Technical Note

Project:	P17-176 Athersley RLE		
Subject:	Technical Note – Contamination and Remediation Summary		
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1 Introduction

1.1 Terms of Reference

In August 2019, Harworth Estates commissioned Rodgers Leask Environmental Ltd (RLE) to undertake a summary of the contamination issues and remediation requirements on land off Wakefield Road, Athersley, Barnsley, henceforth referred to as "the Site". The Site is proposed to be re-developed for a residential end use.

This report also includes an assessment of contamination delineation works undertaken in November 2017.

1.2 Limitations and confidentiality

All conclusions and recommendations made within this report are based upon and limited to the factual information obtained as part of this investigation. No responsibility can be taken by RLE Ltd for information obtained by third parties and it has been assumed that all third party information provided is true and correct.

No liability can be accepted for conditions not revealed within the exploratory holes or pits undertaken by this investigation. The exploratory points cover only a small proportion of the total site area. RLE Ltd has where necessary undertaken extrapolation between locations and no responsibility can be taken for different conditions which may occur between locations.

RLE Ltd has undertaken the work in accordance with our understanding of current best practice at the time of undertaking the report. Further assessment and revision of the report may be required should new information come to light or legislation/changes to best practice be introduced after the date of issue of the report.

RLE Ltd has prepared the report for the sole use and reliance of the Client. The report may not be used or relied upon by any unauthorised third party without the explicit written agreement of RLE Ltd.

2 Reference Documents

RLE has previously produced the following documents which should be referred to in conjunction with this technical note:

- Phase 1 Desk Study, May 2017, ref: 17176-RLE-17-00-RP-O-001
- Coal Mining Risk Assessment, May 2017, ref: 17176-RLE-17-00-RP-O-002
- Phase 2 Geo-Environmental Report January 2018, ref: 17176-RLE-17-00-RP-O-003
- Technical Note: Coal Mining Investigation, November 2019, ref: 17176-RLE-19-00-RP-O-004

3 Background Information

3.1 Site History and Setting

The northwest of the Site was formerly occupied in part by the East Gawber Hall Colliery between c.1856 and 1922, with the remainder of the colliery being situated off-site to the north and west. This colliery included several shafts and adits and railway sidings located in the north of the Site, and numerous additional buildings including some coke ovens situated off-site to the northwest. Additional collieries were present in the wider surrounding area including Primrose Main and Wharncliffe Carlton to the south.

A former railway embankment (now public footpath) is present along the southern Site boundary.

Since closure of the colliery on Site, land north of the Site was redeveloped as an engineering works. The remainder of the Site appears to have been restored to the present condition of grass pasture. Anecdotal evidence provided to RLE by a local resident indicated that the east of the Site was formerly used as an excavator training ground.

3.2 Previously identified Ground Conditions and Contamination

Previous investigation undertaken by RLE in July 2017 included machine excavated trial pits and window sample boreholes. Several different strata of both made ground and natural materials were identified. The extents of each made ground strata are shown on RLE Drawing 17176-RLE-17-XX-DR-0-004 (Intrusive Location Plan, Phase 2 works) included within Appendix A. Table 1 below presents a summary of ground conditions:

Strata Encountered	Mean depth to top of strata (m) [range, m]	Mean depth to base of strata (m) [range, m]	Mean thickness of strata (m) [range, m]
MADE GROUND Made Ground was encountered in five distinct areas which are as follows: **1: Made Ground topsoil (wherever MG present)** (generally comprising brown ashy clayey and sandy topsoil with fragments of brick, coal, sandstone gravels and ceramic fragments. Rare metal pieces, glass, tarmac and wood.	0.00 [0.00]	0.33 [0.2-0.7]	0.33 [0.2-0.7]
2: Made ground within the northern area of the Site (within the vicinity of the former coal mining railway and associated infrastructure) generally comprising black/grey and brown ashy gravelly clay containing varying quantities of clinker, coal, brick fragments, ceramics, glass, shale, metal pieces, tarmac and sandstone/mudstone/siltstone gravels.	0.21 [0.00-0.3]	1.30 [0.6-2.5]	1.09 [0.6-2.25]
3: Made ground within the vicinity of the historic track way located within the western half of the Site generally comprising stiff reddish orange and dark brown clay containing varying quantities of coal fragments, bricks, red shale and gravels of mudstone and sandstone.	0.29 [0.2-0.4]	1.35 [0.8-1.7]	1.06 [0.55-1.5]
4: Made ground within the central area of the Site. generally comprising black ashy gravels of coal, red shale, whole bricks, occasional slag gravels and mudstone/sandstone gravels.	0.38 [0.2-0.6]	1.68 [0.7-2.2]	1.3 [0.3-2.0]
5: Made ground beneath scrubland within the north eastern half of the Site generally comprising yellow clayey gravelly sand and grey gravelly clay containing cobbles and boulders of sandstone and ironstone and occasional fragments of ceramic, brick, coal and shale.	0.28 [0.2-0.3]	1.13 [0.6-1.5]	0.85 [0.3-1.5]
6. TOPSOIL (overlying natural strata) Generally comprising dark brown sandy gravelly clayey topsoil	0.00 [0.00]	0.27 [0.15-0.4]	0.27 [0.15-0.4]

Strata Encountered	Mean depth to top of strata (m) [range, m]	Mean depth to base of strata (m) [range, m]	Mean thickness of strata (m) [range, m]
7. PENNINE MIDDLE COAL MEASURES FORMATION Encountered in all but one (WS03) exploratory positions and comprised clay, gravel (weathered bedrock), mudstone, sandstone, siltstone.	1.54 [0.15-3.7]	2.35* [0.4-4.45*]	0.8* [0.1-2.4*]

A representative selection of samples from all strata on Site were tested for a suite of commonly occurring contaminants, and a contamination risk assessment was undertaken.

The following is a summary of the contamination issues identified per strata:

- Made Ground 1 (topsoil): potential risk to site end users through elevated concentrations of arsenic, lead and PAH. Recommended as not suitable for re-use.
- Made Ground 2 (north of site near former colliery): visual and olfactory evidence of contamination identified in the northwest of site as pockets of red shale with black treacle-like coal tar. Elevated TPH, PAH, arsenic and asbestos fibres (one sample) were identified from within this strata.
- Made Ground 3 (trackway): elevated PAH concentrations.
- Made Ground 4 (central site): elevated arsenic, aromatic TPH and PAH.
- Made Ground 5 (east of site): no contaminants of concern.
- Natural topsoil (stratum 6): Elevated concentrations of arsenic (possibly of natural origin). Recommended as not suitable for re-use.
- Natural subsoil (stratum 7): elevated concentrations of PAH were identified in one sample, which was considered an anomaly and most likely due to sample cross contamination. Otherwise no contaminants of concern were identified.
- Site wide: ground gas regime identified as Amber 1 / CS-1 requiring gas protection measures. Additionally, radon protection measures will be required.

The following is a summary of the remediation works and/or further investigative works which were proposed in the Phase 2 Report:

- Further investigation was recommended to obtain additional samples of topsoil for testing, and delineate any topsoil on site which is suitable for re-use
- Further investigation was recommended to delineate the area of coal tar contamination in the northwest of the Site.

- Remediation of the coal tar contamination will be required, to reduce the risk to site end users and controlled waters.
- Remediation of made ground strata 2, 3 and 4 (north of site, central site and trackway) was recommended by means of an engineered clean cover system of 600mm with a hard dig breaklayer at the base to mitigate the risk to site end users.

4 Objectives and Scope of Works

The objectives of this Technical Note are to address the recommendations identified above in the Phase 2 report, specifically:

- To review and assess additional contamination delineation works which have previously been undertaken by RLE in November 2017. These works aimed to delineate the area of coal tar contamination and further assess the suitability of topsoil for re-use on site.
- To review and summarise the Site wide remediation requirements for each strata/type of material

5 Delineation Works

5.1 Site Works

Additional site investigation works were undertaken on 13th November 2017 and comprised 13 No machine excavated trial pits (TP101 to TP113) in order to delineate the coal tar contamination, and 30 No hand excavated trial pits (TS101 to TS130) to obtain additional topsoil samples. Of these samples, 20 No topsoil samples were tested for arsenic, lead and PAHs to provide additional data for an assessment of suitability for re-use.

Trial pit logs are included within Appendix B.

The location of the additional hand excavated trial pits are shown on RLE Drawing 17176-RLE-17-XX-DR-O-005 (Topsoil Test Location Plan) included within Appendix C.

The location of the additional trial pits to delineate coal tar contamination, along with a cross section through this area is contained within RLE Drawing 17176-RLE-17-XX-DR-O-006 (Coal Tar Delineation Investigation Plan) included within Appendix D.

5.2 Delineation of Coal Tar Contamination

The 13 No additional trial pits have effectively delineated the area of coal tar contamination to a small area in the northwest of the Site, as depicted on drawing 17176-RLE-17-XX-DR-O-006.

TP101 to TP111 were excavated adjacent to and to the south of TT5 where the initial observation of contamination was identified. TP112 and TP113 were excavated adjacent to TT4 where a contamination test result identified elevated concentrations of TPH, however no visual or olfactory evidence of contamination was observed in this area.

Ground conditions in TP101 to TP111 comprised mixed made ground (stratum 2) with lenses of red burnt shale gravel. Coal tar contamination was typically identified at the base of burnt shale, at the interface of the underlying natural clay. Trial pits TP110 and TP111 downhill (south) of the initially identified area of contamination also identified evidence of coal tar contamination, whereas trial pits to the north, east and west generally did not. This suggests that there may be a degree of mobilisation of the coal tar downhill to the south, likely associated with perched groundwater.

To aid future identification, two figures are provided below to indicate the nature of the contaminated material.

Figure 1 below shows the free product in-situ within TP102, as a small pocket of coal tar impacted material perched on impermeable natural clay.

Figure 2 below shows the free-product, red shale and underlying natural clay excavated from TP102.

One contamination test was undertaken on the coal tar impacted soil taken from TT5, which identified the following:

- Total TPH concentration of 25,000 mg/kg (mostly heavy-end aromatic hydrocarbons)
- Total PAH concentration of 960 mg/kg
- Highly elevated concentrations of BTEX including benzene (280 µg/kg), toluene (2900 µg/kg), ethylbenzene (4000 µg/kg), m&p-xylene (64,000 µg/kg), o-xylene (34,000 µg/kg),1,3,5-trimethlybenzene (41,000 µg/kg) and 1,2,4-trimethylbenzene (68,000 µg/kg).
- Elevated (albeit low) concentrations of various other VOCs and SVOCs including dibenzofuran and numerous halocarbons such as trichlorofluoromethane, 1,1,2-trichloroethane and 1,2,3-trichloropropane.

It is also noted that the area of burnt shale and coal tar coincides with the anticipated location of a recorded mine entry, Adit 434408-017. It is possible that this material was brought onto site and used to infill the mine entry, or the placement may merely be coincidental. This material may also have originated as waste from coke ovens, which were present ~100m north as part of the former East Gawber Hall Colliery.

An approximate volume of 1,100 m^3 of coal tar impacted material and 2,500 m^3 of red burnt shale material exists in this area.

It is recommended that the coal tar impacted material is wholly excavated and removed from Site for treatment and/or disposal, although it may fail a hazardous WAC test, requiring treatment prior to disposal. Given the presence of coal tar it will likely classify as hazardous waste. Further testing should be undertaken on the associated red shale material, which may be able to be retained on-Site.

Once all contaminated material has been removed, validation testing should be undertaken on the base and sides of the excavation to confirm that the contamination has been removed. Following from this, the excavation should be backfilled with clean and inert material as approved by a suitably qualified engineer, which should be placed and compacted in layers to reduce the risk of future settlement.

5.3 Reassessment of Topsoil Suitability

5.3.1 Topsoil Strata Descriptions

The initial trial pits undertaken in the Phase 2 Investigation, the 30 No additional hand excavated trial pits (TS101 to TS130) and 20 No additional topsoil tests have effectively delineated areas of topsoil which are considered both suitable and unsuitable for re-use. Based on the observations from these trial pits, four distinct areas of topsoil are proposed. These areas are shown on RLE Drawing 17176-RLE-17-XX-DR-O-005 (Topsoil Test Location Plan), and each topsoil strata is described in Table 2 below:

Topsoil Strata	Description / rationale	Trial pits	No of Samples
1A – Made Ground Topsoil in the north and centre of the Site	Dark brown ashy very gravelly TOPSOIL. Gravel is sub-angular to angular, fine red shale, brick, coal, glass and clinker. **Overlying made ground strata 2, and 4 (former colliery areas)**	TP08, TP10, TP12, TS101, TS106, TS114-121	11
1B – Made Ground Topsoil in the southwest of the Site	Pale brown to dark brown clayey ashy sandy TOPSOIL. Gravel is sub-angular to angular, fine to coarse red shale and brick with rare coal. **Overlying made ground stratum 3 (former track)**	TP02, TP05A, TS102, TS103, TS107, TS108, TS112, TS113	7
1C – Made Ground Topsoil in the northeast of the Site, (reworked natural materials)	Brown slightly sandy clayey TOPSOIL. Rare gravel of brick, coal and clinker. **Overlying made ground stratum 5 (reworked natural)**	TP13, TS122, TS123, T124, TS125, TS127	4
6 – Natural Topsoil, in the west and south of the Site.	Brown slightly clayey slightly sandy TOPSOIL. Rare gravel of coal. **Overlying natural sub-soil**	TP01, TP03, TP16, TS104, TS105, TS109, TS110, TS111, TS126, TS128, TS129, TS130	8

5.3.2 Testing Rationale

Solid (soils) contamination testing was undertaken on the following samples (Table 3) to enable a general spread of chemical information throughout topsoil on site:

Reference	Depth (m)	Strata	Asbestos ID	Rodgers Leask Standard Soils Suite	Rodgers Leask TPH Risk Assessment Suite:	CLR Suite	As	Pb	PAH (USEPA 16)
TP01 D1	0.1	NAT TS 6	X	X					
TP02 D1	0.1	MGTS 1B	X		X				
TP03 D1	0.1	NAT TS 6	X	X					
TP05A D1	0.1	MGTS 1B	X			X			
TP08 D1	0.1	MGTS 1A	X		X				
TP10 D1	0.1	MGTS 1A	X			X			
TP12 D1	0.1	MGTS 1A	X			X			
TP13 D1	0.1	MGTS 1C	X	X					
TP16 D1	0.1	NAT TS 6	X	X					
TS101	0.1	MGTS 1A					X	X	X
TS102	0.1	MGTS 1B					X	X	X
TS103	0.1	MGTS 1B					X	X	X
TS104	0.1	NAT TS 6					X	X	X
TS106	0.1	MGTS 1A					X	X	X
TS108	0.1	MGTS 1B					X	X	X
TS112	0.1	MGTS 1B					X	X	X
TS113	0.1	MGTS 1B					X	X	X
TS114	0.1	MGTS 1A					X	X	X
TS115	0.1	MGTS 1A					X	X	X
TS118	0.1	MGTS 1A					X	X	X
TS120	0.1	MGTS 1A					X	X	X
TS121	0.1	MGTS 1A					X	X	X
TS122	0.1	MGTS 1C					X	X	X
TS124	0.1	MGTS 1C					X	X	X
TS126	0.1	NAT TS 6					X	X	X
TS127	0.1	MGTS 1C					X	X	X
TS129	0.1	NAT TS 6					X	X	X
TS130	0.1	NAT TS 6					X	X	X

Rodgers TPH Risk Assessment Soils Suite: As, Cd, Cu, Cr, Pb, Hg, Ni, V, Zn, Se & WSB, Elemental Sulphur, Water Soluble Sulphate (2:1), Easily Liberated Sulphide, Free Cyanide, Complex Cyanide & Free Cyanide, Thiocyanate, pH, Phenols (total of cresol+ phenol+xylenol), TPH (aliphatic/aromatic split) as TPH CWG inc. BTEX, USEPA 16 speciated PAH, Soil Organic Matter.

Rodgers Standard Soils Suite: As, Cd, Cu, Cr, Pb, Hg, Ni, V, Zn, Se & WSB, Elemental Sulphur, Water Soluble Sulphate (2:1), Easily Liberated Sulphide, Free Cyanide, Complex Cyanide & Free Cyanide, Thiocyanate, pH, Phenols total, USEPA 16 speciated PAH, Soil Organic Matter.

Rodgers Leask Contaminated Land Risk Assessment (CLR) Soils Suite: As, Cd, Cu, Cr, Pb, Hg, Ni, V, Zn, Se, Be, Ba & WSB, Extractable Nitrate, Elemental Sulphur, Water Soluble Sulphate (2:1), Easily Liberated Sulphide, Free Cyanide, Complex Cyanide & Free Cyanide, Thiocyanate, pH, Phenols total, TPH (total >C6-C40), USEPA 16 speciated PAH, Soil Organic Matter.

5.3.3 Assessment Approach

Contamination test results are included within Appendix E.

In order to assess the risk posed to the health of Site end users from long term exposure to contaminants in soil a Generic Quantitative Risk Assessment (GQRA) is undertaken. This involves the comparison of contaminant concentrations in soils to appropriate Generic Assessment Criteria (GAC).

The GAC used in this risk assessment have been derived using the Contaminated Land Exposure Assessment Model (CLEA). These include Category 4 Screening Levels (C4SL) published by the Department for Environment, Food and Rural Affairs (DEFRA) and Suitable 4 Use Level's (S4UL) published by Land Quality Management (LQM) and the Chartered Institute of Environmental Health (CIEH).

Where C4SL or S4UL are not available for a contaminant or are not considered to be appropriate for the risk assessment reference has been made to the Environment Agency Soil Guideline Values (SGV), LQM/CIEH GAC and the Environmental Industries Commission (EIC) GAC.

The C4SL and EA SGV have been derived based on the CLEA default value for Soil Organic Matter (SOM) content of 6% and a sandy loam soil type.

The LQM/CIEH S4UL and GAC and the EIC GAC are based on 1%, 2.5% and 6% SOM content and a sandy loam soil type. For this assessment a SOM of 6% is considered to be appropriate, given the high organic matter content of topsoil.

Where contaminants are found to exceed the GAC, there is a need for either DQRA and/or remedial action. If the use of generic criteria is not appropriate a Detailed Quantitative Risk Assessment (DQRA) must be undertaken whereby assessment criteria are derived based on Site specific parameters using the CLEA methodology.

For this assessment where contaminant concentrations have been recorded as below the limit of detection of the analytical method a conservative assumption has been made that the limit of detection is equal to the concentration of the contaminant in the soil. The concentrations of some contaminants (e.g. petroleum hydrocarbons) which significantly exceed their saturation limit can indicate the presence of free product. Where saturation limits are exceeded but no free product is identified the assessment of the risk posed by a contaminant is based on the toxicology of the contaminant and potential exposure pathways to the receptor.

5.3.4 Assessment Criteria

GAC are also referred to as critical concentrations (Cc) within the literature.

Prior to the comparison of soil concentrations against Cc's a suitable method of data comparison is established. This frequently involves establishing averaging areas.

Further advice on the use of Cc's is provided in the Environment Agency document 'Using Soil Guideline Values - science report: SC050021 / SGV introduction (March 2009)'.

Based on the proposed development masterplan the use of Cc's for residential use with plant uptake is considered appropriate for areas with proposed housing. In proposed landscaped areas, a public open space near residential housing scenario is considered appropriate. Should exceedances be identified, the SOM of the individual sample will be taken into consideration.

Should the end use change (due to a revision of the proposed layout for example) reassessment against relevant alternative Cc'c will be required.

5.3.5 Assessment of Data

Table 4 below shows substances that have exceeded their relevant Cc's.

Stratum / rationale	Contaminant	CC (mg/kg)	No. samples exceeding CC within stratum	Concentration of exceednace mg/kg	Sample Ref.
1A: Made Ground Topsoil in the north and centre of the Site.	Lead	200	1 of 11	560	TP10 D1
	Benzo[b]fluoranthene	3.7*	1 of 11	3.8	TP08 D1
	Dibenz(a,h)anthracene	0.30*	1 of 11	0.42	TP08 D1
1B: Made Ground Topsoil in the southwest of the Site (former track)	Arsenic	37	3 of 7	38 - 49	TP5A D1 TS108 TS112
	Lead	200	1 of 7	320	TP2 D1

Stratum / rationale	Contaminant	CC (mg/kg)	No. samples exceeding CC within stratum	Concentration of exceednace mg/kg	Sample Ref.
	Benzo[b]fluoranthene	3.7*	2 of 7	3.9 – 4.7	TS102 TS108
	Benzo[a]pyrene	3.0*	1 of 7	7.3	TS108
	Dibenz(a,h)anthracene	0.3*	4 of 7	0.44 – 1.4	TS102 TS108 TS112 TS113
6: Natural topsoil	Arsenic	37	1 of 7	65	TP01 D1

A star (*) denotes that the GAC for this organic contaminant is dependent on the Soil Organic Matter (SOM) content of the sample. The GAC for a 6% SOM is given above as this is considered most appropriate for these topsoil samples (actual range of SOM 5.5% to 53%).

No elevated concentrations of contaminants of concern were identified from Stratum 1C: made ground topsoil in the east of the Site (overlying made ground stratum 5, reworked natural material).

No asbestos fibres were identified within any of the topsoil samples analysed.

5.3.6 Data Analysis

Where individual samples in a larger sample population exceed the respective critical concentrations (Cc's) statistical testing can be applied to data sets in order to make a meaningful comparison with Cc's.

