken through consideration of a conservative maximum individual Gas Screening Value (GSV) or site characteristic hazardous gas flow rate, in accordance with the following guidance:

- CIRIA 665 – 'Assessing Risks Posed by Hazardous Ground Gases to Buildings'
- NHBC – 'Guidance on Evaluation of Development Proposals on Sites Where Methane and Carbon Dioxide are Present' (March 2007).
- British Standard BS8485:2015 – 'Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings.'

The gas screening values have initially been calculated as per the CIRIA 665 guidance '*Assessing Risks Posed by Hazardous Ground Gases to Buildings*' however the gas screening values presented by EPS within this report have also been defined based on the BS 8485:2015 guidance '*Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings*' which suggests that gas screening values should not only be based on measured data '*but ultimately derived using professional judgement*'.

5.3.1 Assessment of Ground Gas Results

Results of ground gas monitoring conducted over three visits between September and October 2022 identified no plausible risk from ground gas originating from onsite sources nor entering site from any offsite sources within the surrounding area.

The site maximum values do not exceed the very low risk characteristic gas scenario (CS1) criteria. Whilst it is acknowledged that the ground gas monitoring programme comprised three visits, this is considered to be suitable based on the information gathered during the investigation. For example, despite the presence of relatively deep made ground, there was no evidence of putrescible material that would represent a source of carbon that could result in ground gas production presenting a risk to future site users.

5.4 Summary of Findings

Through consideration of the site's history and environmental setting, the previous Phase I Desk Study established that a number of plausible contaminant linkages have the potential either to be currently active, or to become active as a result of development of site. Additionally it was noted that the site was at risk from potential shallow coal workings due to the nearby Sharlston Low Coal seam.

These contaminant linkages primarily comprise of human health risks associated with exposure of construction workers and future site users to made ground and potentially contaminated shallow soils due to the previous use of site as a quarry.

Furthermore, the possibility that mine gas and ground gas could be generated beneath the site from the presence of any infilled quarried sections any was also recognised, as well as risks to future property, infrastructure and controlled waters from any shallow soil contamination that may exist.

Intrusive investigations comprised the formation of five boreholes and five trial pits to a maximum depth of 30.0m bgl. The ground conditions were found to comprise a variable thickness of made ground, overlying sandstone, mudstone and coal of the Pennine Middle Coal Measures. Other than the general presence of made ground materials, no visual/olfactory evidence of contamination was recorded in the field. However there were exceedance of PAHs from a single shallow sample within TP02 that represents a risk to future site users. A ground gas monitoring programme was undertaken as part of the intrusive works. Gas screening values indicate the site is not considered at risk from ground gas or mine gas.

A coal seam was found within BH01 and BH02. Within BH01 it was recorded at 18.80-20.00m bgl and within BH02 it was recorded at 15.50-16.40m bgl, this variance being a result of the sloping nature of site at surface. The seam is interpreted to be consistent between the two boreholes with a thickness of 0.90m-1.02m. No voids were recorded within the coal nor in the surrounding strata with flush being maintained to the termination depth of 30m. As a result, coal mining legacy is not considered to represent a risk to the property.

5.5 Recommendations

In the context of potentially unacceptable or acceptable risks as outlined within the Environment Agency's Land Contamination: Risk Management guidance (LC:RM, 2020), the risks identified by this work will require further consideration, including the implementation of precautionary control measures. Recommended control measures are outlined below.

- a) It is recommended that a cover system comprising a minimum of **600mm** of certified clean soils and a high visibility 'no dig' geotextile at the base across all proposed soft landscaped areas for the development (it is recognised that some material may have to be removed to achieve this thickness). This thickness of material has been deemed necessary as a formal control measure due to concentrations of PAHs in the made ground that is present on the site.

It should be noted that this recommendation is made only for areas of soft landscaping, and there is no such requirement for areas beneath any hard standing or building footprints.

All imported topsoil / subsoil for use within the cover system should be accompanied by appropriate laboratory analysis to demonstrate its chemical and physical suitability for use. The analysis should include TPHs, Asbestos, PAHs and Metals and should also comply with the relevant physical parameters outlined within the British Standard BS 3882:2007 'Specification for topsoil and requirements for use'. Upon completion of this work, the cover system should be verified and reported to Barnsley Metropolitan Borough Council for approval. A cover soils checklist has been included as Appendix H.

- b) To reduce any risk associated with the ingestion of potable water which may have been affected by the diffusion of contaminants in soil into buried water supply pipes, barrier drinking water pipework should be used for all water supply pipes in the development. This will include all pipes (private supplies, mains and any communication pipes). Water Industry Standard 4-32-19 and associated fittings should be used subject to agreement with the local water company. Reference should be made to UK Water Industry Research (UKWIR) - Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites and any relevant local water company guidance.

Precautionary measures are also recommended to ensure safe development, as follows:

- a) All construction workers operating at the site should be advised of the potential for contact with made ground material within shallow soils, particularly beneath the existing buildings and hardstanding. Appropriate health and safety precautions should be adopted during any excavation works to avoid exposure to infilled soils. Reference should be made to relevant health & safety guidance including the following CIRIA document: *R132 Guide to Safe Working on Contaminated Sites*.
- b) Although the findings of the investigation would suggest that significant quantities of asbestos are unlikely to be encountered, the possibility of discrete pockets of this material existing within the made ground remains. If any evidence of visually identifiable ACM is suspected and is to be disturbed during the site development it is recommended that all works are postponed until suitable assessment and control measures (including a Working Method Statement (WMS)) are

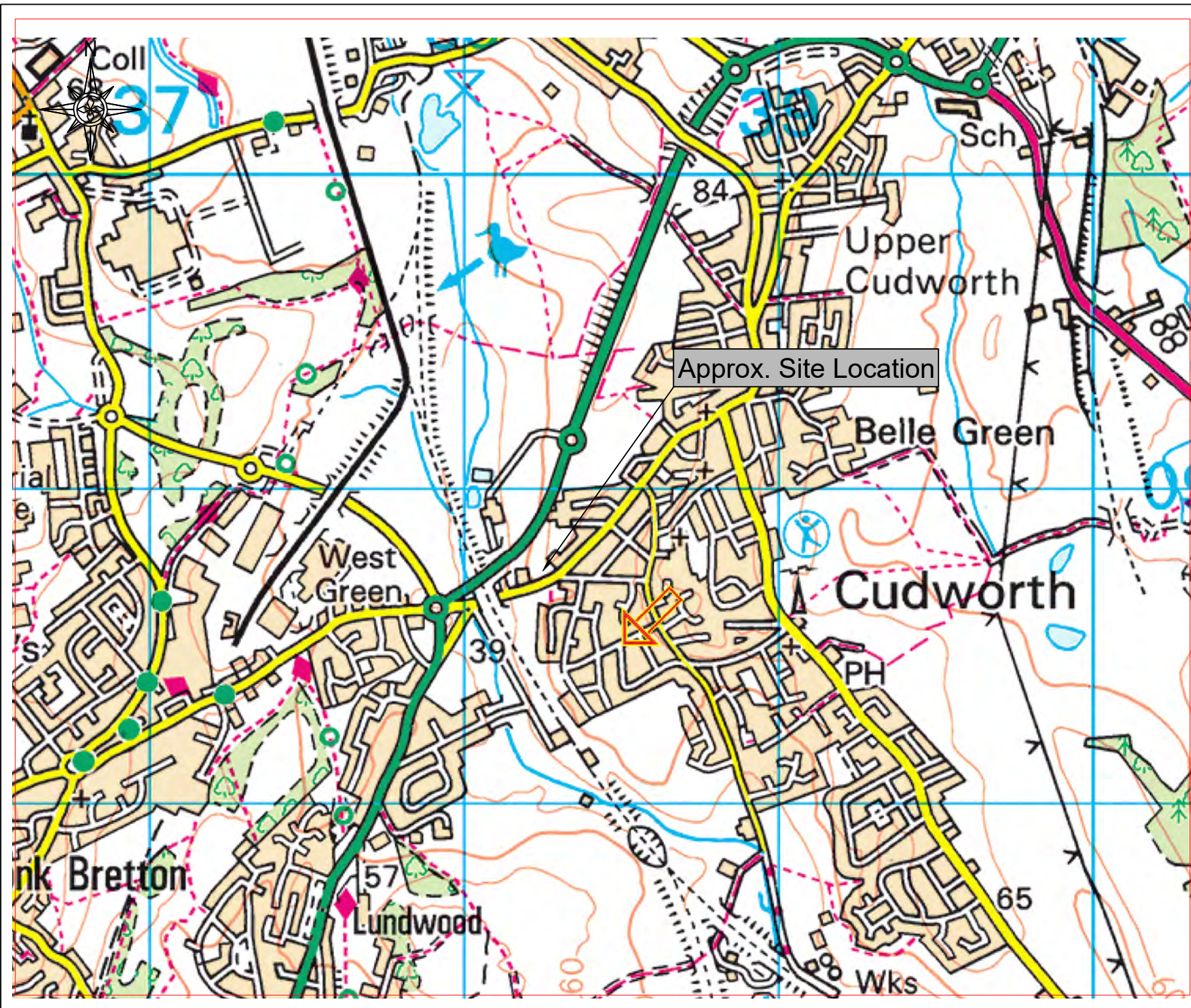
created. This WMS should be in accordance with guidance from CIRIA as well as the CL:AIRE /Joint Industry Working Group industry guidance on Interpretation for Managing and Working with Asbestos in Soil and Construction and Demolition Materials (2016).

- c) Should any palpable evidence of unexpected contamination be encountered during the redevelopment work, it should be reported to EPS so that an inspection can be made and appropriate sampling and assessment work carried out, a method statement for this is provided as Appendix I.

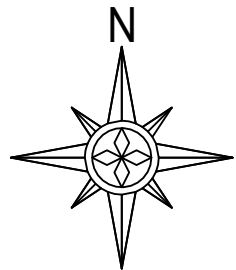
A copy of this report should be provided to the Environmental Health Department Barnsley Metropolitan Borough Council in support of any future planning submissions for the site.



