

The logo for TERRA MECH is a large, stylized, 3D-effect letter 'A' in a light green color. The word 'TERRA' is written vertically along the left side of the 'A', and the word 'MECH' is written vertically along the right side. The text is in a bold, sans-serif font.

ENVIRONMENTAL INVESTIGATION
NO 4135/19
AT
BROADOAK PLACE, UNIVERSITY OF READING
FOR
PROPOSED HOUSING DEVELOPMENT

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ENVIRONMENTAL INVESTIGATION NO 4135/19 AT BROADOAK PLACE, UNIVERSITY OF READING FOR PROPOSED HOUSING DEVELOPMENT

1 INTRODUCTION

- 1.1 This investigation was commissioned by the developers, Messrs Francis Construction Ltd, in order to provide a ground contamination assessment for the development area.
- 1.2 The Contamination Assessments have been carried out with reference to CLR 11 (Model Procedures for the Management of Land Contamination), as well as Environment Agency Guidance for the Safe Development of Housing on Land Affected by Contamination (R&D Publication 66-2008) and BS 10175 (Code of Practice for the Investigation of Potentially Contaminated Sites). This phased approach is set out below.

Previous Investigations

- 1.3 A desk study and preliminary phase 2 investigation was carried out by Enzygo Geo Environmental Ltd at this site in May 2016 which was documented in their report referenced CRM.415.001.GE. R.001.A.
- 1.4 Subsequently Ground and Water carried out further investigation and soil analysis over the site area which was documented in their report dated and referenced GWPR2462/CAR/December 2018.

2 SITE DETAILS

Site Location

- 2.1 This site lies about 2.2km south east of central Reading on the norther boundary of the Whiteknights campus of the University of Reading. The site centre is located at grid reference 473377E 172370N and post code reference RG1 5JJ.

Brief Description

- 2.2 The area under consideration is approximately 0.5ha according to the Groundsure report provided by Enzygo and is irregular in shape.
- 2.3 At the time of the investigation the site was under development with the proposed dwellings shown in the Enzygo and Ground and Water reports completely constructed and in the process of being internally fitted.
- 2.4 The ground to the south of the buildings, which will form the access pathways, was rough and chewed up by site traffic. The ground to the north of the buildings, which will become the garden areas, was being stripped. The ground immediately to the north of the buildings had been built up with clay behind timber retaining walls to create raise patio areas behind each dwelling.

Published Geology

- 2.5 Data provided by British Geological Survey ©NERC shows the site to be underlain by London Clay Formation with no superficial deposits present on the site area.
- 2.6 The mapping does however show that a capping of Boyn Hill Gravels was present to the south west and Lambeth Group deposits to the north.

3 PREVIOUS INVESTIGATION FINDINGS

- 3.1 The Enzygo investigation included some historic maps, the 1979 map showed that the site area was originally part of a woodland. The 1899 map then showed that a building had appeared on the eastern side of the site and that a row of houses was now present along Redlands Road to the north of the site.
- 3.2 No direct link to Redlands Road was shown from the site area. At the same time, formal pathways were shown on the 1899 map around the parkland to the south of the site. Field brace symbols (∫) on the map indicate that the site area was tied to Park House to the west of the site. These details suggest that the site area and the building were associated with park maintenance.
- 3.3 This history as a maintenance depot appears from Google Earth aerial pictures (not reproduced) to have endured until just before 2017 when the depot buildings were removed. By this time the depot had grown by the addition of a number of buildings to the original shown on the 1899 map, which may have been replaced previously and the obvious addition of a concrete slab over the whole site.

Soil Analysis

- 3.4 The Enzygo investigation included the recovery of samples from boreholes and hand excavated pits over the site. The analysis revealed high concentrations of Lead and tarry PAH compounds, together with Amosite and Chrysotile Asbestos fibres.
- 3.5 These contaminants were found in a layer of dark ashy made ground above the natural pale orange brown gravelly clays associated with the drift deposits above the London Clay Formation. The highest concentrations of these tars, fibres and the Lead was in the western side of the site.

- 3.6 The follow on investigation by Ground And Water Limited included the drilling of nine small diameter boreholes and excavation of 8 shallow trial pits by hand. This investigation provided further evidence of the Lead and PAH contamination in the western side of the site.
- 3.7 The Ground and Water Limited report went on to recommend the removal of soils to a depth of 0.5m around the locations of their TPF and around the Enzygo HP01 location and then for validation photographs and tests to be carried out.

Terramech Conclusions on the Investigations

- 3.8 We suspect that the site was a maintenance depot for the park and that a yard area was built up on the sloping ground by import of soils and cinders from hearths. These cinders were commonly used for dressing pathways and tracks on parkland and we would expect that a plentiful supply was available from the growing town around the park.
- 3.9 Lead can be present along with other metals in coal (usually as pyrites) and can be left behind in the ash and clinker from the fire. The low temperatures of combustion in a hearth liberate coal tars (PAH such as Anthracene) and also create tars (PAH such as Pyrene).
- 3.10 We would also note that brick fragments were found as well as asbestos fibres. This suggests that construction/demolition waste was present. Building work at the turn of the century (1899-1900) did not have the transport abilities we have now. Waste materials would therefore be burned and spread out over a site.
- 3.11 Ash was considered beneficial for plants due to the elevated Potassium (Potash) that was present. Any timber that was treated with Lead based paints would leave behind high Lead concentrations when burned.

- 3.12 Other building materials such as Lead roof flashing, Lead pipework, Lead window beads may have also been present. The fire would have served to melt the lead and distribute it throughout the ash.
- 3.13 Demolition of the maintenance buildings and the slab on which they lay has revealed the ashy remnants of the fill used to create the depot floor platform and perhaps some residues from cinders stored for parkland pathway repairs.
- 3.14 We understand that our client has picked this project up after the original contractor for the project folded up their company. At that time the buildings and groundworks for the patios had been largely completed. We do not know however, if the original contractor had carried out any of the works recommended by Ground and Water Limited.

4 GROUND INVESTIGATION

- 4.1 In order to check on the state of the site with respect to the contaminated ashy made ground layer and its removal or not, we have visited the site to inspect and collect samples of the exposed soils on the 20th April 2019. We were also asked by Francis Construction to collect and test samples of stockpiled soil from the site to define its waste acceptance criteria.

Stockpiled Soils for Removal

- 4.2 The sampling from the stockpiles was carried out using a hand trowel. One sample was taken from each of two small stockpiles (each about 30m³), whilst three samples were taken from a third larger stockpile (about 100m³).
- 4.3 These samples were taken by digging into each of the stockpiles and compositing the sample representing an average of what was present.

- 4.4 These five samples were then scheduled for Waste Acceptance Criteria tests as well as tests for total metal concentrations and Asbestos.

Inspection and Testing of the Gardens

- 4.5 We have then inspected and tested the soils in the rear garden areas. Our inspections showed that the gardens behind plots 5 to 10 had been excavated down to natural undisturbed orange brown occasionally gravelly clays. The presence of a new sewer access in the garden showed that the ground level was some 0.5m below the expected finished ground level.
- 4.6 Although a similar amount of soil had been removed from the garden behind plots 1–4, we could see that a layer of dark ashy made ground still remained amongst patches of newer fill materials and pale orange brown gravelly clay.
- 4.7 We have begun assessment by testing the dark ashy made ground with an insitu metals analyser (XRF). This analyser gives results within a minute and comparison of laboratory and XRF results for this site and previous sites shows an almost 1 to 1 relationship. We have then gone on to XRF test the soils in the plot 5 to 10 gardens. Samples were then taken from these gardens to confirm the XRF results and to consider the PAH compounds and asbestos detected previously.

Notes on X-Ray Fluorescence Analysis (XRF)

- 4.8 We have used the XRF at this site over the garden areas as discussed above. We have also used the analyser to test samples that are to be sent for laboratory analysis. A number of exposures or readings were taken in each sample to give an average which can be compared with the laboratory results.

- 4.9 The X-Ray Fluorescence Analyser (XRF) exposes insitu soil or samples to a primary X-Ray beam which induces elements to emit or fluoresce an X-Ray in response. Each element fluoresces at a particular point on the detectable X-Ray energy spectrum. From the peaks in the spectrum, the analyser calculates the concentrations of the detectable metal elements that are present.
- 4.10 The primary X-Ray beam is very narrow and a number of exposures at any one location can rapidly show if metal contaminants are homogenous throughout the soil mass or present in isolated grains or flakes.
- 4.11 The results are expressed as the analyser sees them, in a wet state. The wet weight concentrations are then corrected for the moisture on the basis of an assumed or measured moisture content for the soil.
- 4.12 The assessment parameters and criteria for the results of the laboratory analysis and the XRF analysis are discussed in separate sections.

Sampling

- 4.13 The samples were recovered for contamination analysis in accordance with BS10175 (2011). The samples were placed in laboratory supplied containers including amber glass jars with hydrocarbon resistant seals and plastic waterproof pots.
- 4.14 The samples were then placed in plastic cool boxes with frozen ice packs to be transported to a fridge at our laboratory for storage before being couriered to an MCERTS accredited laboratory for analysis

5 CONTAMINATION RISK ASSESSMENT (QUANTITATIVE)

Soil Contaminants of Concern

- 5.1 The potential contaminants identified for each potential contamination source are assembled from the conceptual models in the Enzygo report, as well as the Ground and Water report. Soil samples recovered from the site were tested for these contaminants.

Soils Assessment Criteria

- 5.2 For the assessment of the risk posed to human health, the measured soil concentrations for particular contaminants are compared to acceptable limits set out in two main guidance reports. Both give values derived using the Environment Agency CLEA model.
- 5.3 Our assessments are based on a hierarchy of CLEA model derived values where the Environment Agency Soils Guideline Values (SGVs - 2008) and Suitable For Use Values (S4UL - 2015) from the Chartered Institute of Environmental Health are most preferred, followed by values derived by Terramech using the CLEA model.
- 5.4 We have included an assessment value for Lead derived in the DEFRA SP1010 report using the CLEA model and the original minimal or tolerable levels of risk methodology used for SGVs and S4ULs. These guideline values are appended.

Asbestos

- 5.5 We have used CIRIA C733 (Asbestos In Soil And Made Ground) methodology to derive guideline values for three main types of asbestos in a number of exposure scenarios based on the minimal or tolerable levels risk level of 1 in 100,000 used to derive HCVs for other contaminants.

Exposure Scenario

5.6 The generic exposure scenario for residential land use, where occupants are not expected to grow and consume fruits and vegetables on the site, has been selected for the assessment of soil contamination concentrations.

5.7 The generic guideline values and an explanation of their application are appended .

Assessment of the Measured Concentrations in Soil

5.8 The measured concentrations of contaminants in the samples recovered from this site and concentrations measured by insitu XRF (X-Ray Fluorescence) analysis, were compared with the assessment criteria described above as follows. The laboratory and XRF result sheets are appended.

Metal Compounds

5.9 Analysis showed that concentrations of metals detected insitu and in the samples were generally seen to be low and none of the measured concentrations exceeded the respective guideline values with the exception of Lead.

5.10 The trace concentrations of the other metals detected were entirely consistent with naturally occurring metals. Iron is the most common and gives some clays and silts their orange brown colour, other metals are present as a result of the origin of the Iron and it is rare for any Iron present to be pure and not contain traces of Arsenic, Nickel, Copper, Tin and Zinc among others.

5.11 The Lead concentrations were tested with the XRF analyser in a line of 20 points across the whole garden area (plots 1 to 10) initially concentrating on the plot 1 and 2 garden. The results are appended and referenced *Exposure Nos. 1 to 20*.

- 5.12 This confirmed that the dark ashy soil in the garden to plots 1 to 4 contained the highest concentrations of Lead. The highest value measured was 2542mg/kg however, as we stepped eastward over the boundary between plot 4 and plot 5 (exposures 13 and 14) the Lead concentrations fell significantly.
- 5.13 On that basis Francis Construction have carried out further excavations in that garden to remove the rest of the dark ashy soil. We have then returned to the site on the 18th April 2019 to re test the newly exposed soils in the plot 1-4 garden. Again, samples were recovered to confirm the XRF results and also to check for PAH and Asbestos.
- 5.14 The ground in the garden area to plots 1 to 4 was now at a level of about 0.7m below finished ground level. XRF exposures (referenced exposure Nos 103 to 119) now showed that although high Lead concentrations still remained in the plot 1 garden, the concentration had fallen from an average of 1196mg/kg to 667mg/kg. The average Lead concentration for the plot 2 garden was now 346mg/kg, the Plot 3 Lead average was 119mg/kg and for the plot 4 garden, the average was 130.8mg/kg.
- 5.15 Pathways for Lead into the human body are limited to absorption by the gut after direct soil ingestion or the consumption of plants which have taken up Lead. Green vegetables and tuber vegetables have the most significant Lead uptake compared with root vegetables and fruit. Dermal absorption is insignificant as a pathway, as are the dust inhalation pathways. On this basis the guideline for Lead in soils from gardens where no cultivation of food is to take place is 310mg/kg.
- 5.16 On this basis we can see that the concentrations of Lead in the plot 1 garden were still above the guideline value for gardens where plants are not grown for consumption by the occupants.

Lead Analysis Laboratory / XRF Comparison		
Sample Ref JE 19/4611	Lab mg/kg	XRF mg/kg (average)
Plot 1-4 TP1@ 0.6m	315	377.28
Plot 1-4 TP2 @0.6m	549	775.6
Plot 5-10 TP3 @ 0.6m	146	171
Plot 5-10 TP4 @ 0.6m	149	206.4
Plot 1-4 S1 @ 0.7m	178	211.2
Plot 1-4 S2 @ 0.7m	86	73.4
Stockpile 1	206	195
Stockpile 2 - S1	177	303.2
Stockpile 2 – S2	126	132.8
Stockpile 2 – S3	232	221.6
Stockpile 3	52	226.4

5.17 The comparison between laboratory measured values and the values from the XRF analyser are presented in the table above. Given the variability in the dark ashy soil in terms of the brick fragments and the more sandy ash, we can see that there is a good correlation.

Hydrocarbon Totals

5.18 The samples were analysed using a basic total hydrocarbons test which gives the concentrations in the C10 to C40 range over a range of carbon chain length bands (Texas Bands). This test does not differentiate between Aliphatic Hydrocarbons (open chain molecule: $\text{H}-\text{C}-\text{C}-\text{C}-\text{C}-\text{C}-\text{C}-\text{C}-\text{C}-\text{C}-\text{C}-\text{H}$) and Aromatic Hydrocarbons (ringed molecules .

5.19 The analysis showed that there were elevated concentrations in the C21 to C35 band, the highest value was 129mg/kg in sample *Plot 5-10 TP3*. Analysis of samples after excavation of the plot 1 to 4 gardens showed that the highest measured hydrocarbons concentration was now 11mg/kg (sample ref *plot 1-4 S2*). These values did not exceed either limits for Aliphatic or Aromatic Hydrocarbons and is therefore expected to pose a minimal or tolerable level of risk to this development.

5.20 **Note 1** - The hydrocarbon concentrations detected in any one band will comprise both Aliphatic and Aromatic Hydrocarbons and the guideline values for hydrocarbons are given individually for Aliphatic and Aromatic Hydrocarbon bands. Where the measured total concentration does not exceed the guideline values for either Aliphatic or Aromatic Hydrocarbons, it is not possible for the guideline values to have been exceeded.

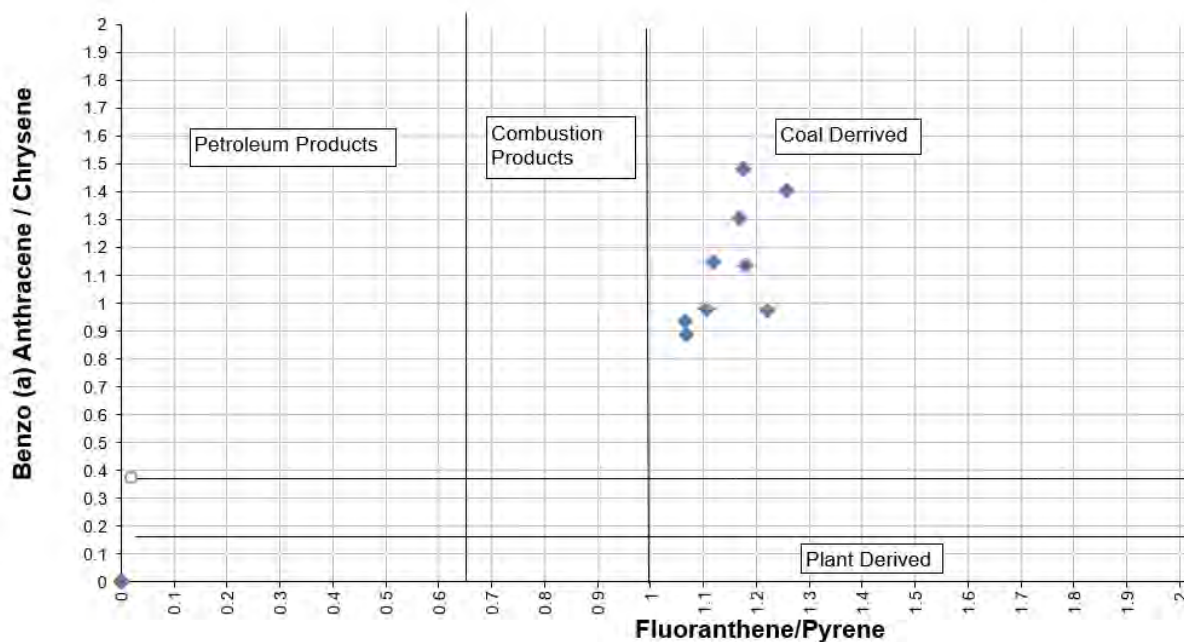
5.21 **Note 2** - If the un-differentiated concentrations exceed the guideline values for either Aliphatic or Aromatic Hydrocarbons, then the results could not be compared with the CIEH/LQM derived S4UL values and it would be necessary to carry out more detailed analysis which differentiates between Aliphatic Hydrocarbons and Aromatic Hydrocarbons.

Poly-cyclic Aromatic Hydrocarbons

5.22 Poly-cyclic Aromatic Hydrocarbons (PAH) are present in coal tars, combustion by-products and fuels and they are one of the most common forms of soil contamination, often as a legacy of the UK's industrial past.

5.23 These tarry hydrocarbons are made up of long chains of hydrogen and carbon atoms, which unlike the open ended chains seen in the Aliphatic group, have linked to form rings (). There are many different configurations of these rings resulting in a vast number of different compounds. We have focused our attention on a group of sixteen of these hydrocarbon compounds which were identified by the United States Environmental Protection Agency as being the most common and/or the most toxic.

5.24 This showed that although present, none of the sixteen were present at concentrations exceeding their respective individual guideline values before the second round of excavations. Samples taken after these excavations showed even lower values which pose an absolutely minimal or tolerable level of risk to this development.



Above a plot of the ratios of Benzo Anthracene / Chrysene vs the ratio of Fluoranthene / Pyrene

- 5.25 In order to identify the source of these hydrocarbons (i.e. petroleum products combustion by-products, plant derived or coal derived) we have looked at the proportions of particular individuals (by plotting concentration ratios – see plot above).
- 5.26 This shows that the PAH compounds correspond with coal, coal tar and creosote. Coal tars/pitch and creosote may well have been used over the park area for preserving fence posts and other exterior timber and would be a residue in any bonfire areas where such items were burned.