The following assessment of contamination has been undertaken in accordance with the CL:AIRE/CIEH guidance 'Guidance on Comparing Soil Contamination Data with a Critical Concentration' (May 2008) which requires consideration of a null hypothesis as follows:

- The true mean (μ) of the sample population is ≥ than the Cc.

Statistical analysis will establish whether the null hypothesis is correct. The alternative hypothesis considers the following:

- The μ of the sample population is < Cc.

In accordance with the CL:AIRE/CIEH guidance consideration of the 95% Upper Confidence Level (UCL) is required to confirm the null/alternative hypothesis'.

An appropriate dataset is required to perform the statistical analysis and an assessment of the following is required:

- The presence of non-detects i.e. < laboratory detection limit;
- The presence of potential outliers, and
- Checking the normality of the data.

Non-Detects

Where data is shown as < detection, it has been assumed that the actual concentration is half the limit of detection.

Outliers

Outliers are data that do not appear to be part of the main data set and could be present as the result of an error in the data or are clearly indicative of a different dataset (e.g. natural soil or different type of Made Ground). Any outliers have been calculated in accordance with the Grubbs test as shown in Appendix B of the CL:AIRE/CIEH guidance.

The rationale for including or excluding each individual outlier is discussed below.

Normal Distribution

The choice of statistical test is dependent on whether the data is normally or non-normally distributed and therefore an assessment has been made to establish the normality of the dataset.

Once the above factors have been considered the following statistical test is undertaken calculate the 95% UCL value:

- **The one-sample t-test** is applied to the data shows evidence of normality; or
- **The one-sided Chebychev Theorem** is applied if the data is shown to be non-normally distributed.

Based on the proposals for the Site, averaging areas of each of the topsoil strata named above are considered appropriate to be used for the data analysis.

The individual calculation sheets are presented in Appendix F and are summarised in Table 5 below:

Averaging Area ref:	Contaminant	No of samples	95% UCL	Assessment Criteria mg/kg	Exceed 95% UCL?	Outliers (included or excluded from dataset)
1a – Made ground Topsoil in north of site	Lead	11	116	200	No	TP10 D1 (excluded as probable hot spot - contaminant concentrations highly elevated above rest of sample dataset)
	Benzo[b]fluoranthene	11	2.73	3.7	No	None
	Dibenz(a,h) anthracene	11	0.264	0.3	No	TP08 D1 (included)
1B: Made Ground Topsoil in the southwest of the Site (former track)	Arsenic	7	41.7	37	Yes	None
	Lead	7	281	200	Yes	TP02 D1 (included)
	Benzo[b]fluoranthene	7	4.7	3.7	Yes	None
	Benzo[a]pyrene	7	6.2	3.0	Yes	TS108 (included)
	Dibenz(a,h) anthracene	7	1.20	0.3	Yes	TS108 (included)
6: Natural Topsoil	Arsenic	8	29.1	37	No	TP01 D2 (excluded as probable hot spot of natural origin)

5.3.7 Discussion

Based on the above additional contamination testing of topsoil and statistical analysis of the results, the following is concluded:

- **Stratum 1A (made ground topsoil in the former colliery area)** is considered suitable for re-use from a contamination perspective. One potential hot-spot exists surrounding TP10 for elevated concentrations of lead, which requires further investigation or treatment/removal from site. However visual inspection noted this topsoil stratum is of poor quality, containing frequent brick, stone and cobble material. Hence it may not be practical to re-use for residential rear gardens.
- **Stratum 1B (made ground topsoil in west, in area of former track)** is not considered suitable for re-use on Site based on statistically elevated concentrations of arsenic, lead and PAHs within this material. This material is recommended to be removed from site for disposal at a suitable licensed facility.
- **Stratum 1C (made ground topsoil in east, overlying reworked natural ground)** is considered suitable for re-use on Site. No elevated concentrations of

contaminants were identified within this material and the topsoil visually appears to be good quality.

- **Stratum 6 (natural topsoil)** is considered suitable for re-use on Site. One potential hotspot exists surrounding TP01 for elevated concentrations of arsenic. The arsenic hotspot is considered likely to be natural in origin, from elevated metal concentrations within coal fragments. It is therefore considered to present a low risk to human health, however further investigation or risk assessment into the bioavailability of the arsenic should be undertaken to confirm this.

6 Summary of Suggested Remediation Requirements

From the above investigation it is clear that there are contamination issues on site which require remedial action in order for the Site to be considered suitable for the proposed residential development. However it is considered that remediation can be achieved utilising conventional remedial techniques such as excavation and removal, and/or clean cover capping systems.

Table 6 below lists each strata on Site, estimates volumes, and lists any recommended remedial requirements. The location of each stratum on site is shown on RLE Drawings 17176-RLE-17-XX-DR-0-004 (Intrusive Location Plan, Phase 2 works), 17176-RLE-17-XX-DR-O-005 (Topsoil Test Location Plan) and 17176-RLE-17-XX-DR-O-006 (Coal Tar Delineation Investigation Plan) contained within Appendix A, C and D. Clean cover calculation sheets (in accordance with BRE 465) are contained within Appendix G.

Stratum Reference	Remedial Recommendations	Estimated Volume
1A – Made Ground Topsoil in the north and centre of the Site	Hotpot of lead contamination from single sample TP10 D1 (560mg/kg) – further investigation or removal required. No statistically elevated contaminants identified throughout the remainder of this strata, however this topsoil is of poor quality for use in residential gardens. This topsoil could be re-used in POS or landscaped areas, otherwise removal from site and disposal at a suitable licensed facility is recommended.	8,000 m^3 ~500 m^3 of which around TP10, requires removal or further investigation
1B – Made Ground Topsoil in the southwest of the Site (former track)	Not suitable for re-use on Site due to statistically elevated concentrations of arsenic, lead, benzo[b]fluoranthene, benzo[a]pyrene and dibenz(a,h)anthracene. It is recommended this topsoil is removed from Site and disposed of at a suitable licensed facility.	3,000 m^3

Stratum Reference	Remedial Recommendations	Estimated Volume
1C – Made Ground Topsoil in the northeast of the Site, (overlying reworked natural materials)	Considered suitable for re-use on Site. No contaminants of concern have been identified, and topsoil is of good quality for use in residential gardens.	6,000 m^3
2: Made ground within the northern area of the Site (former colliery and railway)	Remediation via use of 600mm thickness engineered clean cover system with a hard dig breaklayer is recommended to mitigate the risk to Site end users, due to elevated TPH, PAH, arsenic and asbestos fibres.	12,000 m^3
Coal tar free product contamination within stratum 2	Excavation and removal from Site for treatment and/or disposal. Likely to classify as hazardous waste (may fail WAC test). Red shale associated with the coal tar impacted material may also require excavation and removal. However additional contamination testing should be undertaken to confirm this, and may be able to reduce the amount of associated material that is also disposed of. Restrictions may be placed on a suitable purpose for re-use of the red shale, or use of a membrane will be required to separate from concrete. Validation testing should be undertaken from the base and sides of the excavation once contamination has been removed in order to confirm the remediation has been successful. The excavation should be backfilled with clean inert material as approved by a suitably qualified engineer, which should be placed and compacted in layers to reduce the risk of future settlement.	1,100 m^3 coal tar impacted soil 2,500 m^3 red shale (more testing required, may require removal)
3: Made ground, former trackway in west of Site.	Remediation via use of a 200mm thickness engineered clean cover system is recommended to mitigate the risk to Site end users due to elevated and PAHs.	5,500 m^3
4: Made ground within the central area of the Site (former colliery and railway)	Remediation via use of a 500mm thickness engineered clean cover system is recommended to mitigate the risk to Site end users due to elevated arsenic, aromatic TPH and PAHs.	5,000 m^3
5: Made ground in the east of Site (reworked natural).	None. No contaminants of concern identified. Suitable for retention and re-use on Site.	8,000 m^3
6. Natural topsoil	Considered suitable for re-use on Site. Hotspot of arsenic contamination from a single sample TP01 D2 (65 mg/kg) is likely to be of natural origin. This requires removal from Site or further risk assessment, which could include an assessment into the bioavailability of arsenic in soil.	7,000 m^3
7. Pennine Middle Coal Measures	None. No contaminants of concern identified. Suitable for retention and re-use on Site.	-

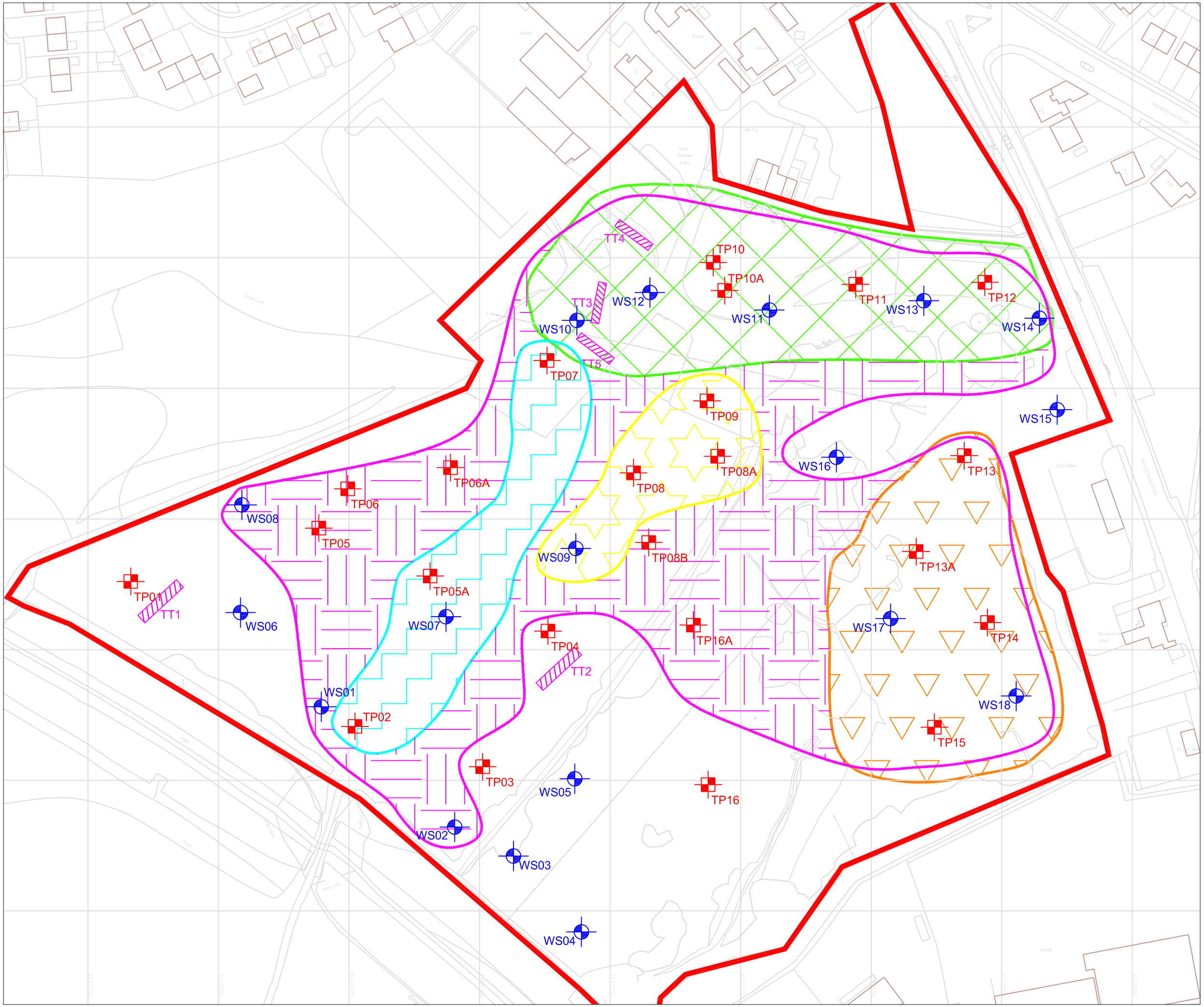
Approval of the above remediation recommendations should be sought from regulators and warranty providers. Volumes given are approximate.

An earthworks strategy and a CL:AIRE approved Materials Management Plan (MMP) will be required to control movement of soils on site. A remediation strategy and method statement may be required.

Appendix A: Intrusive Location Plan (Phase 2 works, July 2017)

Drawing No: 17176-RLE-19-XX-DR-O-004

A3



GENERAL NOTES

NO DIMENSIONS TO BE SCALED OFF THIS DRAWING.

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.

ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

KEY

TP01 — APPROXIMATE LOCATION AND REFERENCE OF TRIAL PIT EXCAVATED BY RLE.

WS01 — APPROXIMATE LOCATION AND REFERENCE OF WINDOW SAMPLE SUNK BY RLE.

TT1 — APPROXIMATE LOCATION AND REFERENCE OF TRIAL TRENCH EXCAVATED BY RLE.

APPROXIMATE EXTENTS OF MADE GROUND STRATUM 2: VICINITY OF FORMER COAL MINE, RAILWAYS / INFRASTRUCTURE

APPROXIMATE EXTENTS OF MADE GROUND 3: HISTORIC TRACK

APPROXIMATE EXTENTS OF MADE GROUND 4: CENTRAL AREA, IN VICINITY OF FORMER COLLIERY AND RAILWAY

APPROXIMATE EXTENTS OF MADE GROUND 5: REWORKED NATURAL IN EAST OF SITE

MADE GROUND STRATUM 1: TOPSOIL

Rev	Date	Amendments	By	Chk
A	11/11/19	UPDATED STRATUM REFS	AT	SF

Client

HARWORTH ESTATES

Project

ATHERSLEY

Drawing Title

INTRUSIVE LOCATION PLAN

Status

INFORMATION

Scale	Drawn	Checked	Date
NTS	AT	IPB	19/09/17

Drawing No. 17176-RLE-19-XX-DR-0-004 Rev. A

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Appendix B: Trial Pit Logs (November 2017)

Trial Pit Log

TrialPit No
TT5
Sheet 1 of 1

Project Name: Athersley, Barnsley	Project No. p17-176	Co-ords: / Level:	Date 25/07/2017
Location: Barnsley		Dimensions (m): / Depth 1.90	Scale 1:25
Client: Harworth Estates			Logged

Samples & In Situ Testing				Level (m)	Depth (m)	Stratum Description	Legend	Water Strike
Depth	Ref.	Type	Results					
						MADE GROUND: Black ash, coal, brick fragments, clayey as before.		
					0.50	MADE GROUND: Gravel and cobble of red pottery and brick fragments. Oil and fuels at base in eastwest.		
1.70	D1	ES						
					1.80	Natural stiff grey sandy CLAY.		
					1.90	End of Pit at 1.900m		

Remarks:

Stability:

Trial Pit Log

TrialPit No
TP101
Sheet 1 of 1

Project Name: Athersley, Barnsley	Project No. p17-176	Co-ords: 434687E - 408812N Level: 71.30	Date 13/11/2017
Location: Barnsley		Dimensions (m):	Scale 1:25
Client: Harworth Estates		Depth 2.40	Logged AT

Samples & In Situ Testing				Level (m)	Depth (m)	Stratum Description	Legend	Water Strike
Depth	Ref.	Type	Results					
				71.00	0.30	MADE GROUND: Grass overlying dark brown ashy gravelly topsoil. Gravel is sub-angular to angular, fine to coarse brick, ceramic, coal and glass.		
				70.40	0.90	MADE GROUND: Stiff ornage brown mottled grey gravelly clay. Gravel is sub-angular to angular, fine to coarse coal, mudstone and brick.		
				70.10	1.20	MADE GROUND: Firm to soft black and grey gravelly organic clay. Gravel is sub-angular to angular, fine to coarse brick and coal. Slight organic odour (possible relict topsoil).		
				69.60	1.70	MADE GROUND: Red sub-angular to angular, fine to coarse gravel of burnt shale.		
				69.20	2.10	MADE GROUND: Grey very clayey cobbly gravel of sub-angular to angular, fine to coarse mudstone and sandstone. Occasional whole brick. Pockets of visual and olfactory coal tar contamination.		
				68.90	2.40	Stiff grey green gravelly CLAY. Gravel is sub-angular to angular, fine to coarse mudstone.		
						End of Pit at 2.400m		

1 2 3 4 5

Remarks: Trial trench. No groundwater encountered. Small seepage of black shiny coal tar observed at 1.8m depth within clay underlying made ground.

Stability: Sides stable.

Trial Pit Log

TrialPit No
TP10A
Sheet 1 of 1

Project Name: Athersley, Barnsley	Project No. p17-176	Co-ords: / Level:	Date 20/07/2017
Location: Barnsley		Dimensions (m): / Depth 2.20	Scale 1:25
Client: Harworth Estates			Logged

Samples & In Situ Testing				Level (m)	Depth (m)	Stratum Description	Legend	Water Strike
Depth	Ref.	Type	Results					
						MADE GROUND: Turf overlying dark brown slightly ashy gravelly topsoil with brick fragments, metal pieces, coal, glass, ceramic and wood fragments.		
					0.30	MADE GROUND: Black/dark brown ashy CLAY containing coal, glass, brick, and occasional plastic.		
					1.10	Very stiff yellow sandy CLAY.		
					2.20	End of Pit at 2.200m		

Remarks: No groundwater encountered.

Stability: Sides stable.

Trial Pit Log

TrialPit No
TP102
Sheet 1 of 1

Project Name: Athersley, Barnsley	Project No. p17-176	Co-ords: 434690E - 408791N Level: 71.40	Date 13/11/2017
Location: Barnsley		Dimensions (m):	Scale 1:25
Client: Harworth Estates		Depth 2.30	Logged AT

Samples & In Situ Testing				Level (m)	Depth (m)	Stratum Description	Legend	Water Strike
Depth	Ref.	Type	Results					
				71.00	0.40	MADE GROUND: Grass overlying dark brown ashy gravelly topsoil. Gravel is sub-angular to angular, fine to coarse brick, ceramic, coal and glass.		
				70.60	0.80	MADE GROUND: Soft to firm yellow brown gravelly cobbly CLAY. Gravel is sub-angular to angular, fine to coarse mudstone, brick and coal.		
				70.20	1.20	MADE GROUND: Grey very clayey cobbly gravel of sub-angular to angular, fine to coarse mudstone, brick and coal.		
				69.40	2.00	MADE GROUND: Red sub-angular to angular, fine to coarse gravel of burnt shale. One seepage of coal tar contamination noted at 1.9m in the north of the excavation, entering the pit from the northeast side.		
				69.10	2.30	Stiff orange brown mottled grey CLAY. Pockets of very soft dark grey and black clay with coal tar odour noted between 2.0m and 2.1m in the northwest of the excavation.		
						End of Pit at 2.300m		

1 2 3 4 5

Remarks: Trial trench. Perched groundwater seepage into trench from the southwest face at 2.0m depth, standing in base at 2.0m. Small coal tar seepage into trench at 1.9m in the northwest end of the trench, seeping from the northeast face. Pockets of coal tar imacted gravelly clay excavated between 2.0m and 2.1m.

Stability: Sides slightly unstable between 1.2m and 2.0m.

Trial Pit Log

TrialPit No **TP103** Sheet 1 of 1

Project Name: Athersley, Barnsley	Project No. p17-176	Co-ords: 434700E - 408800N Level: 71.90	Date 13/11/2017
Location: Barnsley		Dimensions (m):	Scale 1:25
Client: Harworth Estates		Depth 2.20	Logged AT

Samples & In Situ Testing				Level (m)		Depth (m)	Stratum Description	Legend	Water Strike
Depth	Ref.	Type	Results						
				71.60		0.30	MADE GROUND: Grass overlying dark brown ashy gravelly topsoil. Gravel is sub-angular to angular, fine to coarse brick, ceramic, coal and glass.		
				71.30		0.60	MADE GROUND: Stiff orange brown mottled black gravelly clay. Gravel is sub-angular to angular, fine to coarse mudstone, coal and brick. Occasional cobble of brick and sandstone.		
				70.90	1	1.00	MADE GROUND: Firm to stiff grey green gravelly very cobbly CLAY. Gravel and cobble is sub-angular to angular, fine to coarse brick, coal, mudstone and sandstone. Occasional whole brick, and occasional fragment of red burnt shale. Boulders of sandstone at 0.9m.		
				70.00	2	1.90	MADE GROUND: Red sub-angular to angular, fine to coarse gravel of burnt shale. Cobbles and boulders of mudstone and sandstone between 1.6m and 1.9m. Two pockets of viscous black coal tar observed between 1.8m and 1.9m.		
				69.70		2.20	MADE GROUND: Stiff yellow brown and grey green CLAY.		
							End of Pit at 2.200m		
					3				
					4				
					5				

Remarks: Trial trench. Perched groundwater seepage into trench at 1.9m. Two small seepages of coal tar into trench at 1.9m, in the southeast and centre of the trench. Numerous small pockets of coal tar imacted clay excavated between 1.9m and 2.0m.

Stability: Sides slightly unstable between 1.0m and 1.9m.