FIGURES



KEY:



Rev	Date	Drawn	Description	CHK'd



The Geotechnical and Environmental Engineers
www.epstrategies.co.uk

Site
Former Knowles Quarry, Cudworth
UK22.6086

Client
Hewitt-Craft

Title
Figure 1 - Site Location Plan

Surveyed by:	WT	Drawn by:	WT
Checked by:		Date:	19/10/22

Scale: (M Sheet) Drawing Reference: Figure1_KnowlesQuarry

Job No: UK22.6086 Rev:



- KEY:
- SITE BOUNDARY
 - EPS TRIAL PIT
 - EPS ROTARY BOREHOLE
 - EPS ROTARY BOREHOLE WINSTALL

Rev	Date	Drawn	Description	CHK'd



The Geotechnical and Environmental Engineers
www.epstrategies.co.uk

Site
Former Knowles Quarry, Cudworth
UK22.6086

Client
Hewitt-Craft

Title
Figure 2 - Borehole Location Plan

Surveyed by:	WT	Drawn by:	WT
Checked by:		Date:	19/10/22

Scale	(M Sheet)	Drawing Reference
		Figure2_KnowlesQuarry

Job No	Rev
UK22.6086	



TABLES

Table 1 – Laboratory Testing Schedule

Sample ID	Sample Depth (m bgl)	EPS TPH Suite	EPS Waste Suite
TP01 ES1	0.7-0.9	X	-
TP01 ES2	1.4-1.6	-	X
TP02 ES1	1.8-1.9	-	X
TP02 ES2	0.1-0.3	-	X
TP03 ES1	1.0-1.1	-	X
TP04 ES2	1.6-1.7	X	-
TP05 ES1	0.2-0.5	X	-
TP05 ES2	2.0-2.2	-	X

Notes:

mbgl

X

-

meters below ground level

Sample Analysed

Sample Not Analysed

Table 2 – Gas Monitoring Results

28th September 2022

Borehole	Flow (l/hr)	CH ₄ (%v/v)		CO ₂ (%v/v)		O ₂ (%v/v)		Organic Vapour (ppmV)
		Peak	Steady	Peak	Steady	Peak	Steady	
BH03	<0.1	<0.1	<0.1	0.2	0.1	20.6	20.6	<0.1
BH04	<0.1	<0.1	<0.1	1.2	1.1	20.6	20.0	<0.1
BH05	<0.1	<0.1	<0.1	0.8	0.7	20.4	20.3	<0.1

28th September 2022 on mostly clear day with some broken clouds. Atmospheric Pressure was 995bar.

4th October 2022

Borehole	Flow (l/hr)	CH ₄ (%v/v)		CO ₂ (%v/v)		O ₂ (%v/v)		Organic Vapour (ppmV)
		Peak	Steady	Peak	Steady	Peak	Steady	
BH03	<0.1	<0.1	<0.1	<0.1	<0.1	21.0	20.9	<0.1
BH04	<0.1	<0.1	<0.1	0.3	<0.1	21.3	21.1	<0.1
BH05	<0.1	<0.1	<0.1	0.9	0.8	20.9	20.5	<0.1

4th October 2022 on mostly cloudy day. Atmospheric Pressure was 1007bar.

10th October 2022

Borehole	Flow (l/hr)	CH ₄ (%v/v)		CO ₂ (%v/v)		O ₂ (%v/v)		Organic Vapour (ppmV)
		Peak	Steady	Peak	Steady	Peak	Steady	
BH03	<0.1	<0.1	<0.1	0.2	<0.1	20.5	20.5	<0.1
BH04	<0.1	<0.1	<0.1	1.0	1.0	19.6	19.6	<0.1
BH05	<0.1	<0.1	<0.1	1.0	1.0	19.7	19.7	<0.1

10th October 2022 on mostly cloudy day. Atmospheric Pressure was 1001bar.



APPENDICES

APPENDIX A

Selected Site Photographs



KEY:

— SITE BOUNDARY

①

APPROXIMATE PHOTO LOCATIONS

Rev	Date	Drawn	Description	CHK'd



The Geotechnical and Environmental Engineers
www.epstrategies.co.uk

Site
Former Knowles Quarry, Cudworth
UK22.6086

Client
Hewitt-Craft

Title
App. A - Photo Location Plan

Surveyed by:	WT	Drawn by:	WT
Checked by:		Date:	19/10/22

Scale	(M Sheet)	Drawing Reference
		AppA_KnowlesQuarry

Job No	Rev
UK22.6086	

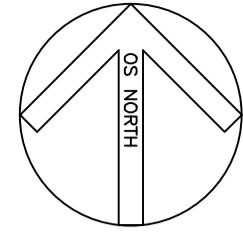
<p>Photo 1: Image showing rig set up on BH01</p>	<p>Photo 2: Image showing quarry face and overlooking location of TP02</p>
	
<p>Photo 3: Image showing the location of TP01 with brown sandy clay recovered</p>	<p>Photo 4: Image showing TP03</p>
	
<p>Photo 5: Showing digger and rig onsite, view across cleared area</p>	<p>Photo 6: Image showing TP04</p>
	



APPENDIX B

Proposed Development Plan

1) This drawing and the design and details depicted thereon are the copyright of Peter Dimberline Chartered Architect.
 2) All dimensions on this drawing are to be checked by the Contractor and any discrepancies are to be reported to the Architect.
 3) Do not scale critical dimensions off this drawing.
 4) Contractor to ensure that all Health & Safety requirements (CDM Regulations) in relation to this project will be complied with.



A. Position of access road revised and amendments made to parking and external works in general

REVISIONS

PETER DIMBERLINE Dip Arch, RIBA
CHARTERED ARCHITECT

2 TIPSEY COURT, STAINCROSS
 BARNSELY, S75 6FZ

tel/fax (01226) 390947
 email: pdimberline@tiscali.co.uk

CLIENT
 Darren Hewitt-Craft

PROJECT
 Proposed residential development

LOCATION
 Knowles Quarry, Barnsley Road,
 Cudworth, Barnsley

DRAWING
 Proposed site plan

SCALES 1:200 DATE Sep' 20

DRWG No. 2018/15/02

DRAWN BY
 PD

REV. A

APPENDIX C

Permit to Enter or Disturb Coal Authority Interests (Permit 25607)

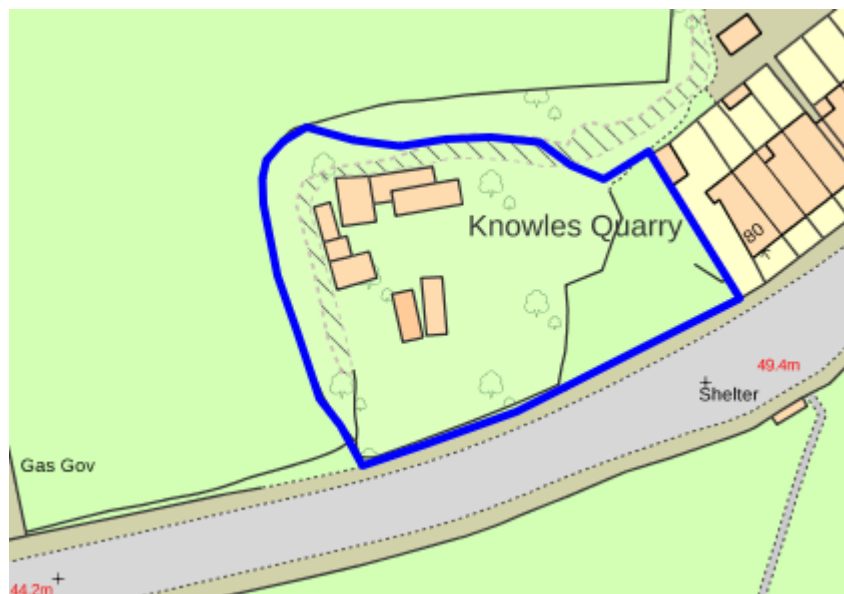


The Coal
Authority

Granted Permit Boundary

Permit Ref: 25607

Permit Boundary:



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APPENDIX D

Site Specific Exploratory Logs



Borehole Log

Borehole No.

BH01

Sheet 1 of 1

Project Name:	Former Knowles Quarry, Cudworth	Project No. UK22.6086	Co-ords:	-158482E - 7089792N	Hole Type RO
Location:	Cudworth	Level:		Scale 1:151	
Client:	Hewitt-Craft	Dates:		16/09/2022 Logged By WT	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	In Situ Results					
█	▼				2.80		Dark brown sandy gravelly clay MADE GROUND with fragments of brick, glass and plastic observed throughout. Sandstone clasts observed from 1.7m. <i>Gradually lightening with increasingly sandy content, with sandstone clasts included.</i>	1	
							Brown/Beige slightly silty SANDSTONE. Recorded to be fractured with silty bands recorded throughout the unit up to ~20cm thick.	2	
								3	
								4	
								5	
								6	
								7	
								8	
								9	
								10	
	11								
	12								
	13								
	14								
	15								
	16								
	17								
	18								
	19								
	20								
	21								
	22								
	23								
	24								
	25								
	26								
	27								
	28								
	29								
	30								
					30.00		End of Borehole at 30.000m	30	

Remarks

No visual or olfactory contamination observed further than the expected made ground. Initial water strike at approximately 13m with a subsequent strike at 23m. Target depth achieved. Drilling method was open hole with water flush with logs being inferred from arisings.








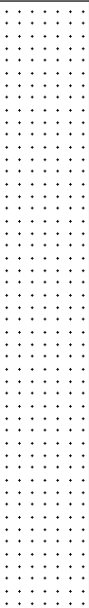



Borehole Log

Borehole No.

BH02

Sheet 1 of 1

Project Name:	Former Knowles Quarry, Cudworth	Project No. UK22.6086	Co-ords:	-158520E - 7089799N	Hole Type RO
Location:	Cudworth	Level:		Scale 1:151	
Client:	Hewitt-Craft	Dates:		20/10/2022 Logged By WT	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	In Situ Results					
█	▼				1.60			Dark brown sandy gravelly clay MADE GROUND with fragments of brick, glass and plastic observed throughout. <i>Rootlets present from vegetation cleared prior to borehole formation.</i>	1
					2.70			Beige/Brown blocky SANDSTONE. Recorded to be fractured with silty bands recorded throughout the unit up to ~20cm thick.	2
					3.40			Greyish brown silty MUDSTONE.	3
								Beige/Grey/Orange slightly silty SANDSTONE. Slight variation in colour throughout. Occasional silty layers.	4
									5
									6
									7
									8
									9
									10
							11		
							12		
							13		
							14		
							15		
					15.50		COAL	16	
					16.40		<i>Flush maintained, no voids encountered.</i> Grey slightly silty MUDSTONE	17	
					17.30		Light brown/grey SANDSTONE with occasional silty layers up to ~10cm thick.	18	
								19	
					20.00		End of Borehole at 20.000m	20	
								21	
								22	
								23	
								24	
								25	
								26	
								27	
								28	
								29	
								30	

Remarks
No visual or olfactory contamination observed further than the expected made ground. Initial water strike at approximately 12m. Target depth achieved with coal seam proven. Drilling method was open hole with water flush with logs being inferred from arisings.





Borehole Log

Borehole No.