Hydrocarbons (Phenols)

- 5.27 Phenols (total Monohydric Phenols includes Cresols or Methylphenol and Chlorinated Phenols) were below detection limits in all samples from both rounds of sampling and therefore the concentrations did not exceed the guideline value for Phenol published in the new Soil Guideline Value (SGV) report.

Cyanide Compounds

- 5.28 Cyanide is a common industrial contaminant and can be used in the case hardening of steel, or it can be present as a combustion by product. Older industries such as town gas works produced Cyanide based waste called Blue Billy (Ferric Cyanide). Cyanides can also be present as a result of plants such as Laurel (in the berries) as well as other plant roots seeds and berries.
- 5.29 The analysis from both rounds of sampling did not detect any Cyanide Compounds. The testing was for total Cyanides which can include Thiocyanates, one of the most complex form of Cyanide formed by metabolism by plants and animals, Cyanide Salts which involve metals such as Iron (which forms Blue Billy), and free Cyanide which is the most toxic.

Asbestos

- 5.30 Asbestos screening was carried out on the samples, this showed that a trace of Chrysotile asbestos was found in both the samples from the plot 1-4 gardens. None were found in the samples from the plot 5-10 gardens. Following further excavation in the plot 1-4 gardens the new samples showed no traces of asbestos fibres.
- 5.31 We would note that the asbestos contaminated soil that was found during previous investigations of the site had been successfully removed, given its presence in the main stockpile of soil for removal and absence in the gardens.

Waste Acceptance Criteria

- 5.32 Assessment of soils destined for landfills takes two stages. The first is basic site characterisation, the second stage is compliance testing to assess the behaviour of these materials when they are buried.

- 5.33 Waste Acceptance Criteria (WAC) compliance testing involves a series of leachate or solubility tests for metalloid compounds and total concentrations of hydrocarbon based compounds as well as organic matter content. The leachate and total concentrations were then compared to values set out in BS EN 12457-3.
- 5.34 The purpose of these tests is to assess the risk posed by the material when placed in a landfill. These risks range from the leaching of soluble contaminants out of the material and into groundwater or water courses, to the risk posed by matter which could decay and generate gases such as Methane, Hydrogen Sulphide or Carbon Dioxide.
- 5.35 Soil removed from the garden areas behind all of the plots (1 to 10) had been heaped in three separate stockpiles. Samples were taken from each of these stockpiles. Each sample comprised a mixture of materials from the stockpile.
- 5.36 Stockpile 2 was the largest (approx. 90m³) and 3 samples were taken. Stockpiles 1 and 3 were much smaller so one sample was taken from each. The stockpile locations are shown on the appended plans.

Stockpile 1

- 5.37 The results show a marginally elevated concentration of Lead (only slightly over the 200mg/kg limit for gardens but WAC tests showed the Lead to be insoluble) with everything else within limits. Asbestos was not detected. This stockpile should therefore be classified as uncontaminated.
- 5.38 The WAC tests show that this stockpile should be classified as inert waste.

Stockpile 2

- 5.39 The results show a marginally elevated concentration of Lead and concentrations of Amosite and Chrysotile asbestos. Given the elevated Lead and presence of Amosite, this soil cannot be used in any residential setting and the stockpile should be classified as contaminated.
- 5.40 Asbestos was detected in two of the three samples. In both instances the concentration was below the 0.1% threshold for inert waste.
- 5.41 The 3 WAC tests showed that most of the determinants were within limits for inert waste apart from elevated sulphates in one of the three samples (Stockpile 2 - S1) . This is probably some plasterboard residue.
- 5.42 In isolation this sulphate value classifies the stockpile as 'Stable non-reactive waste in a non-hazardous landfill' however, once the material is mixed on removal, the overall proportion of sulphates will be lower. On this basis we consider that this stockpile should be classified as inert waste

Stockpile 3

- 5.43 The results show an elevated concentration (0.47mg/kg) of a PAH compound called Dibenzo Anthracene (over the 0.24mg/kg limit for gardens) with everything else within limits. Asbestos was not detected.
- 5.44 Given that the ratios of the concentrations of the other PAH compounds suggests that they are all coal derived, we consider that these compounds are not bio-accessible. This soil should therefore be classified as uncontaminated.
- 5.45 The WAC tests show that this soil should be classified as inert waste.

Summary of Laboratory Analysis

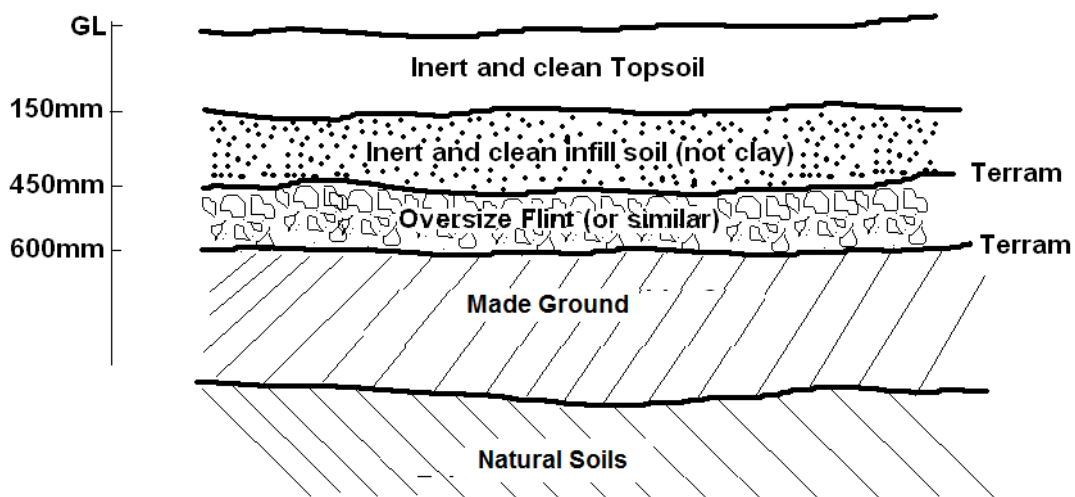
- 5.46 The results showed that elevated concentrations of Lead, PAH and Asbestos were found insitu and in samples from the base of the excavations in the gardens behind plots 1 to 4. After removal of another layer of soil we have returned and seen that the ashy material had been removed.
- 5.47 Analysis of the new layer of exposed soils showed that some Lead contamination remained in the garden to plot 1. The Lead concentrations in the remaining plots were at or very close to acceptable limits. Elevated concentrations of the tarry PAH compounds found previously (Benzo Pyrene, Benzo Fluoranthene and Dibenzo Anthracene) and the Asbestos that was found previously, were not detected.

6 RECOMMENDATIONS

- 6.1 The Laboratory results show that the elevated concentrations of PAH compounds and Asbestos were no longer present.
- 6.2 The laboratory and XRF analysis did however show that residues of the elevated Lead concentrations remain in the garden to plot 1. Lead concentrations were within acceptable limits for the gardens to plots 2 to 10. We suspect that entirely clean natural soils are present just below these remnants of the contaminated layer.
- 6.3 Given that this soil surface is now about 0.7m below finished ground level and given that it is now a very thin residue layer, we consider that once 0.7m of material is placed above to form the final garden level, the residue layer will be satisfactorily capped.

Capping Layer

- 6.4 The infilled excavation should first be covered by a break layer (described below) above the residues of the made ground. Where bare natural clay is present, there is no need to include the break layer.
- 6.5 The break layer comprises granular material which serves as an anti-capillarity barrier that prevents the slow rise of dissolved contaminants and also stops new occupants from easily digging down into the made ground or the contamination plume.



- 6.6 The granular break layer should be sandwiched by a woven geotextile, top and bottom. The granular material would be oversize flint or a similar non porous stone. Crushed brick and concrete will not be suitable.
- 6.7 The granular layer would then be covered by suitable clean inert soils. This layer should not be clay due to potential waterlogging however, the materials should be able to retain some moisture for any plants or shrubs planted in the garden. The last 150mm should be a clean uncontaminated topsoil which also complies with the multipurpose topsoil specification in BS3882.

Imported Soil

- 6.8 Materials imported to the site to form piling mats, sub-bases to roadways or topsoils for gardens should be certified free of any contamination, in particular the topsoils. In some cases Local Authorities insist on imported soils being tested insitu rather than trusting analysis carried out by the soil supplier.
- 6.9 If analysis of imported soil is required, we would recommend that the soil is kept in a stockpile until the results of the analysis are available. If the soil is of unacceptable quality, it can then easily be removed.

7 NOTES

- 7.1 The comments given in the report and the opinion expressed herein are based on the information provided by the client and other published information. Third party information was therefore used in the preparation of this report and Terramech Investigations Ltd. cannot guarantee the accuracy or completeness of this information.
- 7.2 There may be other sources of information not included in those listed that hold data relevant to the Desk Study undertaken at the site that could materially affect the conclusions made in this report. The interpretation of the maps and/or other data commented on in this report is subjective.
- 7.3 The investigation report and the opinion expressed therein are also based on the ground conditions encountered during the site work and on the results of tests made in the field and laboratory. However, there may be special conditions prevailing at the site which have not, or could not be disclosed by the investigations and have not therefore been taken into account in this report.

7.4 The conclusions in this report represent our professional opinion, these conclusions have been drawn up with the greatest care to ensure that all apparent issues were addressed properly in accordance with applicable UK guidance and accepted practice.

Written by:



J.R. Puzyna BEng (Hons) MCIEH
Terramech Investigations Ltd

Checked by:



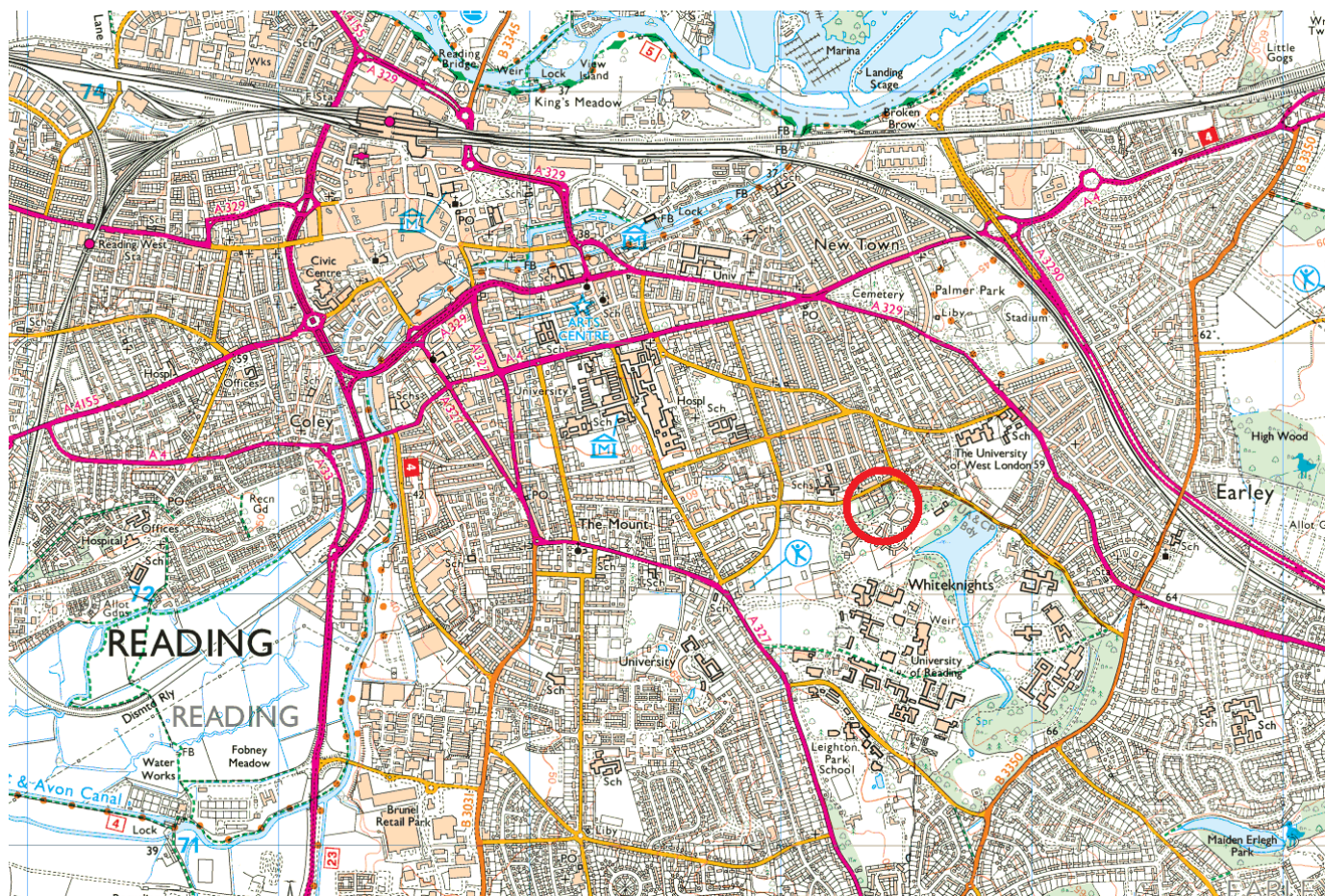
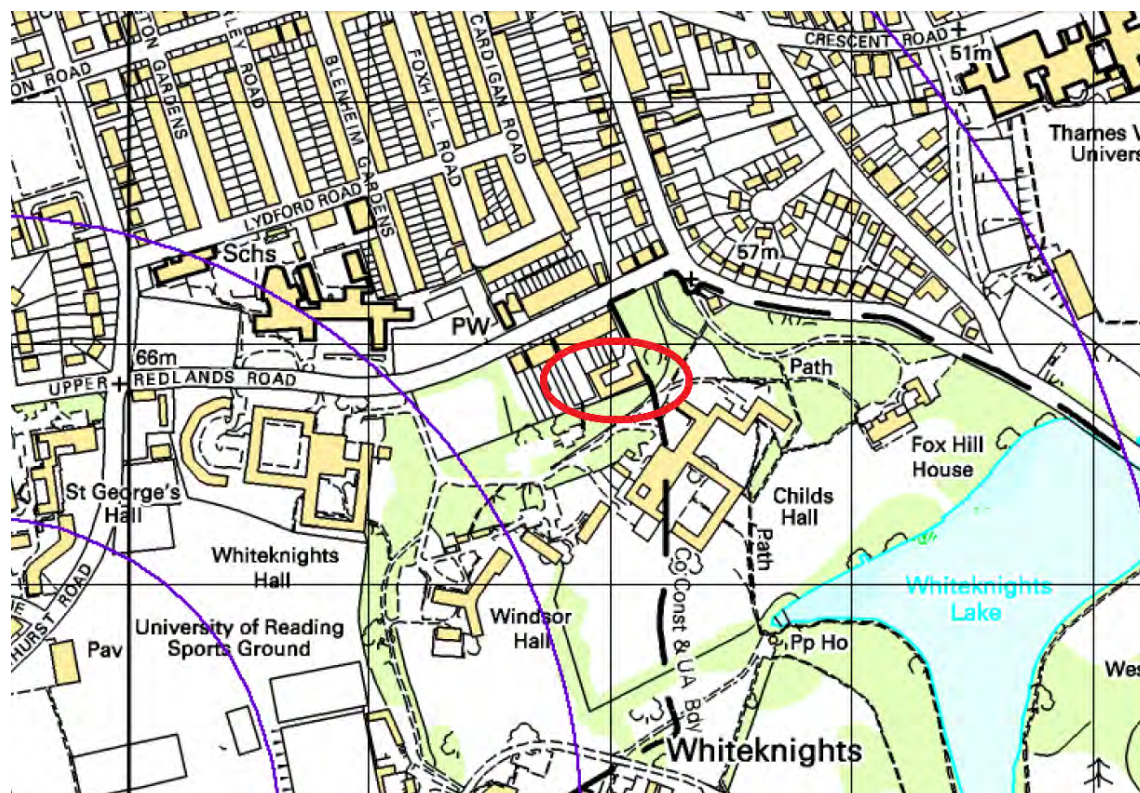
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JRP/JGM

13 May, 2019

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FIGURES



DATE: 09.05.19



Above, the plot 1-4 garden area excavated to about 0.6m below finished ground level

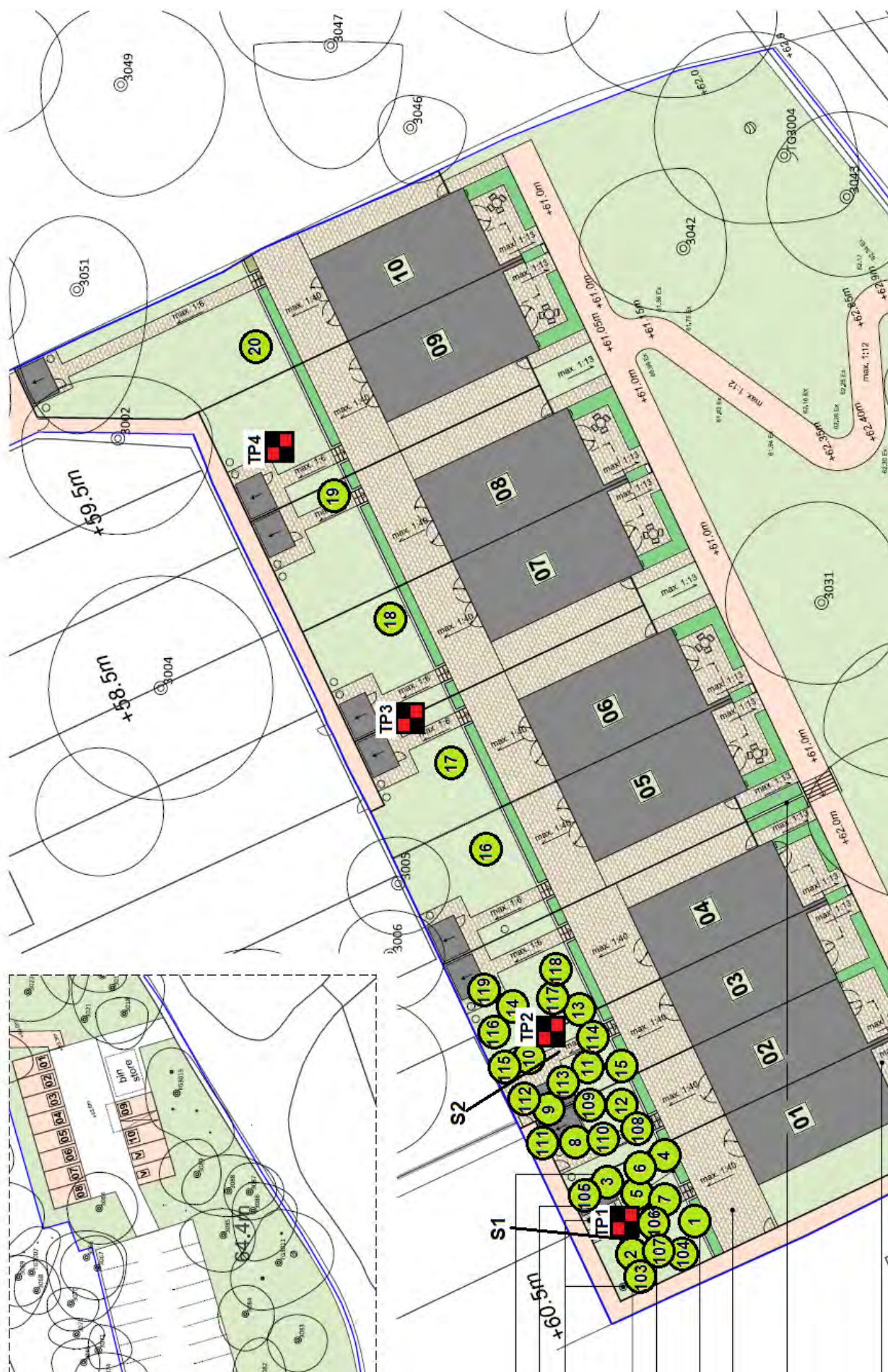


Above, XRF analyser set up and testing the dark brown ashy topsoil layer.