Trial Pit Log

TrialPit No **TP104** Sheet 1 of 1

Project Name: Athersley, Barnsley	Project No. p17-176	Co-ords: 434708E - 408805N Level: 71.95	Date 13/11/2017
Location: Barnsley		Dimensions (m):	Scale 1:25
Client: Harworth Estates		Depth 2.70	Logged AT

Samples & In Situ Testing				Level (m)	Depth (m)	Stratum Description	Legend	Water Strike
Depth	Ref.	Type	Results					
				71.65	0.30	MADE GROUND: Grass overlying dark brown ashy gravelly topsoil. Gravel is sub-angular to angular, fine to coarse brick, ceramic, coal and glass.		
				71.25	0.70	MADE GROUND: Stiff brown gravelly clay. Gravel is sub-angular to angular, fine to coarse mudstone, brick and coal.		
				70.85	1.10	MADE GROUND: Stiff orange brown gravelly clay. Gravel is sub-angular to angular, fine to coarse mudstone, brick and coal.		
				70.65	1.30	MADE GROUND: Firm friable grey and black slightly organic gravelly clay. Gravel is sub-angular to angular, fine to coarse brick and coal. Slight organic odour (possible relict topsoil).		
				70.55	1.40	MADE GROUND: Black sandy gravel of sub-angular to angular, fine to coarse coal and mudstone.		
				70.35	1.60	MADE GROUND: Red sub-angular to angular, fine to coarse gravel of burnt shale.		
				69.85	2.10	MADE GROUND: Firm to stiff yellow brown silty clay. Occasional gravel and cobble of bright hard coal.		
				69.25	2.70	Stiff becoming very stiff grey CLAY.		
						End of Pit at 2.700m		

Remarks: Trial pit. No groundwater encountered. No visual or olfactory evidence of contamination noted.

Stability: Sides stable.

Trial Pit Log

TrialPit No **TP105** Sheet 1 of 1

Project Name: Athersley, Barnsley	Project No. p17-176	Co-ords: 434682E - 408782N Level: 71.10	Date 13/11/2017
Location: Barnsley		Dimensions (m):	Scale 1:25
Client: Harworth Estates		Depth 2.60	Logged AT

Samples & In Situ Testing				Level (m)	Depth (m)	Stratum Description	Legend	Water Strike
Depth	Ref.	Type	Results					
				70.85	0.25	MADE GROUND: Grass overlying dark brown ashy gravelly topsoil. Gravel is sub-angular to angular, fine to coarse brick, ceramic and coal.		
				70.60	0.50	MADE GROUND: Stiff orange brown gravelly clay. Gravel is sub-angular to angular, fine to coarse mudstone, brick and coal.		
				70.20	0.90	MADE GROUND: Grey sub-angular to angular, fine to coarse gravel of mudstone. Occasional whole brick, and cobble and boulder of sandstone.		
				69.50	1.60	MADE GROUND: Firm orange brown silty gravelly reworked clay. Gravel is sub-angular to angular, fine to coarse coal, black shale and sandstone. Occasional stiff pockets. Sandstone cobbles between 1.3m and 1.6m		
				68.50	2.60	Stiff to very stiff orange brown mottled grey gravelly CLAY. Gravel is sub-angular to angular, fine to coarse mudstone. Becoming grey below 2.1m. Band of black clay/highly weathered coal between 2.4m and 2.5m.		
						End of Pit at 2.600m		

Remarks: Trial pit. No groundwater encountered. No visual or olfactory evidence of contamination noted.

Stability: Sides stable.

Trial Pit Log

TrialPit No **TP106** Sheet 1 of 1

Project Name: Athersley, Barnsley	Project No. p17-176	Co-ords: 434689E - 408819N Level: 71.50	Date 13/11/2017
Location: Barnsley		Dimensions (m):	Scale 1:25
Client: Harworth Estates		Depth 2.10	Logged AT

Samples & In Situ Testing				Level (m)	Depth (m)	Stratum Description	Legend	Water Strike
Depth	Ref.	Type	Results					
				71.20	0.30	MADE GROUND: Grass overlying dark brown ashy gravelly topsoil. Gravel is sub-angular to angular, fine to coarse brick, ceramic and coal.		
						MADE GROUND: Firm to stiff yellow brown gravelly clay. Gravel is sub-angular to angular fine to coarse coal, mudstone, brick and red burnt shale.		
				70.30	1.20			
				70.20	1.30	MADE GROUND: Black very clayey slightly organic gravelly clay. Gravel is sub-angular to angular, fine to coarse coal, sandstone and mudstone. (Possible relict topsoil).		
						MADE GROUND: Red sub-angular to angular, fine to coarse gravel of burnt shale.		
				69.90	1.60	Stiff to very stiff orange brown mottled grey gravelly CLAY. Gravel is sub-angular to angular, fine to coarse mudstone and sandstone.		
				69.40	2.10	End of Pit at 2.100m		

1 2 3 4 5

Remarks: Trial pit. No groundwater encountered. No visual or olfactory evidence of contamination noted.

Stability: Sides stable.

Trial Pit Log

TrialPit No
TP107
Sheet 1 of 1

Project Name: Athersley, Barnsley	Project No. p17-176	Co-ords: 434700E - 408789N Level: 71.60	Date 13/11/2017
Location: Barnsley		Dimensions (m):	Scale 1:25
Client: Harworth Estates		Depth 2.60	Logged AT

Samples & In Situ Testing				Level (m)	Depth (m)	Stratum Description	Legend	Water Strike
Depth	Ref.	Type	Results					
				71.30	0.30	MADE GROUND: Grass overlying dark brown ashy gravelly topsoil. Gravel is sub-angular to angular, fine to coarse brick, ceramic and coal.		
				70.50	1.10	MADE GROUND: Stiff orange brown gravelly clay. Gravel is sub-angular to angular, fine to coarse mudstone, brick and coal.		
				69.80	1.80	MADE GROUND: Red sub-angular to angular, fine to coarse gravel of burnt shale.		
				69.50	2.10	MADE GROUND: Brown clayey gravel of sub-angular to angular, fine to coarse burnt shale and mudstone. Small seepage of groundwater with coal tar odour and sheen at 2.1m.		
				69.00	2.60	Firm to stiff grey CLAY.		
						End of Pit at 2.600m		

1 2 3 4 5

Remarks: Trial pit. Groundwater seepage with coal tar odour and sheen encountered at 2.1m.

Stability: Sides slightly unstable between 1.1m and 2.1m.

Trial Pit Log

TrialPit No **TP108** Sheet 1 of 1

Project Name: Athersley, Barnsley	Project No. p17-176	Co-ords: 434709E - 408794N Level: 71.50	Date 13/11/2017
Location: Barnsley		Dimensions (m):	Scale 1:25
Client: Harworth Estates		Depth 2.30	Logged AT

Samples & In Situ Testing				Level (m)	Depth (m)	Stratum Description	Legend	Water Strike
Depth	Ref.	Type	Results					
				71.20	0.30	MADE GROUND: Grass overlying dark brown ashy gravelly topsoil. Gravel is sub-angular to angular, fine to coarse brick, ceramic and coal.		
						MADE GROUND: Very clayey ashy gravel of sub-angular to angular, fine to coarse coal, brick and mudstone.		
				70.30	1.20	MADE GROUND: Red clayey gravel of sub-angular to angular, fine to coarse burnt shale and grey mudstone.		
				70.10	1.40	MADE GROUND: Black clayey gravel of sub-angular to angular, fine to coarse mudstone, coal and red shale.		
				69.70	1.80	MADE GROUND: Firm to stiff orange brown reworked sandy clay.		
				69.40	2.10	Stiff grey gravelly CLAY. Gravel is sub-angular to angular, fine to coarse mudstone.		
				69.20	2.30	End of Pit at 2.300m		

Remarks: Trial pit. No groundwater encountered. No visual or olfactory evidence of contamination noted.

Stability: Sides stable.

Trial Pit Log

TrialPit No **TP109** Sheet 1 of 1

Project Name: Athersley, Barnsley	Project No. p17-176	Co-ords: 434710E - 408782N Level: 71.00	Date 13/11/2017
Location: Barnsley		Dimensions (m):	Scale 1:25
Client: Harworth Estates		Depth 1.80	Logged AT

Samples & In Situ Testing				Level (m)		Depth (m)	Stratum Description	Legend	Water Strike
Depth	Ref.	Type	Results						
				70.70		0.30	MADE GROUND: Grass overlying dark brown ashy gravelly topsoil. Gravel is sub-angular to angular, fine to coarse brick, ceramic and coal.		
							MADE GROUND: Black very clayey ashy gravel of sub-angular to angular, fine to coarse coal, sandstone, brick and burnt shale.		
				70.00	1	1.00	MADE GROUND: Firm pale grey very gravelly CLAY. Gravel is sub-angular to angular, fine to coarse mudstone.		
				69.70		1.30	MADE GROUND: Grey brown clayey gravel, cobbles and boulders of sandstone.		
				69.20		1.80	End of Pit at 1.800m		
					2				
					3				
					4				
					5				

Remarks: Trial pit. Strong groundwater ingress at 1.6m.

Stability: Sides slightly unstable below 1.2m.

Trial Pit Log

TrialPit No
TP110
Sheet 1 of 1

Project Name: Athersley, Barnsley	Project No. p17-176	Co-ords: 434694E - 408780N Level: 70.70	Date 13/11/2017
Location: Barnsley		Dimensions (m):	Scale 1:25
Client: Harworth Estates		Depth 1.90	Logged AT

Samples & In Situ Testing				Level (m)	Depth (m)	Stratum Description	Legend	Water Strike
Depth	Ref.	Type	Results					
				70.10	0.60	MADE GROUND: Grass overlying dark brown ashy gravelly topsoil. Gravel is sub-angular to angular, fine to coarse brick, ceramic and coal.		
				69.50	1.20	MADE GROUND: Firm to stiff grey gravelly CLAY. Gravel is sub-angular to angular, fine to coarse mudstone, sandstone and rare brick. Occasional pockets of soft black clay with coal fines.		
				68.80	1.90	MADE GROUND: Firm orange brown gravelly CLAY. Gravel is sub-angular to angular mudstone and sandstone. Groundwater seepage with coal tar odour and sheen at 1.85m.		
						End of Pit at 1.900m		

Remarks: Trial pit. Groundwater seepage with coal tar odour and sheen encountered at 1.9m.

Stability: Sides stable.

Trial Pit Log

TrialPit No **TP111**
Sheet 1 of 1

Project Name: Athersley, Barnsley	Project No. p17-176	Co-ords: 434693E - 408767N Level: 70.60	Date 13/11/2017
Location: Barnsley		Dimensions (m):	Scale 1:25
Client: Harworth Estates		Depth 2.60	Logged AT

Samples & In Situ Testing				Level (m)		Depth (m)	Stratum Description	Legend	Water Strike
Depth	Ref.	Type	Results						
				70.10		0.50	MADE GROUND: Grass overlying dark brown ashy gravelly topsoil. Gravel is sub-angular to angular, fine to coarse brick, ceramic and coal.		
				69.60	1	1.00	MADE GROUND: Firm red and grey gravelly clay. Gravel is sub-angular to angular, fine to coarse burnt shale and mudstone.		
				69.00		1.60	MADE GROUND: Black clayey sandy gravel of coal fines. Occasional cobble of bright coal.		
					2		MADE GROUND: Orange brown clayey gravel of sub-angular to angular, fine to coarse red shale, mudstone and coal. Four large fragments of animal bones encountered between 2.2m and 2.6m.		
				68.00		2.60	End of Pit at 2.600m		
					3				
					4				
					5				

Remarks: Trial pit. No groundwater encountered. No visual or olfactory evidence of contamination noted. Animal bones encountered between 2.2m and 2.6m.

Stability: Sides unstable below 1.6m.

Trial Pit Log

TrialPit No
TP112
Sheet 1 of 1

Project Name: Athersley, Barnsley	Project No. p17-176	Co-ords: 434709E - 408864N Level: 73.00	Date 13/11/2017
Location: Barnsley		Dimensions (m):	Scale 1:25
Client: Harworth Estates		Depth 1.90	Logged AT

Samples & In Situ Testing				Level (m)	Depth (m)	Stratum Description	Legend	Water Strike
Depth	Ref.	Type	Results					
						MADE GROUND: Grass overlying brown sandy ashy gravel. Gravel is sub-angular to angular, fine to coarse coal, mudstone, sandstone, brick and concrete. Frequent whole bricks and cobbles/boulders of concrete. Occasional fragments of plastic sheeting, and one fragment of a green hi-vis item of clothing. Slight organic odour.		
				71.80	1.20	MADE GROUND: Firm orange brown reworked very gravelly clay. Gravel is sub-angular to angular, fine to coarse coal and brick.		
				71.40	1.60	Firm to stiff orange brown sandy CLAY.		
				71.10	1.90	End of Pit at 1.900m		

Remarks: Trial pit. No groundwater encountered. No visual or olfactory evidence of contamintion noted.

Stability: Sides slightly unstable between surface and 1.2m.

Trial Pit Log

TrialPit No
TP113
Sheet 1 of 1

Project Name: Athersley, Barnsley	Project No. p17-176	Co-ords: 434693E - 408855N Level: 72.80	Date 13/11/2017
Location: Barnsley		Dimensions (m):	Scale 1:25
Client: Harworth Estates		Depth 1.60	Logged AT

Samples & In Situ Testing				Level (m)	Depth (m)	Stratum Description	Legend	Water Strike
Depth	Ref.	Type	Results					
						MADE GROUND: Grass overlying whole bricks and concrete cobbles/boulders in a black ashy matrix.		
				72.20	0.60	MADE GROUND: Stiff grey green gravelly clay. Gravel is sub-angular to angular, fine to coarse mudstone, brick and coal.		
				72.00	0.80	MADE GROUND: Firm black ashy gravelly clay. Gravel is sub-angular to angular, fine to coarse coal.		
				71.90	0.90	MADE GROUND: Black clayey gravel of sub-angular to angular, fine to coarse mudstone, coal and red shale. Concrete obstruction (very large boulder?) at 1.6m.		
				71.20	1.60	End of Pit at 1.600m		

1 2 3 4 5

Remarks: Trial pit. No groundwater encountered. No visual or olfactory evidence of contamintion noted. Terminated due to large concrete boulder obstruction.

Stability: Sides unstable between surface and 0.6m.

Appendix C: Topsoil Test Location Plan

Drawing No: 17176-RLE-19-XX-DR-O-005

A3

LEAD HOTSPOT AT TP10
ESTIMATED VOLUME: ~500M^3

SEE RLE DRAWING
17176-RLE-17-XX-DR-O-006 FOR
DETAILS OF WORKS IN THIS AREA
UNDERTAKEN IN NOVEMBER 2017
FOR DELINEATION OF COAL TAR
CONTAMINATION

MADE GROUND TOPSOIL (FORMER
TRACK, STRATUM 1B)
ESTIMATED VOLUME: ~3,000M^3

Pb@560mg/kg
TP10

6100

TS101
CLEAN*

TS118
CLEAN*

ESTIMATED 8,000M^3

TS117
CLEAN*

TS119
NOT TESTED

TS120
CLEAN*

TP12
CLEAN*

TS121
CLEAN*

TS122
CLEAN*

NOT TESTED
TS123

TP13
CLEAN*

TS113
PAH contam

CLEAN*
TS114

NOT TESTED
TS116

TP08
PAH contam

CLEAN*
TS115

ESTIMATED 800M^3

TS126
CLEAN*

TS105
TP01
As@65mg/kg
Probable natural elevated As
NOT TESTED

TS106
CLEAN*

PAH contam
TS112
As@38mg/kg

TP05A
As@49mg/kg

TS107
NOT TESTED

TS108

ESTIMATED 1,500M^3

TS104
CLEAN*

PAH contam
TS102

TS103
CLEAN*

TP02
Pb@320mg/kg

TS109
NOT TESTED

TS127
CLEAN*

ESTIMATED 6,000M^3

TS125
NOT TESTED

TS124
CLEAN*

TS110
NOT TESTED

NOT TESTED
TS128

CLEAN*
TP16

TS111
NOT TESTED

TP03
CLEAN*

ESTIMATED 4,500M^3

TS129
CLEAN*

TS130
CLEAN*

APPROXIMATE VOLUMES OF TOPSOIL:

(ASSUMING AVERAGE THICKNESS OF 0.3M
ACROSS ENTIRE SITE)
TOTAL TOPSOIL VOLUME: **~24,450M^3**

NATURAL TOPSOIL - **~7000M^3**
MG TOPSOIL (SUITABLE) - **~6,000M^3**
MG TOPSOIL (UNSUITABLE) - **~8,000M^3**
MG TOPSOIL (CONTAMINATED) - **~3,500M^3**

GENERAL NOTES

NO DIMENSIONS TO BE SCALED OFF THIS DRAWING.

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.

ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

KEY

TP01
TP01

APPROXIMATE LOCATION AND REFERENCE OF TOPSOIL SAMPLED FROM TRIAL PIT EXCAVATED BY RLE IN JULY 2017.
- TOPSOIL SAMPLES IN EXCEEDANCE OF THE GENERIC ASSESSMENT CRITERIA* HIGHLIGHTED IN RED

TS01
TS01

APPROXIMATE LOCATION AND REFERENCE OF ADDITIONAL TOPSOIL SAMPLE EXCAVATED BY RLE IN NOVEMBER 2017.
- TOPSOIL SAMPLES IN EXCEEDANCE OF THE GENERIC ASSESSMENT CRITERIA* HIGHLIGHTED IN RED

MADE GROUND TOPSOIL - NOT SUITABLE TO REMAIN IN-SITU DUE TO:
- STATISTICAL ARSENIC AND PAH CONTAMINATION ACROSS A BROAD AREA OF A FORMER TRACK IN SOUTHWEST OF SITE (STRATUM 1B)
- HOT SPOT OF LEAD CONTAMINATION IN THE NORTH OF THE SITE (STRATUM 1A)

MADE GROUND TOPSOIL STRATUM 1A - NOT SUITABLE FOR REUSE/SALE DUE TO VERY POOR QUALITY, GRAVELLY ASHY NATURE. NO CONTAMINANTS OF CONCERN IDENTIFIED

MADE GROUND TOPSOIL 1C - SUITABLE FOR REUSE/SALE. NO CONTAMINANTS OF CONCERN IDENTIFIED, MATERIAL IS OF ACCEPTABLE QUALITY.

NATURAL TOPSOIL STRATUM 6 - SUITABLE FOR REUSE/SALE. NO CONTAMINANTS OF CONCERN IDENTIFIED, MATERIAL IS OF ACCEPTABLE QUALITY.
FURTHER ASSESSMENT REQUIRED FOR POSSIBLE AS HOTSPOT AT TP01

*ALL SAMPLES TESTED HAVE BEEN SCREENED AGAINST GENERIC ASSESSMENT CRITERIA (GAC) DERIVED USING THE CONTAMINATED LAND EXPOSURE ASSESSMENT MODEL (CLEA), INCLUDING C4SL AND S4UL VALUES FOR CONTAMINANTS BASED ON A RESIDENTIAL END USE WITH PLANT UPTAKE SCENARIO.