TP01

Sheet 1 of 1

Project Name: Former Knowles Quarry,
CudworthProject No.
UK22.6086

Co-ords: -158532E - 7089792N

Hole Type
TP

Location: Cudworth

Level:

Scale
1:15

Client: Hewitt-Craft

Dates: 16/09/2022

Logged By
WT

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	In Situ Results				
		0.70	ES				Brown sandy slightly gravelly clay MADE GROUND. Fragments of brick and various debris including glass, ash and plastic fragments. Sandstone clasts found increasingly towards base. <i>Rootlets present from vegetation cleared prior to trial pit formation.</i>	
		1.40	ES					
				1.60			End of Borehole at 1.600m	

Remarks

No visual or olfactory contamination observed further than the expected made ground material. Groundwater was not encountered. Target depth achieved.





Borehole Log

Borehole No.

TP02

Sheet 1 of 1

Project Name:	Former Knowles Quarry, Cudworth	Project No.	UK22.6086	Co-ords:	-158509E - 7089810N	Hole Type	TP
Location:	Cudworth	Level:			Scale 1:15		
Client:	Hewitt-Craft	Dates:			16/09/2022		
						Logged By WT	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	In Situ Results				
		0.10	ES		0.85		Black/Brown sandy gravelly MADE GROUND. Possible subbase material. <i>Rootlets present from vegetation cleared prior to trial pit formation.</i>	
							Brown sandy slightly gravelly clay MADE GROUND. Fragments of brick and various debris including glass, ash and plastic fragments. Sandstone clasts found increasingly towards base.	
		1.80	ES		2.00		End of Borehole at 2.000m	

Remarks
No visual or olfactory contamination observed further than the expected made ground material. Groundwater was not encountered. Target depth achieved.





Borehole Log

Borehole No.

TP03

Sheet 1 of 1

Project Name:	Former Knowles Quarry, Cudworth	Project No.	UK22.6086	Co-ords:	-158524E - 7089774N	Hole Type	TP
Location:	Cudworth	Level:			Scale 1:15		
Client:	Hewitt-Craft	Dates:			16/09/2022		
						Logged By WT	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	In Situ Results				
		1.00	ES				Grey/brown sandy gravelly clay MADE GROUND. Various fragments of brick, ash, glass and household waste from surface. Sandstone clasts seen from 1.4m. <i>Rootlets present from vegetation cleared prior to trial pit formation.</i>	
				1.70			End of Borehole at 1.700m	

Remarks
 No visual or olfactory contamination observed further than the expected made ground material. Groundwater was not encountered. Target depth achieved.





Borehole Log

Borehole No.

TP04

Sheet 1 of 1

Project Name:	Former Knowles Quarry, Cudworth	Project No.	UK22.6086	Co-ords:	-158499E - 7089783N	Hole Type	TP
Location:	Cudworth	Level:			Scale 1:15		
Client:	Hewitt-Craft	Dates:			16/09/2022		
						Logged By WT	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	In Situ Results				
		0.90	ES				Brown sandy slightly gravelly clay MADE GROUND. Fragments of brick and various debris including glass, ash and plastic fragments. Sandstone clasts found increasingly towards base. <i>Rootlets present from vegetation cleared prior to trial pit formation.</i>	
		1.60	ES					
				2.00			End of Borehole at 2.000m	

Remarks
No visual or olfactory contamination observed further than the expected made ground material. Groundwater was not encountered. Target depth achieved.





Borehole Log

Borehole No.

TP05

Sheet 1 of 1

Project Name: Former Knowles Quarry,
CudworthProject No.
UK22.6086

Co-ords: -158487E - 7089812N

Hole Type
TP

Location: Cudworth

Level:

Scale
1:15

Client: Hewitt-Craft

Dates: 16/09/2022

Logged By
WT

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	In Situ Results				
Well		0.20	ES		0.50	Legend	Black/Brown sandy gravelly MADE GROUND. Possible subbase material.	
							Brown sandy slightly gravelly clay MADE GROUND. Fragments of brick and various debris including glass, and ash.	
		2.00	ES		2.40			
							End of Borehole at 2.400m	

Remarks

No visual or olfactory contamination observed further than the expected made ground material. Groundwater was not encountered. Target depth achieved.



APPENDIX E

Laboratory Results – Environmental

EPS Ltd
7B Caxton House
Broad Street
Cambourne
Cambridgeshire
CB23 6JN



4225



Attention : William Topping
Date : 27th September, 2022
Your reference : UK22.6086
Our reference : Test Report 22/15199 Batch 1 Schedule A
Location : Former Knowles Quarry
Date samples received : 17th September, 2022
Status : Final Report
Issue : 1

Nine samples were received for analysis on 17th September, 2022 of which three were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:



Bruce Leslie
Project Manager

Please include all sections of this report if it is reproduced

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 22/15199

SOILS and ASH

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

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

Please include all sections of this report if it is reproduced

All solid results are expressed on a dry weight basis unless stated otherwise.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

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.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 22/15199

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes	Yes	AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	No
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes

EPS Ltd
7B Caxton House
Broad Street
Cambourne
Cambridgeshire
CB23 6JN



4225



Attention : William Topping
Date : 4th October, 2022
Your reference : UK22.6086
Our reference : Test Report 22/15199 Batch 1 Schedule B
Location : Former Knowles Quarry
Date samples received : 17th September, 2022
Status : Final Report
Issue : 1

Nine samples were received for analysis on 17th September, 2022 of which five were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:



Phil Sommerton BSc

Senior Project Manager

Please include all sections of this report if it is reproduced

Mass of sample taken (kg)	-	Moisture Content Ratio (%) =	9.5					
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	91.3					
Particle Size <4mm =	>95%							
EMT Job No	22/15199		Landfill Waste Acceptance Criteria Limits					
Sample No	6							
Client Sample No	TP01 ES2							
Depth/Other	1.40-1.60							
Sample Date	16/09/2022							
Batch No	1							
Solid Waste Analysis			Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill			
Total Organic Carbon (%)	1.78					3	5	6
Loss on Ignition (%)	3.8					-	-	10
Sum of BTEX (mg/kg)	<0.025					6	-	-
Sum of 7 PCBs (mg/kg)	<0.035					1	-	-
Mineral Oil (mg/kg) (EH_CU_1D_AL)	<30					500	-	-
PAH Sum of 17(mg/kg)	7.25					100	-	-
pH (pH Units)	7.83					-	>6	-
ANC to pH 7 (mol/kg)	-					-	to be evaluated	to be evaluated
ANC to pH 4 (mol/kg)	-					-	to be evaluated	to be evaluated
Eluate Analysis	10:1 concⁿ leached		Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg					
	C₁₀	A₁₀						
	mg/l	mg/kg	mg/kg					
Arsenic	0.0043	0.043	0.5	2	25			
Barium	0.018	0.18	20	100	300			
Cadmium	<0.0005	<0.005	0.04	1	5			
Chromium	<0.0015	<0.015	0.5	10	70			
Copper	<0.007	<0.07	2	50	100			
Mercury	<0.001	<0.01	0.01	0.2	2			
Molybdenum	0.012	0.12	0.5	10	30			
Nickel	<0.002	<0.02	0.4	10	40			
Lead	<0.005	<0.05	0.5	10	50			
Antimony	<0.002	<0.02	0.06	0.7	5			
Selenium	<0.003	<0.03	0.1	0.5	7			
Zinc	<0.003	<0.03	4	50	200			
Chloride	0.4	4	800	15000	25000			
Fluoride	1.0	10	10	150	500			
Sulphate as SO4	5.2	52	1000	20000	50000			
Total Dissolved Solids	42	420	4000	60000	100000			
Phenol	<0.01	<0.1	1	-	-			
Dissolved Organic Carbon	2	<20	500	800	1000			

Mass of sample taken (kg)	-	Moisture Content Ratio (%) =	23.1					
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	81.2					
Particle Size <4mm =	>95%							
EMT Job No	22/15199		Landfill Waste Acceptance Criteria Limits					
Sample No	9							
Client Sample No	TP02 ES2							
Depth/Other	0.10-0.30							
Sample Date	16/09/2022							
Batch No	1							
Solid Waste Analysis			Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill			
Total Organic Carbon (%)	5.83					3	5	6
Loss on Ignition (%)	10.9					-	-	10
Sum of BTEX (mg/kg)	<0.025					6	-	-
Sum of 7 PCBs (mg/kg)	<0.035					1	-	-
Mineral Oil (mg/kg) (EH_CU_1D_AL)	<30					500	-	-
PAH Sum of 17(mg/kg)	193.29					100	-	-
pH (pH Units)	6.84					-	>6	-
ANC to pH 7 (mol/kg)	-					-	to be evaluated	to be evaluated
ANC to pH 4 (mol/kg)	-					-	to be evaluated	to be evaluated
Eluate Analysis	10:1 concⁿ leached		Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg					
	C₁₀	A₁₀						
	mg/l	mg/kg	mg/kg					
Arsenic	0.0046	0.046	0.5	2	25			
Barium	0.042	0.42	20	100	300			
Cadmium	<0.0005	<0.005	0.04	1	5			
Chromium	0.0016	0.016	0.5	10	70			
Copper	0.015	0.15	2	50	100			
Mercury	<0.001	<0.01	0.01	0.2	2			
Molybdenum	<0.002	<0.02	0.5	10	30			
Nickel	0.005	0.05	0.4	10	40			
Lead	0.008	0.08	0.5	10	50			
Antimony	0.007	0.07	0.06	0.7	5			
Selenium	<0.003	<0.03	0.1	0.5	7			
Zinc	0.084	0.84	4	50	200			
Chloride	1.3	13	800	15000	25000			
Fluoride	<0.3	<3	10	150	500			
Sulphate as SO4	<0.5	<5	1000	20000	50000			
Total Dissolved Solids	102	1020	4000	60000	100000			
Phenol	<0.01	<0.1	1	-	-			
Dissolved Organic Carbon	13	130	500	800	1000			