Above and below, the plots 1-4 garden area after additional excavation and placement of part of the break layer specified in the report.





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APPENDIX A

CONTAMINATION ANALYSIS (Plot 1-10, XRF Exposures 1 to 20)



Results of X-Ray Fluorescence Analysis (XRF)

Sackedgate Ltd. Reg 09712671, 26 Reading Road, Burghfield Common, Berkshire RG7 3QA - T- 01189 832 570 M-07555 106 620

Instrument Type	Olympus Vanta C	Site Ref	4135
Instrument Serial No.	800722	Location	Broad Oak Place, University of Reading
Units	ppm	Client	Terramech

Exposure No.	1	2	3	4	5	6	7	8	9	10
Locn	0	0	0	0	0	0	0	0	0	0

Lat	0	51.4454002	51.4455986	51.4455986	51.4454994	51.4454994	51.4454994	51.4455986	51.4455986	51.4454994
Long	0	-0.945799	-0.945785	-0.945783	-0.945783	-0.945798	-0.945841	-0.945698	-0.945712	-0.945711
date	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019

m/c (%)	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%
Measured/ Assumed	A	A	A	A	A	A	A	A	A	A

Antimony	0	0	0	0	0	0	0	0	0	0
LOD	25	21	28	28	32	42	25	30	34	29
Arsenic	19.2	10.8	13.2	26.4	32.4	50.4	22.8	14.4	18	12
LOD	16	9	11	22	27	42	19	12	15	10
Cadmium	0	0	0	0	0	0	0	0	0	0
LOD	13	11	15	15	17	22	13	15	18	15
Chromium	87.6	80.4	34.8	90	43.2	56.4	30	37.2	42	34.8
LOD	18	16	29	21	36	47	25	31	35	29
Cobalt	0	0	0	0	0	0	0	0	0	0
LOD	47	44	52	72	70	71	46	57	59	53
Copper	66	56.4	52.8	90	72	67.2	42	43.2	42	46.8
LOD	4	4	4	6	6	7	4	4	5	4
Iron	25762.8	28712.4	25569.6	43464	34258.8	24210	24860.4	28989.6	25178.4	25971.6
LOD	128	122	139	228	209	200	125	158	157	142
Lead	890.4	343.2	302.4	1426.8	1608	2542.8	1262.4	368.4	459.6	254.4
LOD	8	4	5	13	15	25	10	6	7	5
Mercury	0	0	0	0	0	0	0	0	0	0
LOD	7	5	7	8	9	13	7	7	8	7
Molybdenum	0	0	0	0	0	0	0	0	0	0
LOD	3	3	3	3	4	5	3	3	4	3
Nickel	30	31.2	27.6	48	34.8	15.6	36	22.8	34.8	28.8
LOD	5	4	5	6	7	13	5	5	6	5
Selenium	2.4	1.2	1.2	2.4	2.4	3.6	2.4	2.4	2.4	1.2
LOD	2	1	1	2	2	3	2	2	2	1
Titanium	3645.6	4616.4	3562.8	3824.4	3264	3656.4	3586.8	3460.8	5454	3664.8
LOD	116	111	124	133	140	188	112	128	170	129
Tin	0	0	0	0	0	0	0	0	0	0
LOD	20	17	23	22	26	34	20	24	28	23
Vanadium	67.2	66	66	82.8	86.4	134.4	24	96	34.8	27.6
LOD	14	13	16	17	18	25	20	17	29	23
Zinc	380.4	226.8	195.6	625.2	526.8	644.4	370.8	248.4	261.6	169.2
LOD	6	4	5	10	9	13	6	6	7	5

Sulphur	1158	1063.2	754.8	1474.8	1677.6	1476	942	1208.4	703.2	673.2
LOD	50	39	55	63	77	113	46	60	73	58
Light El	816499.2	770659.2	835790.4	826334.4	848384.4	792882	853497.6	812659.2	762004.8	799096.8
LOD	1564	1479	1725	1883	2055	2711	1514	1777	2049	1748

Results Checked & Issued For and on Behalf of Sackedgate Ltd

Julian Puzyna

Julian Puzyna BEng Hons MCIEH

1) X-Ray Fluorescence analysis is carried out in situ or from sample containers. Soil is not homogeneous and the concentrations of contaminants vary throughout the soil mass. Large variations are sometimes found at locations just millimetres from each other. This analysis considers a small scan area which may not represent the variability that is more widely present. Where possible a number of tests are carried out to assess the variability within each sample or at each point location tested. 2) The analyser measures concentrations as it sees them in the soil, in its wet state. The results above are corrected for moisture content and are presented on a 'dry weight' basis calculated from a measured or an assumed moisture content. 3) Most elements (eg Lead) give a fairly constant fluorescent response for different compounds of that element. A small number of elements however, give different responses depending on the actual compound that is present. The analyser always shows the worst case concentration and sometimes greatly overestimates the concentrations of those elements.



Results of X-Ray Fluorescence Analysis (XRF)

Sackedgate Ltd. Reg 09712671, 26 Reading Road, Burghfield Common, Berkshire RG7 3QA - T- 01189 832 570 M-07555 106 620

Instrument Type	Olympus Vanta C	Site Ref	4135
Instrument Serial No.	800722	Location	Broad Oak Place, University of Reading
Units	ppm	Client	Terramech

Exposure No.	11	12	13	14	15	16	17	18	19	20
Locn	0	0	0	0	0	0	0	0	0	0

Lat	51.4454994	51.4455986	51.4455986	51.4454994	51.4454994	51.4455986	51.4457016	51.4457016	51.4457016	51.4458008
Long	-0.945726	-0.945669	-0.945712	-0.945768	-0.945768	-0.94541	-0.945441	-0.945309	-0.945267	-0.945153
date	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019

m/c (%)	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%
Measured/ Assumed	A	A	A	A	A	A	A	A	A	A

Antimony	0	0	0	232.8	0	0	0	0	0	0
LOD	27	28	30	24	30	25	25	26	21	24
Arsenic	9.6	20.4	25.2	10.8	8.4	9.6	8.4	10.8	8.4	9.6
LOD	8	17	21	9	7	8	7	9	7	8
Cadmium	0	0	0	0	0	0	0	0	0	0
LOD	14	15	15	13	15	13	13	13	11	12
Chromium	33.6	36	38.4	79.2	33.6	79.2	75.6	62.4	75.6	31.2
LOD	28	30	32	19	28	18	18	17	15	26
Cobalt	0	0	0	0	0	0	0	0	0	0
LOD	53	57	58	68	48	55	57	60	52	51
Copper	30	61.2	57.6	34.8	24	20.4	34.8	28.8	25.2	26.4
LOD	4	5	5	4	4	4	4	4	3	3
Iron	28482	29434.8	28614	48069.6	21969.6	31968	35938.8	36826.8	38745.6	32504.4
LOD	141	157	160	211	121	156	167	179	152	149
Lead	166.8	836.4	1102.8	226.8	97.2	180	141.6	262.8	194.4	205.2
LOD	4	9	11	4	3	4	3	5	3	4
Mercury	0	0	0	0	0	0	0	0	0	0
LOD	6	7	8	6	6	5	6	6	5	5
Molybdenum	0	0	0	0	0	0	0	0	0	0
LOD	3	3	4	3	3	3	3	3	2	3
Nickel	19.2	33.6	31.2	27.6	9.6	32.4	25.2	27.6	34.8	33.6
LOD	5	5	6	5	8	5	5	5	4	5
Selenium	1.2	2.4	2.4	1.2	1.2	1.2	1.2	1.2	1.2	1.2
LOD	1	2	2	1	1	1	1	1	1	1
Titanium	3998.4	3074.4	4471.2	4910.4	3704.4	3807.6	4034.4	3684	4288.8	4221.6
LOD	126	120	143	130	129	116	119	114	105	114
Tin	0	0	0	232.8	0	0	0	0	0	0
LOD	22	23	24	12	24	20	20	20	17	19
Vanadium	27.6	62.4	78	61.2	27.6	26.4	26.4	67.2	54	50.4
LOD	23	15	18	15	23	22	22	14	12	13
Zinc	157.2	368.4	366	183.6	80.4	183.6	177.6	196.8	205.2	184.8
LOD	4	7	7	5	3	4	4	5	4	4

Sulphur	807.6	1305.6	1218	936	5688	571.2	715.2	680.4	1191.6	558
LOD	53	59	64	48	77	45	45	46	37	40
Light El	756648	838158	792720	760986	739563.6	856486.8	810408	891452.4	792082.8	845674.8
LOD	1682	1713	1861	1730	1711	1613	1649	1589	1450	1542

Results Checked & Issued For and on Behalf of Sackedgate Ltd

Julian Puzyna

Julian Puzyna BEng Hons MCIEH

1) X-Ray Fluorescence analysis is carried out in situ or from sample containers. Soil is not homogeneous and the concentrations of contaminants vary throughout the soil mass. Large variations are sometimes found at locations just millimetres from each other. This analysis considers a small scan area which may not represent the variability that is more widely present. Where possible a number of tests are carried out to assess the variability within each sample or at each point location tested. 2) The analyser measures concentrations as it sees them in the soil, in its wet state. The results above are corrected for moisture content and are presented on a 'dry weight' basis calculated from a measured or an assumed moisture content. 3) Most elements (eg Lead) give a fairly constant fluorescent response for different compounds of that element. A small number of elements however, give different responses depending on the actual compound that is present. The analyser always shows the worst case concentration and sometimes greatly overestimates the concentrations of those elements.

**ENVIRONMENTAL INVESTIGATION
NO 4135/19
AT
BROADOAK PLACE, UNIVERSITY OF READING
FOR
PROPOSED HOUSING DEVELOPMENT**

APPENDIX B

CONTAMINATION ANALYSIS (Plots 1 to 10, Laboratory TP1 to TP4 & stockpiles WAC)



Exova Jones Environmental

Registered Office: Exova Environmental UK Limited, 10 Lower Grosvenor Place, London, SW1W 0EN. Reg No. 11371415

Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

Terramech Investigations Ltd
183 Long Lane
Tilehurst
Reading
Berkshire
RG31 6YW

Tel: +44 (0) 1244 833780

Fax: +44 (0) 1244 833781



Attention :	Julian Puzyna
Date :	27th March, 2019
Your reference :	4135
Our reference :	Test Report 19/4611 Batch 1
Location :	Broad oak Place, University Of Reading
Date samples received :	21st March, 2019
Status :	Final report
Issue :	1

Nine samples were received for analysis on 21st March, 2019 of which nine were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

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

Compiled By:

Bruce Leslie
Project Co-ordinator

Please see attached notes for all abbreviations and acronyms

Client Name: Terramech Investigations Ltd
Reference: 4135
Location: Broadoak Place, University Of Reading
Contact: Julian Puzyna
JE Job No.: 19/4611

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1	2	3	4	5-7	8-10	11-13	14-16	17-19		Please see attached notes for all abbreviations and acronyms		
Sample ID	PLOT 1-4 - TP1	PLOT 1-4 - TP2	PLOT 5-10 - TP3	PLOT 5-10 - TP4	STOCKPILE 1	STOCKPILE 2 S1	STOCKPILE 2 S2	STOCKPILE 2 S3	STOCKPILE 3				
Depth	0.60	0.60	0.60	0.60									
COC No / misc													
Containers	J	J	J	J	V J T	V J T	V J T	V J T	V J T				
Sample Date	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019				
Sample Type	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay				
Batch Number	1	1	1	1	1	1	1	1	1				
Date of Receipt	21/03/2019	21/03/2019	21/03/2019	21/03/2019	21/03/2019	21/03/2019	21/03/2019	21/03/2019	21/03/2019		LOD/LOR	Units	Method No.
PAH MS													
Naphthalene ^{#M}	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.07		<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.11	0.08	0.04	0.09	<0.03	0.18	0.14	0.15	0.29		<0.03	mg/kg	TM4/PM8
Acenaphthene ^{#M}	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.10		<0.05	mg/kg	TM4/PM8
Fluorene ^{#M}	<0.04	<0.04	<0.04	<0.04	<0.04	0.07	0.07	0.07	0.13		<0.04	mg/kg	TM4/PM8
Phenanthrene ^{#M}	0.31	0.31	0.57	0.46	0.21	0.75	0.73	0.75	1.47		<0.03	mg/kg	TM4/PM8
Anthracene [#]	0.12	0.07	0.26	0.21	0.06	0.36	0.31	0.28	0.70		<0.04	mg/kg	TM4/PM8
Fluoranthene ^{#M}	1.15	0.64	1.31	0.93	0.38	1.95	2.54	1.41	3.71		<0.03	mg/kg	TM4/PM8
Pyrene [#]	1.08	0.60	1.11	0.84	0.34	1.67	2.02	1.20	3.04		<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene [#]	0.72	0.32	0.67	0.47	0.23	1.24	1.60	0.86	1.87		<0.06	mg/kg	TM4/PM8
Chrysene ^{#M}	0.77	0.36	0.59	0.48	0.20	0.95	1.14	0.58	1.92		<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene ^{#M}	1.53	0.63	0.98	0.84	0.37	2.30	2.46	1.38	4.19		<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene [#]	0.80	0.31	0.55	0.48	0.20	1.15	1.33	0.72	2.19		<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene ^{#M}	0.60	0.23	0.31	0.31	0.13	0.84	0.72	0.49	1.51		<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene [#]	0.11	0.06	0.08	0.06	<0.04	0.30	0.26	0.17	0.47		<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene [#]	0.57	0.23	0.27	0.30	0.11	0.81	0.62	0.48	1.41		<0.04	mg/kg	TM4/PM8
Coronene	-	-	-	-	<0.04	0.17	0.14	0.12	0.22		<0.04	mg/kg	TM4/PM8
PAH 16 Total	7.9	3.8	6.7	5.5	-	-	-	-	-		<0.6	mg/kg	TM4/PM8
PAH 17 Total	-	-	-	-	2.23	12.74	14.08	8.66	23.29		<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	1.10	0.45	0.71	0.60	0.27	1.66	1.77	0.99	3.02		<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.43	0.18	0.27	0.24	0.10	0.64	0.69	0.39	1.17		<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	92	93	94	93	93	94	93	89	91		<0	%	TM4/PM8
EPH >C8-C10 ^{#M}	<5	<5	<5	<5	-	-	-	-	-		<5	mg/kg	TM5/PM8
EPH >C10-C12 ^{#M}	<10	<10	<10	<10	-	-	-	-	-		<10	mg/kg	TM5/PM8
EPH >C12-C16 ^{#M}	<10	<10	<10	<10	-	-	-	-	-		<10	mg/kg	TM5/PM8
EPH >C16-C21 ^{#M}	<10	<10	15	25	-	-	-	-	-		<10	mg/kg	TM5/PM8
EPH >C21-C35 ^{#M}	87	64	129	175	-	-	-	-	-		<10	mg/kg	TM5/PM8
EPH >C8-C35 ^{#M}	87	64	144	200	-	-	-	-	-		<30	mg/kg	TM5/PM8
Mineral Oil (C10-C40)	-	-	-	-	35	35	33	50	57		<30	mg/kg	TM5/PM8/PM16
MTBE [#]	-	-	-	-	<5	<5	<5	<5	<5		<5	ug/kg	TM31/PM12
Benzene [#]	-	-	-	-	<5	<5	<5	<5	<5		<5	ug/kg	TM31/PM12
Toluene [#]	-	-	-	-	<5	<5	<5	<5	<5		<5	ug/kg	TM31/PM12
Ethylbenzene [#]	-	-	-	-	<5	<5	<5	<5	<5		<5	ug/kg	TM31/PM12
m/p-Xylene [#]	-	-	-	-	<5	<5	<5	<5	<5		<5	ug/kg	TM31/PM12
o-Xylene [#]	-	-	-	-	<5	<5	<5	<5	<5		<5	ug/kg	TM31/PM12
PCB 28 [#]	-	-	-	-	<5	<5	<5	<5	<5		<5	ug/kg	TM17/PM8
PCB 52 [#]	-	-	-	-	<5	<5	<5	<5	<5		<5	ug/kg	TM17/PM8
PCB 101 [#]	-	-	-	-	<5	<5	<5	<5	<5		<5	ug/kg	TM17/PM8
PCB 118 [#]	-	-	-	-	<5	<5	<5	<5	<5		<5	ug/kg	TM17/PM8
PCB 138 [#]	-	-	-	-	<5	<5	<5	<5	<5		<5	ug/kg	TM17/PM8
PCB 153 [#]	-	-	-	-	<5	<5	<5	<5	<5		<5	ug/kg	TM17/PM8

Mass of sample taken (kg)	-	Moisture Content Ratio (%) =	25.5
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	79.7
Particle Size <4mm =	>95%		
JEFL Job No	19/4611	Landfill Waste Acceptance Criteria Limits	
Sample No	7		
Client Sample No	STOCKPILE 1		
Depth/Other			
Sample Date	20/03/2019		
Batch No	1		
Solid Waste Analysis		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non- Hazardous Landfill
Total Organic Carbon (%)	1.54	3	5
Loss on Ignition (%)	4.7	-	10
Sum of BTEX (mg/kg)	<0.025	6	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-
Mineral Oil (mg/kg)	35	500	-
PAH Sum of 17(mg/kg)	2.23	100	-
pH (pH Units)	8.80	-	>6
ANC to pH 7 (mol/kg)	0.03	-	to be evaluated
ANC to pH 4 (mol/kg)	0.44	-	to be evaluated
Eluate Analysis	10:1 conc ⁿ leached		Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg
	C ₁₀ mg/l	A ₁₀ mg/kg	
Arsenic	0.0039	0.039	0.5
Barium	0.007	0.07	20
Cadmium	<0.0005	<0.005	0.04
Chromium	<0.0015	<0.015	0.5
Copper	0.007	<0.07	2
Mercury	<0.001	<0.01	0.01
Molybdenum	0.007	0.07	0.5
Nickel	<0.002	<0.02	0.4
Lead	<0.005	<0.05	0.5
Antimony	<0.002	<0.02	0.06
Selenium	<0.003	<0.03	0.1
Zinc	<0.003	<0.03	4
Chloride	1.1	11	800
Fluoride	0.7	7	10
Sulphate as SO ₄	23.1	231	1000
Total Dissolved Solids	118	1180	4000
Phenol	<0.01	<0.1	1
Dissolved Organic Carbon	9	90	500