Rev	Date	Amendments	By	Chk
A	11/11/19	NEW DRAWING TEMPLATE	AT	SF

Client
HARWORTH ESTATES

Project
ATHERSLEY

Drawing Title
TOPSOIL TEST
LOCATION PLAN

Status
INFORMATION

Scale	Drawn	Checked	Date
A3 @NTS	AT	IPB	11/11/19

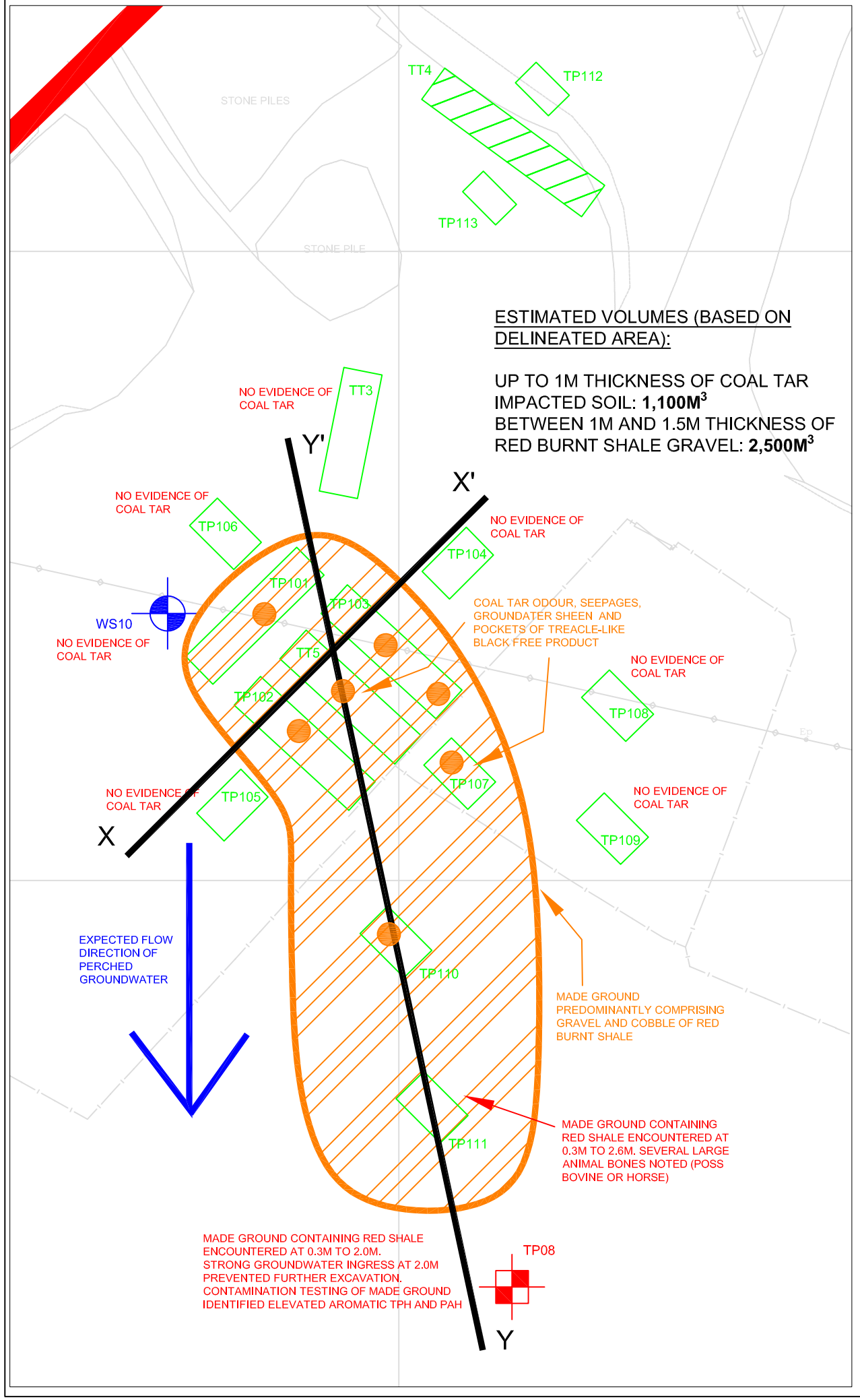
Drawing No. 17176-RLE-19-XX-DR-0-005 Rev. A

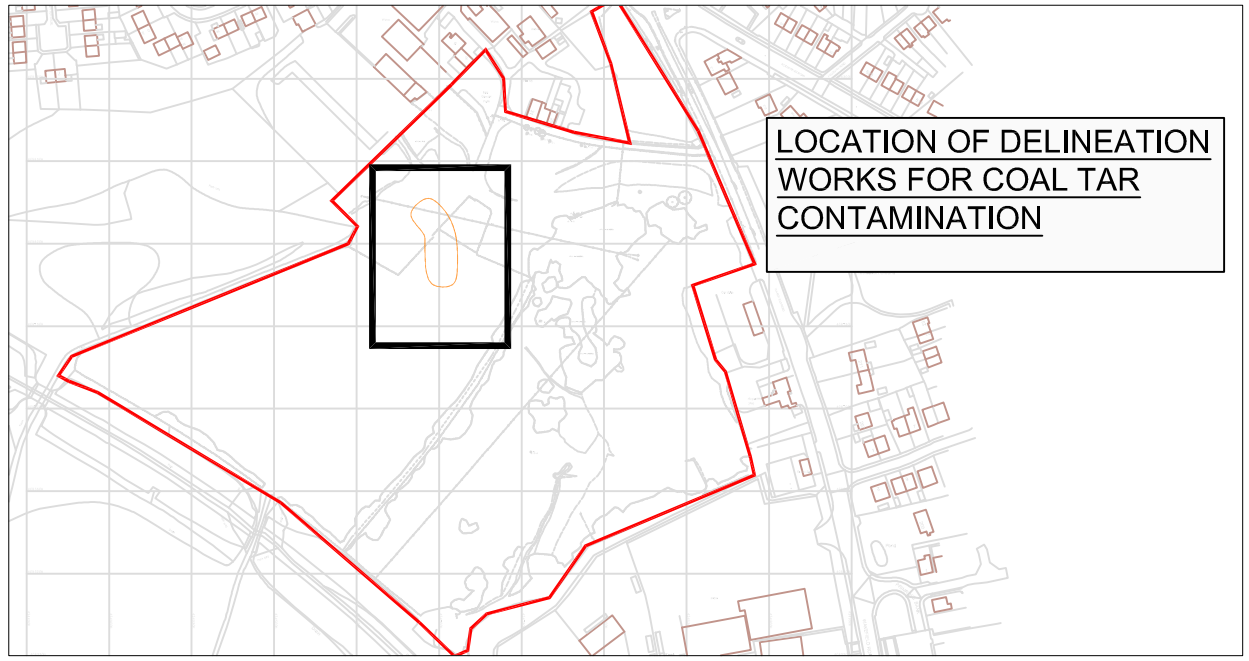
St James House ● Mansfield Road ● Derby ● DE1 3TQ ● Tel: 01332 285000 ● Fax: 01332 291728 ● www.rodgersleask.co.uk

Appendix D: Coal Tar Delineation Plan

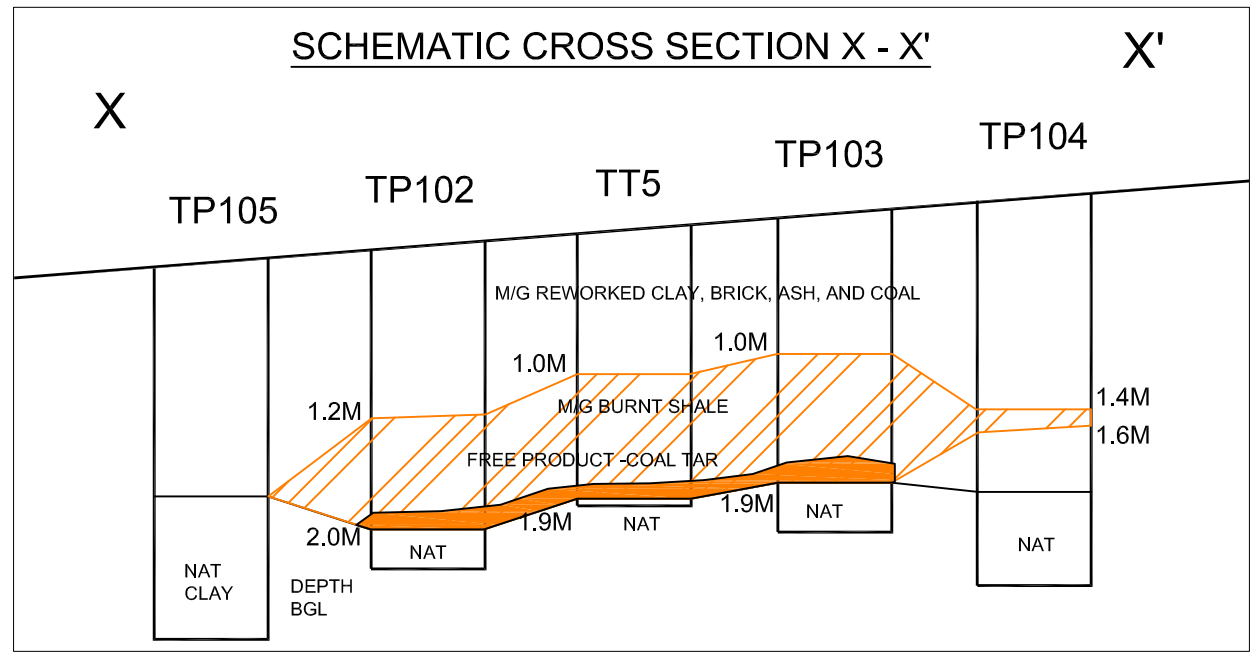
Drawing No: 17176-RLE-19-XX-DR-O-006

A3

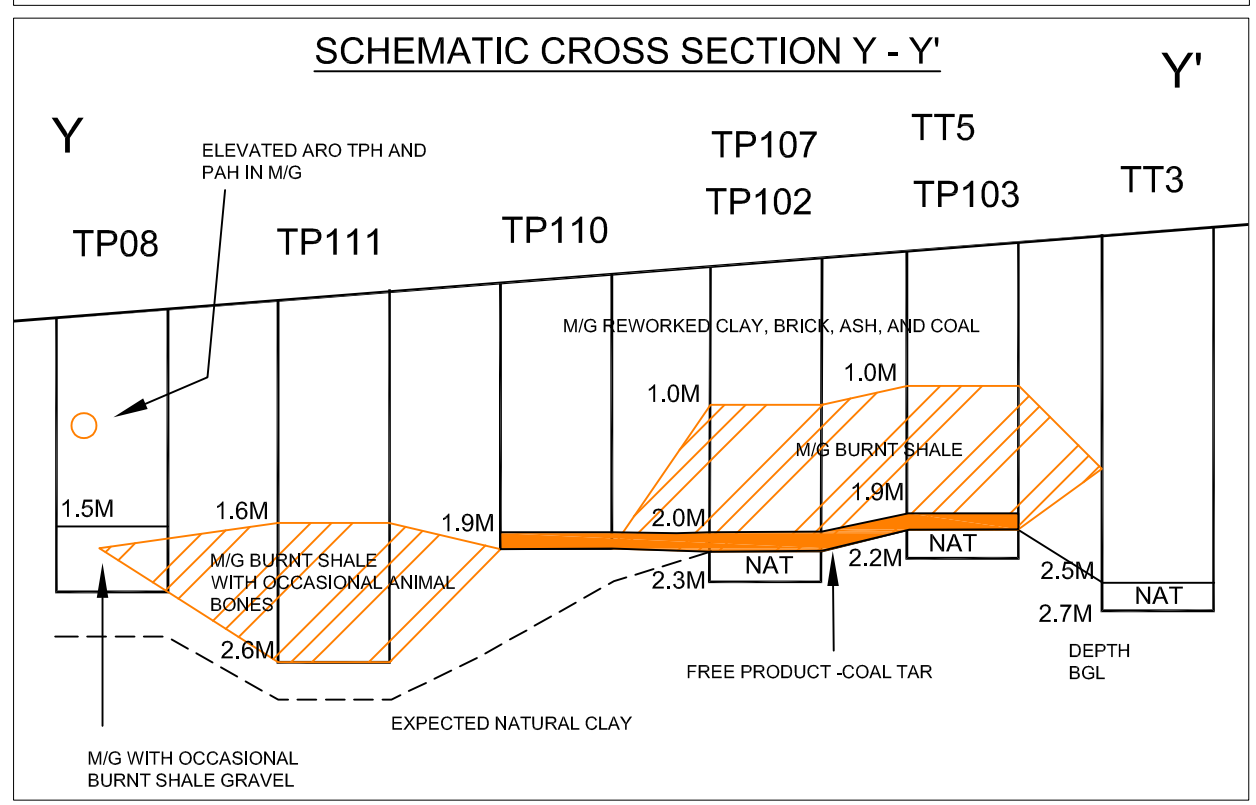




SCHEMATIC CROSS SECTION X - X'



SCHEMATIC CROSS SECTION Y - Y'



GENERAL NOTES

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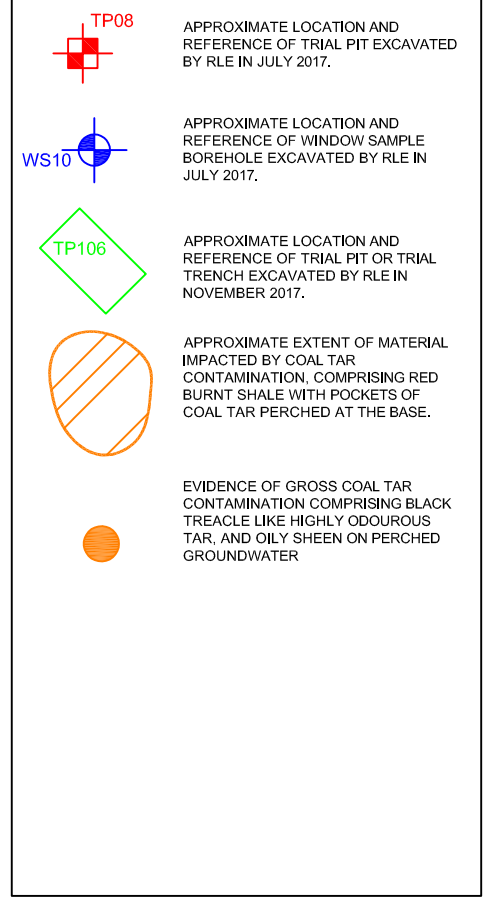
ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.

ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

KEY



Rev	Date	Amendments	By	Chk
A	11/11/19	DRAWING LAYOUT CHANGED A3	AT	SF

RLE

Client
HARWORTH ESTATES

Project
ATHERSLEY

Drawing Title
COAL TAR DELINEATION INVESTIGATION PLAN

Status
INFORMATION

Scale	Drawn	Checked	Date
A3 @NTS	AT	IPB	11/11/19

Drawing No. 17176-RLE-19-XX-DR-0-006 Rev. A

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Appendix E: Contamination Test Results

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

UKAS TESTING
2183

Final Report

Report No.:	17-19520-1
Initial Date of Issue:	08-Aug-2017
Client	Rodgers Leask Environmental
Client Address:	St James House St Marys Wharf Mansfield Road Derby DE1 3TQ
Contact(s):	Adam Taylor Mark Churchill
Project	P17-176 - Athersley, Barnsley
Quotation No.:	Q14-02112
Order No.:	RLE 17-08-01
No. of Samples:	26
Turnaround (Wkdays):	5
Date Approved:	08-Aug-2017
Approved By:	
Details:	Martin Dyer, Laboratory Manager

Date Received:	27-Jul-2017
Date Instructed:	01-Aug-2017
Results Due:	07-Aug-2017

Chemtest
The right chemistry to deliver results

Results - Leachate

Project: P17-176 - Athersley, Barnsley

Client: Rodgers Leask Environmental					**Chemtest Job No.:**	17-19520	17-19520	17-19520	17-19520	17-19520
Quotation No.: Q14-02112					**Chemtest Sample ID.:**	489238	489252	489257	489259	489262	489270
Order No.: RLE 17-08-01					Client Sample Ref.:	TP2	TP8	TP10	TP11	TP12	TT4
					Client Sample ID.:	D2	D2	D2	D2	D1	D1
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.60	0.70	0.50	0.40	0.20	1.90
					Bottom Depth (m):	0.70	0.80	0.60	0.50	0.30	1.90
					Date Sampled:	19-Jul-2017	20-Jul-2017	20-Jul-2017	21-Jul-2017	21-Jul-2017	24-Jul-2017
Determinand	**Accred.**	**SOP**	**Units**	**LOD**							
pH	U	1010		N/A		7.8	7.0	7.7	8.0	7.7	7.5
Sulphate	U	1220	mg/l	1.0		55	24	150	27	22	350
Cyanide (Total)	U	1300	mg/l	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Cyanide (Free)	U	1300	mg/l	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Hardness	U	1415	mg/l	15		59	20	310	73	55	460
Arsenic (Dissolved)	U	1450	µg/l	1.0		< 1.0	< 1.0	1.8	1.0	1.1	1.4
Boron (Dissolved)	U	1450	µg/l	20		54	36	250	87	42	280
Cadmium (Dissolved)	U	1450	µg/l	0.080		< 0.080	< 0.080	< 0.080	< 0.080	< 0.080	< 0.080
Chromium (Dissolved)	U	1450	µg/l	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper (Dissolved)	U	1450	µg/l	1.0		1.5	< 1.0	4.5	3.0	3.4	< 1.0
Mercury (Dissolved)	U	1450	µg/l	0.50		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Manganese (Dissolved)	U	1450	µg/l	1.0		2.8	56	6.2	1.6	6.5	1200
Nickel (Dissolved)	U	1450	µg/l	1.0		< 1.0	3.3	1.5	< 1.0	1.1	8.7
Lead (Dissolved)	U	1450	µg/l	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Selenium (Dissolved)	U	1450	µg/l	1.0		< 1.0	< 1.0	1.4	< 1.0	< 1.0	2.2
Zinc (Dissolved)	U	1450	µg/l	1.0		< 1.0	14	5.5	< 1.0	< 1.0	10
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10		< 0.10	< 0.10				< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10		< 0.10	< 0.10				< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10		< 0.10	< 0.10				< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10		< 0.10	< 0.10				< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10		< 0.10	< 0.10				< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10		< 0.10	< 0.10				< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10		< 0.10	< 0.10				< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10		< 0.10	< 0.10				< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0		< 5.0	< 5.0				< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10		< 0.10	< 0.10				< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10		< 0.10	< 0.10				< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10		< 0.10	< 0.10				< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10		< 0.10	< 0.10				< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10		< 0.10	< 0.10				< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10		< 0.10	< 0.10				< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10		< 0.10	< 0.10				< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0		< 5.0	< 5.0				< 5.0
Total Petroleum Hydrocarbons	N	1675	µg/l	10		< 10	< 10				< 10
Naphthalene	U	1700	µg/l	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	1700	µg/l	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	1700	µg/l	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Chemtest
The right chemistry to deliver results

Results - Leachate

Project: P17-176 - Athersley, Barnsley

Client: Rodgers Leask Environmental			**Chemtest Job No.:**		17-19520	17-19520	17-19520	17-19520	17-19520	17-19520
Quotation No.: Q14-02112			**Chemtest Sample ID.:**		489238	489252	489257	489259	489262	489270
Order No.: RLE 17-08-01			Client Sample Ref.:		TP2	TP8	TP10	TP11	TP12	TT4
			Client Sample ID.:		D2	D2	D2	D2	D1	D1
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.60	0.70	0.50	0.40	0.20	1.90
			Bottom Depth (m):		0.70	0.80	0.60	0.50	0.30	1.90
			Date Sampled:		19-Jul-2017	20-Jul-2017	20-Jul-2017	21-Jul-2017	21-Jul-2017	24-Jul-2017
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
Fluorene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	U	1700	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Benzene	U	1760	µg/l	1.0	3.1	< 1.0				< 1.0
Toluene	U	1760	µg/l	1.0	5.7	< 1.0				< 1.0
Ethylbenzene	U	1760	µg/l	1.0	1.4	< 1.0				< 1.0
m & p-Xylene	U	1760	µg/l	1.0	2.9	< 1.0				< 1.0
o-Xylene	U	1760	µg/l	1.0	1.7	< 1.0				< 1.0
Total Phenols	U	1920	mg/l	0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030

Chemtest
The right chemistry to deliver results

Results - Soil

Project: P17-176 - Athersley, Barnsley

Client: Rodgers Leask Environmental					**Chemtest Job No.:**	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520
Quotation No.: Q14-02112					**Chemtest Sample ID.:**	489234	489235	489236	489237	489238	489240	489241	489244	489245
Order No.: RLE 17-08-01					Client Sample Ref.:	TP1	TP1	TP1	TP2	TP2	TP3	TP3	TP5A	TP5A
					Client Sample ID.:	D1	D2	D3	D1	D2	D1	D2	D1	D2
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.10	0.30	1.00	0.20	0.60	0.30	1.00	0.10	0.80
					Bottom Depth (m):	0.20	0.40	1.10	0.30	0.70	0.40	1.10	0.20	0.90
					Date Sampled:	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017
					Asbestos Lab:	COVENTRY			COVENTRY	COVENTRY	COVENTRY		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**										
ACM Type	U	2192		N/A		-			-	-	-		-	-
Asbestos Identification	U	2192	%	0.001		No Asbestos Detected			No Asbestos Detected	No Asbestos Detected	No Asbestos Detected		No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020		18	16	11	11	20	12	12	11	14
pH	U	2010		N/A		5.9	5.6	5.7	7.5	6.0	5.9	6.4	7.0	4.9
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40		0.87	0.65		0.53	1.1	< 0.40	< 0.40	0.99	1.3
Magnesium (Water Soluble)	N	2120	g/l	0.010				< 0.010		0.018				0.091
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010		0.016	0.057	0.021	0.040	0.21	0.040	< 0.010	1.1	0.86
Total Sulphur	U	2175	%	0.010		0.093	0.15	0.040	0.24	0.10	0.032	0.010	0.52	0.22
Chloride (Water Soluble)	U	2220	g/l	0.010				< 0.010		< 0.010				0.012
Nitrate (Water Soluble)	N	2220	g/l	0.010				< 0.010		< 0.010			< 0.010	< 0.010
Cyanide (Complex)	U	2300	mg/kg	0.50					< 0.50	< 0.50			< 0.50	< 0.50
Cyanide (Free)	U	2300	mg/kg	0.50		< 0.50	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50		< 0.50	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50		
Thiocyanate	U	2300	mg/kg	5.0					6.6	< 5.0				
Sulphide (Easily Liberatable)	U	2325	mg/kg	0.50		4.4	8.4		6.2	4.1	4.9	3.9	7.0	3.9
Ammonium (Water Soluble)	U	2120	g/l	0.01				< 0.01		< 0.01				< 0.01
Sulphate (Acid Soluble)	U	2430	%	0.010		0.098	0.12	0.076	0.31	0.31	0.048	< 0.010	0.69	0.55
Arsenic	U	2450	mg/kg	1.0		18	65		28	19	7.3	< 1.0	49	14
Barium	U	2450	mg/kg	10									170	85
Beryllium	U	2450	mg/kg	1.0									1.5	1.1
Cadmium	U	2450	mg/kg	0.10		0.24	< 0.10		0.21	0.10	0.11	< 0.10	0.21	0.16
Chromium	U	2450	mg/kg	1.0		21	21		26	26	17	24	20	20
Copper	U	2450	mg/kg	0.50		37	61		56	29	21	23	60	21
Mercury	U	2450	mg/kg	0.10		< 0.10	0.20		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Nickel	U	2450	mg/kg	0.50		23	14		29	52	34	32	36	31
Lead	U	2450	mg/kg	0.50		56	40		320	38	23	14	62	35
Selenium	U	2450	mg/kg	0.20		0.34	1.0		0.26	< 0.20	< 0.20	< 0.20	0.70	< 0.20
Vanadium	U	2450	mg/kg	5.0					24	25			31	23
Zinc	U	2450	mg/kg	0.50		64	18		86	72	73	75	76	70
Organic Matter	U	2625	%	0.40		10	17		16	0.50	1.4	< 0.40	17	4.3
Total TPH >C6-C40	U	2670	mg/kg	10									140	< 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0					< 1.0	< 1.0				
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0					< 1.0	< 1.0				
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0					< 1.0	< 1.0				
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0					< 1.0	< 1.0				