Mass of sample taken (kg)	-	Moisture Content Ratio (%) =	12.6					
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	88.8					
Particle Size <4mm =	>95%							
EMT Job No	22/15199		Landfill Waste Acceptance Criteria Limits					
Sample No	12							
Client Sample No	TP02 ES2							
Depth/Other	1.80-1.90							
Sample Date	16/09/2022							
Batch No	1							
Solid Waste Analysis			Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill			
Total Organic Carbon (%)	0.28					3	5	6
Loss on Ignition (%)	1.8					-	-	10
Sum of BTEX (mg/kg)	<0.025					6	-	-
Sum of 7 PCBs (mg/kg)	<0.035					1	-	-
Mineral Oil (mg/kg) (EH_CU_1D_AL)	<30					500	-	-
PAH Sum of 17(mg/kg)	<0.64					100	-	-
pH (pH Units)	5.53					-	>6	-
ANC to pH 7 (mol/kg)	-					-	to be evaluated	to be evaluated
ANC to pH 4 (mol/kg)	-					-	to be evaluated	to be evaluated
Eluate Analysis	10:1 concⁿ leached		Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg					
	C₁₀	A₁₀						
	mg/l	mg/kg	mg/kg					
Arsenic	<0.0025	<0.025	0.5	2	25			
Barium	0.019	0.19	20	100	300			
Cadmium	<0.0005	<0.005	0.04	1	5			
Chromium	<0.0015	<0.015	0.5	10	70			
Copper	<0.007	<0.07	2	50	100			
Mercury	<0.001	<0.01	0.01	0.2	2			
Molybdenum	<0.002	<0.02	0.5	10	30			
Nickel	<0.002	<0.02	0.4	10	40			
Lead	<0.005	<0.05	0.5	10	50			
Antimony	<0.002	<0.02	0.06	0.7	5			
Selenium	<0.003	<0.03	0.1	0.5	7			
Zinc	0.003	0.03	4	50	200			
Chloride	<0.3	<3	800	15000	25000			
Fluoride	<0.3	<3	10	150	500			
Sulphate as SO4	10.1	101	1000	20000	50000			
Total Dissolved Solids	<35	<350	4000	60000	100000			
Phenol	<0.01	<0.1	1	-	-			
Dissolved Organic Carbon	<2	<20	500	800	1000			

Mass of sample taken (kg)	-	Moisture Content Ratio (%) =	6.7					
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	93.8					
Particle Size <4mm =	>95%							
EMT Job No	22/15199		Landfill Waste Acceptance Criteria Limits					
Sample No	15							
Client Sample No	TP03 ES1							
Depth/Other	1.00-1.10							
Sample Date	16/09/2022							
Batch No	1							
Solid Waste Analysis			Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill			
Total Organic Carbon (%)	0.17					3	5	6
Loss on Ignition (%)	1.1					-	-	10
Sum of BTEX (mg/kg)	<0.025					6	-	-
Sum of 7 PCBs (mg/kg)	<0.035					1	-	-
Mineral Oil (mg/kg) (EH_CU_1D_AL)	<30					500	-	-
PAH Sum of 17(mg/kg)	1.21					100	-	-
pH (pH Units)	7.80					-	>6	-
ANC to pH 7 (mol/kg)	-					-	to be evaluated	to be evaluated
ANC to pH 4 (mol/kg)	-					-	to be evaluated	to be evaluated
Eluate Analysis	10:1 concⁿ leached		Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg					
	C₁₀	A₁₀						
	mg/l	mg/kg	mg/kg					
Arsenic	0.0233	0.233	0.5	2	25			
Barium	0.011	0.11	20	100	300			
Cadmium	<0.0005	<0.005	0.04	1	5			
Chromium	<0.0015	<0.015	0.5	10	70			
Copper	<0.007	<0.07	2	50	100			
Mercury	<0.001	<0.01	0.01	0.2	2			
Molybdenum	0.003	0.03	0.5	10	30			
Nickel	<0.002	<0.02	0.4	10	40			
Lead	<0.005	<0.05	0.5	10	50			
Antimony	0.009	0.09	0.06	0.7	5			
Selenium	<0.003	<0.03	0.1	0.5	7			
Zinc	0.003	0.03	4	50	200			
Chloride	<0.3	<3	800	15000	25000			
Fluoride	<0.3	<3	10	150	500			
Sulphate as SO4	0.7	7	1000	20000	50000			
Total Dissolved Solids	<35	<350	4000	60000	100000			
Phenol	<0.01	<0.1	1	-	-			
Dissolved Organic Carbon	3	30	500	800	1000			

Mass of sample taken (kg)	-	Moisture Content Ratio (%) =	9.0					
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	91.8					
Particle Size <4mm =	>95%							
EMT Job No	22/15199		Landfill Waste Acceptance Criteria Limits					
Sample No	27							
Client Sample No	TP05 ES2							
Depth/Other	2.00-2.20							
Sample Date	16/09/2022							
Batch No	1							
Solid Waste Analysis			Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill			
Total Organic Carbon (%)	0.26					3	5	6
Loss on Ignition (%)	1.2					-	-	10
Sum of BTEX (mg/kg)	<0.025					6	-	-
Sum of 7 PCBs (mg/kg)	<0.035					1	-	-
Mineral Oil (mg/kg) (EH_CU_1D_AL)	<30					500	-	-
PAH Sum of 17(mg/kg)	2.51					100	-	-
pH (pH Units)	8.37					-	>6	-
ANC to pH 7 (mol/kg)	-					-	to be evaluated	to be evaluated
ANC to pH 4 (mol/kg)	-					-	to be evaluated	to be evaluated
Eluate Analysis	10:1 concⁿ leached		Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg					
	C₁₀	A₁₀						
	mg/l	mg/kg	mg/kg					
Arsenic	<0.0025	<0.025	0.5	2	25			
Barium	0.009	0.09	20	100	300			
Cadmium	<0.0005	<0.005	0.04	1	5			
Chromium	<0.0015	<0.015	0.5	10	70			
Copper	<0.007	<0.07	2	50	100			
Mercury	<0.001	<0.01	0.01	0.2	2			
Molybdenum	0.002	0.02	0.5	10	30			
Nickel	<0.002	<0.02	0.4	10	40			
Lead	<0.005	<0.05	0.5	10	50			
Antimony	<0.002	<0.02	0.06	0.7	5			
Selenium	<0.003	<0.03	0.1	0.5	7			
Zinc	<0.003	<0.03	4	50	200			
Chloride	<0.3	<3	800	15000	25000			
Fluoride	0.5	5	10	150	500			
Sulphate as SO4	3.2	32	1000	20000	50000			
Total Dissolved Solids	37	370	4000	60000	100000			
Phenol	<0.01	<0.1	1	-	-			
Dissolved Organic Carbon	<2	<20	500	800	1000			

Client Name: EPS Ltd
Reference: UK22.6086
Location: Former Knowles Quarry
Contact: William Topping

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Asbestos sub-samples are retained for not less than 6 months from the date of analysis unless specifically requested.

The LOQ of the Asbestos Quantification is 0.001% dry fibre of dry mass of sample.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

Where trace asbestos is reported the amount of asbestos will be <0.1%.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analyst Name	Date Of Analysis	Analysis	Result
22/15199	1	TP01 ES2	1.40-1.60	5	Catherine Coles	28/09/2022	General Description (Bulk Analysis)	red sand,stone
					Catherine Coles	28/09/2022	Asbestos Fibres	NAD
					Catherine Coles	28/09/2022	Asbestos ACM	NAD
					Catherine Coles	28/09/2022	Asbestos Type	NAD
22/15199	1	TP02 ES2	0.10-0.30	8	Catherine Coles	28/09/2022	General Description (Bulk Analysis)	brown loose soil
					Catherine Coles	28/09/2022	Asbestos Fibres	NAD
					Catherine Coles	28/09/2022	Asbestos ACM	NAD
					Catherine Coles	28/09/2022	Asbestos Type	NAD
22/15199	1	TP02 ES2	1.80-1.90	11	Catherine Coles	28/09/2022	General Description (Bulk Analysis)	red sand/soil
					Catherine Coles	28/09/2022	Asbestos Fibres	NAD
					Catherine Coles	28/09/2022	Asbestos ACM	NAD
					Catherine Coles	28/09/2022	Asbestos Type	NAD
22/15199	1	TP03 ES1	1.00-1.10	14	Catherine Coles	28/09/2022	General Description (Bulk Analysis)	red sand,stone
					Catherine Coles	28/09/2022	Asbestos Fibres	NAD
					Catherine Coles	28/09/2022	Asbestos ACM	NAD
					Catherine Coles	28/09/2022	Asbestos Type	NAD
22/15199	1	TP05 ES2	2.00-2.20	26	Catherine Coles	28/09/2022	General Description (Bulk Analysis)	red sand/stone
					Catherine Coles	28/09/2022	Asbestos Fibres	NAD
					Catherine Coles	28/09/2022	Asbestos ACM	NAD
					Catherine Coles	28/09/2022	Asbestos Type	NAD

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 22/15199

SOILS and ASH

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

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

Please include all sections of this report if it is reproduced

All solid results are expressed on a dry weight basis unless stated otherwise.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

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.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 22/15199

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes	Yes	AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes

EMT Job No: 22/15199

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	No
TM17	Modified US EPA method 8270D v5:2014. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3:1990/USEPA 160.1/3 (TDS/TS: 1971) Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.			AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes
TM22	Modified BS1377-3:1990 Gravimetric determination of Loss on Ignition by temperature controlled Muffle Furnace (35C-440C). On request modified ASTM D2974-00 LOI (105C-440C)	PM0	No preparation is required.	Yes		AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes	Yes	AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM17	Modified method BS EN12457-2:2002 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes

EMT Job No: 22/15199

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 Second edition (2021)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 9214 - 340.2 (EPA 1998)	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.			AR	



APPENDIX F

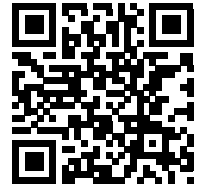
HazWaste OnlineTM - Classification



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)



IDL6R-RMPUA-CCQSP

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

Job name

UK22.6086 Former Knowles Quarry

Description/Comments

Samples collected during site investigation

Project

UK22.6098 Former Knowles Quarry

Site

Former Knowles Quarry, Cudworth

Classified by

Name: **Lee Anderson**
Date: **17 Oct 2022 14:01 GMT**
Telephone: **0113 8730211**

Company: **Environmental Strategies Ltd EPS**
10-12 East Parade
Leeds
LS1 2BH

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

HazWasteOnline™ Certification:

CERTIFIED

Course

Hazardous Waste Classification

Date

03 Dec 2020

Next 3 year Refresher due by Dec 2023

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	TP01 ES2-16/09/2022-1.40-1.60m	1.4-1.6	Non Hazardous		2
2	TP02 ES2-16/09/2022-0.10-0.30m	0.1-0.3	Non Hazardous		4
3	TP02 ES2-16/09/2022-1.80-1.90m	1.8-1.9	Non Hazardous		7
4	TP03 ES1-16/09/2022-1.00-1.10m	1.0-1.1	Non Hazardous		9
5	TP05 ES2-16/09/2022-2.00-2.20m	2.0-2.2	Non Hazardous		11
6	TP01 ES1-16/09/2022-0.70-0.90m	0.7-0.9	Non Hazardous		14
7	TP04 ES2-16/09/2022-1.60-1.70m	1.6-1.7	Non Hazardous		15
8	TP05 ES1-16/09/2022-0.20-0.50m	0.2-0.5	Non Hazardous		16