Mass of sample taken (kg)	-	Moisture Content Ratio (%) =	25.9
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	79.4
Particle Size <4mm =	>95%		
JEFL Job No	19/4611	Landfill Waste Acceptance Criteria Limits	
Sample No	10		
Client Sample No	STOCKPILE 2 - S1		
Depth/Other			
Sample Date	20/03/2019		
Batch No	1		
Solid Waste Analysis		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non- Hazardous Landfill
Total Organic Carbon (%)	NDP	3	5
Loss on Ignition (%)	NDP	-	-
Sum of BTEX (mg/kg)	<0.025	6	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-
Mineral Oil (mg/kg)	35	500	-
PAH Sum of 17(mg/kg)	12.74	100	-
pH (pH Units)	8.41	-	>6
ANC to pH 7 (mol/kg)	0.07	-	to be evaluated
ANC to pH 4 (mol/kg)	0.73	-	to be evaluated
Eluate Analysis	10:1 conc ⁿ leached		Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg
	C ₁₀ mg/l	A ₁₀ mg/kg	
Arsenic	<0.0025	<0.025	0.5
Barium	0.025	0.25	20
Cadmium	<0.0005	<0.005	0.04
Chromium	0.0031	0.031	0.5
Copper	<0.007	<0.07	2
Mercury	<0.001	<0.01	0.01
Molybdenum	0.004	0.04	0.5
Nickel	<0.002	<0.02	0.4
Lead	<0.005	<0.05	0.5
Antimony	<0.002	<0.02	0.06
Selenium	<0.003	<0.03	0.1
Zinc	<0.003	<0.03	4
Chloride	1.3	13	800
Fluoride	0.6	6	10
Sulphate as SO ₄	151.2	1513	1000
Total Dissolved Solids	297	2971	4000
Phenol	<0.01	<0.1	1
Dissolved Organic Carbon	5	50	500

Mass of sample taken (kg)	-	Moisture Content Ratio (%) =	23.5
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	81.0
Particle Size <4mm =	>95%		
JEFL Job No	19/4611	Landfill Waste Acceptance Criteria Limits	
Sample No	13		
Client Sample No	STOCKPILE 2 - S2		
Depth/Other			
Sample Date	20/03/2019		
Batch No	1		
Solid Waste Analysis		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non- Hazardous Landfill
Total Organic Carbon (%)	0.90	3	5
Loss on Ignition (%)	4.7	-	10
Sum of BTEX (mg/kg)	<0.025	6	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-
Mineral Oil (mg/kg)	33	500	-
PAH Sum of 17(mg/kg)	14.08	100	-
pH (pH Units)	8.62	-	>6
ANC to pH 7 (mol/kg)	0.06	-	to be evaluated
ANC to pH 4 (mol/kg)	0.89	-	to be evaluated
Eluate Analysis	10:1 conc ⁿ leached		Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg
	C ₁₀ mg/l	A ₁₀ mg/kg	
Arsenic	0.0060	0.060	0.5
Barium	0.007	0.07	20
Cadmium	<0.0005	<0.005	0.04
Chromium	0.0031	0.031	0.5
Copper	<0.007	<0.07	2
Mercury	<0.001	<0.01	0.01
Molybdenum	0.003	0.03	0.5
Nickel	<0.002	<0.02	0.4
Lead	<0.005	<0.05	0.5
Antimony	0.004	0.04	0.06
Selenium	<0.003	<0.03	0.1
Zinc	<0.003	<0.03	4
Chloride	1.1	11	800
Fluoride	0.7	7	10
Sulphate as SO ₄	54.5	545	1000
Total Dissolved Solids	157	1570	4000
Phenol	<0.01	<0.1	1
Dissolved Organic Carbon	8	80	500

Mass of sample taken (kg)	-	Moisture Content Ratio (%) =	2.3
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	97.7
Particle Size <4mm =	>95%		
JEFL Job No	19/4611	Landfill Waste Acceptance Criteria Limits	
Sample No	16		
Client Sample No	STOCKPILE 2 - S3		
Depth/Other			
Sample Date	20/03/2019		
Batch No	1		
Solid Waste Analysis		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non- Hazardous Landfill
Total Organic Carbon (%)	NDP	3	5
Loss on Ignition (%)	NDP	-	-
Sum of BTEX (mg/kg)	<0.025	6	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-
Mineral Oil (mg/kg)	50	500	-
PAH Sum of 17(mg/kg)	8.66	100	-
pH (pH Units)	8.47	-	>6
ANC to pH 7 (mol/kg)	0.04	-	to be evaluated
ANC to pH 4 (mol/kg)	0.33	-	to be evaluated
Eluate Analysis	10:1 conc ⁿ leached		Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg
	C ₁₀ mg/l	A ₁₀ mg/kg	
Arsenic	0.0032	0.032	0.5
Barium	0.011	0.11	20
Cadmium	<0.0005	<0.005	0.04
Chromium	<0.0015	<0.015	0.5
Copper	<0.007	<0.07	2
Mercury	<0.001	<0.01	0.01
Molybdenum	0.005	0.05	0.5
Nickel	<0.002	<0.02	0.4
Lead	<0.005	<0.05	0.5
Antimony	<0.002	<0.02	0.06
Selenium	<0.003	<0.03	0.1
Zinc	0.003	0.03	4
Chloride	1.1	11	800
Fluoride	0.4	4	10
Sulphate as SO ₄	12.5	125	1000
Total Dissolved Solids	97	970	4000
Phenol	<0.01	<0.1	1
Dissolved Organic Carbon	7	70	500

Mass of sample taken (kg)	-	Moisture Content Ratio (%) =	53.7
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	65.1
Particle Size <4mm =	>95%		
JEFL Job No	19/4611	Landfill Waste Acceptance Criteria Limits	
Sample No	19		
Client Sample No	STOCKPILE 3		
Depth/Other			
Sample Date	20/03/2019		
Batch No	1		
Solid Waste Analysis		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non- Hazardous Landfill
Total Organic Carbon (%)	0.59	3	5
Loss on Ignition (%)	6.1	-	10
Sum of BTEX (mg/kg)	<0.025	6	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-
Mineral Oil (mg/kg)	57	500	-
PAH Sum of 17(mg/kg)	23.29	100	-
pH (pH Units)	9.28	-	>6
ANC to pH 7 (mol/kg)	0.11	-	to be evaluated
ANC to pH 4 (mol/kg)	1.86	-	to be evaluated
Eluate Analysis	10:1 conc ⁿ leached		Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg
	C ₁₀ mg/l	A ₁₀ mg/kg	
Arsenic	0.0065	0.065	0.5
Barium	0.013	0.13	20
Cadmium	<0.0005	<0.005	0.04
Chromium	0.0504	0.504	0.5
Copper	0.007	0.07	2
Mercury	<0.001	<0.01	0.01
Molybdenum	0.007	0.07	0.5
Nickel	<0.002	<0.02	0.4
Lead	<0.005	<0.05	0.5
Antimony	0.003	0.03	0.06
Selenium	<0.003	<0.03	0.1
Zinc	<0.003	<0.03	4
Chloride	3.0	30	800
Fluoride	0.6	6	10
Sulphate as SO ₄	85.2	852	1000
Total Dissolved Solids	227	2271	4000
Phenol	<0.01	<0.1	1
Dissolved Organic Carbon	9	90	500

Client Name: Terramech Investigations Ltd
Reference: 4135
Location: Broadoak Place, University Of Reading
Contact: Julian Puzyrna

Note:

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

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:



Ryan Butterworth
Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
19/4611	1	PLOT 1-4 - TP1	0.60	1	22/03/2019	General Description (Bulk Analysis)	soil-stones
					22/03/2019	Asbestos Fibres	Fibre Bundles
					22/03/2019	Asbestos ACM	NAD
					22/03/2019	Asbestos Type	Chrysotile
					22/03/2019	Asbestos Level Screen	less than 0.1%
19/4611	1	PLOT 1-4 - TP2	0.60	2	22/03/2019	General Description (Bulk Analysis)	soil-stones
					22/03/2019	Asbestos Fibres	Fibre Bundles
					22/03/2019	Asbestos ACM	NAD
					22/03/2019	Asbestos Type	Chrysotile
					22/03/2019	Asbestos Level Screen	less than 0.1%
19/4611	1	PLOT 5-10 - TP3	0.60	3	22/03/2019	General Description (Bulk Analysis)	soil-stones
					22/03/2019	Asbestos Fibres	NAD
					22/03/2019	Asbestos ACM	NAD
					22/03/2019	Asbestos Type	NAD
					22/03/2019	Asbestos Level Screen	NAD
19/4611	1	PLOT 5-10 - TP4	0.60	4	22/03/2019	General Description (Bulk Analysis)	soil-stones
					22/03/2019	Asbestos Fibres	NAD
					22/03/2019	Asbestos ACM	NAD
					22/03/2019	Asbestos Type	NAD
					22/03/2019	Asbestos Level Screen	NAD
19/4611	1	STOCKPILE 1		6	22/03/2019	General Description (Bulk Analysis)	soil-stones
					22/03/2019	Asbestos Fibres	NAD
					22/03/2019	Asbestos ACM	NAD
					22/03/2019	Asbestos Type	NAD
					22/03/2019	Asbestos Level Screen	NAD
19/4611	1	STOCKPILE 2 - S1		9	22/03/2019	General Description (Bulk Analysis)	soil-stones
					22/03/2019	Asbestos Fibres	Fibre Bundles
					22/03/2019	Asbestos Fibres (2)	Fibre Bundles
					22/03/2019	Asbestos ACM	NAD
					22/03/2019	Asbestos ACM (2)	NAD
					22/03/2019	Asbestos Type	Chrysotile
					22/03/2019	Asbestos Type (2)	Amosite
					22/03/2019	Asbestos Level Screen	less than 0.1%

Client Name: Terramech Investigations Ltd
Reference: 4135
Location: Broadoak Place, University Of Reading
Contact: Julian Puzyna

[illegible]

Matrix : Solid

[illegible]

Client Name: Terramech Investigations Ltd
Reference: 4135
Location: Broadoak Place, University Of Reading
Contact: Julian Puzyna

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 19/4611

SOILS

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

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

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

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

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

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

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

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

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

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

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

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

WATERS

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

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

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

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

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

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

DILUTIONS

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

BLANKS

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

NOTE

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

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

REPORTS FROM THE SOUTH AFRICA LABORATORY

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

Please include all sections of this report if it is reproduced

ABBREVIATIONS and ACRONYMS USED

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

JE Job No: 19/4611

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	No
TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3: 1990/USEPA 160.3 Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.			AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO ₂ generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes

JE Job No: 19/4611

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM22	Modified BS1377-3:1990 Gravimetric determination of Loss on Ignition by temperature controlled Muffle Furnace (35C-440C). On request modified ASTM D2974-00 LOI (105C-440C)	PM0	No preparation is required.	Yes		AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21	As received solid or water samples are extracted in Methanol: Sodium Hydroxide (0.1M NaOH) (60:40) by orbital shaker.	Yes	Yes	AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes	Yes	AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM62	Acid digestion of as received solid samples using Aqua Regia refluxed at 112.5 °C.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM0	No preparation is required.	Yes		AR	Yes

JE Job No: 19/4611

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM50	Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM29	Dried and ground solid sample is boiled with dilute hydrochloric acid, the resulting liquor is then analysed.	Yes	Yes	AD	Yes
TM50	Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM29	Dried and ground solid sample is boiled with dilute hydrochloric acid, the resulting liquor is then analysed.			AR	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060, APHA Standard Methods for Examination of Water and Wastewater 5310B, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No
TM74	Analysis of water soluble boron (20:1 extract) by ICP-OES.	PM32	Hot water soluble boron is extracted from dried and ground samples using a 20:1 ratio.	Yes	Yes	AD	Yes
TM74	Analysis of water soluble boron (20:1 extract) by ICP-OES.	PM61	As received solid samples are extracted with hot water in a 20:1 ratio of water to soil ready for analysis by ICP.			AR	Yes
TM77	Modified DDCE/NTS method 15364:2006. Determination of Acid Neutralization Capacity by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	No
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes	Yes	AR	Yes
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2	PM0	No preparation is required.			AR	Yes

JE Job No: 19/4611

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.			AR	

**ENVIRONMENTAL INVESTIGATION
NO 4135/19
AT
BROADOAK PLACE, UNIVERSITY OF READING
FOR
PROPOSED HOUSING DEVELOPMENT**

APPENDIX C

CONTAMINATION ANALYSIS (Plot 1-10, XRF TP1 to TP4 & stockpiles WAC)



Results of X-Ray Fluorescence Analysis (XRF)

Sackedgate Ltd. Reg 09712671, 26 Reading Road, Burghfield Common, Berkshire RG7 3QA - T- 01189 832 570 M-07555 106 620

Instrument Type	Olympus Vanta C	Site Ref	4135
Instrument Serial No.	800722	Location	Broadoak Place, University of Reading
Units	ppm	Client	Terramech

Exposure No.	21	22	23	24	25	26	27	28	29	30
Locn	stockpile 1	stockpile 1	stockpile 2 S1	stockpile 2 S1	stockpile 2 S1	stockpile 2 S2	stockpile 2 S2	stockpile 2 S2	stockpile 2 S3	stockpile 2 S3

Lat	0	0	0	0	0	0	0	0	0	0
Long	0	0	0	0	0	0	0	0	0	0
date	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019

m/c (%)	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%
Measured/ Assumed	A	A	A	A	A	A	A	A	A	A

Antimony	0	0	0	0	0	0	0	0	0	0
LOD	25	30	26	27	30	31	25	27	28	40
Arsenic	9.6	10.8	13.2	12	13.2	10.8	8.4	8.4	12	14.4
LOD	8	9	11	10	11	9	7	7	10	12
Cadmium	0	0	0	0	0	0	0	0	0	0
LOD	13	15	14	14	15	16	13	14	14	21
Chromium	141.6	116.4	33.6	33.6	76.8	39.6	87.6	94.8	73.2	51.6
LOD	19	21	28	28	20	33	18	19	19	43
Cobalt	0	0	0	0	0	0	0	0	0	0
LOD	53	58	55	54	58	59	53	59	58	76
Copper	32.4	25.2	38.4	26.4	37.2	27.6	33.6	26.4	42	33.6
LOD	4	4	4	4	4	4	4	4	4	6
Iron	32694	30234	30784.8	30332.4	30228	29287.2	31256.4	32989.2	32842.8	32078.4
LOD	149	160	154	153	162	168	151	168	167	219
Lead	176.4	213.6	332.4	262.8	314.4	150	132	116.4	247.2	199.2
LOD	4	4	5	5	5	4	3	3	5	6
Mercury	0	0	0	0	0	0	0	0	0	0
LOD	6	6	6	6	7	7	6	6	7	9
Molybdenum	0	0	0	0	0	0	0	0	0	14.4
LOD	3	3	3	3	3	4	3	3	3	3
Nickel	20.4	25.2	25.2	31.2	37.2	25.2	24	26.4	33.6	49.2
LOD	4	5	5	5	6	6	5	5	5	8
Selenium	1.2	1.2	1.2	1.2	2.4	2.4	1.2	1.2	1.2	2.4
LOD	1	1	1	1	2	2	1	1	1	2
Titanium	3985.2	3712.8	3645.6	3919.2	4034.4	3246	3901.2	4017.6	4334.4	4827.6
LOD	116	131	119	123	135	131	119	126	131	186
Tin	0	0	0	0	0	0	0	0	0	0
LOD	20	24	21	22	24	25	20	22	22	32
Vanadium	25.2	96	74.4	27.6	68.4	61.2	60	28.8	28.8	40.8
LOD	21	17	15	23	17	17	15	24	24	34
Zinc	193.2	178.8	216	196.8	217.2	184.8	195.6	162	213.6	162
LOD	4	5	5	5	5	5	5	5	5	6

Sulphur	1034.4	696	1017.6	1484.4	3348	1065.6	861.6	819.6	942	615.6
LOD	44	57	49	51	67	60	43	49	50	90
Light El	788860.8	766218	826236	827341.2	782461.2	823239.6	822705.6	843049.2	817316.4	766014
LOD	1604	1892	1691	1681	1854	1908	1611	1718	1742	2507

Results Checked & Issued For and on Behalf of Sackedgate Ltd

Julian Puzyna

Julian Puzyna BEng Hons MCIEH

1) X-Ray Fluorescence analysis is carried out in situ or from sample containers. Soil is not homogeneous and the concentrations of contaminants vary throughout the soil mass. Large variations are sometimes found at locations just millimetres from each other. This analysis considers a small scan area which may not represent the variability that is more widely present. Where possible a number of tests are carried out to assess the variability within each sample or at each point location tested. 2) The analyser measures concentrations as it sees them in the soil, in its wet state. The results above are corrected for moisture content and are presented on a 'dry weight' basis calculated from a measured or an assumed moisture content. 3) Most elements (eg Lead) give a fairly constant fluorescent response for different compounds of that element. A small number of elements however, give different responses depending on the actual compound that is present. The analyser always shows the worst case concentration and sometimes greatly overestimates the concentrations of those elements.