Chemtest
The right chemistry to deliver results

Results - Soil

Project: P17-176 - Athersley, Barnsley

Client: Rodgers Leask Environmental			**Chemtest Job No.:**		17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520
Quotation No.: Q14-02112			**Chemtest Sample ID.:**		489234	489235	489236	489237	489238	489240	489241	489244	489245
Order No.: RLE 17-08-01			Client Sample Ref.:		TP1	TP1	TP1	TP2	TP2	TP3	TP3	TP5A	TP5A
			Client Sample ID.:		D1	D2	D3	D1	D2	D1	D2	D1	D2
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.10	0.30	1.00	0.20	0.60	0.30	1.00	0.10	0.80
			Bottom Depth (m):		0.20	0.40	1.10	0.30	0.70	0.40	1.10	0.20	0.90
			Date Sampled:		19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017
			Asbestos Lab:		COVENTRY			COVENTRY	COVENTRY	COVENTRY		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0				< 1.0	< 1.0				
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0				10	< 1.0				
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0				58	< 1.0				
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0				< 1.0	< 1.0				
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0				68	< 5.0				
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0				< 1.0	< 1.0				
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0				< 1.0	< 1.0				
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0				< 1.0	< 1.0				
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0				< 1.0	< 1.0				
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0				< 1.0	< 1.0				
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0				38	< 1.0				
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0				190	< 1.0				
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0				< 1.0	< 1.0				
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0				230	< 5.0				
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0				300	< 10				
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	1.4	< 0.10	< 0.10		
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	0.69	< 0.10	< 0.10		
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	0.56	< 0.10	< 0.10		
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	1.9	< 0.10	< 0.10		
Phenanthrene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	2.7	< 0.10	< 0.10		
Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	0.69	< 0.10	< 0.10		
Fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	3.0	< 0.10	< 0.10		
Pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	3.4	< 0.10	< 0.10		
Benzo[a]anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	0.74	< 0.10	< 0.10		
Chrysene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	1.1	< 0.10	< 0.10		
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	3.1	< 0.10	< 0.10		
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	0.91	< 0.10	< 0.10		
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	1.5	< 0.10	< 0.10		
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	1.5	< 0.10	< 0.10		
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	0.18	< 0.10	< 0.10		
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	1.0	< 0.10	< 0.10		
Total Of 16 PAH's	U	2700	mg/kg	2.0	< 2.0	< 2.0		< 2.0	24	< 2.0	< 2.0		
Dichlorodifluoromethane	U	2760	µg/kg	1.0									
Chloromethane	U	2760	µg/kg	1.0									
Vinyl Chloride	U	2760	µg/kg	1.0									
Bromomethane	U	2760	µg/kg	20									

Chemtest
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Results - Soil

Project: P17-176 - Athersley, Barnsley

Client: Rodgers Leask Environmental			**Chemtest Job No.:**		17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520
Quotation No.: Q14-02112			**Chemtest Sample ID.:**		489234	489235	489236	489237	489238	489240	489241	489244	489245
Order No.: RLE 17-08-01			Client Sample Ref.:		TP1	TP1	TP1	TP2	TP2	TP3	TP3	TP5A	TP5A
			Client Sample ID.:		D1	D2	D3	D1	D2	D1	D2	D1	D2
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.10	0.30	1.00	0.20	0.60	0.30	1.00	0.10	0.80
			Bottom Depth (m):		0.20	0.40	1.10	0.30	0.70	0.40	1.10	0.20	0.90
			Date Sampled:		19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017
			Asbestos Lab:		COVENTRY			COVENTRY	COVENTRY	COVENTRY		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Chloroethane	U	2760	µg/kg	2.0									
Trichlorofluoromethane	U	2760	µg/kg	1.0									
1,1-Dichloroethene	U	2760	µg/kg	1.0									
Trans 1,2-Dichloroethene	U	2760	µg/kg	1.0									
1,1-Dichloroethane	U	2760	µg/kg	1.0									
cis 1,2-Dichloroethene	U	2760	µg/kg	1.0									
Bromochloromethane	U	2760	µg/kg	5.0									
Trichloromethane	U	2760	µg/kg	1.0									
1,1,1-Trichloroethane	U	2760	µg/kg	1.0									
Tetrachloromethane	U	2760	µg/kg	1.0									
1,1-Dichloropropene	U	2760	µg/kg	1.0									
Benzene	U	2760	µg/kg	1.0				< 1.0	< 1.0				
1,2-Dichloroethane	U	2760	µg/kg	2.0									
Trichloroethene	U	2760	µg/kg	1.0									
1,2-Dichloropropane	U	2760	µg/kg	1.0									
Dibromomethane	U	2760	µg/kg	1.0									
Bromodichloromethane	U	2760	µg/kg	5.0									
cis-1,3-Dichloropropene	N	2760	µg/kg	10									
Toluene	U	2760	µg/kg	1.0				< 1.0	< 1.0				
Trans-1,3-Dichloropropene	N	2760	µg/kg	10									
1,1,2-Trichloroethane	U	2760	µg/kg	10									
Tetrachloroethene	U	2760	µg/kg	1.0									
1,3-Dichloropropane	U	2760	µg/kg	2.0									
Dibromochloromethane	U	2760	µg/kg	10									
1,2-Dibromoethane	U	2760	µg/kg	5.0									
Chlorobenzene	U	2760	µg/kg	1.0									
1,1,1,2-Tetrachloroethane	U	2760	µg/kg	2.0									
Ethylbenzene	U	2760	µg/kg	1.0				< 1.0	< 1.0				
m & p-Xylene	U	2760	µg/kg	1.0				< 1.0	< 1.0				
o-Xylene	U	2760	µg/kg	1.0				< 1.0	< 1.0				
Styrene	U	2760	µg/kg	1.0									
Tribromomethane	U	2760	µg/kg	1.0									
Isopropylbenzene	U	2760	µg/kg	1.0									
Bromobenzene	U	2760	µg/kg	1.0									
1,2,3-Trichloropropane	N	2760	µg/kg	50									
N-Propylbenzene	U	2760	µg/kg	1.0									

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Results - Soil

Project: P17-176 - Athersley, Barnsley

Client: Rodgers Leask Environmental			**Chemtest Job No.:**		17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520
Quotation No.: Q14-02112			**Chemtest Sample ID.:**		489234	489235	489236	489237	489238	489240	489241	489244	489245
Order No.: RLE 17-08-01			Client Sample Ref.:		TP1	TP1	TP1	TP2	TP2	TP3	TP3	TP5A	TP5A
			Client Sample ID.:		D1	D2	D3	D1	D2	D1	D2	D1	D2
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.10	0.30	1.00	0.20	0.60	0.30	1.00	0.10	0.80
			Bottom Depth (m):		0.20	0.40	1.10	0.30	0.70	0.40	1.10	0.20	0.90
			Date Sampled:		19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017
			Asbestos Lab:		COVENTRY			COVENTRY	COVENTRY	COVENTRY		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
2-Chlorotoluene	U	2760	µg/kg	1.0									
1,3,5-Trimethylbenzene	U	2760	µg/kg	1.0									
4-Chlorotoluene	U	2760	µg/kg	1.0									
Tert-Butylbenzene	U	2760	µg/kg	1.0									
1,2,4-Trimethylbenzene	U	2760	µg/kg	1.0									
Sec-Butylbenzene	U	2760	µg/kg	1.0									
1,3-Dichlorobenzene	U	2760	µg/kg	1.0									
4-Isopropyltoluene	U	2760	µg/kg	1.0									
1,4-Dichlorobenzene	U	2760	µg/kg	1.0									
N-Butylbenzene	U	2760	µg/kg	1.0									
1,2-Dichlorobenzene	U	2760	µg/kg	1.0									
1,2-Dibromo-3-Chloropropane	U	2760	µg/kg	50									
1,2,4-Trichlorobenzene	U	2760	µg/kg	1.0									
Hexachlorobutadiene	U	2760	µg/kg	1.0									
1,2,3-Trichlorobenzene	U	2760	µg/kg	2.0									
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0									
N-Nitrosodimethylamine	U	2790	mg/kg	0.50									
Phenol	U	2790	mg/kg	0.50									
2-Chlorophenol	U	2790	mg/kg	0.50									
Bis-(2-Chloroethyl)Ether	U	2790	mg/kg	0.50									
1,3-Dichlorobenzene	U	2790	mg/kg	0.50									
1,4-Dichlorobenzene	N	2790	mg/kg	0.50									
1,2-Dichlorobenzene	U	2790	mg/kg	0.50									
2-Methylphenol	U	2790	mg/kg	0.50									
Bis(2-Chloroisopropyl)Ether	U	2790	mg/kg	0.50									
Hexachloroethane	N	2790	mg/kg	0.50									
N-Nitrosodi-n-propylamine	U	2790	mg/kg	0.50									
4-Methylphenol	U	2790	mg/kg	0.50									
Nitrobenzene	U	2790	mg/kg	0.50									
Isophorone	U	2790	mg/kg	0.50									
2-Nitrophenol	N	2790	mg/kg	0.50									
2,4-Dimethylphenol	N	2790	mg/kg	0.50									
Bis(2-Chloroethoxy)Methane	U	2790	mg/kg	0.50									
2,4-Dichlorophenol	U	2790	mg/kg	0.50									
1,2,4-Trichlorobenzene	U	2790	mg/kg	0.50									
Naphthalene	U	2790	mg/kg	0.50									

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Results - Soil

Project: P17-176 - Athersley, Barnsley

Client: Rodgers Leask Environmental			**Chemtest Job No.:**		17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520
Quotation No.: Q14-02112			**Chemtest Sample ID.:**		489234	489235	489236	489237	489238	489240	489241	489244	489245
Order No.: RLE 17-08-01			Client Sample Ref.:		TP1	TP1	TP1	TP2	TP2	TP3	TP3	TP5A	TP5A
			Client Sample ID.:		D1	D2	D3	D1	D2	D1	D2	D1	D2
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.10	0.30	1.00	0.20	0.60	0.30	1.00	0.10	0.80
			Bottom Depth (m):		0.20	0.40	1.10	0.30	0.70	0.40	1.10	0.20	0.90
			Date Sampled:		19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017
			Asbestos Lab:		COVENTRY			COVENTRY	COVENTRY	COVENTRY		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
4-Chloroaniline	N	2790	mg/kg	0.50									
Hexachlorobutadiene	U	2790	mg/kg	0.50									
4-Chloro-3-Methylphenol	U	2790	mg/kg	0.50									
2-Methylnaphthalene	U	2790	mg/kg	0.50									
4-Nitrophenol	N	2790	mg/kg	0.50									
Hexachlorocyclopentadiene	N	2790	mg/kg	0.50									
2,4,6-Trichlorophenol	U	2790	mg/kg	0.50									
2,4,5-Trichlorophenol	U	2790	mg/kg	0.50									
2-Chloronaphthalene	U	2790	mg/kg	0.50									
2-Nitroaniline	U	2790	mg/kg	0.50									
Acenaphthylene	U	2790	mg/kg	0.50									
Dimethylphthalate	U	2790	mg/kg	0.50									
2,6-Dinitrotoluene	U	2790	mg/kg	0.50									
Acenaphthene	U	2790	mg/kg	0.50									
3-Nitroaniline	N	2790	mg/kg	0.50									
Dibenzofuran	U	2790	mg/kg	0.50									
4-Chlorophenylphenylether	U	2790	mg/kg	0.50									
2,4-Dinitrotoluene	U	2790	mg/kg	0.50									
Fluorene	U	2790	mg/kg	0.50									
Diethyl Phthalate	U	2790	mg/kg	0.50									
4-Nitroaniline	U	2790	mg/kg	0.50									
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.50									
Azobenzene	U	2790	mg/kg	0.50									
4-Bromophenylphenyl Ether	U	2790	mg/kg	0.50									
Hexachlorobenzene	U	2790	mg/kg	0.50									
Pentachlorophenol	N	2790	mg/kg	0.50									
Phenanthrene	U	2790	mg/kg	0.50									
Anthracene	U	2790	mg/kg	0.50									
Carbazole	U	2790	mg/kg	0.50									
Di-N-Butyl Phthalate	U	2790	mg/kg	0.50									
Fluoranthene	U	2790	mg/kg	0.50									
Pyrene	U	2790	mg/kg	0.50									
Butylbenzyl Phthalate	U	2790	mg/kg	0.50									
Benzo[a]anthracene	U	2790	mg/kg	0.50									
Chrysene	U	2790	mg/kg	0.50									
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.50									

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Results - Soil

Project: P17-176 - Athersley, Barnsley

Client: Rodgers Leask Environmental			**Chemtest Job No.:**		17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520
Quotation No.: Q14-02112			**Chemtest Sample ID.:**		489234	489235	489236	489237	489238	489240	489241	489244	489245
Order No.: RLE 17-08-01			Client Sample Ref.:		TP1	TP1	TP1	TP2	TP2	TP3	TP3	TP5A	TP5A
			Client Sample ID.:		D1	D2	D3	D1	D2	D1	D2	D1	D2
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.10	0.30	1.00	0.20	0.60	0.30	1.00	0.10	0.80
			Bottom Depth (m):		0.20	0.40	1.10	0.30	0.70	0.40	1.10	0.20	0.90
			Date Sampled:		19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017
			Asbestos Lab:		COVENTRY			COVENTRY	COVENTRY	COVENTRY		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Di-N-Octyl Phthalate	U	2790	mg/kg	0.50									
Benzo[b]fluoranthene	U	2790	mg/kg	0.50									
Benzo[k]fluoranthene	U	2790	mg/kg	0.50									
Benzo[a]pyrene	U	2790	mg/kg	0.50									
Indeno(1,2,3-c,d)Pyrene	U	2790	mg/kg	0.50									
Dibenz(a,h)Anthracene	U	2790	mg/kg	0.50									
Benzo[g,h,i]perylene	U	2790	mg/kg	0.50									
Naphthalene	U	2800	mg/kg	0.10								1.0	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10								< 0.10	< 0.10
Acenaphthene	U	2800	mg/kg	0.10								< 0.10	< 0.10
Fluorene	U	2800	mg/kg	0.10								< 0.10	< 0.10
Phenanthrene	U	2800	mg/kg	0.10								2.3	< 0.10
Anthracene	U	2800	mg/kg	0.10								0.34	< 0.10
Fluoranthene	U	2800	mg/kg	0.10								1.3	< 0.10
Pyrene	U	2800	mg/kg	0.10								1.1	< 0.10
Benzo[a]anthracene	U	2800	mg/kg	0.10								0.67	< 0.10
Chrysene	U	2800	mg/kg	0.10								0.60	< 0.10
Benzo[b]fluoranthene	U	2800	mg/kg	0.10								0.54	< 0.10
Benzo[k]fluoranthene	U	2800	mg/kg	0.10								0.15	< 0.10
Benzo[a]pyrene	U	2800	mg/kg	0.10								0.44	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10								< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10								< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10								< 0.10	< 0.10
Total Of 16 PAH's	N	2800	mg/kg	2.0								8.4	< 2.0
PCB 81	N	2815	mg/kg	0.010									
PCB 77	N	2815	mg/kg	0.010									
PCB 105	N	2815	mg/kg	0.010									
PCB 114	N	2815	mg/kg	0.010									
PCB 118	N	2815	mg/kg	0.010									
PCB 123	N	2815	mg/kg	0.010									
PCB 126	N	2815	mg/kg	0.010									
PCB 156	N	2815	mg/kg	0.010									
PCB 157	N	2815	mg/kg	0.010									
PCB 167	N	2815	mg/kg	0.010									
PCB 169	N	2815	mg/kg	0.010									
PCB 189	N	2815	mg/kg	0.010									

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Results - Soil

Project: P17-176 - Athersley, Barnsley

Client: Rodgers Leask Environmental			**Chemtest Job No.:**		17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520
Quotation No.: Q14-02112			**Chemtest Sample ID.:**		489234	489235	489236	489237	489238	489240	489241	489244	489245
Order No.: RLE 17-08-01			Client Sample Ref.:		TP1	TP1	TP1	TP2	TP2	TP3	TP3	TP5A	TP5A
			Client Sample ID.:		D1	D2	D3	D1	D2	D1	D2	D1	D2
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.10	0.30	1.00	0.20	0.60	0.30	1.00	0.10	0.80
			Bottom Depth (m):		0.20	0.40	1.10	0.30	0.70	0.40	1.10	0.20	0.90
			Date Sampled:		19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017	19-Jul-2017
			Asbestos Lab:		COVENTRY			COVENTRY	COVENTRY	COVENTRY		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Total PCBs (12 Congeners)	N	2815	mg/kg	0.12									
Total Phenols	U	2920	mg/kg	0.30	< 0.30	< 0.30		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30

Chemtest
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Results - Soil

Project: P17-176 - Athersley, Barnsley

Client: Rodgers Leask Environmental					**Chemtest Job No.:**	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520
Quotation No.: Q14-02112					**Chemtest Sample ID.:**	489246	489251	489252	489256	489257	489259	489260	489261	489262
Order No.: RLE 17-08-01					Client Sample Ref.:	TP5A	TP8	TP8	TP10	TP10	TP11	TP11	TP11	TP12
					Client Sample ID.:	D3	D1	D2	D1	D2	D2	D3	D4	D1
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	1.30	0.10	0.70	0.20	0.50	0.40	0.70	1.60	0.20
					Bottom Depth (m):	1.40	0.20	0.80	0.30	0.60	0.50	0.80	1.70	0.30
					Date Sampled:	19-Jul-2017	20-Jul-2017	20-Jul-2017	20-Jul-2017	20-Jul-2017	21-Jul-2017	21-Jul-2017	21-Jul-2017	21-Jul-2017
					Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**										
ACM Type	U	2192		N/A			-	-	-	-	-	-		-
Asbestos Identification	U	2192	%	0.001			No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected		No Asbestos Detected
Moisture	N	2030	%	0.020	14		9.8	15	13	17	14	16	12	12
pH	U	2010		N/A	5.3		7.3	4.2	10.1	7.9	7.6	7.2	7.1	7.1
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40			0.55	0.86	0.80	2.3	1.2	0.95	0.40	1.4
Magnesium (Water Soluble)	N	2120	g/l	0.010	0.067			0.014			< 0.010			
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.40		0.026	0.10	0.91	0.45	0.080	0.057	0.060	< 0.010
Total Sulphur	U	2175	%	0.010	0.047		0.24	0.72	0.28	0.27	0.29	0.12	0.022	0.39
Chloride (Water Soluble)	U	2220	g/l	0.010	0.012			< 0.010			< 0.010			
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010			< 0.010	< 0.010	< 0.010	< 0.010	< 0.010		< 0.010
Cyanide (Complex)	U	2300	mg/kg	0.50			< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		< 0.50
Cyanide (Free)	U	2300	mg/kg	0.50			< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50			< 0.50	< 0.50					< 0.50	
Thiocyanate	U	2300	mg/kg	5.0			6.6	< 5.0						
Sulphide (Easily Liberatable)	U	2325	mg/kg	0.50			11	4.1	49	15	26	8.0	5.3	10
Ammonium (Water Soluble)	U	2120	g/l	0.01	< 0.01			< 0.01			< 0.01			
Sulphate (Acid Soluble)	U	2430	%	0.010	0.13		0.31	0.39	0.47	0.21	0.28	0.11	0.028	0.13
Arsenic	U	2450	mg/kg	1.0			35	46	26	28	67	19	6.6	29
Barium	U	2450	mg/kg	10					180	160	180	100		140
Beryllium	U	2450	mg/kg	1.0					1.1	1.0	1.6	< 1.0		1.4
Cadmium	U	2450	mg/kg	0.10			0.30	< 0.10	0.77	0.53	0.36	0.20	< 0.10	0.20
Chromium	U	2450	mg/kg	1.0			24	6.4	130	78	30	15	20	15
Copper	U	2450	mg/kg	0.50			60	32	240	220	140	28	25	75
Mercury	U	2450	mg/kg	0.10			< 0.10	< 0.10	< 0.10	< 0.10	0.42	< 0.10	< 0.10	< 0.10
Nickel	U	2450	mg/kg	0.50			31	9.5	83	58	48	24	32	33
Lead	U	2450	mg/kg	0.50			110	24	560	120	95	37	10	71
Selenium	U	2450	mg/kg	0.20			0.46	1.2	1.8	1.6	1.2	0.36	< 0.20	0.82
Vanadium	U	2450	mg/kg	5.0			27	11	27	28	37	20		27
Zinc	U	2450	mg/kg	0.50			130	19	220	250	130	70	54	76
Organic Matter	U	2625	%	0.40			26	79	15	28	38	9.7	1.2	57
Total TPH >C6-C40	U	2670	mg/kg	10					220	440	73	< 10		1400
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0			7.6	12						
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0			3.5	7.4						
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0			21	14						
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0			6.8	8.6						