Related documents

#	Name	Description
1	EMT-22-15199-Batch-1-Sched-B-202210041402.HWOL	Element .hwol file used to populate the Job
2	EMT-22-15199-Batch-1-Sched-A-202209271448.HWOL	Element .hwol file used to populate the Job

Report


Created by: Lee Anderson

Created date: 17 Oct 2022 14:01 GMT

Appendices

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

Classification of sample: TP01 ES2-16/09/2022-1.40-1.60m

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

Sample details

Sample name:	LoW Code:
TP01 ES2-16/09/2022-1.40-1.60m	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
1.4-1.6 m	
Moisture content:	
10.5%	
(dry weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 10.5% Dry 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	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane 603-181-00-X	216-653-1	1634-04-4		<5 µg/kg		<0.005 mg/kg	<0.000005 %		<LOD
2	benzene 601-020-00-8	200-753-7	71-43-2		<5 µg/kg		<0.005 mg/kg	<0.000005 %		<LOD
3	toluene 601-021-00-3	203-625-9	108-88-3		<5 µg/kg		<0.005 mg/kg	<0.000005 %		<LOD
4	ethylbenzene 601-023-00-4	202-849-4	100-41-4		<5 µg/kg		<0.005 mg/kg	<0.000005 %		<LOD
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) } 215-160-9		1308-38-9		38.4 mg/kg	1.462	50.791 mg/kg	0.00508 %	✓	
6	polychlorobiphenyls; PCB 602-039-00-4	215-648-1	1336-36-3		<35 µg/kg		<0.035 mg/kg	<0.0000035 %		<LOD
7	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex } 033-005-00-1				11 mg/kg	1.895	18.86 mg/kg	0.00189 %	✓	
8	cadmium (non-pyrophoric); [1] cadmium oxide (non-pyrophoric) [2] 048-002-00-0	231-152-8 [1] 215-146-2 [2]	7440-43-9 [1] 1306-19-0 [2]		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
9	copper { copper(II) chloride; copper dichloride } 231-210-2		7447-39-4		26 mg/kg	2.116	49.784 mg/kg	0.00498 %	✓	
10	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } 082-001-00-6			1	40 mg/kg		36.199 mg/kg	0.00362 %	✓	
11	mercury { mercury dichloride } 080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
12	nickel { nickel diiodide } 028-029-00-4	236-666-6	13462-90-3		42 mg/kg	5.324	202.372 mg/kg	0.0202 %	✓	
13	selenium { nickel selenate } 028-031-00-5	239-125-2	15060-62-5		2 mg/kg	2.554	4.622 mg/kg	0.000462 %	✓	
14	zinc { zinc oxide } 030-013-00-7	215-222-5	1314-13-2		78 mg/kg	1.245	87.862 mg/kg	0.00879 %	✓	



#	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									
15	chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
16	naphthalene				0.07	mg/kg		0.0633	mg/kg	0.00000633 %	✓	
	601-052-00-2	202-049-5	91-20-3									
17	acenaphthylene				0.11	mg/kg		0.0995	mg/kg	0.00000995 %	✓	
		205-917-1	208-96-8									
18	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9									
19	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		201-695-5	86-73-7									
20	phenanthrene				0.64	mg/kg		0.579	mg/kg	0.0000579 %	✓	
		201-581-5	85-01-8									
21	anthracene				0.12	mg/kg		0.109	mg/kg	0.0000109 %	✓	
		204-371-1	120-12-7									
22	fluoranthene				1.31	mg/kg		1.186	mg/kg	0.000119 %	✓	
		205-912-4	206-44-0									
23	pyrene				1.03	mg/kg		0.932	mg/kg	0.0000932 %	✓	
		204-927-3	129-00-0									
24	benzo[a]anthracene				0.54	mg/kg		0.489	mg/kg	0.0000489 %	✓	
	601-033-00-9	200-280-6	56-55-3									
25	chrysene				0.64	mg/kg		0.579	mg/kg	0.0000579 %	✓	
	601-048-00-0	205-923-4	218-01-9									
26	benzo[a]pyrene; benzo[def]chrysene				0.59	mg/kg		0.534	mg/kg	0.0000534 %	✓	
	601-032-00-3	200-028-5	50-32-8									
27	indeno[123-cd]pyrene				0.46	mg/kg		0.416	mg/kg	0.0000416 %	✓	
		205-893-2	193-39-5									
28	dibenz[a,h]anthracene				0.11	mg/kg		0.0995	mg/kg	0.00000995 %	✓	
	601-041-00-2	200-181-8	53-70-3									
29	benzo[ghi]perylene				0.36	mg/kg		0.326	mg/kg	0.0000326 %	✓	
		205-883-8	191-24-2									
30	coronene				0.15	mg/kg		0.136	mg/kg	0.0000136 %	✓	
		205-881-7	191-07-1									
31	benzo[b]fluoranthene				0.81	mg/kg		0.733	mg/kg	0.0000733 %	✓	
	601-034-00-4	205-911-9	205-99-2									
32	benzo[k]fluoranthene				0.31	mg/kg		0.281	mg/kg	0.0000281 %	✓	
	601-036-00-5	205-916-6	207-08-9									
33	TPH (C6 to C40) petroleum group				<38	mg/kg		<38	mg/kg	<0.0038 %		<LOD
			TPH									
34	pH				7.83	pH		7.83	pH	7.83 pH		
			PH									
35	xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<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]									
Total:										0.0496 %		

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
- This determinand is defined in the EU CLP Table 3
- <LOD** Below limit of detection
- ND** Not detected
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: TP02 ES2-16/09/2022-0.10-0.30m

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

Sample details

Sample name:	LoW Code:
TP02 ES2-16/09/2022-0.10-0.30m	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.1-0.3 m	
Moisture content:	
30.8%	
(dry weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 30.8% Dry 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	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane 603-181-00-X 216-653-1 1634-04-4				<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
2	benzene 601-020-00-8 200-753-7 71-43-2				<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
3	toluene 601-021-00-3 203-625-9 108-88-3				<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
4	ethylbenzene 601-023-00-4 202-849-4 100-41-4				<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) } 215-160-9 1308-38-9				68 mg/kg	1.462	75.983 mg/kg	0.0076 %	✓	
6	polychlorobiphenyls; PCB 602-039-00-4 215-648-1 1336-36-3				<35 µg/kg		<0.035 mg/kg	<0.0000035 %		<LOD
7	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex } 033-005-00-1				25.7 mg/kg	1.895	37.224 mg/kg	0.00372 %	✓	
8	cadmium (non-pyrophoric); [1] cadmium oxide (non-pyrophoric) [2] 048-002-00-0 231-152-8 [1] 7440-43-9 [1] 215-146-2 [2] 1306-19-0 [2]				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
9	copper { copper(II) chloride; copper dichloride } 231-210-2 7447-39-4				75 mg/kg	2.116	121.32 mg/kg	0.0121 %	✓	
10	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } 082-001-00-6			1	181 mg/kg		138.379 mg/kg	0.0138 %	✓	
11	mercury { mercury dichloride } 080-010-00-X 231-299-8 7487-94-7				0.2 mg/kg	1.353	0.207 mg/kg	0.0000207 %	✓	
12	nickel { nickel diiodide } 028-029-00-4 236-666-6 13462-90-3				63.6 mg/kg	5.324	258.888 mg/kg	0.0259 %	✓	
13	selenium { nickel selenate } 028-031-00-5 239-125-2 15060-62-5				1 mg/kg	2.554	1.952 mg/kg	0.000195 %	✓	
14	zinc { zinc oxide } 030-013-00-7 215-222-5 1314-13-2				567 mg/kg	1.245	539.566 mg/kg	0.054 %	✓	



#	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									
15	chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 215-607-8 1333-82-0				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
16	naphthalene 601-052-00-2 202-049-5 91-20-3				0.56	mg/kg		0.428	mg/kg	0.0000428 %	✓	
17	acenaphthylene 205-917-1 208-96-8				7.97	mg/kg		6.093	mg/kg	0.000609 %	✓	
18	acenaphthene 201-469-6 83-32-9				0.89	mg/kg		0.68	mg/kg	0.000068 %	✓	
19	fluorene 201-695-5 86-73-7				1.62	mg/kg		1.239	mg/kg	0.000124 %	✓	
20	phenanthrene 201-581-5 85-01-8				10.28	mg/kg		7.859	mg/kg	0.000786 %	✓	
21	anthracene 204-371-1 120-12-7				5.66	mg/kg		4.327	mg/kg	0.000433 %	✓	
22	fluoranthene 205-912-4 206-44-0				29.4	mg/kg		22.477	mg/kg	0.00225 %	✓	
23	pyrene 204-927-3 129-00-0				25.09	mg/kg		19.182	mg/kg	0.00192 %	✓	
24	benzo[a]anthracene 601-033-00-9 200-280-6 56-55-3				15.37	mg/kg		11.751	mg/kg	0.00118 %	✓	
25	chrysene 601-048-00-0 205-923-4 218-01-9				13.64	mg/kg		10.428	mg/kg	0.00104 %	✓	
26	benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 200-028-5 50-32-8				18.56	mg/kg		14.19	mg/kg	0.00142 %	✓	
27	indeno[123-cd]pyrene 205-893-2 193-39-5				14.81	mg/kg		11.323	mg/kg	0.00113 %	✓	
28	dibenz[a,h]anthracene 601-041-00-2 200-181-8 53-70-3				3.14	mg/kg		2.401	mg/kg	0.00024 %	✓	
29	benzo[ghi]perylene 205-883-8 191-24-2				11.08	mg/kg		8.471	mg/kg	0.000847 %	✓	
30	coronene 205-881-7 191-07-1				4.12	mg/kg		3.15	mg/kg	0.000315 %	✓	
31	benzo[b]fluoranthene 601-034-00-4 205-911-9 205-99-2				22.39	mg/kg		17.118	mg/kg	0.00171 %	✓	
32	benzo[k]fluoranthene 601-036-00-5 205-916-6 207-08-9				8.71	mg/kg		6.659	mg/kg	0.000666 %	✓	
33	TPH (C6 to C40) petroleum group TPH				560	mg/kg		428.135	mg/kg	0.0428 %	✓	
34	pH PH				6.84	pH		6.84	pH	6.84 pH		
35	xylene 601-022-00-9 202-422-2 [1] 95-47-6 [1] 203-396-5 [2] 106-42-3 [2] 203-576-3 [3] 108-38-3 [3] 215-535-7 [4] 1330-20-7 [4]				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
Total:										0.175 %		