Results of X-Ray Fluorescence Analysis (XRF)

Sackedgate Ltd. Reg 09712671, 26 Reading Road, Burghfield Common, Berkshire RG7 3QA - T- 01189 832 570 M-07555 106 620

Instrument Type	Olympus Vanta C	Site Ref	4135
Instrument Serial No.	800722	Location	Broadoak Place, University of Reading
Units	ppm	Client	Terramech

Exposure No.	31	32	33	34	35	36	37	38	39	40
Locn	stockpile 2 S3	stockpile 3	stockpile 3	stockpile 3	Plot 1-4 TP1	Plot 1-4 TP1	Plot 1-4 TP1	Plot 1-4 TP1	Plot 1-4 TP1	Plot 1-4 TP2

Lat	0	0	0	0	0	0	0	0	0	0
Long	0	0	0	0	0	0	0	0	0	0
date	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019

m/c (%)	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%
Measured/ Assumed	A	A	A	A	A	A	A	A	A	A

Antimony	0	0	0	0	0	0	0	0	0	0
LOD	35	34	26	33	26	24	24	28	30	33
Arsenic	13.2	13.2	13.2	12	13.2	10.8	12	16.8	15.6	21.6
LOD	11	11	11	10	11	9	10	14	13	18
Cadmium	0	0	0	0	0	0	0	0	0	0
LOD	18	18	14	18	13	12	13	15	15	17
Chromium	103.2	43.2	73.2	44.4	31.2	69.6	66	33.6	109.2	38.4
LOD	25	36	18	37	26	17	17	28	22	32
Cobalt	0	0	0	0	0	0	0	0	0	0
LOD	70	62	52	63	47	46	45	53	56	57
Copper	36	39.6	33.6	19.2	49.2	44.4	58.8	63.6	51.6	37.2
LOD	5	5	4	5	4	4	4	5	5	5
Iron	31868.4	26294.4	27757.2	27986.4	24996	26840.4	25092	27627.6	27511.2	25472.4
LOD	199	170	145	175	126	123	119	147	153	156
Lead	218.4	202.8	318	158.4	367.2	310.8	296.4	523.2	388.8	697.2
LOD	5	5	5	4	5	4	4	7	6	9
Mercury	0	0	0	0	0	0	0	0	0	0
LOD	8	8	7	8	6	6	6	7	7	7
Molybdenum	0	12	0	0	0	0	0	0	0	0
LOD	4	2	3	4	3	3	3	3	4	4
Nickel	42	10.8	22.8	22.8	28.8	32.4	24	27.6	30	10.8
LOD	7	9	5	6	5	4	4	5	6	9
Selenium	2.4	2.4	1.2	2.4	1.2	1.2	1.2	2.4	2.4	2.4
LOD	2	2	1	2	1	1	1	2	2	2
Titanium	4653.6	3566.4	3238.8	3792	4639.2	3886.8	3732	3652.8	4638	3159.6
LOD	166	149	115	153	125	111	112	125	142	136
Tin	0	0	0	0	0	0	0	0	0	0
LOD	28	28	21	27	21	19	20	23	24	26
Vanadium	36	32.4	84	82.8	26.4	97.2	24	27.6	30	31.2
LOD	30	27	15	20	22	14	20	23	25	26
Zinc	192	211.2	216	217.2	235.2	213.6	206.4	224.4	201.6	328.8
LOD	6	6	5	6	5	4	4	5	5	7

Sulphur	594	1551.6	1387.2	1364.4	1082.4	972	1054.8	1005.6	1012.8	1616.4
LOD	75	70	48	62	48	42	44	51	59	71
Light El	781773.6	823218	870843.6	785838	817238.4	787347.6	793056	819975.6	797726.4	807093.6
LOD	2248	2068	1595	2037	1608	1513	1532	1710	1855	1981

Results Checked & Issued For and on Behalf of Sackedgate Ltd

Julian Puzyna

Julian Puzyna BEng Hons MCIEH

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Results of X-Ray Fluorescence Analysis (XRF)

Sackedgate Ltd. Reg 09712671, 26 Reading Road, Burghfield Common, Berkshire RG7 3QA - T- 01189 832 570 M-07555 106 620

Instrument Type	Olympus Vanta C	Site Ref	4135
Instrument Serial No.	800722	Location	Broad Oak Place, University of Reading
Units	ppm	Client	Terramech

Exposure No.	41	42	43	44	45	46				
Locn	Plot 1-4 TP2	Plot 1-4 TP2	Plot 5-10 TP3	Plot 5-10 TP3	Plot 5-10 TP4	Plot 5-10 TP4				

Lat	0	0	0	0	0	0				
Long	0	0	0	0	0	0				
date	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019	20/03/2019				

m/c (%)	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%				
Measured/ Assumed	A	A	A	A	A	A				

Antimony	0	0	0	0	0	0				
LOD	29	29	25	27	30	48				
Arsenic	19.2	21.6	9.6	9.6	10.8	18				
LOD	16	18	8	8	9	15				
Cadmium	0	0	0	0	0	0				
LOD	15	15	13	14	16	25				
Chromium	40.8	88.8	31.2	68.4	39.6	63.6				
LOD	34	20	26	19	33	53				
Cobalt	0	0	0	0	0	0				
LOD	90	54	52	57	64	104				
Copper	46.8	39.6	25.2	14.4	30	0				
LOD	5	4	4	4	4	10				
Iron	64762.8	26715.6	30614.4	32830.8	33549.6	41604				
LOD	329	150	148	164	184	308				
Lead	754.8	874.8	170.4	171.6	188.4	224.4				
LOD	10	9	4	4	4	7				
Mercury	0	0	0	0	0	0				
LOD	7	7	6	6	7	11				
Molybdenum	0	0	0	0	0	25.2				
LOD	3	3	3	3	4	3				
Nickel	9.6	30	20.4	37.2	25.2	70.8				
LOD	8	5	5	5	6	11				
Selenium	2.4	2.4	1.2	1.2	1.2	2.4				
LOD	2	2	1	1	1	2				
Titanium	2607.6	3736.8	3945.6	3698.4	4311.6	5209.2				
LOD	120	130	117	120	142	229				
Tin	0	0	0	0	0	0				
LOD	23	24	20	22	24	38				
Vanadium	30	67.2	26.4	64.8	105.6	50.4				
LOD	25	16	22	15	18	42				
Zinc	408	370.8	164.4	160.8	178.8	162				
LOD	8	7	4	4	5	8				

Sulphur	1281.6	1608	722.4	694.8	782.4	921.6				
LOD	63	61	44	48	60	125				
Light El	803464.8	833320.8	835218	829980	799762.8	679300.8				
LOD	2038	1789	1610	1700	1949	3086				

Results Checked & Issued For and on Behalf of Sackedgate Ltd

Julian Puzyna

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**ENVIRONMENTAL INVESTIGATION
NO 4135/19
AT
BROADOAK PLACE, UNIVERSITY OF READING
FOR
PROPOSED HOUSING DEVELOPMENT**

APPENDIX D

CONTAMINATION ANALYSIS (Plot 1-4, XRF Exposures 103 to 119)



Results of X-Ray Fluorescence Analysis (XRF)

Sackedgate Ltd. Reg 09712671, 26 Reading Road, Burghfield Common, Berkshire RG7 3QA - T- 01189 832 570 M-07555 106 620

Instrument Type	Olympus Vanta C	Site Ref	4135
Instrument Serial No.	800722	Location	Broad Oak Place, University of Reading
Units	ppm	Client	Terramech

Exposure No.	103	104	105	106	107	108	109	110	111	112
Locn	Plot 1	Plot 1	Plot 1	Plot 1	Plot 1	Plot 2	Plot 2	Plot 2	Plot 2	Plot 3

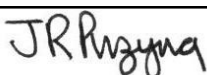
Lat	0	0	51.4454002	51.4454002	51.4454002	51.4454002	51.4454994	51.4455986	51.4454994	51.4454994
Long	0	0	-0.945781	-0.945681	-0.945811	-0.945725	-0.945727	-0.945715	-0.945754	-0.945652
date	18/04/2019	18/04/2019	18/04/2019	18/04/2019	18/04/2019	18/04/2019	18/04/2019	18/04/2019	18/04/2019	18/04/2019

m/c (%)	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%
Measured/ Assumed	A	A	A	A	A	A	A	A	A	A

Antimony	0	0	0	0	0	0	0	0	0	0
LOD	28	27	28	27	26	28	28	33	29	32
Arsenic	18	20.4	19.2	19.2	19.2	14.4	15.6	13.2	12	32.4
LOD	4	17	16	16	16	12	13	11	10	5
Cadmium	0	0	0	0	0	0	0	0	0	0
LOD	14	14	15	14	13	14	15	17	15	17
Chromium	127.2	36	88.8	80.4	63.6	69.6	84	40.8	38.4	44.4
LOD	21	30	20	19	18	19	20	34	32	37
Cobalt	0	0	0	0	0	0	0	0	0	0
LOD	67	61	71	54	51	53	53	59	63	79
Copper	20.4	98.4	87.6	45.6	58.8	55.2	51.6	30	36	20.4
LOD	4	5	5	4	4	4	4	5	4	5
Iron	41911.2	36015.6	43772.4	31502.4	29119.2	27495.6	27166.8	25639.2	34966.8	43288.8
LOD	206	179	222	155	145	145	149	165	187	255
Lead	81.6	904.8	753.6	800.4	789.6	411.6	488.4	220.8	265.2	91.2
LOD	3	9	9	8	8	6	6	5	5	4
Mercury	0	0	0	0	0	0	0	0	0	0
LOD	7	7	8	7	6	7	7	8	7	7
Molybdenum	0	0	0	0	0	0	0	0	0	0
LOD	3	3	3	3	3	3	3	4	3	4
Nickel	48	36	62.4	28.8	24	33.6	25.2	22.8	30	0
LOD	6	5	6	5	5	5	5	6	5	9
Selenium	1.2	2.4	2.4	2.4	2.4	1.2	2.4	2.4	1.2	2.4
LOD	1	2	2	2	2	1	2	2	1	2
Titanium	4917.6	4011.6	4250.4	3124.8	3676.8	3595.2	3890.4	4131.6	4220.4	4461.6
LOD	136	126	133	114	115	121	127	146	132	147
Tin	0	0	0	0	0	0	0	0	0	0
LOD	22	22	23	21	21	22	23	27	23	26
Vanadium	87.6	75.6	66	26.4	87.6	87.6	28.8	32.4	97.2	93.6
LOD	16	16	16	22	15	16	24	27	16	18
Zinc	135.6	404.4	362.4	366	392.4	274.8	308.4	248.4	237.6	146.4
LOD	4	7	7	6	6	6	6	6	6	5

Sulphur	4111.2	2737.2	3819.6	10039.2	4454.4	21888	11174.4	5154	2444.4	2012.4
LOD	67	59	68	82	58	129	95	84	60	70
Light El	806461.2	819832.8	825457.2	822680.4	862165.2	856028.4	871743.6	920283.6	877489.2	911288.4
LOD	1839	1688	1838	1568	1487	1537	1598	1774	1694	1832

Results Checked & Issued For and on Behalf of Sackedgate Ltd


Julian Puzyna BEng Hons MCIEH

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Results of X-Ray Fluorescence Analysis (XRF)

Sackedgate Ltd. Reg 09712671, 26 Reading Road, Burghfield Common, Berkshire RG7 3QA - T- 01189 832 570 M-07555 106 620

Instrument Type	Olympus Vanta C	Site Ref	4135
Instrument Serial No.	800722	Location	Broad Oak Place, University of Reading
Units	ppm	Client	Terramech

Exposure No.	113	114	115	116	117	118	119			
Locn	Plot 3	Plot 3	Plot 3	Plot 4	Plot 4	Plot 4	Plot 4			

Lat	51.4454994	51.4454994	51.4454994	51.4455986	51.4454994	51.4454994	51.4454994			
Long	-0.94558	-0.945609	-0.945667	-0.945625	-0.945595	-0.945581	-0.945624			
date	18/04/2019	18/04/2019	18/04/2019	18/04/2019	18/04/2019	18/04/2019	18/04/2019			

m/c (%)	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%			
Measured/ Assumed	A	A	A	A	A	A	A			

Antimony	0	0	0	0	0	0	0			
LOD	26	30	30	30	28	29	35			
Arsenic	18	7.2	13.2	12	19.2	9.6	9.6			
LOD	3	6	11	10	4	8	8			
Cadmium	0	0	0	0	0	0	0			
LOD	13	15	16	16	15	15	18			
Chromium	74.4	81.6	103.2	36	81.6	94.8	122.4			
LOD	19	21	20	30	20	20	25			
Cobalt	0	0	0	0	0	0	0			
LOD	71	46	52	52	61	61	91			
Copper	33.6	22.8	50.4	40.8	25.2	26.4	33.6			
LOD	4	4	4	4	4	4	6			
Iron	51638.4	20281.2	25278	24360	34338	34602	47709.6			
LOD	228	120	141	142	171	178	302			
Lead	51.6	70.8	262.8	205.2	67.2	151.2	99.6			
LOD	2	3	5	4	3	4	4			
Mercury	0	0	0	0	0	0	0			
LOD	6	7	7	7	6	7	8			
Molybdenum	0	0	0	0	0	0	10.8			
LOD	3	3	3	4	3	3	3			
Nickel	46.8	19.2	28.8	33.6	24	44.4	48			
LOD	6	5	5	5	5	6	8			
Selenium	1.2	1.2	2.4	1.2	1.2	1.2	2.4			
LOD	1	1	2	1	1	1	2			
Titanium	5376	4202.4	2748	3754.8	4309.2	4554	4476			
LOD	133	135	117	130	133	134	158			
Tin	0	0	0	0	0	0	0			
LOD	21	24	24	24	23	23	28			
Vanadium	82.8	64.8	67.2	27.6	28.8	30	96			
LOD	16	17	16	23	24	25	19			
Zinc	99.6	102	147.6	294	103.2	159.6	136.8			
LOD	4	4	4	6	4	5	6			

Sulphur	734.4	2799.6	3303.6	1426.8	2845.2	9088.8	1694.4			
LOD	46	60	54	59	62	87	77			
Light El	773050.8	816117.6	847549.2	888414	786156	835328.4	899539.2			
LOD	1769	1629	1556	1624	1710	1705	2109			

Results Checked & Issued For and on Behalf of Sackedgate Ltd

Julian Puzyna

Julian Puzyna BEng Hons MCIEH

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FOR
PROPOSED HOUSING DEVELOPMENT**

APPENDIX E

CONTAMINATION ANALYSIS (Plots 1 to 4, Laboratory Samples S1 & S2)



Exova Jones Environmental

Registered Office: Exova Environmental UK Limited, 10 Lower Grosvenor Place, London, SW1W 0EN. Reg No. 11371415

Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

Terramech Investigations Ltd
183 Long Lane
Tilehurst
Reading
Berkshire
RG31 6YW

Tel: +44 (0) 1244 833780

Fax: +44 (0) 1244 833781



Attention :	Julian Puzyna
Date :	7th May, 2019
Your reference :	4135
Our reference :	Test Report 19/6970 Batch 1
Location :	Broad oak Place, University Of Reading
Date samples received :	27th April, 2019
Status :	Final report
Issue :	1

Two samples were received for analysis on 27th April, 2019 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

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

Compiled By:

Phil Sommerton BSc

Project Manager

Client Name: Terramech Investigations Ltd
Reference: 4135
Location: Broadoak Place, University Of Reading
Contact: Julian Puzyna
JE Job No.: 19/6970

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1	2									Please see attached notes for all abbreviations and acronyms		
Sample ID	PLOTS 1-4 S1	PLOTS 1-4 S2											
Depth	0.70	0.70											
COC No / misc													
Containers	J	J											
Sample Date	18/04/2019	18/04/2019											
Sample Type	Clay	Clay											
Batch Number	1	1											
Date of Receipt	27/04/2019	27/04/2019									LOD/LOR	Units	Method No.
Arsenic ^{#M}	13.5	12.0									<0.5	mg/kg	TM30/PM15
Cadmium ^{#M}	0.3	<0.1									<0.1	mg/kg	TM30/PM15
Chromium ^{#M}	54.2	54.5									<0.5	mg/kg	TM30/PM15
Copper ^{#M}	27	20									<1	mg/kg	TM30/PM15
Lead ^{#M}	178	86									<5	mg/kg	TM30/PM15
Mercury ^{#M}	<0.1	<0.1									<0.1	mg/kg	TM30/PM15
Nickel ^{#M}	24.2	22.3									<0.7	mg/kg	TM30/PM15
Selenium ^{#M}	<1	1									<1	mg/kg	TM30/PM15
Total Sulphate as SO4 ^{#M}	655	447									<50	mg/kg	TM50/PM29
PAH MS													
Naphthalene ^{#M}	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	0.04									<0.03	mg/kg	TM4/PM8
Acenaphthene ^{#M}	<0.05	<0.05									<0.05	mg/kg	TM4/PM8
Fluorene ^{#M}	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Phenanthrene ^{#M}	0.04	0.21									<0.03	mg/kg	TM4/PM8
Anthracene [#]	<0.04	0.10									<0.04	mg/kg	TM4/PM8
Fluoranthene ^{#M}	0.11	0.50									<0.03	mg/kg	TM4/PM8
Pyrene [#]	0.10	0.45									<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene [#]	0.09	0.26									<0.06	mg/kg	TM4/PM8
Chrysene ^{#M}	0.06	0.25									<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene ^{#M}	0.13	0.47									<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene [#]	0.06	0.23									<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene ^{#M}	<0.04	0.20									<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene [#]	<0.04	0.09									<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene [#]	0.05	0.19									<0.04	mg/kg	TM4/PM8
PAH 16 Total	0.6	3.0									<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.09	0.34									<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.04	0.13									<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	93	95									<0	%	TM4/PM8
EPH >C8-C10 ^{#M}	<5	<5									<5	mg/kg	TM5/PM8
EPH >C10-C12 ^{#M}	<10	<10									<10	mg/kg	TM5/PM8
EPH >C12-C16 ^{#M}	<10	<10									<10	mg/kg	TM5/PM8
EPH >C16-C21 ^{#M}	<10	11									<10	mg/kg	TM5/PM8
EPH >C21-C35 ^{#M}	<10	36									<10	mg/kg	TM5/PM8
EPH >C8-C35 ^{#M}	<30	47									<30	mg/kg	TM5/PM8
Phenol ^{#M}	<0.01	<0.01									<0.01	mg/kg	TM26/PM21
Natural Moisture Content	25.7	11.7									<0.1	%	PM4/PM0
Total Cyanide ^{#M}	<0.5	<0.5									<0.5	mg/kg	TM89/PM45

Please see attached notes for all abbreviations and acronyms

Client Name: Terramech Investigations Ltd
Reference: 4135
Location: Broadoak Place, University Of Reading
Contact: Julian Puzyna

Note:

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

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:



Ryan Butterworth
Asbestos Team Leader

[illegible]

Client Name: Terramech Investigations Ltd
Reference: 4135
Location: Broadoak Place, University Of Reading
Contact: Julian Puzyna

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 19/6970

SOILS

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

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

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

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

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

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

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

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

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

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

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

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

WATERS

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

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

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

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

DEVIATING SAMPLES

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

SURROGATES

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

DILUTIONS

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

BLANKS

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

NOTE

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

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

REPORTS FROM THE SOUTH AFRICA LABORATORY

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

Please include all sections of this report if it is reproduced

ABBREVIATIONS and ACRONYMS USED

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

JE Job No: 19/6970

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	No
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21	As received solid or water samples are extracted in Methanol: Sodium Hydroxide (0.1M NaOH) (60:40) by orbital shaker.	Yes	Yes	AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes	Yes	AD	Yes
TM50	Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM29	Dried and ground solid sample is boiled with dilute hydrochloric acid, the resulting liquor is then analysed.	Yes	Yes	AD	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	

JE Job No: 19/6970

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes	Yes	AR	Yes

**ENVIRONMENTAL INVESTIGATION
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AT
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FOR
PROPOSED HOUSING DEVELOPMENT**

APPENDIX F

CONTAMINATION ANALYSIS (Plots 1 to 4, XRF Samples S1 & S2)



Results of X-Ray Fluorescence Analysis (XRF)

Sackedgate Ltd. Reg 09712671, 26 Reading Road, Burghfield Common, Berkshire RG7 3QA - T- 01189 832 570 M-07555 106 620

Instrument Type	Olympus Vanta C	Site Ref	4135
Instrument Serial No.	800722	Location	Broadoak Place, University of Reading
Units	ppm	Client	Terramech

Exposure No.	32	33	34	35	36	37	38	39	40	41
Locn	Plot 1-4 S1	Plot 1-4 S1	Plot 1-4 S1	Plot 1-4 S1	Plot 1-4 S1	Plot 1-4 S2	Plot 1-4 S2	Plot 1-4 S2	Plot 1-4 S2	Plot 1-4 S2

Lat	0	0	0	0	0	0	0	0	0	0
Long	0	0	0	0	0	0	0	0	0	0
date	24/04/2019	24/04/2019	24/04/2019	24/04/2019	24/04/2019	24/04/2019	24/04/2019	24/04/2019	24/04/2019	24/04/2019

m/c (%)	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%
Measured/ Assumed	A	A	A	A	A	A	A	A	A	A