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Results - Soil

Project: P17-176 - Athersley, Barnsley

Client: Rodgers Leask Environmental					**Chemtest Job No.:**	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520
Quotation No.: Q14-02112					**Chemtest Sample ID.:**	489246	489251	489252	489256	489257	489259	489260	489261	489262
Order No.: RLE 17-08-01					Client Sample Ref.:	TP5A	TP8	TP8	TP10	TP10	TP11	TP11	TP11	TP12
					Client Sample ID.:	D3	D1	D2	D1	D2	D2	D3	D4	D1
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	1.30	0.10	0.70	0.20	0.50	0.40	0.70	1.60	0.20
					Bottom Depth (m):	1.40	0.20	0.80	0.30	0.60	0.50	0.80	1.70	0.30
					Date Sampled:	19-Jul-2017	20-Jul-2017	20-Jul-2017	20-Jul-2017	20-Jul-2017	21-Jul-2017	21-Jul-2017	21-Jul-2017	21-Jul-2017
					Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**										
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0		25	42							
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0		29	120							
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0		75	330							
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0		< 1.0	< 1.0							
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0		170	530							
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0		< 1.0	< 1.0							
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0		< 1.0	6.3							
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0		3.4	28							
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0		< 1.0	51							
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0		< 1.0	350							
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0		11	830							
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0		6.7	590							
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0		< 1.0	< 1.0							
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0		21	1800							
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0		190	2400							
Naphthalene	U	2700	mg/kg	0.10		2.0	4.8						< 0.10	
Acenaphthylene	U	2700	mg/kg	0.10		1.2	4.2						< 0.10	
Acenaphthene	U	2700	mg/kg	0.10		0.98	1.5						< 0.10	
Fluorene	U	2700	mg/kg	0.10		3.1	4.5						< 0.10	
Phenanthrene	U	2700	mg/kg	0.10		5.0	4.9						< 0.10	
Anthracene	U	2700	mg/kg	0.10		1.0	2.1						< 0.10	
Fluoranthene	U	2700	mg/kg	0.10		3.5	1.0						0.23	
Pyrene	U	2700	mg/kg	0.10		4.3	1.3						0.37	
Benzo[a]anthracene	U	2700	mg/kg	0.10		0.86	4.3						< 0.10	
Chrysene	U	2700	mg/kg	0.10		1.5	< 0.10						< 0.10	
Benzo[b]fluoranthene	U	2700	mg/kg	0.10		3.8	2.5						< 0.10	
Benzo[k]fluoranthene	U	2700	mg/kg	0.10		1.3	< 0.10						< 0.10	
Benzo[a]pyrene	U	2700	mg/kg	0.10		1.6	< 0.10						< 0.10	
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10		1.5	< 0.10						< 0.10	
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10		0.42	< 0.10						< 0.10	
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10		1.0	2.0						< 0.10	
Total Of 16 PAH's	U	2700	mg/kg	2.0		33	33						< 2.0	
Dichlorodifluoromethane	U	2760	µg/kg	1.0										
Chloromethane	U	2760	µg/kg	1.0										
Vinyl Chloride	U	2760	µg/kg	1.0										
Bromomethane	U	2760	µg/kg	20										

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Project: P17-176 - Athersley, Barnsley

Client: Rodgers Leask Environmental			**Chemtest Job No.:**		17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520
Quotation No.: Q14-02112			**Chemtest Sample ID.:**		489246	489251	489252	489256	489257	489259	489260	489261	489262
Order No.: RLE 17-08-01			Client Sample Ref.:		TP5A	TP8	TP8	TP10	TP10	TP11	TP11	TP11	TP12
			Client Sample ID.:		D3	D1	D2	D1	D2	D2	D3	D4	D1
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		1.30	0.10	0.70	0.20	0.50	0.40	0.70	1.60	0.20
			Bottom Depth (m):		1.40	0.20	0.80	0.30	0.60	0.50	0.80	1.70	0.30
			Date Sampled:		19-Jul-2017	20-Jul-2017	20-Jul-2017	20-Jul-2017	20-Jul-2017	21-Jul-2017	21-Jul-2017	21-Jul-2017	21-Jul-2017
			Asbestos Lab:			COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Chloroethane	U	2760	µg/kg	2.0									
Trichlorofluoromethane	U	2760	µg/kg	1.0									
1,1-Dichloroethene	U	2760	µg/kg	1.0									
Trans 1,2-Dichloroethene	U	2760	µg/kg	1.0									
1,1-Dichloroethane	U	2760	µg/kg	1.0									
cis 1,2-Dichloroethene	U	2760	µg/kg	1.0									
Bromochloromethane	U	2760	µg/kg	5.0									
Trichloromethane	U	2760	µg/kg	1.0									
1,1,1-Trichloroethane	U	2760	µg/kg	1.0									
Tetrachloromethane	U	2760	µg/kg	1.0									
1,1-Dichloropropene	U	2760	µg/kg	1.0									
Benzene	U	2760	µg/kg	1.0		< 1.0	< 1.0						
1,2-Dichloroethane	U	2760	µg/kg	2.0									
Trichloroethene	U	2760	µg/kg	1.0									
1,2-Dichloropropane	U	2760	µg/kg	1.0									
Dibromomethane	U	2760	µg/kg	1.0									
Bromodichloromethane	U	2760	µg/kg	5.0									
cis-1,3-Dichloropropene	N	2760	µg/kg	10									
Toluene	U	2760	µg/kg	1.0		< 1.0	< 1.0						
Trans-1,3-Dichloropropene	N	2760	µg/kg	10									
1,1,2-Trichloroethane	U	2760	µg/kg	10									
Tetrachloroethene	U	2760	µg/kg	1.0									
1,3-Dichloropropane	U	2760	µg/kg	2.0									
Dibromochloromethane	U	2760	µg/kg	10									
1,2-Dibromoethane	U	2760	µg/kg	5.0									
Chlorobenzene	U	2760	µg/kg	1.0									
1,1,1,2-Tetrachloroethane	U	2760	µg/kg	2.0									
Ethylbenzene	U	2760	µg/kg	1.0		< 1.0	< 1.0						
m & p-Xylene	U	2760	µg/kg	1.0		< 1.0	< 1.0						
o-Xylene	U	2760	µg/kg	1.0		< 1.0	< 1.0						
Styrene	U	2760	µg/kg	1.0									
Tribromomethane	U	2760	µg/kg	1.0									
Isopropylbenzene	U	2760	µg/kg	1.0									
Bromobenzene	U	2760	µg/kg	1.0									
1,2,3-Trichloropropane	N	2760	µg/kg	50									
N-Propylbenzene	U	2760	µg/kg	1.0									

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Results - Soil

Project: P17-176 - Athersley, Barnsley

Client: Rodgers Leask Environmental			**Chemtest Job No.:**		17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520
Quotation No.: Q14-02112			**Chemtest Sample ID.:**		489246	489251	489252	489256	489257	489259	489260	489261	489262
Order No.: RLE 17-08-01			Client Sample Ref.:		TP5A	TP8	TP8	TP10	TP10	TP11	TP11	TP11	TP12
			Client Sample ID.:		D3	D1	D2	D1	D2	D2	D3	D4	D1
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		1.30	0.10	0.70	0.20	0.50	0.40	0.70	1.60	0.20
			Bottom Depth (m):		1.40	0.20	0.80	0.30	0.60	0.50	0.80	1.70	0.30
			Date Sampled:		19-Jul-2017	20-Jul-2017	20-Jul-2017	20-Jul-2017	20-Jul-2017	21-Jul-2017	21-Jul-2017	21-Jul-2017	21-Jul-2017
			Asbestos Lab:			COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
2-Chlorotoluene	U	2760	µg/kg	1.0									
1,3,5-Trimethylbenzene	U	2760	µg/kg	1.0									
4-Chlorotoluene	U	2760	µg/kg	1.0									
Tert-Butylbenzene	U	2760	µg/kg	1.0									
1,2,4-Trimethylbenzene	U	2760	µg/kg	1.0									
Sec-Butylbenzene	U	2760	µg/kg	1.0									
1,3-Dichlorobenzene	U	2760	µg/kg	1.0									
4-Isopropyltoluene	U	2760	µg/kg	1.0									
1,4-Dichlorobenzene	U	2760	µg/kg	1.0									
N-Butylbenzene	U	2760	µg/kg	1.0									
1,2-Dichlorobenzene	U	2760	µg/kg	1.0									
1,2-Dibromo-3-Chloropropane	U	2760	µg/kg	50									
1,2,4-Trichlorobenzene	U	2760	µg/kg	1.0									
Hexachlorobutadiene	U	2760	µg/kg	1.0									
1,2,3-Trichlorobenzene	U	2760	µg/kg	2.0									
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0									
N-Nitrosodimethylamine	U	2790	mg/kg	0.50									
Phenol	U	2790	mg/kg	0.50									
2-Chlorophenol	U	2790	mg/kg	0.50									
Bis-(2-Chloroethyl)Ether	U	2790	mg/kg	0.50									
1,3-Dichlorobenzene	U	2790	mg/kg	0.50									
1,4-Dichlorobenzene	N	2790	mg/kg	0.50									
1,2-Dichlorobenzene	U	2790	mg/kg	0.50									
2-Methylphenol	U	2790	mg/kg	0.50									
Bis(2-Chloroisopropyl)Ether	U	2790	mg/kg	0.50									
Hexachloroethane	N	2790	mg/kg	0.50									
N-Nitrosodi-n-propylamine	U	2790	mg/kg	0.50									
4-Methylphenol	U	2790	mg/kg	0.50									
Nitrobenzene	U	2790	mg/kg	0.50									
Isophorone	U	2790	mg/kg	0.50									
2-Nitrophenol	N	2790	mg/kg	0.50									
2,4-Dimethylphenol	N	2790	mg/kg	0.50									
Bis(2-Chloroethoxy)Methane	U	2790	mg/kg	0.50									
2,4-Dichlorophenol	U	2790	mg/kg	0.50									
1,2,4-Trichlorobenzene	U	2790	mg/kg	0.50									
Naphthalene	U	2790	mg/kg	0.50									

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Results - Soil

Project: P17-176 - Athersley, Barnsley

Client: Rodgers Leask Environmental					**Chemtest Job No.:**	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520
Quotation No.: Q14-02112					**Chemtest Sample ID.:**	489246	489251	489252	489256	489257	489259	489260	489261	489262
Order No.: RLE 17-08-01					Client Sample Ref.:	TP5A	TP8	TP8	TP10	TP10	TP11	TP11	TP11	TP12
					Client Sample ID.:	D3	D1	D2	D1	D2	D2	D3	D4	D1
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	1.30	0.10	0.70	0.20	0.50	0.40	0.70	1.60	0.20
					Bottom Depth (m):	1.40	0.20	0.80	0.30	0.60	0.50	0.80	1.70	0.30
					Date Sampled:	19-Jul-2017	20-Jul-2017	20-Jul-2017	20-Jul-2017	20-Jul-2017	21-Jul-2017	21-Jul-2017	21-Jul-2017	21-Jul-2017
					Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**										
4-Chloroaniline	N	2790	mg/kg	0.50										
Hexachlorobutadiene	U	2790	mg/kg	0.50										
4-Chloro-3-Methylphenol	U	2790	mg/kg	0.50										
2-Methylnaphthalene	U	2790	mg/kg	0.50										
4-Nitrophenol	N	2790	mg/kg	0.50										
Hexachlorocyclopentadiene	N	2790	mg/kg	0.50										
2,4,6-Trichlorophenol	U	2790	mg/kg	0.50										
2,4,5-Trichlorophenol	U	2790	mg/kg	0.50										
2-Chloronaphthalene	U	2790	mg/kg	0.50										
2-Nitroaniline	U	2790	mg/kg	0.50										
Acenaphthylene	U	2790	mg/kg	0.50										
Dimethylphthalate	U	2790	mg/kg	0.50										
2,6-Dinitrotoluene	U	2790	mg/kg	0.50										
Acenaphthene	U	2790	mg/kg	0.50										
3-Nitroaniline	N	2790	mg/kg	0.50										
Dibenzofuran	U	2790	mg/kg	0.50										
4-Chlorophenylphenylether	U	2790	mg/kg	0.50										
2,4-Dinitrotoluene	U	2790	mg/kg	0.50										
Fluorene	U	2790	mg/kg	0.50										
Diethyl Phthalate	U	2790	mg/kg	0.50										
4-Nitroaniline	U	2790	mg/kg	0.50										
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.50										
Azobenzene	U	2790	mg/kg	0.50										
4-Bromophenylphenyl Ether	U	2790	mg/kg	0.50										
Hexachlorobenzene	U	2790	mg/kg	0.50										
Pentachlorophenol	N	2790	mg/kg	0.50										
Phenanthrene	U	2790	mg/kg	0.50										
Anthracene	U	2790	mg/kg	0.50										
Carbazole	U	2790	mg/kg	0.50										
Di-N-Butyl Phthalate	U	2790	mg/kg	0.50										
Fluoranthene	U	2790	mg/kg	0.50										
Pyrene	U	2790	mg/kg	0.50										
Butylbenzyl Phthalate	U	2790	mg/kg	0.50										
Benzo[a]anthracene	U	2790	mg/kg	0.50										
Chrysene	U	2790	mg/kg	0.50										
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.50										

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Results - Soil

Project: P17-176 - Athersley, Barnsley

Client: Rodgers Leask Environmental			**Chemtest Job No.:**		17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520
Quotation No.: Q14-02112			**Chemtest Sample ID.:**		489246	489251	489252	489256	489257	489259	489260	489261	489262
Order No.: RLE 17-08-01			Client Sample Ref.:		TP5A	TP8	TP8	TP10	TP10	TP11	TP11	TP11	TP12
			Client Sample ID.:		D3	D1	D2	D1	D2	D2	D3	D4	D1
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		1.30	0.10	0.70	0.20	0.50	0.40	0.70	1.60	0.20
			Bottom Depth (m):		1.40	0.20	0.80	0.30	0.60	0.50	0.80	1.70	0.30
			Date Sampled:		19-Jul-2017	20-Jul-2017	20-Jul-2017	20-Jul-2017	20-Jul-2017	21-Jul-2017	21-Jul-2017	21-Jul-2017	21-Jul-2017
			Asbestos Lab:			COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Di-N-Octyl Phthalate	U	2790	mg/kg	0.50									
Benzo[b]fluoranthene	U	2790	mg/kg	0.50									
Benzo[k]fluoranthene	U	2790	mg/kg	0.50									
Benzo[a]pyrene	U	2790	mg/kg	0.50									
Indeno(1,2,3-c,d)Pyrene	U	2790	mg/kg	0.50									
Dibenz(a,h)Anthracene	U	2790	mg/kg	0.50									
Benzo[g,h,i]perylene	U	2790	mg/kg	0.50									
Naphthalene	U	2800	mg/kg	0.10				0.69	1.4	2.5	1.8		< 0.10
Acenaphthylene	N	2800	mg/kg	0.10				0.23	0.17	0.19	< 0.10		< 0.10
Acenaphthene	U	2800	mg/kg	0.10				< 0.10	0.12	0.14	0.15		< 0.10
Fluorene	U	2800	mg/kg	0.10				0.21	0.15	0.18	< 0.10		< 0.10
Phenanthrene	U	2800	mg/kg	0.10				3.7	2.8	4.6	3.6		< 0.10
Anthracene	U	2800	mg/kg	0.10				0.76	0.56	0.83	0.52		< 0.10
Fluoranthene	U	2800	mg/kg	0.10				5.2	2.1	3.1	1.4		< 0.10
Pyrene	U	2800	mg/kg	0.10				4.4	1.8	2.8	1.2		< 0.10
Benzo[a]anthracene	U	2800	mg/kg	0.10				2.3	1.1	1.6	0.56		< 0.10
Chrysene	U	2800	mg/kg	0.10				2.2	1.2	1.6	0.55		< 0.10
Benzo[b]fluoranthene	U	2800	mg/kg	0.10				2.8	1.4	1.9	0.48		< 0.10
Benzo[k]fluoranthene	U	2800	mg/kg	0.10				0.77	0.49	0.49	0.12		< 0.10
Benzo[a]pyrene	U	2800	mg/kg	0.10				2.3	0.99	1.4	0.31		< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10				1.2	0.64	0.77	< 0.10		< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10				< 0.10	0.10	< 0.10	< 0.10		< 0.10
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10				0.90	0.60	0.60	< 0.10		< 0.10
Total Of 16 PAH's	N	2800	mg/kg	2.0				28	16	23	11		< 2.0
PCB 81	N	2815	mg/kg	0.010									
PCB 77	N	2815	mg/kg	0.010									
PCB 105	N	2815	mg/kg	0.010									
PCB 114	N	2815	mg/kg	0.010									
PCB 118	N	2815	mg/kg	0.010									
PCB 123	N	2815	mg/kg	0.010									
PCB 126	N	2815	mg/kg	0.010									
PCB 156	N	2815	mg/kg	0.010									
PCB 157	N	2815	mg/kg	0.010									
PCB 167	N	2815	mg/kg	0.010									
PCB 169	N	2815	mg/kg	0.010									
PCB 189	N	2815	mg/kg	0.010									

Chemtest
The right chemistry to deliver results

Results - Soil

Project: P17-176 - Athersley, Barnsley

Client: Rodgers Leask Environmental					**Chemtest Job No.:**	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520
Quotation No.: Q14-02112					**Chemtest Sample ID.:**	489246	489251	489252	489256	489257	489259	489260	489261	489262
Order No.: RLE 17-08-01					Client Sample Ref.:	TP5A	TP8	TP8	TP10	TP10	TP11	TP11	TP11	TP12
					Client Sample ID.:	D3	D1	D2	D1	D2	D2	D3	D4	D1
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	1.30	0.10	0.70	0.20	0.50	0.40	0.70	1.60	0.20
					Bottom Depth (m):	1.40	0.20	0.80	0.30	0.60	0.50	0.80	1.70	0.30
					Date Sampled:	19-Jul-2017	20-Jul-2017	20-Jul-2017	20-Jul-2017	20-Jul-2017	21-Jul-2017	21-Jul-2017	21-Jul-2017	21-Jul-2017
					Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**										
Total PCBs (12 Congeners)	N	2815	mg/kg	0.12										
Total Phenols	U	2920	mg/kg	0.30			< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30

Chemtest
The right chemistry to deliver results

Results - Soil

Project: P17-176 - Athersley, Barnsley

Client: Rodgers Leask Environmental					**Chemtest Job No.:**	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520
Quotation No.: Q14-02112					**Chemtest Sample ID.:**	489263	489265	489266	489267	489268	489269	489270	489271
Order No.: RLE 17-08-01					Client Sample Ref.:	TP12	TP13	TP13	TP13	TP16	TP16	TT4	TT5
					Client Sample ID.:	D2	D1	D2	D3	D1	D2	D1	D1
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.70	0.10	0.40	0.80	0.20	0.50	1.90	1.70
					Bottom Depth (m):	0.80	0.20	0.50	0.90	0.30	0.60	1.90	1.70
					Date Sampled:	21-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017
					Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY		COVENTRY		COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
ACM Type	U	2192		N/A		-	-	-		-		-	
Asbestos Identification	U	2192	%	0.001		No Asbestos Detected	No Asbestos Detected	No Asbestos Detected		No Asbestos Detected		No Asbestos Detected	
Moisture	N	2030	%	0.020		14	11	12	12	14	10	18	15
pH	U	2010		N/A		7.0	5.7	6.2	5.7	6.3	5.3	7.2	7.6
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40		< 0.40	0.53	< 0.40	0.40	0.88	< 0.40	3.4	0.60
Magnesium (Water Soluble)	N	2120	g/l	0.010					< 0.010				
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010		0.021	< 0.010	< 0.010	0.015	< 0.010	< 0.010	0.74	< 0.010
Total Sulphur	U	2175	%	0.010		0.024	0.044	0.020	0.014	0.043	0.024	0.42	0.70
Chloride (Water Soluble)	U	2220	g/l	0.010					< 0.010				
Nitrate (Water Soluble)	N	2220	g/l	0.010		< 0.010			< 0.010				
Cyanide (Complex)	U	2300	mg/kg	0.50		0.50						2.6	0.50
Cyanide (Free)	U	2300	mg/kg	0.50		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50			< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	2.6	0.50
Thiocyanate	U	2300	mg/kg	5.0								< 5.0	< 5.0
Sulphide (Easily Liberatable)	U	2325	mg/kg	0.50		3.9	5.8	3.9	3.9	3.8	3.9	34	9.9
Ammonium (Water Soluble)	U	2120	g/l	0.01					< 0.01				
Sulphate (Acid Soluble)	U	2430	%	0.010		0.021	0.026	0.025	0.028	0.072	0.053	0.22	0.063
Arsenic	U	2450	mg/kg	1.0		4.9	15	6.3	4.8	13	4.6	30	5.4
Barium	U	2450	mg/kg	10		29							
Beryllium	U	2450	mg/kg	1.0		< 1.0							
Cadmium	U	2450	mg/kg	0.10		< 0.10	0.15	0.11	< 0.10	0.25	0.16	0.27	< 0.10
Chromium	U	2450	mg/kg	1.0		14	16	15	20	17	15	64	18
Copper	U	2450	mg/kg	0.50		15	33	18	21	24	18	57	50
Mercury	U	2450	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Nickel	U	2450	mg/kg	0.50		13	15	22	31	18	22	71	39
Lead	U	2450	mg/kg	0.50		15	61	29	14	63	26	110	47
Selenium	U	2450	mg/kg	0.20		< 0.20	0.31	< 0.20	< 0.20	0.35	< 0.20	6.8	1.4
Vanadium	U	2450	mg/kg	5.0		15						26	< 5.0
Zinc	U	2450	mg/kg	0.50		46	76	68	84	90	72	120	57
Organic Matter	U	2625	%	0.40		1.6	5.5	2.8	0.55	5.7	1.2	19	88
Total TPH >C6-C40	U	2670	mg/kg	10		< 10							
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0								< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0								< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0								92	120
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0								390	190