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
- 🇪🇺 This determinand is defined in the EU CLP Table 3
- <LOD** Below limit of detection
- ND** Not detected
- CLP: Note 1 Only the metal concentration has been used for classification



Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because Sample is solid therefore flammability is reduced

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0428%)

Classification of sample: TP02 ES2-16/09/2022-1.80-1.90m

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

Sample details

Sample name:	LoW Code:	
TP02 ES2-16/09/2022-1.80-1.90m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
1.8-1.9 m		
Moisture content:		
12.6%		
(dry weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 12.6% Dry 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	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4	<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
2	benzene	601-020-00-8	200-753-7	71-43-2	<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
3	toluene	601-021-00-3	203-625-9	108-88-3	<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
4	ethylbenzene	601-023-00-4	202-849-4	100-41-4	<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9	40.2 mg/kg	1.462	52.18 mg/kg	0.00522 %	✓	
6	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3	<35 µg/kg		<0.035 mg/kg	<0.0000035 %		<LOD
7	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }	033-005-00-1			3.3 mg/kg	1.895	5.552 mg/kg	0.000555 %	✓	
8	cadmium (non-pyrophoric); [1] cadmium oxide (non-pyrophoric) [2]	048-002-00-0	231-152-8 [1] 215-146-2 [2]	7440-43-9 [1] 1306-19-0 [2]	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
9	copper { copper(II) chloride; copper dichloride }		231-210-2	7447-39-4	8 mg/kg	2.116	15.032 mg/kg	0.0015 %	✓	
10	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			51 mg/kg		45.293 mg/kg	0.00453 %	✓	
11	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7	<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
12	nickel { nickel diiodide }	028-029-00-4	236-666-6	13462-90-3	20.6 mg/kg	5.324	97.407 mg/kg	0.00974 %	✓	
13	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5	<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
14	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2	39 mg/kg	1.245	43.112 mg/kg	0.00431 %	✓	



#	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								
15	chromium in chromium(VI) compounds (chromium(VI) oxide)				<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %			<LOD
	024-001-00-0	215-607-8	1333-82-0								
16	naphthalene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
	601-052-00-2	202-049-5	91-20-3								
17	acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		205-917-1	208-96-8								
18	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		201-469-6	83-32-9								
19	fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
		201-695-5	86-73-7								
20	phenanthrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		201-581-5	85-01-8								
21	anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
		204-371-1	120-12-7								
22	fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		205-912-4	206-44-0								
23	pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		204-927-3	129-00-0								
24	benzo[a]anthracene				<0.06 mg/kg		<0.06 mg/kg	<0.000006 %			<LOD
	601-033-00-9	200-280-6	56-55-3								
25	chrysene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %			<LOD
	601-048-00-0	205-923-4	218-01-9								
26	benzo[a]pyrene; benzo[def]chrysene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
	601-032-00-3	200-028-5	50-32-8								
27	indeno[123-cd]pyrene				0.06 mg/kg		0.0533 mg/kg	0.00000533 %		✓	
		205-893-2	193-39-5								
28	dibenz[a,h]anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
	601-041-00-2	200-181-8	53-70-3								
29	benzo[ghi]perylene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
		205-883-8	191-24-2								
30	coronene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
		205-881-7	191-07-1								
31	benzo[b]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-034-00-4	205-911-9	205-99-2								
32	benzo[k]fluoranthene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %			<LOD
	601-036-00-5	205-916-6	207-08-9								
33	TPH (C6 to C40) petroleum group				<38 mg/kg		<38 mg/kg	<0.0038 %			<LOD
			TPH								
34	pH				5.53 pH		5.53 pH	5.53 pH			
			PH								
35	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<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]								
Total:									0.0301 %		

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
- This determinand is defined in the EU CLP Table 3
- <LOD Below limit of detection
- ND Not detected
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: TP03 ES1-16/09/2022-1.00-1.10m

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

Sample details

Sample name:	LoW Code:	
TP03 ES1-16/09/2022-1.00-1.10m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
1.0-1.1 m		
Moisture content:		
6.9%		
(dry weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 6.9% Dry 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	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
2	benzene				<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
3	toluene				<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
4	ethylbenzene				<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				45.8 mg/kg	1.462	62.619 mg/kg	0.00626 %	✓	
		215-160-9	1308-38-9							
6	polychlorobiphenyls; PCB				<35 µg/kg		<0.035 mg/kg	<0.0000035 %		<LOD
	602-039-00-4	215-648-1	1336-36-3							
7	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				8 mg/kg	1.895	14.178 mg/kg	0.00142 %	✓	
	033-005-00-1									
8	cadmium (non-pyrophoric); [1] cadmium oxide (non-pyrophoric) [2]				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	048-002-00-0	231-152-8 [1] 215-146-2 [2]	7440-43-9 [1] 1306-19-0 [2]							
9	copper { copper(II) chloride; copper dichloride }				7 mg/kg	2.116	13.855 mg/kg	0.00139 %	✓	
		231-210-2	7447-39-4							
10	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	6 mg/kg		5.613 mg/kg	0.000561 %	✓	
	082-001-00-6									
11	mercury { mercury dichloride }				<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
12	nickel { nickel diiodide }				15.3 mg/kg	5.324	76.204 mg/kg	0.00762 %	✓	
	028-029-00-4	236-666-6	13462-90-3							
13	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5							
14	zinc { zinc oxide }				22 mg/kg	1.245	25.616 mg/kg	0.00256 %	✓	
	030-013-00-7	215-222-5	1314-13-2							



#	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								
15	chromium in chromium(VI) compounds (chromium(VI) oxide)				<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %			<LOD
	024-001-00-0	215-607-8	1333-82-0								
16	naphthalene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
	601-052-00-2	202-049-5	91-20-3								
17	acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		205-917-1	208-96-8								
18	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		201-469-6	83-32-9								
19	fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
		201-695-5	86-73-7								
20	phenanthrene				0.09 mg/kg		0.0842 mg/kg	0.00000842 %		✓	
		201-581-5	85-01-8								
21	anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
		204-371-1	120-12-7								
22	fluoranthene				0.19 mg/kg		0.178 mg/kg	0.0000178 %		✓	
		205-912-4	206-44-0								
23	pyrene				0.15 mg/kg		0.14 mg/kg	0.000014 %		✓	
		204-927-3	129-00-0								
24	benzo[a]anthracene				0.14 mg/kg		0.131 mg/kg	0.0000131 %		✓	
	601-033-00-9	200-280-6	56-55-3								
25	chrysene				0.12 mg/kg		0.112 mg/kg	0.0000112 %		✓	
	601-048-00-0	205-923-4	218-01-9								
26	benzo[a]pyrene; benzo[def]chrysene				0.11 mg/kg		0.103 mg/kg	0.0000103 %		✓	
	601-032-00-3	200-028-5	50-32-8								
27	indeno[123-cd]pyrene				0.11 mg/kg		0.103 mg/kg	0.0000103 %		✓	
		205-893-2	193-39-5								
28	dibenz[a,h]anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
	601-041-00-2	200-181-8	53-70-3								
29	benzo[ghi]perylene				0.09 mg/kg		0.0842 mg/kg	0.00000842 %		✓	
		205-883-8	191-24-2								
30	coronene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
		205-881-7	191-07-1								
31	benzo[b]fluoranthene				0.15 mg/kg		0.14 mg/kg	0.000014 %		✓	
	601-034-00-4	205-911-9	205-99-2								
32	benzo[k]fluoranthene				0.06 mg/kg		0.0561 mg/kg	0.00000561 %		✓	
	601-036-00-5	205-916-6	207-08-9								
33	TPH (C6 to C40) petroleum group				<38 mg/kg		<38 mg/kg	<0.0038 %			<LOD
			TPH								
34	pH				7.8 pH		7.8 pH	7.8 pH			
			PH								
35	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<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]								
Total:									0.0241 %		

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
- This determinand is defined in the EU CLP Table 3
- <LOD Below limit of detection
- ND Not detected
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: TP05 ES2-16/09/2022-2.00-2.20m

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

Sample details

Sample name:	LoW Code:	
TP05 ES2-16/09/2022-2.00-2.20m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
2.0-2.2 m		
Moisture content:		
9.2%		
(dry weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 9.2% Dry 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	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
2	benzene				<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
3	toluene				7 µg/kg		0.0064 mg/kg	0.00000641 %	✓	
	601-021-00-3	203-625-9	108-88-3							
4	ethylbenzene				<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				66.8 mg/kg	1.462	89.407 mg/kg	0.00894 %	✓	
		215-160-9	1308-38-9							
6	polychlorobiphenyls; PCB				<35 µg/kg		<0.035 mg/kg	<0.0000035 %		<LOD
	602-039-00-4	215-648-1	1336-36-3							
7	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				3.4 mg/kg	1.895	5.899 mg/kg	0.00059 %	✓	
	033-005-00-1									
8	cadmium (non-pyrophoric); [1] cadmium oxide (non-pyrophoric) [2]				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	048-002-00-0	231-152-8 [1] 215-146-2 [2]	7440-43-9 [1] 1306-19-0 [2]							
9	copper { copper(II) chloride; copper dichloride }				8 mg/kg	2.116	15.501 mg/kg	0.00155 %	✓	
		231-210-2	7447-39-4							
10	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	7 mg/kg		6.41 mg/kg	0.000641 %	✓	
	082-001-00-6									
11	mercury { mercury dichloride }				<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
12	nickel { nickel diiodide }				24.5 mg/kg	5.324	119.455 mg/kg	0.0119 %	✓	
	028-029-00-4	236-666-6	13462-90-3							
13	selenium { nickel selenate }				2 mg/kg	2.554	4.677 mg/kg	0.000468 %	✓	
	028-031-00-5	239-125-2	15060-62-5							
14	zinc { zinc oxide }				27 mg/kg	1.245	30.776 mg/kg	0.00308 %	✓	
	030-013-00-7	215-222-5	1314-13-2							