Antimony	0	0	0	0	0	0	0	0	0	0
LOD	31	31	43	35	28	26	29	28	33	38
Arsenic	10.8	10.8	16.8	14.4	10.8	19.2	8.4	14.4	15.6	19.2
LOD	9	9	14	12	9	4	7	4	4	5
Cadmium	0	0	0	0	0	0	0	0	0	0
LOD	16	16	22	18	14	14	15	14	17	20
Chromium	82.8	90	106.8	102	96	36	115.2	36	40.8	46.8
LOD	21	22	29	25	20	30	20	30	34	39
Cobalt	0	0	0	0	0	0	0	0	0	0
LOD	67	72	101	80	65	65	63	65	72	78
Copper	24	30	37.2	31.2	33.6	44.4	36	60	55.2	33.6
LOD	4	5	7	5	4	4	4	5	5	6
Iron	37154.4	39975.6	43369.2	38937.6	39528	40203.6	34125.6	38130	35046	33150
LOD	202	224	336	249	195	200	184	200	217	234
Lead	186	175.2	225.6	238.8	230.4	63.6	87.6	76.8	72	67.2
LOD	4	4	7	6	5	3	3	3	3	3
Mercury	0	0	0	0	0	0	0	0	0	0
LOD	8	7	10	9	7	6	7	6	8	8
Molybdenum	0	0	0	0	0	0	0	0	0	0
LOD	4	4	5	4	3	3	3	3	4	4
Nickel	39.6	43.2	57.6	39.6	44.4	40.8	0	42	48	51.6
LOD	6	6	9	7	6	5	8	6	7	8
Selenium	1.2	1.2	2.4	2.4	1.2	1.2	1.2	1.2	2.4	2.4
LOD	1	1	2	2	1	1	1	1	2	2
Titanium	4128	4616.4	4412.4	4533.6	4886.4	3993.6	3688.8	3721.2	3682.8	3475.2
LOD	135	145	188	160	135	119	126	122	139	152
Tin	0	0	0	0	0	0	0	0	0	0
LOD	24	25	34	28	22	21	23	22	27	30
Vanadium	98.4	85.2	45.6	80.4	92.4	27.6	28.8	54	33.6	37.2
LOD	17	18	38	20	16	23	24	15	28	31
Zinc	153.6	188.4	220.8	212.4	213.6	147.6	139.2	163.2	133.2	116.4
LOD	5	6	8	7	5	4	4	5	5	5

Sulphur	469.2	640.8	2002.8	1260	2491.2	488.4	264	404.4	232.8	0
LOD	53	57	103	74	57	41	48	44	56	394
Light El	862537.2	873432	930205.2	887436	822338.4	917008.8	879505.2	913033.2	939073.2	956334
LOD	1752	1783	2189	2016	1717	1484	1710	1578	1723	1945

Results Checked & Issued For and on Behalf of Sackedgate Ltd

Julian Puzyna

Julian Puzyna BEng Hons MCIEH

1) X-Ray Fluorescence analysis is carried out in situ or from sample containers. Soil is not homogeneous and the concentrations of contaminants vary throughout the soil mass. Large variations are sometimes found at locations just millimetres from each other. This analysis considers a small scan area which may not represent the variability that is more widely present. Where possible a number of tests are carried out to assess the variability within each sample or at each point location tested. 2) The analyser measures concentrations as it sees them in the soil, in its wet state. The results above are corrected for moisture content and are presented on a 'dry weight' basis calculated from a measured or an assumed moisture content. 3) Most elements (eg Lead) give a fairly constant fluorescent response for different compounds of that element. A small number of elements however, give different responses depending on the actual compound that is present. The analyser always shows the worst case concentration and sometimes greatly overestimates the concentrations of those elements.

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APPENDIX G

CONTAMINATION ASSESSMENT CRITERIA

Generic Contamination Assessment Criteria



List 1 (Soils Assessment Criteria for Human Health)

- 1A) - Metals
- 1B) - Aliphatic Hydrocarbons
- 1C) - Aromatic Hydrocarbons
- 1D) - BTEX (Monocyclic Aromatic Hydrocarbons)
- 1E) - PAH (Poly-cyclic Aromatic Hydrocarbons)
- 1F) - PCB (Poly Chlorinated Bi-Phenyls)
- 1G) - Chloroalkanes and Alkenes
- 1H) - Explosives
- 1I) - Pesticides
- 1J) - Chlorobenzenes
- 1K) - Phenol and Chlorophenol
- 1L) – Other
- 1M) - Asbestos

This is a tabulated list of generic soil guideline values for the concentrations of contaminants in soils provided by various authorities to protect human health. These are generic values which make the worst case assumption for every exposure and absorption scenario governing the human uptake of the contaminants considered.

At this time Soil Guideline Values (SGVs) have been published by the Environment Agency for Arsenic, Cadmium, Nickel, Mercury, Selenium, Benzene, Toluene, Ethylbenzene, Xylene and Phenol together with Dioxins Furans and Dioxin like PCBs. These were calculated using the CLEA model (v1.04) and Environment Agency guidance documents SR2 (Human Health Toxicological Assessment of Contaminants in Soil) and SR3 (Updated Technical Background to the CLEA Model).

Further numbers of contaminants were assessed on this basis using the same CLEA Model by CIEH/LQM (The Chartered Institute of Environmental Health and Land Quality Management Ltd). Soil guideline values were published in their report on Generic Assessment Criteria for Human Health Assessments (2009). This 2009 guidance was replaced in 2015 by new S4UL values (Suitable '4' Use Levels) which are intended by CIEH/LQM to provide a complete and updated replacement for the values published in their 2009 report (see CIEH/LQM S4UL – 1.1). The S4UL values are the copyright of Land Quality Management Ltd and are reproduced with permission; Publication Number S4UL3262 - All rights reserved.

Where there is no Environment Agency SGV or S4UL, Terramech Investigations have derived values using the CLEA Model with old TOX reports as well as the SR2 report and the SR3 report, as suggested by the Environment Agency.

The assessments should be based on a hierarchy where the Environment Agency SGVs and S4UL from the Chartered Institute of Environmental Health are most preferred, followed by values derived by Terramech using the CLEA model.

DEFRA SP1010 & C4SL

We have also considered C4SL values derived for 6 contaminants in the Department of the Environment Farming and Rural Affairs (DEFRA) SP1010 report. The report describes how levels of contamination at a site are placed in one of four categories. Category 4 is where the level of risk posed is acceptably low, to Category 1, where the level of risk is clearly unacceptable. The Category 4 values presented in the report were primarily intended for use under the Part 2A of the Environmental Protection Act 1990 to screen out low risk sites.

The Category 4 values are however, determined using a Lower Level of Toxicological Concern (LLTC) assessment methodology which differs from the Health Condition Values (HCVs) discussed in Environment Agency SR2 report, these consider minimal or tolerable levels of risk.

A direction was given by the Department for Communities and Local Government (DCLG) and DEFRA for the C4SL system to be used for assessments for Planning as well as assessments under Part 2A of the Environmental Protection Act (SP1010 Companion Document December 2014).

In order to maintain consistency in our approach to all contaminants (i.e. minimal or tolerable levels of risk), we have continued to use the slightly more conservative Environment Agency SR2 – SR3 based values for the 43 contaminants considered in the Environment Agency SGV reports and partner S4UL publication from CIEH/LQM.

Unfortunately, the Environment Agency and CIEH/LQM documents do not give any guidelines for Lead concentrations. The SP1010 publication (March 2014 - Appendix H - Table 4.1) does give a provisional Category 4 value for Lead determined using the original HCV CLEA methodology. We consider this value is to be consistent with the minimal or tolerable levels of risk methodology used for the other 43 contaminants by the Environment Agency and CIEH/LQM. On this basis we have adopted the values for Lead calculated to be protective of children as the critical receptors. For a residential garden, where plants are grown for consumption by the residents, the guideline value is 190mg/kg. No guideline concentrations are given by DEFRA in the SP1010 document for adults under that assessment methodology. Values for the other land use scenarios are presented in the following tables.

Asbestos

CIRIA C733 (Asbestos In Soil And Made Ground) shows how respirable fibre exposure estimates can be carried out based on measured soil concentrations. We have used this methodology to derive guideline values for a number of exposure scenarios based on the minimal or tolerable levels risk level of 1 in 100,000 used to derive HCVs for other contaminants.

We have used the most conservative values for the exposure estimates wherever possible. It should be noted that these values are not corroborated by any other organisation and they are also subject to the notes and caveats set out in the wider CIRIA C733 document.

List 2 (Assessment Criteria for Buried Water Supply Pipes)

Water pipes laid in contaminated ground can absorb some contaminants and allow them to contaminate the water running in the pipes. Our assessments are based on the *UKWIR Report Ref No 10/WM/03/21* which gives a mandatory list of contaminants and threshold concentrations for those contaminants in relation to different types of water pipe materials.

However, we would note that some water utility companies assess contaminants on the basis of their own guidances and we have not reproduced lists of contaminants and their thresholds for all of these individual guidances.

List 3 (Assessment Criteria For Soil Disposal)

Assessment of soils destined for landfills takes two stages. The first is site characterisation to determine if the source site is contaminated, the second stage is compliance testing to assess the leachability or solubility of any contaminants that are present at elevated concentrations, as well as the potential for the material to decay and create gases.

Characterisation is carried out by comparing the soil results with the SGVs and GACs in List 1 with respect to human health as well as list 4 for groundwater protection. If the soils are seen to contain unacceptable concentrations of contaminants, then leachate tests will be required to fully classify the risk to groundwater and organic matter tests are required to assess the gas generation potential. The leachate results and total concentrations for a variety of petrochemical products are then compared with thresholds for different waste categories as set out in BS EN 12457-2.

List 4 (Groundwater Assessment Criteria)

Assessment of groundwater analysis is carried out using Water Supply (Water Quality) Regulations 2000 (SI 2000/3184 as amended) or the Environmental Quality Standard (EQS) values for fresh or saltwater depending on which is the most applicable background water quality scenario for compliance. Where the groundwater is not abstracted and not supplying water to springs or rivers, the results from upstream groundwater analysis would be used for comparison.

When investigations highlight the presence of soil contaminants at concentrations exceeding what could be expected naturally, the measured contaminant concentrations in soil would be assessed at tier 1 stage with respect to the risk posed to groundwater using the Environment Agency R&D Publication 20 Remedial Targets Worksheet, Release 2.2a.

Generic values for soil properties and chemical partition coefficients for contaminants were taken from the Environment Agency CLEA Model (v1.06) and supporting documents under the SC050021 reference. Exceedance of these values should not be taken as demonstrating a risk to controlled waters. Tier 2 and Tier 3 assessments would need to be carried out if exceedances are noted at Tier 1.

Assessment Criteria for Ground Gases

Ground gases are assessed on the basis of the CIRIA C665 document (Assessing Risks Posed by Hazardous Ground Gases to Buildings) which dictates the monitoring period and the frequency of visits required. Worst case flow rates and gas concentrations are then used to derive a Gas Screening Value (GSV) from which a characteristic situation and then a level of protection is defined.

List 1A (Metals mg/kg)					
Contaminant	Generic Exposure Scenario	Terramech (CLEA v1.06 & S4UL methodology)	Environment Agency SGV (CLEA v1.04)	CIEH/LQM S4UL 2015	DEFRA SP1010 'Final' C4SL December 2014
Arsenic	Residential with plant uptake	32	32	37	37
	Residential without plant uptake	35	Not Assessed	40	40
	Allotment		43	43	49
	Commercial	635	640	640	640
	Public Open Space (Residential)	Not Assessed	Not Assessed	79	79
	Public Open Space (Park)	Not Assessed	Not Assessed	170	170
Beryllium	Residential with plant uptake	Not Assessed	Not Assessed	1.7	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	1.7	Not Assessed
	Allotment	Not Assessed	Not Assessed	35	Not Assessed
	Commercial	Not Assessed	Not Assessed	12	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	2.2	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	63	Not Assessed
Boron	Residential with plant uptake	Not Assessed	Not Assessed	Not Assessed	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	Not Assessed	Not Assessed
	Allotment	Not Assessed	Not Assessed	Not Assessed	Not Assessed
	Commercial	Not Assessed	Not Assessed	Not Assessed	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	Not Assessed	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Cadmium	Residential with plant uptake	Not Assessed	10	11	22
	Residential without plant uptake	Not Assessed	Not Assessed	85	150
	Allotment	Not Assessed	1.8	1.9	3.9
	Commercial	Not Assessed	230	190	410
	Public Open Space (Residential)	Not Assessed	Not Assessed	120	220
	Public Open Space (Park)	Not Assessed	Not Assessed	532	880
Chromium III	Residential with plant uptake	Not Assessed	Not Assessed	910	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	910	Not Assessed
	Allotment	Not Assessed	Not Assessed	18000	Not Assessed
	Commercial	Not Assessed	Not Assessed	8600	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	1500	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	3300	Not Assessed
Chromium VI	Residential with plant uptake	Not Assessed	Not Assessed	6	21
	Residential without plant uptake	Not Assessed	Not Assessed	6	21
	Allotment	Not Assessed	Not Assessed	1.8	170
	Commercial	Not Assessed	Not Assessed	33	49
	Public Open Space (Residential)	Not Assessed	Not Assessed	7.7	23
	Public Open Space (Park)	Not Assessed	Not Assessed	220	250
Copper	Residential with plant uptake	Not Assessed	Not Assessed	2400	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	7100	Not Assessed
	Allotment	Not Assessed	Not Assessed	520	Not Assessed
	Commercial	Not Assessed	Not Assessed	68000	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	12000	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	44000	Not Assessed
Lead	Residential with plant uptake	190 ₍₄₎	450 (old SGV) ₍₅₎	Not Assessed	200
	Residential without plant uptake	310 ₍₄₎	450 (old SGV) ₍₅₎	Not Assessed	310
	Allotment	70 ₍₄₎	Not Assessed	Not Assessed	80
	Commercial	1100 ₍₄₎	750 (old SGV) ₍₅₎	Not Assessed	2300
	Public Open Space (Residential)	Not Assessed	Not Assessed	Not Assessed	630
	Public Open Space (Park)	Not Assessed	Not Assessed	Not Assessed	1300
Inorganic Mercury	Residential with plant uptake	Not Assessed	170	40	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	56	Not Assessed
	Allotment	Not Assessed	80	19	Not Assessed
	Commercial	Not Assessed	3600	1100	Not Assessed
	Public Open Space (Residential)	Not Assessed		120	Not Assessed
	Public Open Space (Park)	Not Assessed		240	Not Assessed
Elemental Mercury	Residential with plant uptake	Not Assessed	1	1.2	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	1.2	Not Assessed
	Allotment	Not Assessed	26	21	Not Assessed
	Commercial	Not Assessed	26	25.8	Not Assessed
	Public Open Space (Residential)	Not Assessed		16	Not Assessed
	Public Open Space (Park)	Not Assessed		25.8	Not Assessed
Methyl Mercury	Residential with plant uptake	Not Assessed	11	11	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	15	Not Assessed
	Allotment	Not Assessed	8	6	Not Assessed
	Commercial	Not Assessed	410	320	Not Assessed
	Public Open Space (Residential)	Not Assessed		40	Not Assessed
	Public Open Space (Park)	Not Assessed		68	Not Assessed
Nickel	Residential with plant uptake	Not Assessed	130	180	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	180	Not Assessed
	Allotment	Not Assessed	230	230	Not Assessed
	Commercial	Not Assessed	1800	980	Not Assessed
	Public Open Space (Residential)	Not Assessed		230	Not Assessed
	Public Open Space (Park)	Not Assessed		3400	Not Assessed

List 1A cont. (Metals mg/kg)					
Contaminant	Generic Exposure Scenario	Terramech (CLEA v1.06 & S4UL methodology)	Environment Agency SGV (CLEA v1.04)	CIEH/LQM S4UL 2015 Part 2	DEFRA SP1010 'Final' C4SL December 2014
Selenium	Residential with plant uptake	Not Assessed	350	250	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	430	Not Assessed
	Allotment	Not Assessed	120	88	Not Assessed
	Commercial	Not Assessed	13000	12000	Not Assessed
	Public Open Space (Residential)	Not Assessed		1100	Not Assessed
	Public Open Space (Park)	Not Assessed		1800	Not Assessed
Vanadium	Residential with plant uptake	Not Assessed	Not Assessed	410	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	1200	Not Assessed
	Allotment	Not Assessed	Not Assessed	91	Not Assessed
	Commercial	Not Assessed	Not Assessed	9000	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	2000	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	5000	Not Assessed
Zinc	Residential with plant uptake	Not Assessed	Not Assessed	3700	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	40000	Not Assessed
	Allotment	Not Assessed	Not Assessed	620	Not Assessed
	Commercial	Not Assessed	Not Assessed	730000	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	8100	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	17000	Not Assessed
Free Cyanide	Residential with plant uptake	Not Assessed	Not Assessed	Not Assessed	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	Not Assessed	Not Assessed
	Allotment	Not Assessed	Not Assessed	Not Assessed	Not Assessed
	Commercial	Not Assessed	Not Assessed	Not Assessed	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	Not Assessed	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Complex Cyanide	Residential with plant uptake	Not Assessed	Not Assessed	Not Assessed	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	Not Assessed	Not Assessed
	Allotment	Not Assessed	Not Assessed	Not Assessed	Not Assessed
	Commercial	Not Assessed	Not Assessed	Not Assessed	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	Not Assessed	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Thiocyanate	Residential with plant uptake	Not Assessed	Not Assessed	Not Assessed	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	Not Assessed	Not Assessed
	Allotment	Not Assessed	Not Assessed	Not Assessed	Not Assessed
	Commercial	Not Assessed	Not Assessed	Not Assessed	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	Not Assessed	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	Not Assessed	Not Assessed
This table is not a list of potential contaminants at any one site All values are subject to ongoing review CIEH - Chartered Institute for Environmental Health LQM - Land Quality Management (commercial research) (1) xx/yy/zz SOM - Soil Organic Matter dependant at 1%/2.5%/6% (2) xx/yy/zz pH - pH dependant at pH6/pH7/pH8 (3) Internal limits exceeded during calculations (4) under review by Terramech (5) Value Withdrawn S4UL values are the copyright of Land Quality Management Ltd and are reproduced with permission; Publication Number S4UL3262 All rights reserved		Terramech Investigations Limited 183 Long Lane Tilehurst Reading RG31 6YW Email - info@terramech.co.uk Tel 01189 439 910 Fax 01189 439 920 			

List 1B (Aliphatic Hydrocarbons mg/kg)