Chemtest
The right chemistry to deliver results

Results - Soil

Project: P17-176 - Athersley, Barnsley

Client: Rodgers Leask Environmental			**Chemtest Job No.:**		17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520
Quotation No.: Q14-02112			**Chemtest Sample ID.:**		489263	489265	489266	489267	489268	489269	489270	489271
Order No.: RLE 17-08-01			Client Sample Ref.:		TP12	TP13	TP13	TP13	TP16	TP16	TT4	TT5
			Client Sample ID.:		D2	D1	D2	D3	D1	D2	D1	D1
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.70	0.10	0.40	0.80	0.20	0.50	1.90	1.70
			Bottom Depth (m):		0.80	0.20	0.50	0.90	0.30	0.60	1.90	1.70
			Date Sampled:		21-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY		COVENTRY		COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0							1400	420
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0							2400	280
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0							4200	710
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0							32	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0							8500	1700
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0							< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0							< 1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0							36	610
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0							180	2000
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0							1000	5500
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0							840	6300
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0							900	8900
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0							36	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0							3000	23000
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0							12000	25000
Naphthalene	U	2700	mg/kg	0.10		0.11	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	57
Acenaphthylene	U	2700	mg/kg	0.10		0.15	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	71
Acenaphthene	U	2700	mg/kg	0.10		0.19	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	19
Fluorene	U	2700	mg/kg	0.10		0.27	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	110
Phenanthrene	U	2700	mg/kg	0.10		1.0	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	210
Anthracene	U	2700	mg/kg	0.10		0.30	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	100
Fluoranthene	U	2700	mg/kg	0.10		1.5	0.34	< 0.10	< 0.10	< 0.10	2.7	96
Pyrene	U	2700	mg/kg	0.10		1.4	0.34	< 0.10	< 0.10	< 0.10	2.7	99
Benzo[a]anthracene	U	2700	mg/kg	0.10		0.58	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	49
Chrysene	U	2700	mg/kg	0.10		0.57	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	53
Benzo[b]fluoranthene	U	2700	mg/kg	0.10		0.82	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	25
Benzo[k]fluoranthene	U	2700	mg/kg	0.10		0.80	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	12
Benzo[a]pyrene	U	2700	mg/kg	0.10		0.43	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	25
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10		0.33	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	8.9
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	5.4
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10		0.16	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	7.9
Total Of 16 PAH's	U	2700	mg/kg	2.0		8.6	< 2.0	< 2.0	< 2.0	< 2.0	5.4	960
Dichlorodifluoromethane	U	2760	µg/kg	1.0								< 1.0
Chloromethane	U	2760	µg/kg	1.0								< 1.0
Vinyl Chloride	U	2760	µg/kg	1.0								4.1
Bromomethane	U	2760	µg/kg	20								< 20

Results - Soil

Project: P17-176 - Athersley, Barnsley

Client: Rodgers Leask Environmental			**Chemtest Job No.:**		17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520
Quotation No.: Q14-02112			**Chemtest Sample ID.:**		489263	489265	489266	489267	489268	489269	489270	489271
Order No.: RLE 17-08-01			Client Sample Ref.:		TP12	TP13	TP13	TP13	TP16	TP16	TT4	TT5
			Client Sample ID.:		D2	D1	D2	D3	D1	D2	D1	D1
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.70	0.10	0.40	0.80	0.20	0.50	1.90	1.70
			Bottom Depth (m):		0.80	0.20	0.50	0.90	0.30	0.60	1.90	1.70
			Date Sampled:		21-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY		COVENTRY		COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Chloroethane	U	2760	µg/kg	2.0								< 2.0
Trichlorofluoromethane	U	2760	µg/kg	1.0								3.8
1,1-Dichloroethene	U	2760	µg/kg	1.0								7.7
Trans 1,2-Dichloroethene	U	2760	µg/kg	1.0								7.6
1,1-Dichloroethane	U	2760	µg/kg	1.0								2.8
cis 1,2-Dichloroethene	U	2760	µg/kg	1.0								2.0
Bromochloromethane	U	2760	µg/kg	5.0								< 5.0
Trichloromethane	U	2760	µg/kg	1.0								1.6
1,1,1-Trichloroethane	U	2760	µg/kg	1.0								< 1.0
Tetrachloromethane	U	2760	µg/kg	1.0								1.8
1,1-Dichloropropene	U	2760	µg/kg	1.0								6.6
Benzene	U	2760	µg/kg	1.0							< 1.0	280
1,2-Dichloroethane	U	2760	µg/kg	2.0								12
Trichloroethene	U	2760	µg/kg	1.0								6.6
1,2-Dichloropropane	U	2760	µg/kg	1.0								2.6
Dibromomethane	U	2760	µg/kg	1.0								21
Bromodichloromethane	U	2760	µg/kg	5.0								10
cis-1,3-Dichloropropene	N	2760	µg/kg	10								19
Toluene	U	2760	µg/kg	1.0							< 1.0	2900
Trans-1,3-Dichloropropene	N	2760	µg/kg	10								67
1,1,2-Trichloroethane	U	2760	µg/kg	10								760
Tetrachloroethene	U	2760	µg/kg	1.0								< 1.0
1,3-Dichloropropane	U	2760	µg/kg	2.0								5.6
Dibromochloromethane	U	2760	µg/kg	10								< 10
1,2-Dibromoethane	U	2760	µg/kg	5.0								< 5.0
Chlorobenzene	U	2760	µg/kg	1.0								2.3
1,1,1,2-Tetrachloroethane	U	2760	µg/kg	2.0								< 2.0
Ethylbenzene	U	2760	µg/kg	1.0							6.1	4000
m & p-Xylene	U	2760	µg/kg	1.0							7.6	64000
o-Xylene	U	2760	µg/kg	1.0							3.9	34000
Styrene	U	2760	µg/kg	1.0								7600
Tribromomethane	U	2760	µg/kg	1.0								16
Isopropylbenzene	U	2760	µg/kg	1.0								830
Bromobenzene	U	2760	µg/kg	1.0								5.9
1,2,3-Trichloropropane	N	2760	µg/kg	50								620
N-Propylbenzene	U	2760	µg/kg	1.0								< 1.0

Results - Soil

Project: P17-176 - Athersley, Barnsley

Client: Rodgers Leask Environmental			Chemtest Job No.:		17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520
Quotation No.: Q14-02112			Chemtest Sample ID.:		489263	489265	489266	489267	489268	489269	489270	489271
Order No.: RLE 17-08-01			Client Sample Ref.:		TP12	TP13	TP13	TP13	TP16	TP16	TT4	TT5
			Client Sample ID.:		D2	D1	D2	D3	D1	D2	D1	D1
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.70	0.10	0.40	0.80	0.20	0.50	1.90	1.70
			Bottom Depth (m):		0.80	0.20	0.50	0.90	0.30	0.60	1.90	1.70
			Date Sampled:		21-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY		COVENTRY		COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
2-Chlorotoluene	U	2760	µg/kg	1.0								1300
1,3,5-Trimethylbenzene	U	2760	µg/kg	1.0								41000
4-Chlorotoluene	U	2760	µg/kg	1.0								< 1.0
Tert-Butylbenzene	U	2760	µg/kg	1.0								< 1.0
1,2,4-Trimethylbenzene	U	2760	µg/kg	1.0								68000
Sec-Butylbenzene	U	2760	µg/kg	1.0								< 1.0
1,3-Dichlorobenzene	U	2760	µg/kg	1.0								< 1.0
4-Isopropyltoluene	U	2760	µg/kg	1.0								< 1.0
1,4-Dichlorobenzene	U	2760	µg/kg	1.0								< 1.0
N-Butylbenzene	U	2760	µg/kg	1.0								< 1.0
1,2-Dichlorobenzene	U	2760	µg/kg	1.0								< 1.0
1,2-Dibromo-3-Chloropropane	U	2760	µg/kg	50								< 50
1,2,4-Trichlorobenzene	U	2760	µg/kg	1.0								< 1.0
Hexachlorobutadiene	U	2760	µg/kg	1.0								< 1.0
1,2,3-Trichlorobenzene	U	2760	µg/kg	2.0								< 2.0
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0								< 1.0
N-Nitrosodimethylamine	U	2790	mg/kg	0.50								< 0.50
Phenol	U	2790	mg/kg	0.50								< 0.50
2-Chlorophenol	U	2790	mg/kg	0.50								< 0.50
Bis-(2-Chloroethyl)Ether	U	2790	mg/kg	0.50								< 0.50
1,3-Dichlorobenzene	U	2790	mg/kg	0.50								< 0.50
1,4-Dichlorobenzene	N	2790	mg/kg	0.50								< 0.50
1,2-Dichlorobenzene	U	2790	mg/kg	0.50								< 0.50
2-Methylphenol	U	2790	mg/kg	0.50								< 0.50
Bis(2-Chloroisopropyl)Ether	U	2790	mg/kg	0.50								< 0.50
Hexachloroethane	N	2790	mg/kg	0.50								< 0.50
N-Nitrosodi-n-propylamine	U	2790	mg/kg	0.50								< 0.50
4-Methylphenol	U	2790	mg/kg	0.50								< 0.50
Nitrobenzene	U	2790	mg/kg	0.50								< 0.50
Isophorone	U	2790	mg/kg	0.50								< 0.50
2-Nitrophenol	N	2790	mg/kg	0.50								< 0.50
2,4-Dimethylphenol	N	2790	mg/kg	0.50								< 0.50
Bis(2-Chloroethoxy)Methane	U	2790	mg/kg	0.50								< 0.50
2,4-Dichlorophenol	U	2790	mg/kg	0.50								< 0.50
1,2,4-Trichlorobenzene	U	2790	mg/kg	0.50								< 0.50
Naphthalene	U	2790	mg/kg	0.50								580

Results - Soil

Project: P17-176 - Athersley, Barnsley

Client: Rodgers Leask Environmental			Chemtest Job No.:		17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520
Quotation No.: Q14-02112			Chemtest Sample ID.:		489263	489265	489266	489267	489268	489269	489270	489271
Order No.: RLE 17-08-01			Client Sample Ref.:		TP12	TP13	TP13	TP13	TP16	TP16	TT4	TT5
			Client Sample ID.:		D2	D1	D2	D3	D1	D2	D1	D1
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.70	0.10	0.40	0.80	0.20	0.50	1.90	1.70
			Bottom Depth (m):		0.80	0.20	0.50	0.90	0.30	0.60	1.90	1.70
			Date Sampled:		21-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY		COVENTRY		COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
4-Chloroaniline	N	2790	mg/kg	0.50								< 0.50
Hexachlorobutadiene	U	2790	mg/kg	0.50								< 0.50
4-Chloro-3-Methylphenol	U	2790	mg/kg	0.50								< 0.50
2-Methylnaphthalene	U	2790	mg/kg	0.50								510
4-Nitrophenol	N	2790	mg/kg	0.50								< 0.50
Hexachlorocyclopentadiene	N	2790	mg/kg	0.50								< 0.50
2,4,6-Trichlorophenol	U	2790	mg/kg	0.50								< 0.50
2,4,5-Trichlorophenol	U	2790	mg/kg	0.50								< 0.50
2-Chloronaphthalene	U	2790	mg/kg	0.50								< 0.50
2-Nitroaniline	U	2790	mg/kg	0.50								< 0.50
Acenaphthylene	U	2790	mg/kg	0.50								< 0.50
Dimethylphthalate	U	2790	mg/kg	0.50								< 0.50
2,6-Dinitrotoluene	U	2790	mg/kg	0.50								< 0.50
Acenaphthene	U	2790	mg/kg	0.50								69
3-Nitroaniline	N	2790	mg/kg	0.50								< 0.50
Dibenzofuran	U	2790	mg/kg	0.50								260
4-Chlorophenylphenylether	U	2790	mg/kg	0.50								< 0.50
2,4-Dinitrotoluene	U	2790	mg/kg	0.50								< 0.50
Fluorene	U	2790	mg/kg	0.50								330
Diethyl Phthalate	U	2790	mg/kg	0.50								< 0.50
4-Nitroaniline	U	2790	mg/kg	0.50								< 0.50
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.50								< 0.50
Azobenzene	U	2790	mg/kg	0.50								< 0.50
4-Bromophenylphenyl Ether	U	2790	mg/kg	0.50								< 0.50
Hexachlorobenzene	U	2790	mg/kg	0.50								< 0.50
Pentachlorophenol	N	2790	mg/kg	0.50								< 0.50
Phenanthrene	U	2790	mg/kg	0.50								540
Anthracene	U	2790	mg/kg	0.50								300
Carbazole	U	2790	mg/kg	0.50								37
Di-N-Butyl Phthalate	U	2790	mg/kg	0.50								< 0.50
Fluoranthene	U	2790	mg/kg	0.50								290
Pyrene	U	2790	mg/kg	0.50								240
Butylbenzyl Phthalate	U	2790	mg/kg	0.50								< 0.50
Benzo[a]anthracene	U	2790	mg/kg	0.50								200
Chrysene	U	2790	mg/kg	0.50								120
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.50								< 0.50

Results - Soil

Project: P17-176 - Athersley, Barnsley

Client: Rodgers Leask Environmental			Chemtest Job No.:		17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520
Quotation No.: Q14-02112			Chemtest Sample ID.:		489263	489265	489266	489267	489268	489269	489270	489271
Order No.: RLE 17-08-01			Client Sample Ref.:		TP12	TP13	TP13	TP13	TP16	TP16	TT4	TT5
			Client Sample ID.:		D2	D1	D2	D3	D1	D2	D1	D1
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.70	0.10	0.40	0.80	0.20	0.50	1.90	1.70
			Bottom Depth (m):		0.80	0.20	0.50	0.90	0.30	0.60	1.90	1.70
			Date Sampled:		21-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY		COVENTRY		COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Di-N-Octyl Phthalate	U	2790	mg/kg	0.50								< 0.50
Benzo[b]fluoranthene	U	2790	mg/kg	0.50								140
Benzo[k]fluoranthene	U	2790	mg/kg	0.50								43
Benzo[a]pyrene	U	2790	mg/kg	0.50								95
Indeno(1,2,3-c,d)Pyrene	U	2790	mg/kg	0.50								40
Dibenz(a,h)Anthracene	U	2790	mg/kg	0.50								19
Benzo[g,h,i]perylene	U	2790	mg/kg	0.50								32
Naphthalene	U	2800	mg/kg	0.10	5.7							
Acenaphthylene	N	2800	mg/kg	0.10	0.27							
Acenaphthene	U	2800	mg/kg	0.10	0.35							
Fluorene	U	2800	mg/kg	0.10	0.39							
Phenanthrene	U	2800	mg/kg	0.10	9.0							
Anthracene	U	2800	mg/kg	0.10	1.5							
Fluoranthene	U	2800	mg/kg	0.10	3.3							
Pyrene	U	2800	mg/kg	0.10	2.8							
Benzo[a]anthracene	U	2800	mg/kg	0.10	1.6							
Chrysene	U	2800	mg/kg	0.10	1.8							
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	1.9							
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	0.48							
Benzo[a]pyrene	U	2800	mg/kg	0.10	1.3							
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10	0.50							
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10							
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10	0.52							
Total Of 16 PAH's	N	2800	mg/kg	2.0	31							
PCB 81	N	2815	mg/kg	0.010								< 0.010
PCB 77	N	2815	mg/kg	0.010								< 0.010
PCB 105	N	2815	mg/kg	0.010								< 0.010
PCB 114	N	2815	mg/kg	0.010								< 0.010
PCB 118	N	2815	mg/kg	0.010								< 0.010
PCB 123	N	2815	mg/kg	0.010								< 0.010
PCB 126	N	2815	mg/kg	0.010								< 0.010
PCB 156	N	2815	mg/kg	0.010								< 0.010
PCB 157	N	2815	mg/kg	0.010								< 0.010
PCB 167	N	2815	mg/kg	0.010								< 0.010
PCB 169	N	2815	mg/kg	0.010								< 0.010
PCB 189	N	2815	mg/kg	0.010								< 0.010

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Results - Soil

Project: P17-176 - Athersley, Barnsley

Client: Rodgers Leask Environmental			**Chemtest Job No.:**		17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520	17-19520
Quotation No.: Q14-02112			**Chemtest Sample ID.:**		489263	489265	489266	489267	489268	489269	489270	489271
Order No.: RLE 17-08-01			Client Sample Ref.:		TP12	TP13	TP13	TP13	TP16	TP16	TT4	TT5
			Client Sample ID.:		D2	D1	D2	D3	D1	D2	D1	D1
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.70	0.10	0.40	0.80	0.20	0.50	1.90	1.70
			Bottom Depth (m):		0.80	0.20	0.50	0.90	0.30	0.60	1.90	1.70
			Date Sampled:		21-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017	24-Jul-2017
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY		COVENTRY		COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Total PCBs (12 Congeners)	N	2815	mg/kg	0.12								< 0.12
Total Phenols	U	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GC FID detection
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measuremernt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.

Test Methods

SOP	Title	Parameters included	Method summary
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2790	Semi-Volatile Organic Compounds (SVOCs) in Soils by GC-MS	Semi-volatile organic compounds(cf. USEPA Method 8270)	Acetone/Hexane extraction / GC-MS
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2810	Polychlorinated Biphenyls (PCB) as Aroclors in Soils by GC-ECD	Polychlorinated Biphenyls expressed as an Aroclor (normally reported as *Aroclor 1242)	Extraction of a soil sample, as received, into hexane/acetone (50:50) followed by gas chromatography (GC) using mass spectrometric (MS) detection for identification of polychlorinated biphenyls and electron capture detection (ECD) for quanitation if present.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

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

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

Final Report

Report No.:	17-30488-1
Initial Date of Issue:	22-Nov-2017
Client	Rodgers Leask Environmental
Client Address:	St James House St Marys Wharf Mansfield Road Derby DE1 3TQ
Contact(s):	Mark Churchill
Project	P17-176 - Athersley, Barnsley
Quotation No.:	Q14-02112
Order No.:	RLE 17-11-25
No. of Samples:	20
Turnaround (Wkdays):	5
Date Approved:	22-Nov-2017
Approved By:	

Date Received:	16-Nov-2017
Date Instructed:	16-Nov-2017
Results Due:	22-Nov-2017

Details: Robert Monk, Technical Manager

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Results - Soil

Project: P17-176 - Athersley, Barnsley

Client: Rodgers Leask Environmental			**Chemtest Job No.:**		17-30488	17-30488	17-30488	17-30488	17-30488	17-30488	17-30488	17-30488	17-30488
Quotation No.: Q14-02112			**Chemtest Sample ID.:**		540336	540337	540338	540339	540340	540341	540342	540343	540344
Order No.: RLE 17-11-25			Client Sample Ref.:		TS101	TS102	TS103	TS104	TS106	TS108	TS112	TS113	TS114
			Client Sample ID.:		D1	D1	D1	D1	D1	D1	D1	D1	D1
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
			Bottom Depth (m):		0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
			Date Sampled:		13-Nov-2017	13-Nov-2017	13-Nov-2017	13-Nov-2017	13-Nov-2017	13-Nov-2017	13-Nov-2017	13-Nov-2017	13-Nov-2017
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Moisture	N	2030	%	0.020	23	25	28	26	21	21	16	16	27
Soil Colour	N	2040		N/A	Brown,	Brown,	Brown,	Brown,	Brown,	Brown,	Brown	Brown,	Brown,
Other Material	N	2040		N/A	Stones, Roots,	Stones, Roots,	Stones, Roots,	Stones, Roots,	Stones, Roots,	Stones, Roots,	Stones, Roots,	Stones, Roots,	Stones, Roots,
Soil Texture	N	2040		N/A	Clay,	Loam,	Loam,	Clay,	Loam,	Loam,	Loam,	Loam,	Clay,
Arsenic	M	2450	mg/kg	1.0	32	37	27	26	30	39	38	36	33
Lead	M	2450	mg/kg	0.50	150	130	71	58	86	150	110	130	110
Organic Matter	M	2625	%	0.40	18	22	8.4	8.5	21	19	22	19	19
Naphthalene	M	2700	mg/kg	0.10	0.67	1.6	0.13	< 0.10	0.89	2.1	1.3	1.3	0.52
Acenaphthylene	M	2700	mg/kg	0.10	0.58	0.78	0.13	< 0.10	0.34	1.1	0.84	0.70	0.31
Acenaphthene	M	2700	mg/kg	0.10	0.30	0.57	< 0.10	< 0.10	0.20	0.71	0.53	0.44	0.18
Fluorene	M	2700	mg/kg	0.10	0.96	1.5	< 0.10	< 0.10	1.0	1.0	1.5	1.5	0.73
Phenanthrene	M	2700	mg/kg	0.10	1.3	3.3	0.62	< 0.10	2.9	7.0	0.24	3.5	1.2
Anthracene	M	2700	mg/kg	0.10	0.11	0.72	0.13	< 0.10	0.64	2.1	0.68	0.73	0.15
Fluoranthene	M	2700	mg/kg	0.10	1.0	5.1	1.0	< 0.10	2.7	8.3	3.8	4.3	1.5
Pyrene	M	2700	mg/kg	0.10	1.2	5.3	0.89	< 0.10	2.8	9.6	3.9	4.3	1.4
Benzo[a]anthracene	M	2700	mg/kg	0.10	0.88	3.1	< 0.10	< 0.10	1.6	7.9	2.9	2.6	1.3
Chrysene	M	2700	mg/kg	0.10	1.4	3.4	< 0.10	< 0.10	1.6	8.3	2.7	2.4	0.75
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	1.5	4.7	< 0.10	< 0.10	1.5	3.9	1.3	0.73	0.78
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	0.35	1.5	< 0.10	< 0.10	0.32	2.1	0.58	0.48	0.20
Benzo[a]pyrene	M	2700	mg/kg	0.10	0.59	2.5	< 0.10	< 0.10	1.1	7.3	2.1	2.1	0.74
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10	1.6	< 0.10	< 0.10	0.57	3.7	1.3	1.3	0.53
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	0.16	0.48	< 0.10	< 0.10	< 0.10	1.4	0.44	0.46	0.14
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10	1.2	< 0.10	< 0.10	0.56	2.8	1.2	0.96	0.33
Total Of 16 PAH's	M	2700	mg/kg	2.0	11	37	2.9	< 2.0	19	69	25	28	11