#	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								
15	chromium in chromium(VI) compounds (chromium(VI) oxide)				<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %			<LOD
	024-001-00-0	215-607-8	1333-82-0								
16	naphthalene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
	601-052-00-2	202-049-5	91-20-3								
17	acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		205-917-1	208-96-8								
18	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		201-469-6	83-32-9								
19	fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
		201-695-5	86-73-7								
20	phenanthrene				0.19 mg/kg		0.174 mg/kg	0.0000174 %		✓	
		201-581-5	85-01-8								
21	anthracene				0.07 mg/kg		0.0641 mg/kg	0.00000641 %		✓	
		204-371-1	120-12-7								
22	fluoranthene				0.45 mg/kg		0.412 mg/kg	0.0000412 %		✓	
		205-912-4	206-44-0								
23	pyrene				0.37 mg/kg		0.339 mg/kg	0.0000339 %		✓	
		204-927-3	129-00-0								
24	benzo[a]anthracene				0.26 mg/kg		0.238 mg/kg	0.0000238 %		✓	
	601-033-00-9	200-280-6	56-55-3								
25	chrysene				0.24 mg/kg		0.22 mg/kg	0.000022 %		✓	
	601-048-00-0	205-923-4	218-01-9								
26	benzo[a]pyrene; benzo[def]chrysene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
	601-032-00-3	200-028-5	50-32-8								
27	indeno[123-cd]pyrene				0.21 mg/kg		0.192 mg/kg	0.0000192 %		✓	
		205-893-2	193-39-5								
28	dibenz[a,h]anthracene				0.04 mg/kg		0.0366 mg/kg	0.00000366 %		✓	
	601-041-00-2	200-181-8	53-70-3								
29	benzo[ghi]perylene				0.16 mg/kg		0.147 mg/kg	0.0000147 %		✓	
		205-883-8	191-24-2								
30	coronene				0.07 mg/kg		0.0641 mg/kg	0.00000641 %		✓	
		205-881-7	191-07-1								
31	benzo[b]fluoranthene				0.32 mg/kg		0.293 mg/kg	0.0000293 %		✓	
	601-034-00-4	205-911-9	205-99-2								
32	benzo[k]fluoranthene				0.13 mg/kg		0.119 mg/kg	0.0000119 %		✓	
	601-036-00-5	205-916-6	207-08-9								
33	TPH (C6 to C40) petroleum group				<38 mg/kg		<38 mg/kg	<0.0038 %			<LOD
			TPH								
34	pH				8.37 pH		8.37 pH	8.37 pH			
			PH								
35	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<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]								
Total:									0.0314 %		

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
- This determinand is defined in the EU CLP Table 3
- <LOD** Below limit of detection
- ND** Not detected
- CLP: Note 1 Only the metal concentration has been used for classification



Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because Sample is solid therefore flammability is reduced

Hazard Statements hit:

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

Because of determinand:

toluene: (conc.: 6.41e-07%)



Classification of sample: TP01 ES1-16/09/2022-0.70-0.90m

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

Sample details

Sample name:	LoW Code:
TP01 ES1-16/09/2022-0.70-0.90m	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)
0.7-0.9 m	
Moisture content:	
8.2%	
(dry weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 8.2% Dry 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	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
2	benzene				<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
3	toluene				<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
4	ethylbenzene				<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
5	TPH (C6 to C40) petroleum group				<38 mg/kg		<38 mg/kg	<0.0038 %		<LOD
			TPH							
6	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<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]							
Total:								0.0038 %		

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
- <LOD** Below limit of detection
- ND** Not detected



Classification of sample: TP04 ES2-16/09/2022-1.60-1.70m

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

Sample details

Sample name:	LoW Code:	
TP04 ES2-16/09/2022-1.60-1.70m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
1.6-1.7 m		
Moisture content:		
7.7%		
(dry weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 7.7% Dry 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	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
2	benzene				<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
3	toluene				<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
4	ethylbenzene				<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
5	TPH (C6 to C40) petroleum group				<38 mg/kg		<38 mg/kg	<0.0038 %		<LOD
			TPH							
6	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1]	95-47-6 [1]							
		203-396-5 [2]	106-42-3 [2]							
		203-576-3 [3]	108-38-3 [3]							
		215-535-7 [4]	1330-20-7 [4]							
Total:								0.0038 %		

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
- <LOD** Below limit of detection
- ND** Not detected



Classification of sample: TP05 ES1-16/09/2022-0.20-0.50m

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

Sample details

Sample name:	LoW Code:
TP05 ES1-16/09/2022-0.20-0.50m	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)
0.2-0.5 m	
Moisture content:	
20.6%	
(dry weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 20.6% Dry 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	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane 603-181-00-X 216-653-1 1634-04-4				<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
2	benzene 601-020-00-8 200-753-7 71-43-2				7 µg/kg		0.0058 mg/kg	0.00000058 %	✔	
3	toluene 601-021-00-3 203-625-9 108-88-3				<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
4	ethylbenzene 601-023-00-4 202-849-4 100-41-4				<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
5	TPH (C6 to C40) petroleum group TPH				377 mg/kg		312.604 mg/kg	0.0313 %	✔	
6	xylene 601-022-00-9 202-422-2 [1] 95-47-6 [1] 203-396-5 [2] 106-42-3 [2] 203-576-3 [3] 108-38-3 [3] 215-535-7 [4] 1330-20-7 [4]				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
Total:								0.0313 %		

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
- <LOD Below limit of detection
- ND Not detected

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because Sample is solid therefore flammability is reduced

Hazard Statements hit:

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

Because of determinand:

benzene: (conc.: 5.8e-07%)



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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0313%)

Appendix A: Classifier defined and non GB MCL determinands

- **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

- **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

- **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

- **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

- **copper(II) chloride; copper dichloride** (EC Number: 231-210-2, CAS Number: 7447-39-4)

Description/Comments:

Data source: <https://echa.europa.eu/substance-information/-/substanceinfo/100.028.373>

Data source date: 03 Nov 2016

Hazard Statements: Skin Irrit. 2; H315 , Acute Tox. 4; H302 , Eye Dam. 1; H318 , Acute Tox. 4; H312 , STOT SE 3; H335 , Eye Irrit. 2; H319 , Acute Tox. 3; H301 , Acute Tox. 4; H332 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **lead compounds with the exception of those specified elsewhere in this Annex (worst case)**

EU CLP index number: 082-001-00-6

Description/Comments: Worst Case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following CLP protocols, considers lead compounds from smelting industries, flue dust and similar to be Carcinogenic category 1A

Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)

Hazard Statements: Repr. 1A; H360Df , Acute Tox. 4; H332 , Acute Tox. 4; H302 , STOT RE 2; H373 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Repr. 2; H361f >= 2.5 % , STOT RE 2; H373 >= 0.5 % , Carc. 1A; H350

Reason for additional Hazards Statement(s):

03 Jun 2015 - Carc. 1A; H350 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html (worst case lead compounds). Review date 29/09/2015

- **zinc oxide** (EC Number: 215-222-5, CAS Number: 1314-13-2)

EU CLP index number: 030-013-00-7

Description/Comments:

Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)

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

- **chromium(VI) oxide** (EC Number: 215-607-8, CAS Number: 1333-82-0)

EU CLP index number: 024-001-00-0

Description/Comments:

Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)

Hazard Statements: Ox. Sol. 1; H271 , Carc. 1A; H350 , Muta. 1B; H340 , Repr. 2; H361f , Acute Tox. 2; H330 , Acute Tox. 3; H311 , Acute Tox. 3; H301 , STOT RE 1; H372 , Skin Corr. 1A; H314 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , STOT SE 3; H335 >= 1 %

• **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

• **coronene** (EC Number: 205-881-7, CAS Number: 191-07-1)

Description/Comments: Data from C&L Inventory Database; no entries in Registered Substances or Pesticides Properties databases; SDS: Sigma Aldrich, 1907/2006 compliant, dated 2012 - no entries; IARC – Group 3, not carcinogenic.

Data source: <http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=17010&HarmOnly=no?fc=true&lang=en>

Data source date: 16 Jun 2014

Hazard Statements: STOT SE 2; H371

• **pH** (CAS Number: PH)

Description/Comments: Appendix C4

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: None.



Appendix B: Rationale for selection of metal species

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

Standard Approach

arsenic {arsenic acid and its salts with the exception of those specified elsewhere in this Annex}

Worst case scenario

copper {copper(II) chloride; copper dichloride}

Standard Approach

lead {lead compounds with the exception of those specified elsewhere in this Annex (worst case)}

Standard Approach

mercury {mercury dichloride}

Worst case scenario

nickel {nickel diiodide}

Worst case scenario

selenium {nickel selenate}

Worst case scenario

zinc {zinc oxide}

Standard Approach

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

Standard Approach

Appendix C: Version

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

HazWasteOnline Classification Engine Version: 2022.263.5340.9974 (20 Sep 2022)

HazWasteOnline Database: 2022.273.5362.10003 (03 Oct 2022)

This classification utilises the following guidance and legislation:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020

GB MCL List - version 1.1 of 09 June 2021

APPENDIX G

Generic Screening Criteria



EPS Generic Quantitative Risk Assessment

Generic Screening Criteria (C4SLs) - All Land Uses

Contaminant	Soil Targets					
	Residential		Allotments	Commercial	Public Open Spaces	
	With Home Grown Produce	Without Home Grown Produce			Residential	Parks
Unit	mg/kg					
Arsenic	37	40	49	640	79	168
Benzene	0.87	3.3	0.18	98	140	230
Benzo(a)pyrene	5	5.3	5.7	76	10	21
Cadmium	26	149	4.9	410	220	880
Chromium (VI)	21	21	170	49	23	250
Lead	200	310	80	2330	630	1300
Chloroethene (Vinyl Chloride)	0.017	0.029	0.0058	2.2	7.8	19
Trichloroethene (TCE)	0.043	0.045	0.16	3.4	79	69
Tetrachloroethene (PCE)	1.6	1.6	11	130	3400	2500

Notes:

Targets for Human Health have been taken from the publicly available Category 4 Screening Levels (C4SLs) for assessment of land affected by contamination issued by DEFRA/CL:AIRE in December 2013 and May 2021.

Within the modelling for C4SLs, a Soil Organic Matter content of 6% has been used. Reference to site-specific data should be made where possible.

The C4SLs for the contaminant benzene along with the three chlorinated solvents are the most susceptible to changes in SOM.