Contaminant	Generic Exposure Scenario	Terramech (CLEA v1.06 & S4UL methodology)	Environment Agency SGV (CLEA v1.04)	CIEH/LQM S4UL 2015 Part 3	DEFRA SP1010 'Final' C4SL December 2014
Aliphatic C5-C6	Residential with plant uptake	Not Assessed	Not Assessed	42/78/160 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	42/76/160 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	730/1700/3900 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	3200(304 ^{sol})/5900(558 ^{sol})/12000(1150 ^{sol}) _(1&3)	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	570000/590000/60000 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	95000(304 ^{sol})/130000(558 ^{sol})/180000(1150 ^{sol}) _(1&3)	Not Assessed
Aliphatic C6-C8	Residential with plant uptake	Not Assessed	Not Assessed	100/230/530 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	100/230/530 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	2300/5600/13000 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	7800(144 ^{sol})/17000(322 ^{sol})/40000(736 ^{sol}) _(1&3)	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	600000/610000/620000 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	150000(144 ^{sol})/220000(322 ^{sol})/320000(736 ^{sol}) _(1&3)	Not Assessed
Aliphatic C8-C10	Residential with plant uptake	Not Assessed	Not Assessed	27/65/150 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	27/65/150 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	320/77/1700 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	2000(78 ^{sol})/4800(190 ^{vap})/11000(451 ^{vap}) _(1&3)	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	13000/13000/13000 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	14000(78 ^{sol})/18000(190 ^{vap})/21000(451 ^{vap}) _(1&3)	Not Assessed
Aliphatic C10-C12	Residential with plant uptake	Not Assessed	Not Assessed	130(48 ^{vap})/330(118 ^{vap})/760(283 ^{vap}) _(1&3)	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	130(48 ^{vap})/330(118 ^{vap})/760(283 ^{vap}) _(1&3)	Not Assessed
	Allotment	Not Assessed	Not Assessed	2200/4400/7300 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	9700(48 ^{sol})/23000(118 ^{vap})/47000(283 ^{vap}) _(1&3)	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	13000/13000/13000 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	21000(48 ^{sol})/230000(118 ^{vap})/24000(283 ^{vap}) _(1&3)	Not Assessed
Aliphatic C12-C16	Residential with plant uptake	Not Assessed	Not Assessed	1100(24 ^{sol})/2400(59 ^{sol})/4300(142 ^{sol}) _(1&3)	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	1100(24 ^{sol})/2400(59 ^{sol})/4300(142 ^{sol}) _(1&3)	Not Assessed
	Allotment	Not Assessed	Not Assessed	11000/13000/13000 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	59000(24 ^{sol})/82000(59 ^{sol})/90000(142 ^{sol}) _(1&3)	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	13000/13000/13000 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	25000(24 ^{sol})/25000(59 ^{sol})/26000(142 ^{sol}) _(1&3)	Not Assessed
Aliphatic C16-C35	Residential with plant uptake	Not Assessed	Not Assessed	65000(8.48 ^{sol})/92000(21 ^{sol})/110000 _(1&3)	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	65000(8.48 ^{sol})/92000(21 ^{sol})/110000 _(1&3)	Not Assessed
	Allotment	Not Assessed	Not Assessed	260000/270000/270000 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	1600000/1700000/1800000 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	3800/3800/3800 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	3800/3800/3800 ₍₁₎	Not Assessed
Aliphatic C35-C44	Residential with plant uptake	Not Assessed	Not Assessed	65000(8.48 ^{sol})/92000(21 ^{sol})/110000 _(1&3)	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	65000(8.48 ^{sol})/92000(21 ^{sol})/110000 _(1&3)	Not Assessed
	Allotment	Not Assessed	Not Assessed	260000/270000/270000 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	1600000/1700000/1800000 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	3800/3800/3800 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	3800/3800/3800 ₍₁₎	Not Assessed
Aliphatic C44-C70	Residential with plant uptake	Not Assessed	Not Assessed	1600/1800/1900	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	1600/1800/1900	Not Assessed
	Allotment	Not Assessed	Not Assessed	1200/2100/3000	Not Assessed
	Commercial	Not Assessed	Not Assessed	28000/28000/28000	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	3800/3800/3800	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	7800/7800/7800	Not Assessed
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List 1C (Aromatic (Mono-cyclic and Poly-cyclic) Hydrocarbons mg/kg)					
Contaminant	Generic Exposure Scenario	Terramech (CLEA v1.06 & S4UL methodology)	Environment Agency SGV (CLEA v1.04)	CIEH/LQM S4UL 2015 Part 3	DEFRA SP1010 'Final' C4SL December 2014
Aromatic C5-C7	Residential with plant uptake	Not Assessed	Not Assessed	70/140/300 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	370/690/1400 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	13/27/57 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	26000(1220 ^{sol})/46000(2260 ^{sol})/86000(4710 ^{sol}) _(1&3)	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	56000/56000/56000 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	76000(1220 ^{sol})/84000(2260 ^{sol})/92000(4710 ^{sol}) _(1&3)	Not Assessed
Aromatic C7-C8	Residential with plant uptake	Not Assessed	Not Assessed	130/290/660 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	860/1800/3900 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	22/51/120 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	56000(869 ^{vap})/110000(1920 ^{sol})/180000(4360 ^{vap}) _(1&3)	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	56000/56000/56000 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	87000(869 ^{vap})/95000(1920 ^{sol})/100000(4360 ^{vap}) _(1&3)	Not Assessed
Aromatic C8-C10	Residential with plant uptake	Not Assessed	Not Assessed	34/83/190 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	47/110/270 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	8.6/21/51 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	3500(613 ^{vap})/8100(1500 ^{vap})/17000(3580 ^{vap}) _(1&3)	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	5000/5000/5000 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	7200(613 ^{vap})/8500(1500 ^{vap})/9300(3580 ^{vap}) _(1&3)	Not Assessed
Aromatic C10-C12	Residential with plant uptake	Not Assessed	Not Assessed	74/180/380 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	250/590/1200 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	13/31/74 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	16000(364 ^{sol})/28000(899 ^{sol})/34000(2150 ^{sol}) _(1&3)	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	5000/5000/5000 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	9200(364 ^{sol})/9700(899 ^{sol})/10000 _(1&3)	Not Assessed
Aromatic C12-C16	Residential with plant uptake	Not Assessed	Not Assessed	140/330/660 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	1800/2300(419 ^{sol})/2500 _(1&3)	Not Assessed
	Allotment	Not Assessed	Not Assessed	23/57/130 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	36000/(169 ^{sol})/37000/38000 _(1&3)	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	5100/5100/5000 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	10000/10000/10000 ₍₁₎	Not Assessed
Aromatic C16-C21	Residential with plant uptake	Not Assessed	Not Assessed	260/540/930 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	1900/1900/1900 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	46/110/260 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	28000/28000/28000 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	3800/3800/3800 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	7600/7700/7800 ₍₁₎	Not Assessed
Aromatic C21-C35	Residential with plant uptake	Not Assessed	Not Assessed	1100/1500/1700 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	1900/1900/1900 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	370/820/1600 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	28000/28000/28000 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	3800/3800/3800 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	7800/7800/7900 ₍₁₎	Not Assessed
Aromatic C35-C44	Residential with plant uptake	Not Assessed	Not Assessed	1100/1500/1700 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	1900/1900/1900 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	370/820/1600 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	28000/28000/28000 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	3800/3800/3800 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	7800/7800/7900 ₍₁₎	Not Assessed
Aromatic C44-C70	Residential with plant uptake	Not Assessed	Not Assessed	1600/1800/1900 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	1900/1900/1900 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	1200/2100/3000 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	28000/28000/28000 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	3800/3800/3800 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	7800/7800/7900 ₍₁₎	Not Assessed
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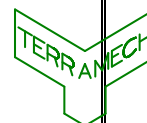


List 1D (BTEX Mono-cyclic Aromatic Hydrocarbons mg/kg)					
Contaminant	Generic Exposure Scenario	Terramech (CLEA v1.06 & S4UL methodology)	Environment Agency SGV (CLEA v1.04)	CIEH/LQM S4UL 2015 Part 3	DEFRA SP1010 'Final' C4SL December 2014
Benzene	Residential with plant uptake	Not Assessed	0.33	0.87/0.17/0.37 ⁽¹⁾	0.87
	Residential without plant uptake	Not Assessed	Not Assessed	0.38/0.70/1.4 ⁽¹⁾	3.3
	Allotment	Not Assessed	0.07	0.017/0.034/0.075 ⁽¹⁾	0.18
	Commercial	Not Assessed	95	27/47/90 ⁽¹⁾	98
	Public Open Space (Residential)	Not Assessed	Not Assessed	72/72/73 ⁽¹⁾	79
	Public Open Space (Park)	Not Assessed	Not Assessed	90/11/110 ⁽¹⁾	170
Toluene	Residential with plant uptake	Not Assessed	610	130/290/660	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	880(869 ^{vap})/1900/3900 ^(1&3)	Not Assessed
	Allotment	Not Assessed	120	22/51/120 ⁽¹⁾	Not Assessed
	Commercial	Not Assessed	4400	56000(869 ^{vap})/56000(1920 ^{vap})/56000(4360 ^{vap}) ^(1&3)	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	5600/5600/5600 ⁽¹⁾	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	87000(869 ^{vap})/95000(1920 ^{vap})/100000(4360 ^{vap}) ^(1&3)	Not Assessed
Ethylbenzene	Residential with plant uptake	Not Assessed	350	47/110/260 ⁽¹⁾	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	83/190/440 ⁽¹⁾	Not Assessed
	Allotment	Not Assessed	90	16/39/91 ⁽¹⁾	Not Assessed
	Commercial	Not Assessed	2800	5700(518 ^{vap})/13000(1220 ^{vap})/27000(2840 ^{vap}) ^(1&3)	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	24000/24000/25000 ⁽¹⁾	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	17000(518 ^{vap})/22000(1220 ^{vap})/27000(2840 ^{vap}) ^(1&3)	Not Assessed
o-Xylene	Residential with plant uptake	Not Assessed	250	60/140/330 ⁽¹⁾	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	88/210/480 ⁽¹⁾	Not Assessed
	Allotment	Not Assessed	160	28/67/160 ⁽¹⁾	Not Assessed
	Commercial	Not Assessed	2600	6600(478 ^{sol})/15000(1120 ^{sol})/33000(2620 ^{sol}) ^(1&3)	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	41000/42000/43000 ⁽¹⁾	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	17000(478 ^{sol})/24000(1120 ^{sol})/33000(2620 ^{sol}) ^(1&3)	Not Assessed
m-Xylene	Residential with plant uptake	Not Assessed	240	59/140/320 ⁽¹⁾	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	52/190/450 ⁽¹⁾	Not Assessed
	Allotment	Not Assessed	180	31/74/170 ⁽¹⁾	Not Assessed
	Commercial	Not Assessed	3500	6200(625 ^{vap})/14000(1470 ^{vap})/31000(3460 ^{vap}) ^(1&3)	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	41000/42000/43000 ⁽¹⁾	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	17000(625 ^{vap})/24000(1470 ^{vap})/32000(3460 ^{vap}) ^(1&3)	Not Assessed
p-Xylene	Residential with plant uptake	Not Assessed	230	56/130/310 ⁽¹⁾	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	79/180/430 ⁽¹⁾	Not Assessed
	Allotment	Not Assessed	160	29/69/160 ⁽¹⁾	Not Assessed
	Commercial	Not Assessed	3200	59000(576 ^{sol})/14000(1350 ^{sol})/30000(3170 ^{sol}) ^(1&3)	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	41000/42000/43000 ⁽¹⁾	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	17000(576 ^{sol})/23000(1350 ^{sol})/31000(3170 ^{sol}) ^(1&3)	Not Assessed
This table is not a list of potential contaminants at any one site All values are subject to ongoing review CIEH - Chartered Institute for Environmental Health LQM - Land Quality Management (commercial research) (1) xx/yy/zz SOM - Soil Organic Matter dependant at 1%/2.5%/6% (2) xx/yy/zz pH - pH dependant at pH6/pH7/pH8 (3) Internal limits exceeded during calculations. Vapour or solubility saturation limit exceeded (limit presented in brackets) (4) under review by Terramech S4UL values are the copyright of Land Quality Management Ltd and are reproduced with permission; Publication Number S4UL3262 All rights reserved			Terramech Investigations Limited 183 Long Lane Tilehurst Reading RG31 6YW Email - info@terramech.co.uk Tel 01189 439 910 Fax 01189 439 920 		

List 1E (Poly-cyclic Aromatic Hydrocarbons or PAH - mg/kg)					
Contaminant	Generic Exposure Scenario	Terramech (CLEA v1.06 & S4UL methodology)	Environment Agency SGV (CLEA v1.04)	CIEH/LQM S4UL 2015 Part 4	DEFRA SP1010 'Final' C4SL December 2014
Acenaphthene	Residential with plant uptake	Not Assessed	Not Assessed	210/610/1100 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	3000/(57 ^{soil})/4700(141 ^{soil})/6000(336 ^{soil}) _(1&3)	Not Assessed
	Allotment	Not Assessed	Not Assessed	34/85/200 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	8400(57 ^{soil})/97000(141 ^{soil})/100000 _(1&3)	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	15000/15000/15000 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	29000/30000/30000 ₍₁₎	Not Assessed
Acenaphthylene	Residential with plant uptake	Not Assessed	Not Assessed	170/420/920 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	2900(86.1 ^{soil})/4600(212 ^{soil})/6000(506 ^{soil}) _(1&3)	Not Assessed
	Allotment	Not Assessed	Not Assessed	28/69/160 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	83000(86.1 ^{soil})/97000(212 ^{soil})/100000 _(1&3)	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	15000/15000/15000 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	29000/30000/30000 ₍₁₎	Not Assessed
Anthracene	Residential with plant uptake	Not Assessed	Not Assessed	2400/5400/11000 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	31000(1.17 ^{vap})/35000/37000 _(1&3)	Not Assessed
	Allotment	Not Assessed	Not Assessed	380/950/2200 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	520000/540000/540000 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	74000/74000/74000 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	150000/150000/150000 ₍₁₎	Not Assessed
Benzo (a) Anthracene	Residential with plant uptake	Not Assessed	Not Assessed	7.2/11/13 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	11/14/15 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	2.9/6.5/13 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	170/170/180 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	29/29/29 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	49/56/62 ₍₁₎	Not Assessed
Benzo (a) Pyrene	Residential with plant uptake	Not Assessed	Not Assessed	2.2/2.7/3.0 ₍₁₎	5.0
	Residential without plant uptake	Not Assessed	Not Assessed	3.2/3.2/3.2 ₍₁₎	5.3
	Allotment	Not Assessed	Not Assessed	0.97/2.0/3.5 ₍₁₎	5.7
	Commercial	Not Assessed	Not Assessed	35/35/36 ₍₁₎	77
	Public Open Space (Residential)	Not Assessed	Not Assessed	5.7/5.7/5.7 ₍₁₎	10
	Public Open Space (Park)	Not Assessed	Not Assessed	11/12/13 ₍₁₎	21
Benzo (b) Fluoranthene	Residential with plant uptake	Not Assessed	Not Assessed	2.6/3.3/3.7 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	3.9/4.0/4.0 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	0.99/2.1/3.9 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	44/44/45 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	7.1/7.2/7.2 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	13/15/16 ₍₁₎	Not Assessed
Benzo (ghi) Perylene	Residential with plant uptake	Not Assessed	Not Assessed	320/340/350 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	360/360/360 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	290/470/640 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	3900/4000/4000 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	640/640/640 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	1400/1500/1600 ₍₁₎	Not Assessed
Benzo (k) Fluoranthene	Residential with plant uptake	Not Assessed	Not Assessed	77/93/100 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	110/110/110 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	37/75/130 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	1200/1200/1200 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	190/190/190 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	370/410/440 ₍₁₎	Not Assessed
Chrysene	Residential with plant uptake	Not Assessed	Not Assessed	15/22/27 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	30/31/32 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	4.1/9.4/19 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	350/350/350 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	57/57/57 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	93/110/120 ₍₁₎	Not Assessed
Dibenzo (ah) Anthracene	Residential with plant uptake	Not Assessed	Not Assessed	0.24/0.28/0.3 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	0.31/0.32/0.32 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	0.14/0.27/0.43 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	3.5/3.6/3.6 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	0.57/0.57/0.58 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	1.1/1.3/1.4 ₍₁₎	Not Assessed
Fluoranthene	Residential with plant uptake	Not Assessed	Not Assessed	280/560/890 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	1500/1600/1600 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	52/130/290 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	23000/23000/23000 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	3100/3100/3100 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	6300/6300/6400 ₍₁₎	Not Assessed
Fluorene	Residential with plant uptake	Not Assessed	Not Assessed	170/400/860 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	2800(30.9 ^{soil})/3800(76.5 ^{soil})/4500(183 ^{soil}) _(1&3)	Not Assessed
	Allotment	Not Assessed	Not Assessed	27/67/160 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	63000(30.9 ^{soil})/68000/71000 _(1&3)	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	9900/9900/9900 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	20000/20000/20000 ₍₁₎	Not Assessed