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Results - Soil

Project: P17-176 - Athersley, Barnsley

Client: Rodgers Leask Environmental			**Chemtest Job No.:**	17-30488	17-30488	17-30488	17-30488	17-30488	17-30488	17-30488	17-30488	17-30488
Quotation No.: Q14-02112			**Chemtest Sample ID.:**	540345	540346	540347	540348	540349	540350	540351	540352	540353
Order No.: RLE 17-11-25			Client Sample Ref.:	TS115	TS117	TS118	TS120	TS121	TS122	TS124	TS126	TS127
			Client Sample ID.:	D1	D1	D1	D1	D1	D1	D1	D1	D1
			Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.16
			Bottom Depth (m):	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.16
			Date Sampled:	13-Nov-2017	13-Nov-2017	13-Nov-2017	13-Nov-2017	13-Nov-2017	13-Nov-2017	13-Nov-2017	13-Nov-2017	13-Nov-2017
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Moisture	N	2030	%	0.020	17	20	20	16	17	22	22	23	23
Soil Colour	N	2040		N/A	Brown,	Brown,	Brown,	Brown	Brown,	Brown,	Brown	Brown,	Brown,
Other Material	N	2040		N/A	Stones, Roots,	Stones, Roots,	Stones, Roots,	Stones, Roots,	Stones, Roots,	Stones, Roots,	Stones, Roots,	Stones, Roots,	Stones, Roots,
Soil Texture	N	2040		N/A	Loam,	Loam,	Loam,	Loam,	Clay,	Clay,	Clay,	Loam,	Loam,
Arsenic	M	2450	mg/kg	1.0	35	23	28	31	27	27	20	17	21
Lead	M	2450	mg/kg	0.50	120	70	180	59	73	130	89	55	60
Organic Matter	M	2625	%	0.40	21	13	22	53	12	12	15	8.3	8.5
Naphthalene	M	2700	mg/kg	0.10	1.3	1.2	1.5	5.4	0.77	0.26	0.22	< 0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10	0.80	0.45	0.84	2.2	0.45	0.42	0.11	< 0.10	< 0.10
Acenaphthene	M	2700	mg/kg	0.10	0.35	0.32	0.49	2.1	0.16	0.16	< 0.10	< 0.10	< 0.10
Fluorene	M	2700	mg/kg	0.10	1.3	1.2	1.8	7.8	1.1	0.30	0.11	< 0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	3.4	2.6	3.8	10	1.9	3.0	0.52	< 0.10	< 0.10
Anthracene	M	2700	mg/kg	0.10	0.76	0.42	0.46	1.8	0.89	0.48	0.10	< 0.10	< 0.10
Fluoranthene	M	2700	mg/kg	0.10	4.4	3.0	3.4	2.4	0.89	4.8	1.3	< 0.10	< 0.10
Pyrene	M	2700	mg/kg	0.10	5.0	2.9	3.4	2.6	0.93	4.4	1.4	< 0.10	< 0.10
Benzo[a]anthracene	M	2700	mg/kg	0.10	2.9	1.6	1.8	< 0.10	< 0.10	2.2	0.62	< 0.10	< 0.10
Chrysene	M	2700	mg/kg	0.10	3.3	1.3	1.6	< 0.10	< 0.10	2.2	0.53	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	1.1	< 0.10	0.26	< 0.10	< 0.10	3.1	0.99	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	0.60	< 0.10	0.29	< 0.10	< 0.10	0.97	0.17	< 0.10	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10	2.2	1.3	1.3	< 0.10	< 0.10	1.8	0.75	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	1.4	< 0.10	0.55	< 0.10	< 0.10	1.2	0.76	< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	1.1	0.13	0.81	< 0.10	< 0.10	0.93	0.56	< 0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0	30	16	22	34	7.1	26	8.1	< 2.0	< 2.0

Chemtest
The right chemistry to deliver results

Results - Soil

Project: P17-176 - Athersley, Barnsley

Client: Rodgers Leask Environmental			**Chemtest Job No.:**	17-30488	17-30488
Quotation No.: Q14-02112			**Chemtest Sample ID.:**	540354	540355
Order No.: RLE 17-11-25			Client Sample Ref.:	TS129	TS130
			Client Sample ID.:	D1	D1
			Sample Type:	SOIL	SOIL
			Top Depth (m):	0.12	0.18
			Bottom Depth (m):	0.12	0.18
			Date Sampled:	13-Nov-2017	13-Nov-2017
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Moisture	N	2030	%	0.020	19	20
Soil Colour	N	2040		N/A	Brown,	Brown
Other Material	N	2040		N/A	Stones, Roots,	Stones
Soil Texture	N	2040		N/A	Loam,	Sand
Arsenic	M	2450	mg/kg	1.0	19	16
Lead	M	2450	mg/kg	0.50	78	110
Organic Matter	M	2625	%	0.40	10	6.4
Naphthalene	M	2700	mg/kg	0.10	0.19	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10	0.14	< 0.10
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Fluorene	M	2700	mg/kg	0.10	0.14	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	0.21	< 0.10
Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Fluoranthene	M	2700	mg/kg	0.10	0.30	< 0.10
Pyrene	M	2700	mg/kg	0.10	0.27	< 0.10
Benzo[a]anthracene	M	2700	mg/kg	0.10	0.13	< 0.10
Chrysene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0	< 2.0	< 2.0

Chemtest
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Test Methods

SOP	Title	Parameters included	Method summary
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

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

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk

Appendix F: Statistical Analysis Calculation Sheets

Statistical Analysis - 1a Made Ground Topsoil north of site **Benzo[b]fluoranthene**

Results

Null Hypothesis Ho **the true mean concentration is equal to or greater than the critical concentration of a contaminant**

	Sample Size n:	11		**Settings**
	Sample Mean x:	1.104	**Critical Concentration Cc (mg/kg):**	3.7
	Sample Standard Deviation s:	1.237	**Confidence Level (decimal):**	0.95
	Normality (W):	0.820	**Lower Detection Threshold (mg/kg):**	0.1
	W_c:	0.850	**Data deviates significantly from normality on chart?:**	FALSE
	Abnormal?:	TRUE		
T test	**t_0:**			
	$t_{(n-1,0.95)}$:		(Replaces any blanks in Data with half of the detection threshold)	
	t_p:			
	(1st) P_1:		CC based on 6% SOM	
	Rejected?:			
	UCL0.95	**#VALUE!**		
Chebychev	**k_0:**	-6.960		
	k_α:	4.360		
	kcrit:	-4.360		
	reject H0?	TRUE		
	k1:	6.960		
	alpha	0.020		
	(2nd) P_1:	0.980		
	Rejected?:	TRUE		
	UCL0.95	**2.730**	No outlier	

Verdict: *Can reject Ho, no further action required*

Statistical Analysis - 1a Made Ground Topsoil north of site dibenz(a,h)anthracene

Results

Null Hypothesis Ho **the true mean concentration is equal to or greater than the critical concentration of a contaminant**

	Sample Size n:	11		**Settings**
	Sample Mean x:	0.138	**Critical Concentration Cc (mg/kg):**	0.3
	Sample Standard Deviation s:	0.096	**Confidence Level (decimal):**	0.95
	Normality (W):	0.539	**Lower Detection Threshold (mg/kg):**	0.1
	W_c:	0.850	**Data deviates significantly from normality on chart?:**	TRUE
	Abnormal?:	TRUE		
T test	**t_0:**			
	$t_{(n-1,0.95)}$:		(Replaces any blanks in Data with half of the detection threshold)	
	t_p:			
	(1st) P_1:		CC based on 6% SOM	
	Rejected?:			
	UCL0.95	**#VALUE!**		
Chebychev	**k_0:**	-5.609		
	k_α:	4.360		
	kcrit:	-4.360		
	reject H0?	TRUE		
	k1:	5.609		
	alpha	0.031		
	(2nd) P_1:	0.969		
	Rejected?:	TRUE		
	UCL0.95	**0.264**	TP08 outlier included	

Verdict: *Can reject Ho, no further action required*

Statistical Analysis - 1a Made Ground Topsoil north of site **LEAD**

Results

Null Hypothesis Ho **the true mean concentration is equal to or greater than the critical concentration of a contaminant**

	Sample Size n:	11		**Settings**
	Sample Mean x:	59.400	**Critical Concentration Cc (mg/kg):**	200
	Sample Standard Deviation s:	43.551	**Confidence Level (decimal):**	0.95
	Normality (W):	0.561	**Lower Detection Threshold (mg/kg):**	1
	W_c:	0.850	**Data deviates significantly from normality on chart?:**	TRUE
	Abnormal?:	TRUE		
T test	**t_0:**			
	$t_{(n-1,0.95)}$:		(Replaces any blanks in Data with half of the detection threshold)	
	t_p:			
	(1st) P_1:		CC based on 6% SOM	
	Rejected?:			
	UCL0.95	**#VALUE!**		
Chebychev	**k_0:**	-10.707		
	k_α:	4.360		
	kcrit:	-4.360		
	reject H0?	TRUE		
	k1:	10.707		
	alpha	0.009		
	(2nd) P_1:	0.991		
	Rejected?:	TRUE		
	UCL0.95	**116.652**	TP10 outlier excluded	

Verdict: *Can reject Ho, no further action required*

Statistical Analysis - 1b Made Ground Topsoil former track Arsenic

Results

Null Hypothesis Ho **the true mean concentration is equal to or greater than the critical concentration of a contaminant**

	Sample Size n:	7		**Settings**
	Sample Mean x:	36.286	**Critical Concentration Cc (mg/kg):**	37
	Sample Standard Deviation s:	7.387	**Confidence Level (decimal):**	0.95
	Normality (W):	0.917	**Lower Detection Threshold (mg/kg):**	0.1
	W_c:	0.803	**Data deviates significantly from normality on chart?:**	FALSE
	Abnormal?:	FALSE		
T test	**t_0:**	-0.256		
	$t_{(n-1,0.95)}$:	1.943	(Replaces any blanks in Data with half of the detection threshold)	
	t_p:	0.256		
	(1st) P_1:	0.597	CC based on 6% SOM	
	Rejected?:	FALSE		
	UCL0.95	**41.71130134**	No outliers	
Chebychev	**k_0:**			
	k_α:			
	kcrit:			
	reject H0?			
	k1:			
	alpha			
	(2nd) P_1:			
	Rejected?:			
	UCL0.95	**#VALUE!**		

Verdict: *Cannot reject H0, further investigation or remediation needed*

Statistical Analysis - 1b Made Ground Topsoil former track Benzo[a]pyrene

Results

Null Hypothesis Ho **the true mean concentration is equal to or greater than the critical concentration of a contaminant**

	Sample Size n:	7	**Settings**
	Sample Mean x:	2.091	**Critical Concentration Cc (mg/kg):** 3
	Sample Standard Deviation s:	2.515	**Confidence Level (decimal):** 0.95
	Normality (W):	0.782	**Lower Detection Threshold (mg/kg):** 0.1
	W_c:	0.803	**Data deviates significantly from normality on chart?:** TRUE
	Abnormal?:	TRUE	
T test	**t_0:**		
	$t_{(n-1,0.95)}$:		(Replaces any blanks in Data with half of the detection threshold)
	t_p:		
	(1st) P_1:		CC based on 6% SOM
	Rejected?:		
	UCL0.95	**#VALUE!**	
Chebychev	**k_0:**	-0.956	
	k_α:	4.360	
	kcrit:	-4.360	
	reject H0?	FALSE	
	k1:	0.956	
	alpha	0.564	
	(2nd) P_1:	0.436	
	Rejected?:	FALSE	
	UCL0.95	**6.236**	TS108 outlier included

Verdict: *Cannot reject H0, further investigation or remediation needed*

Statistical Analysis - 1b Made Ground Topsoil former track Benzo[b]fluoranthene

Results

Null Hypothesis Ho **the true mean concentration is equal to or greater than the critical concentration of a contaminant**

	Sample Size n:	7	**Settings**
	Sample Mean x:	1.624	**Critical Concentration Cc (mg/kg):** 3.7
	Sample Standard Deviation s:	1.887	**Confidence Level (decimal):** 0.95
	Normality (W):	0.797	**Lower Detection Threshold (mg/kg):** 0.1
	W_c:	0.803	**Data deviates significantly from normality on chart?:** FALSE
	Abnormal?:	TRUE	
T test	**t_0:**		
	$t_{(n-1,0.95)}$:		(Replaces any blanks in Data with half of the detection threshold)
	t_p:		
	(1st) P_1:		CC based on 6% SOM
	Rejected?:		
	UCL0.95	**#VALUE!**	
Chebychev	**k_0:**	-2.910	
	k_α:	4.360	
	kcrit:	-4.360	
	reject H0?	FALSE	
	k1:	2.910	
	alpha	0.106	
	(2nd) P_1:	0.894	
	Rejected?:	FALSE	
	UCL0.95	**4.734**	No outliers

Verdict: *Cannot reject H0, further investigation or remediation needed*

Statistical Analysis - 6 Natural Topsoil Arsenic

Results

Null Hypothesis Ho **the true mean concentration is equal to or greater than the critical concentration of a contaminant**

	Sample Size n:	7	**Settings**
	Sample Mean x:	19.714	**Critical Concentration Cc (mg/kg):** 37
	Sample Standard Deviation s:	5.707	**Confidence Level (decimal):** 0.95
	Normality (W):	0.750	**Lower Detection Threshold (mg/kg):** 0.1
	W_c:	0.803	**Data deviates significantly from normality on chart?:** TRUE
	Abnormal?:	TRUE	
T test	**t_0:**		
	$t_{(n-1,0.95)}$:		(Replaces any blanks in Data with half of the detection threshold)
	t_p:		
	(1st) P_1:		CC based on 6% SOM
	Rejected?:		
	UCL0.95	**#VALUE!**	
Chebychev	**k_0:**	-8.013	
	k_α:	4.360	
	kcrit:	-4.360	
	reject H0?	TRUE	
	k1:	8.013	
	alpha	0.015	
	(2nd) P_1:	0.985	
	Rejected?:	TRUE	
	UCL0.95	**29.119**	TP01 outlier excluded

Verdict: *Can reject Ho, no further action required*

Statistical Analysis - 1b Made Ground Topsoil former track Lead

Results

Null Hypothesis Ho **the true mean concentration is equal to or greater than the critical concentration of a contaminant**

	Sample Size n:	7	**Settings**
	Sample Mean x:	139.000	**Critical Concentration Cc (mg/kg):** 200
	Sample Standard Deviation s:	86.060	**Confidence Level (decimal):** 0.95
	Normality (W):	0.792	**Lower Detection Threshold (mg/kg):** 0.1
	W_c:	0.803	**Data deviates significantly from normality on chart?:** FALSE
	Abnormal?:	TRUE	
T test	**t_0:**		
	$t_{(n-1,0.95)}$:		(Replaces any blanks in Data with half of the detection threshold)
	t_p:		
	(1st) P_1:		CC based on 6% SOM
	Rejected?:		
	UCL0.95	**#VALUE!**	TP2 outlier included
Chebychev	**k_0:**	-1.875	
	k_α:	4.360	
	kcrit:	-4.360	
	reject H0?	FALSE	
	k1:	1.875	
	alpha	0.224	
	(2nd) P_1:	0.776	
	Rejected?:	FALSE	
	UCL0.95	**280.821**	

Verdict: *Cannot reject H0, further investigation or remediation needed*

Appendix G: BRE 465 (Cover Systems for Land Regeneration) Calculation Sheets

Made Ground 2 north of site (former colliery and railway)

Calculations based on mixed zone (M)	600	mm

Contaminant	Site Data				Expressed as a Factor of Target Guideline Value				Cover Thickness Required for Compliance to Specified Target Guideline Value	
	Contamination of Ground (Cg)	Contamination of Cover (Cc)	Target Guideline Value 1	Target Guideline Value 2	Soil / Target Guideline Value 1	Cover / Target Guideline Value 1	Soil / Target Guideline Value 2	Cover / Target Guideline Value 2	Target Guideline Value 1	Target Guideline Value 2
	Units		Units		Fraction				(mm)	
Arsenic	67	18.5	37	37	1.8	0.5	1.8	0.5	371	371
Ali C8-C10	92	13.5	27	27	3.4	0.5	3.4	0.5	497	497
Ali C10-C12	390	65	130	130	3.0	0.5	3.0	0.5	480	480
Ali C12-C16	1400	550	1100	1100	1.3	0.5	1.3	0.5	212	212
Aro C8-C10	36	17	34	34	1.1	0.5	1.1	0.5	63	63
Aro C10-C12	180	37	74	74	2.4	0.5	2.4	0.5	445	445
Aro C12-C16	1000	70	140	140	7.1	0.5	7.1	0.5	555	555
Aro C16-C21	840	130	260	260	3.2	0.5	3.2	0.5	490	490

Summary		
	Target Guideline Value 1	Target Guideline Value 2
Number of contaminants	8	8
Number of contaminants **with no** thickness calculation	0	0
Breakdown - Number for which no TV specfied	0	0
Breakdown - Number for which no soil specified	0	0
Breakdown - Number for which no cover specified	0	0
Breakdown - Number for which cover > TV	0	0
Number of contaminants **with** thickness calculation	8	8
Breakdown - Number for which no cover required	0	0
Breakdown - Number for which cover required	8	8

Overall thickness of cover required	**555**	**555**

Made Ground 3: former track in west of site.

Calculations based on mixed zone (M)	600	mm

Contaminant	Site Data				Expressed as a Factor of Target Guideline Value				Cover Thickness Required for Compliance to Specified Target Guideline Value	
	Contamination of Ground (Cg)	Contamination of Cover (Cc)	Target Guideline Value 1	Target Guideline Value 2	Soil / Target Guideline Value 1	Cover / Target Guideline Value 1	Soil / Target Guideline Value 2	Cover / Target Guideline Value 2	Target Guideline Value 1	Target Guideline Value 2
	Units		Units		Fraction				(mm)	
Benzo [b] fluoranthene	3.1	1.3	2.6	2.6	1.2	0.5	1.2	0.5	167	167

Summary		
	Target Guideline Value 1	Target Guideline Value 2
Number of contaminants	1	1
Number of contaminants **with no** thickness calculation	0	0
Breakdown - Number for which no TV specfied	0	0
Breakdown - Number for which no soil specified	0	0
Breakdown - Number for which no cover specified	0	0
Breakdown - Number for which cover > TV	0	0
Number of contaminants **with** thickness calculation	1	1
Breakdown - Number for which no cover required	0	0
Breakdown - Number for which cover required	1	1

Overall thickness of cover required	**167**	**167**

Made Ground 4: Central site (former colliery and railway)

Calculations based on mixed zone (M)	600	mm

Contaminant	Site Data				Expressed as a Factor of Target Guideline Value				Cover Thickness Required for Compliance to Specified Target Guideline Value	
	Contamination of Ground (Cg)	Contamination of Cover (Cc)	Target Guideline Value 1	Target Guideline Value 2	Soil / Target Guideline Value 1	Cover / Target Guideline Value 1	Soil / Target Guideline Value 2	Cover / Target Guideline Value 2	Target Guideline Value 1	Target Guideline Value 2
	Units		Units		Fraction				(mm)	
Arsenic	46	18.5	37	37	1.2	0.5	1.2	0.5	196	196
Aro C12-C16	350	70	140	140	2.5	0.5	2.5	0.5	450	450
Aro C16-C21	830	130	260	260	3.2	0.5	3.2	0.5	489	489
Napthalene	4.8	1.15	2.3	2.3	2.1	0.5	2.1	0.5	411	411

Summary		
	Target Guideline Value 1	Target Guideline Value 2
Number of contaminants	4	4
Number of contaminants **with no** thickness calculation	0	0
Breakdown - Number for which no TV specfied	0	0
Breakdown - Number for which no soil specified	0	0
Breakdown - Number for which no cover specified	0	0
Breakdown - Number for which cover > TV	0	0
Number of contaminants **with** thickness calculation	4	4
Breakdown - Number for which no cover required	0	0
Breakdown - Number for which cover required	4	4

Overall thickness of cover required	**489**	**450**