May-22

EPS Generic Quantitative Risk Assessment - Residential Land Use

Contaminant	Soil Targets		
	Human Health	Controlled Waters	
		Surface Water	Groundwater
Unit	mg/kg		
Arsenic	See C4SL	n/c	n/c
Cadmium	See C4SL	n/c	n/c
Chromium III	910	n/c	n/c
Chromium VI	See C4SL	n/c	n/c
Copper	2400	n/c	n/c
Mercury (elemental)	1.2	0.085	1.22
Nickel	180	n/c	n/c
Lead	See C4SL	n/c	n/c
Selenium	250	n/c	n/c
Zinc	3700	n/c	n/c
Benzene	See C4SL	0.064	0.0064
Toluene	130	1.33	12.6
Ethylbenzene	47	0.77	11.5
Xylene (para)	56	1.18	19.6
MTBE#	49	4.41	0.026
Benzo(a)Pyrene	See C4SL	n/c	n/c
Naphthalene	2.3	0.11	0.11
Aliphatic C5-C6	42	4.06	0.81
Aliphatic C6-C8	100	17.8	3.57
Aliphatic C8-C10	27	n/c	n/c
Aliphatic C10-C12	130(48)*	n/c	n/c
Aliphatic C12-C16	1100(8.48)**	n/c	n/c
Aliphatic C16-C35	65000 (8.48)**	n/c	n/c
Aromatic C8-C10	34	6.71	1.34
Aromatic C10-C12	74	10.6	2.13
Aromatic C12-C16	140	21.2	4.23
Aromatic C16-C21	260	n/c	n/c
Aromatic C21-C35	1100	n/c	n/c
Tetrachloroethene	See C4SL	0.24	0.24
Trichloroethene	See C4SL	0.13	0.13
cis-1,2 Dichloroethene		0.21	0.21
Vinyl Chloride	See C4SL	0.0012	0.0012

Contaminant	Groundwater Targets		
	Human Health	Controlled Waters	
		Surface Water	Groundwater
Unit	µg/l		
Arsenic	n/c	50	10
Cadmium	n/c	2.5#	5
Chromium III	n/c	4.7	50
Chromium VI	n/c	3.4	
Copper	n/c	93.1#	2000
Mercury (elemental)	1.1	1	1
Nickel	n/c	14.8#	20
Lead	n/c	27.7#	10
Selenium	n/c	10	10
Zinc	n/c	373#	3000
Benzene	210	10	1
Toluene	230,000	74	700
Ethylbenzene	10,000	20	300
Xylene (para)	9,900	30	500
MTBE#	83,000	2600	15
Benzo(a)Pyrene	n/c	0.005 (0.00017)	0.01
Naphthalene	220	2	2
Aliphatic C5-C6	1,900	50	10
Aliphatic C6-C8	1,500	50	10
Aliphatic C8-C10	57	50	10
Aliphatic C10-C12	37	50	10
Aliphatic C12-C16	n/c	50	10
Aliphatic C16-C35	n/c	50	10
Aromatic C8-C10	1,900	50	10
Aromatic C10-C12	6,800	50	10
Aromatic C12-C16	39,000	50	10
Aromatic C16-C21	n/c	50	10
Aromatic C21-C35	n/c	50	10
Tetrachloroethene	34	10	10
Trichloroethene	5.7	10	10
cis-1,2 Dichloroethene	130	50	50
Vinyl Chloride	0.62	0.5	0.5

Notes:

f = Oral, dermal and inhalation exposure compared with oral HCV N/C = Not Calculated

* = S4UL exceeds vapour saturation limit (in brackets)

** = S4UL exceeds solubility saturation limit (in brackets)

n/c = not calculated. Under normal conditions contaminant exhibits low solubility /volatility, therefore risks from leaching and/or vapour pathways are considered low.

To establish suitable compliance criteria for Surface Water review of baseline groundwater quality in England and Wales was completed following research reported in Shand, P, Edmunds, W M, Lawrence, A R, Smedley, P L, and Burke, S. 2007. The natural (baseline) quality of groundwater in England and Wales. British Geological Survey Research Report No. RR/07/06. Where compliance criteria was found below the 97.7 percentile of baseline value, the latter was adopted as GAC.

Soil Targets

Targets for Human Health have been taken from S4ULs 'Suitable For Use Levels for Human Health Risk Assessment' – LQM and CIEH (2014) derived using standard sandy loam soil with 1% SOM, except (#) = EIC/AGS/CL/AIRE GAC 'Soil Generic Assessment Criteria' (2010). For sites where ground conditions differ significantly from sandy loam or site-specific SOM and pH are available, the generic human health targets may be revised.

Targets for Controlled waters have been derived using EA Remedial Targets Worksheet (v3.1) - using standard Sandy Loam ground conditions as described in Science Report SC050021/SR3, assuming no degradation for a 10m compliance distance with criteria of EQS or UKDWS for Surface Water and Groundwater respectively (see notes for GW targets).

Groundwater Targets

For Surface Water, targets have been taken as Freshwater EQS where available. For MTBE Predicted No Effect Concentration (European Risk Assessment Report, 2002) was used. For individual TPH fractions, in absence of UK EQS, a 5 times multiplier of UKDWS has been taken.

For Groundwater, targets have been taken as UKDWS where available. In the absence of UK targets internationally recognised criteria were adopted. For MTBE, WHO taste threshold has been adopted.

Targets for Human Health have been taken from Society of Brownfield Risk Assessment (SoBRA) 'Development of Generic Assessment Criteria for Assessing Vapour Risks to Human Health from Volatile Contaminants in Groundwater' - Version 1.0, February 2017, derived using sandy soil and 1%SOM. GAC were set up assuming source at 50cm below typical ground bearing slab of 15cm thickness. GAC were derived for vapour pathways only. For sites where ground conditions, or differ significantly from described above, the generic human health targets may be revised.



APPENDIX H

Cover Soils Checklist



ADVISORY NOTE

SOILS FOR USE IN COVER SYSTEMS

This note applies where there is a need for a control measure in the form of a defined thickness of clean soil to be used in gardens and soft landscaped areas in order to reduce risks from underlying contamination (a 'cover system'). Where a specific thickness has been presented, it is what EPS consider sufficient provided the soil forming the cover system is good quality, as it is assumed that over time this soil will become intermixed with the underlying soils and therefore needs to have the necessary 'dilution' effect. The aim being that an acceptable reduction in exposure to contamination is achieved, rather than absolute prevention.

These simple cover systems are designed in general accordance with the BRE 2004 guidance '*Cover Systems for Land Regeneration, Thickness of Cover Systems for Contaminated Land*'. In many cases guidance from a Local Planning Authority or NHBC/Approved Inspector may also apply and need to be taken into account. In most cases, to design the cover system EPS have to assume a certain quality of cover soils in advance. In these circumstances, we utilise what we consider to represent 'good quality soil' in that the soil could never be considered 'contaminated' but is also pragmatic and does not represent an unrealistic or unsustainable objective for much of the soils in the UK. In numerical terms, this standard typically equates to soil containing contaminants at around 25% of their adopted screening values in the risk assessment.

For the cover system itself, EPS would usually carry out a verification process of your site to demonstrate the control measure has been implemented as intended to satisfy all interested parties such as planning authorities, the NHBC and the future property owner. To document this process, EPS will prepare a Verification Report. If you wish for EPS to do this, we will need the following points confirmed relating to the soils preferably before they are installed in gardens.

If there are any queries, please contact EPS before purchasing any soil.

EPS Contact Details:

Tel: 01954 710666

Email: info@epstrategies.co.uk



Pre-Verification Cover System Checklist		Yes?
Soil Source	The soil must not be a waste. Has it been confirmed that the soil is not a waste and has never been deemed as such in the past?	
	Has the source of the soil been provided?	
	Have all the delivery notes confirming the source, volume and type of soil been provided for all that is to be used? Where suppliers such as British Sugar are used, the soils should be delivered direct to site (not via an intermediary depot).	
Soil Quality	The soils are free of invasive plant species such as Japanese Knotweed, and have not been sourced from an affected area?	
	Do the soils look clean and of a high quality? I.e. the soil must not have an odour or contain any visual evidence of contamination, including oils, asbestos, glass, plastic, rubble, metal, ash, sharp objects or tarmac/bitumen?	
	Testing to 'BS 3882:2015 <i>Specification for topsoil and requirements for use</i> ' is preferable but generally not essential for public health regulation, provided you can confirm the soils comply with the above points, are suitable for their intended purpose and will provide an adequate growing medium?	
	<p>Has the soil been chemically tested prior to it arriving at site?</p> <p>Any soil test results presented to EPS by a third party must be current and clearly relate to the soil used, i.e. the testing must generally be dated within 6 weeks of delivery. The quantity of testing will be dependent on how much confidence is generated in the quality of the material, as well any specific local regulatory requirements. If the soil is clean soil from an established source such as British Sugar, the testing they provide at source may be sufficient alone without further testing (by EPS).</p> <p>For other soils, EPS can advise on the likely testing frequencies but as a rule of thumb, anticipate at least one sample per average-sized plot. The testing would usually comprise the following: Heavy Metals, Poly Aromatic Hydrocarbons, Asbestos and Total Petroleum Hydrocarbons at an accredited lab. If adequate testing has not been completed, then EPS will need to test it from stockpiles prior to installation. Installing the soils into gardens without any testing data is not advised, as it may need to all be removed later.</p>	
Cover Thickness	Are all excavations ready which will allow the necessary thickness of cover soils to be installed?	
	If yes, can you provide waste transfer documentation for any excavated soils?	



APPENDIX I

Method Statement for Encountering Unexpected Contamination



METHOD STATEMENT

ACTIONS TO BE TAKEN IN THE EVENT OF DISCOVERING UNEXPECTED CONTAMINATION DURING INTRUSIVE GROUNDWORKS

If at any point during intrusive groundworks at a site, evidence of unforeseen contamination is encountered in the form of significant noxious odours, discolouration, or instability within soils or sheen/ discolouration in groundwater, the following actions will be taken:

- Intrusive works in the immediate area of the impacted ground will be suspended and the continuation of work in other areas of the site will be considered within the context of the site specific health & safety plan.
- Environmental Protection Strategies Ltd (EPS) will be contacted and appraised of the situation so that arrangements can be made to characterise the impact and determine what action may be necessary in addition to the scheduled site works. Where possible / health & safety plan permits, digital photographs of the impacted ground will be taken and emailed to EPS at the address below to assist in the initial assessment
- It may well be necessary for EPS to attend site to undertake visual inspection and obtain samples for field and/or laboratory analysis, although the actions taken will be dependent on the nature of what is encountered
- In cases where EPS consider the unforeseen contamination likely to pose a significant risk of significant harm to adjacent site users or local environmental receptors, the local authority and the Environment Agency will be informed of the situation and the actions being taken
- Once appropriate action has been agreed and undertaken, a written summary will be produced by EPS for submission to the Local Authority, (and where relevant, the Environment Agency) in accordance with planning requirements. The submission will include details of work undertaken, analytical results of investigative and validation samples obtained and conclusions and recommendations for any further actions considered necessary
- Where regulatory bodies have been involved, site works should only recommence following their agreement and in all cases should only recommence when the site manager considers it safe to do so within the context of the site specific health & safety plan.

EPS Contact Details:

Marcus Bell	Associate Director	Tel: 0787 206 9979
Will Evans	Director	Tel: 0781 253 9655
Steve Bullock	Director	Tel: 0786 694 9221

Email: info@epstrategies.co.uk (Automatically forwarded to the above and office-based personnel)



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