List 1E cont (Poly-cyclic Aromatic Hydrocarbons or PAH - mg/kg)					
Contaminant	Generic Exposure Scenario	Terramech (CLEA v1.06 & S4UL methodology)	Environment Agency SGV (CLEA v1.04)	CIEH/LQM S4UL 2015 Part 4	DEFRA SP1010 'Final' C4SL December 2014
Indeno (cd) Pyrene	Residential with plant uptake	Not Assessed	Not Assessed	27/36/41 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	45/46/46 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	9.5/21/39 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	500/510/510 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	82/82/82 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	150/170/180 ₍₁₎	Not Assessed
Naphthalene	Residential with plant uptake	Not Assessed	Not Assessed	2.3/5.6/13 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	2.3/5.6/13 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	4.1/10/24 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	190(76.4 ^{sol})/460(183 ^{sol})/1100(432 ^{sol}) _(1&3)	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	4900/4900/4900 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	1200(76.4 ^{sol})/1900(183 ^{sol})/3000 _(1&3)	Not Assessed
Phenanthrene	Residential with plant uptake	Not Assessed	Not Assessed	95/220/440 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	1300(36 ^{sol})/1500/1500 _(1&3)	Not Assessed
	Allotment	Not Assessed	Not Assessed	15/38/90 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	22000/22000/23000 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	3100/3100/3100 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	6200/6200/6300 ₍₁₎	Not Assessed
Pyrene	Residential with plant uptake	Not Assessed	Not Assessed	620/1200/2000 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	3700/3800/3800 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	110/270/620 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	54000/54000/54000 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	7400/7400/7400 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	15000/15000/15000 ₍₁₎	Not Assessed
Coal Tar (Benzo (a) Pyrene as surrogate)	Residential with plant uptake	Not Assessed	Not Assessed	0.79/0.98/1.1 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	1.2/1.2/1.2 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	0.32/0.67/1.2 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	15/15/15 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	2.2/2.2/2.2 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	4.4/4.7/4.8 ₍₁₎	Not Assessed
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List 1F (PCBs µg/kg)					
Contaminant	Generic Exposure Scenario	Terramech (CLEA v1.06 & S4UL methodology)	Environment Agency New SGV (CLEA v1.04)	CIEH/LQM 2nd Ed 2009 or CIEH/LQM S4UL 2015	DEFRA SP1010 'Final' C4SL December 2014
Sum of PCDDs, PCDFs and dioxin-like PCBs	Residential with plant uptake	Not Assessed	8	Not Assessed	Not Assessed
	Residential without plant uptake	Not Assessed	8	Not Assessed	Not Assessed
	Allotment	Not Assessed		Not Assessed	Not Assessed
	Commercial	Not Assessed	240	Not Assessed	Not Assessed
PCB-77	Residential with plant uptake	Not Assessed	0.0774	Not Assessed	Not Assessed
	Residential without plant uptake	Not Assessed	0.0783	Not Assessed	Not Assessed
	Allotment	Not Assessed	0.233	Not Assessed	Not Assessed
	Commercial	Not Assessed	2.33	Not Assessed	Not Assessed
PCB-81	Residential with plant uptake	Not Assessed	0.0774	Not Assessed	Not Assessed
	Residential without plant uptake	Not Assessed	0.0783	Not Assessed	Not Assessed
	Allotment	Not Assessed	0.233	Not Assessed	Not Assessed
	Commercial	Not Assessed	2.33	Not Assessed	Not Assessed
PCB-126	Residential with plant uptake	Not Assessed	0.0777	Not Assessed	Not Assessed
	Residential without plant uptake	Not Assessed	0.0783	Not Assessed	Not Assessed
	Allotment	Not Assessed	0.247	Not Assessed	Not Assessed
	Commercial	Not Assessed	2.33	Not Assessed	Not Assessed
PCB-169	Residential with plant uptake	Not Assessed	0.0777	Not Assessed	Not Assessed
	Residential without plant uptake	Not Assessed	0.0783	Not Assessed	Not Assessed
	Allotment	Not Assessed	0.251	Not Assessed	Not Assessed
	Commercial	Not Assessed	2.33	Not Assessed	Not Assessed
PCB-105	Residential with plant uptake	Not Assessed	0.0777	Not Assessed	Not Assessed
	Residential without plant uptake	Not Assessed	0.0783	Not Assessed	Not Assessed
	Allotment	Not Assessed	0.247	Not Assessed	Not Assessed
	Commercial	Not Assessed	2.33	Not Assessed	Not Assessed
PCB-114	Residential with plant uptake	Not Assessed	0.0777	Not Assessed	Not Assessed
	Residential without plant uptake	Not Assessed	0.0783	Not Assessed	Not Assessed
	Allotment	Not Assessed	0.247	Not Assessed	Not Assessed
	Commercial	Not Assessed	2.33	Not Assessed	Not Assessed
PCB-118	Residential with plant uptake	Not Assessed	0.0777	Not Assessed	Not Assessed
	Residential without plant uptake	Not Assessed	0.0783	Not Assessed	Not Assessed
	Allotment	Not Assessed	0.247	Not Assessed	Not Assessed
	Commercial	Not Assessed	2.33	Not Assessed	Not Assessed
PCB-123	Residential with plant uptake	Not Assessed	0.0777	Not Assessed	Not Assessed
	Residential without plant uptake	Not Assessed	0.0783	Not Assessed	Not Assessed
	Allotment	Not Assessed	0.247	Not Assessed	Not Assessed
	Commercial	Not Assessed	2.33	Not Assessed	Not Assessed
PCB-156	Residential with plant uptake	Not Assessed	0.0777	Not Assessed	Not Assessed
	Residential without plant uptake	Not Assessed	0.0783	Not Assessed	Not Assessed
	Allotment	Not Assessed	0.251	Not Assessed	Not Assessed
	Commercial	Not Assessed	2.33	Not Assessed	Not Assessed
PCB-157	Residential with plant uptake	Not Assessed	0.0777	Not Assessed	Not Assessed
	Residential without plant uptake	Not Assessed	0.0783	Not Assessed	Not Assessed
	Allotment	Not Assessed	0.251	Not Assessed	Not Assessed
	Commercial	Not Assessed	2.33	Not Assessed	Not Assessed
PCB-156	Residential with plant uptake	Not Assessed	0.0777	Not Assessed	Not Assessed
	Residential without plant uptake	Not Assessed	0.0783	Not Assessed	Not Assessed
	Allotment	Not Assessed	0.251	Not Assessed	Not Assessed
	Commercial	Not Assessed	2.33	Not Assessed	Not Assessed
PCB-157	Residential with plant uptake	Not Assessed	0.0777	Not Assessed	Not Assessed
	Residential without plant uptake	Not Assessed	0.0783	Not Assessed	Not Assessed
	Allotment	Not Assessed	0.251	Not Assessed	Not Assessed
	Commercial	Not Assessed	2.33	Not Assessed	Not Assessed
PCB-167	Residential with plant uptake	Not Assessed	0.0777	Not Assessed	Not Assessed
	Residential without plant uptake	Not Assessed	0.0783	Not Assessed	Not Assessed
	Allotment	Not Assessed	0.251	Not Assessed	Not Assessed
	Commercial	Not Assessed		Not Assessed	Not Assessed
PCB-189	Residential with plant uptake	Not Assessed	0.0778	Not Assessed	Not Assessed
	Residential without plant uptake	Not Assessed	0.0783	Not Assessed	Not Assessed
	Allotment	Not Assessed	0.252	Not Assessed	Not Assessed
	Commercial	Not Assessed	2.33	Not Assessed	Not Assessed
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List 1G (ChloroAlkanes & Alkenes mg/kg)					
Contaminant	Generic Exposure Scenario	Terramech (CLEA v1.06 & S4UL methodology)	Environment Agency SGV (CLEA v1.04)	CIEH/LQM S4UL 2015 Part5	DEFRA SP1010 'Final' C4SL December 2014
1,2 Dichloroethane (1,2 -DCA)	Residential with plant uptake	Not Assessed	Not Assessed	0.0071/0.011/0.019	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	0.0092/0.013/0.023	Not Assessed
	Allotment	Not Assessed	Not Assessed	0.0046/0.0083/0.016	Not Assessed
	Commercial	Not Assessed	Not Assessed	0.67/0.97/1.7	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	29/29/29	Not Assessed
1,1,1 Trichloroethane	Public Open Space (Park)	Not Assessed	Not Assessed	21/24/28	Not Assessed
	Residential with plant uptake	Not Assessed	Not Assessed	8.8/18/39	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	9.0/18/40	Not Assessed
	Allotment	Not Assessed	Not Assessed	48/110/240	Not Assessed
	Commercial	Not Assessed	Not Assessed	660/1300/3000	Not Assessed
1,1,2,2 Tetrachloroethanes	Public Open Space (Residential)	Not Assessed	Not Assessed	14000/14000/14000	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	57000(1425 ^{vap})/76000(2915 ^{vap})/100000(6392 ^{vap})	Not Assessed
	Residential with plant uptake	Not Assessed	Not Assessed	1.6/3.4/7.5	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	3.9/8.0/17	Not Assessed
	Allotment	Not Assessed	Not Assessed	0.41/0.89/2.0	Not Assessed
1,1,1,2 Tetrachloroethanes	Commercial	Not Assessed	Not Assessed	270/550/1100	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	1400/1400/1400	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	1800/2100/2300	Not Assessed
	Residential with plant uptake	Not Assessed	Not Assessed	1.2/2.8/6.4	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	1.5/3.5/8.2	Not Assessed
Tetrachloroethene	Allotment	Not Assessed	Not Assessed	0.79/1.9/4.4	Not Assessed
	Commercial	Not Assessed	Not Assessed	110/250/560	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	1400/1400/1400	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	1500/1800/2100	Not Assessed
	Residential with plant uptake	Not Assessed	Not Assessed	0.18/0.39/0.9	Not Assessed
Tetrachloromethane Aka Carbon Terachloride	Residential without plant uptake	Not Assessed	Not Assessed	0.18/0.4/0.92	Not Assessed
	Allotment	Not Assessed	Not Assessed	0.65/1.5/3.6	Not Assessed
	Commercial	Not Assessed	Not Assessed	19/42/95	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	1400/1400/1400	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	820(424 ^{soil})/1100(951 ^{soil})/1500	Not Assessed
Trichloroethene	Residential with plant uptake	Not Assessed	Not Assessed	0.026/0.058/0.13	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	0.026/0.058/0.13	Not Assessed
	Allotment	Not Assessed	Not Assessed	0.45/1.0/2.4	Not Assessed
	Commercial	Not Assessed	Not Assessed	2.9/6.3/14	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	890/920/950	Not Assessed
Trichloromethane Aka Chloroform	Public Open Space (Park)	Not Assessed	Not Assessed	190/270/400	Not Assessed
	Residential with plant uptake	Not Assessed	Not Assessed	0.016/0.034/0.075	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	0.017/0.036/0.08	Not Assessed
	Allotment	Not Assessed	Not Assessed	0.041/0.091/0.21	Not Assessed
	Commercial	Not Assessed	Not Assessed	1.2/2.6/6.7	Not Assessed
Chloroethene Aka Vinyl Chloride	Public Open Space (Residential)	Not Assessed	Not Assessed	120/120/120	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	70/91/120	Not Assessed
	Residential with plant uptake	Not Assessed	Not Assessed	0.91/1.7/3.4	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	1.2/2.1/4.2	Not Assessed
	Allotment	Not Assessed	Not Assessed	0.42/0.83/1.7	Not Assessed
	Commercial	Not Assessed	Not Assessed	99/170/350	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	2500/2500/2500	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	2600/2800/3100	Not Assessed
	Residential with plant uptake	Not Assessed	Not Assessed	0.00064/0.00087/0.0014	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	0.00077/0.0010/0.0015	Not Assessed
	Allotment	Not Assessed	Not Assessed	0.000550.0010/0.0018	Not Assessed
	Commercial	Not Assessed	Not Assessed	0.059/0.077/0.12	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	3.5/3.5/3.5	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	4.8/5.0/5.4	Not Assessed
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List 1H (Explosives mg/kg)

Contaminant	Generic Exposure Scenario	Terramech (CLEA v1.06 & S4UL methodology)	Environment Agency SGV (CLEA v1.04)	CIEH/LQM S4UL 2015 Part 6	DEFRA SP1010 'Final' C4SL December 2014
2,4,6 Trinitrotoluene Aka TNT	Residential with plant uptake	Not Assessed	Not Assessed	1.6/3.7/8.1	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	65/66/66	Not Assessed
	Allotment	Not Assessed	Not Assessed	0.24/0.58/1.4	Not Assessed
	Commercial	Not Assessed	Not Assessed	1000/1000/1000	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	130/130/130	Not Assessed
RDX	Public Open Space (Park)	Not Assessed	Not Assessed	260/270/270	Not Assessed
	Residential with plant uptake	Not Assessed	Not Assessed	120/250/540	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	13000/13000/13000	Not Assessed
	Allotment	Not Assessed	Not Assessed	17/38/85	Not Assessed
	Commercial	Not Assessed	Not Assessed	21000/21000/21000	Not Assessed
HMX	Public Open Space (Residential)	Not Assessed	Not Assessed	26000/26000/27000	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	49000(18.7sol)/51000/53000	Not Assessed
	Residential with plant uptake	Not Assessed	Not Assessed	5.7/13/26	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	6700/6700/6700	Not Assessed
	Allotment	Not Assessed	Not Assessed	0.86/1.9/3.9	Not Assessed
	Commercial	Not Assessed	Not Assessed	11000/11000/11000	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	13000/13000/13000	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	23000(0.36 ^{vap})/23000(0.39 ^{vap})/24000(0.48 ^{vap})	Not Assessed
This table is not a list of potential contaminants at any one site All values are subject to ongoing review CIEH - Chartered Institute for Environmental Health LQM - Land Quality Management (commercial research) (1) xx/yy/zz SOM - Soil Organic Matter dependant at 1%/2.5%/6% (2) xx/yy/zz pH - pH dependant at pH6/pH7/pH8 (3) Internal limits exceeded during calculations. Vapour or solubility saturation limit exceeded (limit presented in brackets) (4) under review by Terramech S4UL values are the copyright of Land Quality Management Ltd and are reproduced with permission; Publication Number S4UL3262 All rights reserved			Terramech Investigations Limited 183 Long Lane Tilehurst Reading RG31 6YW Email - info@terramech.co.uk Tel 01189 439 910 Fax 01189 439 920		



List 11 (Pesticides mg/kg)

Contaminant	Generic Exposure Scenario	Terramech (CLEA v1.06 & S4UL methodology)	Environment Agency SGV (CLEA v1.04)	CIEH/LQM S4UL 2015 Part 7	DEFRA SP1010 'Final' C4SL December 2014
Aldrin	Residential with plant uptake	Not Assessed	Not Assessed	5.7/6.6/7.1 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	7.3/7.4/7.5 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	3.2/6.1/9.6 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	170/170/170 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	18/18/18 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	30/30/31 ₍₁₎	Not Assessed
Dieldrin	Residential with plant uptake	Not Assessed	Not Assessed	0.97/2/3.5 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	7/7.3/7.4 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	0.17/0.41/0.96 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	170/170/170 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	18/18/18 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	30/30/30 ₍₁₎	Not Assessed
Atrazine	Residential with plant uptake	Not Assessed	Not Assessed	3.3/7.6/17.4 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	610/620/620 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	0.5/1.2/2.7 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	9300/9300/9400 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	1200/1200/1200 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	2300/2400/2400 ₍₁₎	Not Assessed
Dichlorvos	Residential with plant uptake	Not Assessed	Not Assessed	0.032/0.066/0.14 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	6.4/6.5/6.6 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	0.0049/0.010/0.022 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	140/140/140 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	16/16/16 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	26/26/27 ₍₁₎	Not Assessed
Alpha Endosulfan	Residential with plant uptake	Not Assessed	Not Assessed	7.4/18/41 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	160(0.003 ^{vap})/280(0.007 ^{vap})/410(0.016 ^{vap}) _(1 & 3)	Not Assessed
	Allotment	Not Assessed	Not Assessed	1.2/2.9/6.6 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	5600(0.016 ^{vap})/7400(0.016 ^{vap})/8400(0.016 ^{vap}) _(1 & 3)	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	1200/1200/1200 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	2400/2400/2500 ₍₁₎	Not Assessed
Beta Endosulfan	Residential with plant uptake	Not Assessed	Not Assessed	7.0/17/39 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	150(0.00007 ^{vap})/320(0.0002 ^{vap})/440(0.0004 ^{vap}) _(1 & 3)	Not Assessed
	Allotment	Not Assessed	Not Assessed	1.1/2.7/6.4 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	6300(0.00007 ^{vap})/7800(0.0002 ^{vap})/8700(0.0004 ^{vap}) _(1 & 3)	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	1200/1200/1200 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	2400/2400/2500 ₍₁₎	Not Assessed
Alpha BHC (Hexachlorocyclohexane) Inc Lindane	Residential with plant uptake	Not Assessed	Not Assessed	0.23/0.66/1.2 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	6.9/9.2/11 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	0.035/0.087/0.21 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	170/180/180 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	24/24/24 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	47/48/48 ₍₁₎	Not Assessed
Beta BHC (Hexachlorocyclohexane) Inc Lindane	Residential with plant uptake	Not Assessed	Not Assessed	0.085/0.2/0.46 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	3.7/3.8/3.8 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	0.013/0.032/0.077 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	65/65/65 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	8.1/8.1/8.1 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	15/15/16 ₍₁₎	Not Assessed
Gamma BHC (Hexachlorocyclohexane) Inc Lindane	Residential with plant uptake	Not Assessed	Not Assessed	0.06/0.14/0.33 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	2.9/3.3/3.5 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	0.0092/0.023/0.054 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	67/69/70 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	8.2/8.2/8.2 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	14/15/15 ₍₁₎	Not Assessed
DDT _{TOT} (Sum of DDD, DDE,TDE and DDT)	Residential with plant uptake	Not Assessed	Not Assessed	Not Assessed	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	Not Assessed	Not Assessed
	Allotment	Not Assessed	Not Assessed	Not Assessed	Not Assessed
	Commercial	Not Assessed	Not Assessed	Not Assessed	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	Not Assessed	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	Not Assessed	Not Assessed
This table is not a list of potential contaminants at any one site All values are subject to ongoing review CIEH - Chartered Institute for Environmental Health LQM - Land Quality Management (commercial research) (1) xx/yy/zz SOM - Soil Organic Matter dependant at 1%/2.5%/6% (2) xx/yy/zz pH - pH dependant at pH6/pH7/pH8 (3) Internal limits exceeded during calculations. Vapour or solubility saturation limit exceeded (limit presented in brackets) (4) under review by Terramech S4UL values are the copyright of Land Quality Management Ltd and are reproduced with permission; Publication Number S4UL3262 All rights reserved			Terramech Investigations Limited 183 Long Lane Tilehurst Reading RG31 6YW Email - info@terramech.co.uk Tel 01189 439 910 Fax 01189 439 920		



List 1J (Chlorobenzenes mg/kg)					
Contaminant	Generic Exposure Scenario	Terramech (CLEA v1.06 & S4UL methodology)	Environment Agency SGV (CLEA v1.04)	CIEH/LQM S4UL 2015 Part8	DEFRA SP1010 'Final' C4SL December 2014
Chlorobenzene	Residential with plant uptake	Not Assessed	Not Assessed	0.46/1.0/2.4 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	0.46/1.0/2.4 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	5.9/14/32 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	56/130/290 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	11000/13000/14000 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	1300(675 ^{sol})/2000(1520 ^{sol})/2900 ₍₁₎	Not Assessed
1,2 Dichlorobenzene	Residential with plant uptake	Not Assessed	Not Assessed	23/56/130 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	24/57/130 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	94/230/540 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	2000(571 ^{sol})/4800(1370 ^{sol})/11000(3240 ^{sol}) ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	90000/95000/98000	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	24000(571 ^{sol})/36000(1370 ^{sol})/51000(3240 ^{sol}) ₍₁₎	Not Assessed
1,3 Dichlorobenzene	Residential with plant uptake	Not Assessed	Not Assessed	0.4/0.1/2.3 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	0.44/1.1/2.5 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	0.25/0.6/1.5 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	30/73/170 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	300/300/300 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	390/440/470 ₍₁₎	Not Assessed
1,4 Dichlorobenzene	Residential with plant uptake	Not Assessed	Not Assessed	61/150/350 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	61/150/350 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	19/37/88 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	4400(224 ^{vap})/10000(540 ^{vap})/25000(1280 ^{vap}) ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	17000/17000/17000 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	36000(224 ^{vap})/36000(540 ^{vap})/36000(1280 ^{vap}) ₍₁₎	Not Assessed
1,2,3 Trichlorobenzene	Residential with plant uptake	Not Assessed	Not Assessed	1.5/3.6/8.6 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	1.5/3.7/8.8 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	4.7/12/28 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	102/250/590 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	1800/1800/1800 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	770(134 ^{vap})/1100(330 ^{vap})/1600(789 ^{vap}) ₍₁₎	Not Assessed
1,2,4 Trichlorobenzene	Residential with plant uptake	Not Assessed	Not Assessed	2.6/6.4/15 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	2.6/6.4/15 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	55/140/320 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	220/530/1300 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	15000/17000/19000 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	1700(318 ^{vap})/2600(786 ^{vap})/4000(1880 ^{vap}) ₍₁₎	Not Assessed
1,3,5 Trichlorobenzene	Residential with plant uptake	Not Assessed	Not Assessed	0.33/0.81/1.9 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	0.33/0.81/1.9 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	4.7/12/28 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	23/55/130 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	1700/1700/1800 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	380(36.7 ^{vap})/580(90.8 ^{vap})/860(217 ^{vap}) ₍₁₎	Not Assessed
1,2,3,4 Tetrachlorobenzenes	Residential with plant uptake	Not Assessed	Not Assessed	15/36/78 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	24/56/120 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	4.4/11/26 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	1700(122 ^{vap})/3080(304 ^{vap})/4400(728 ^{vap}) ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	830/830/830 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	1500(122 ^{vap})/1600/1600 ₍₁₎	Not Assessed
1,2,3,5 Tetrachlorobenzenes	Residential with plant uptake	Not Assessed	Not Assessed	0.66/1.6/3.7 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	0.75/1.9/4.3 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	0.38/0.9/2.2 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	49(39.4 ^{vap})/120(98.1 ^{vap})/240235 ^{vap}) ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	78/79/79 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	110(39 ^{vap})/120/130 ₍₁₎	Not Assessed
1,2,4,5 Tetrachlorobenzenes	Residential with plant uptake	Not Assessed	Not Assessed	0.33/0.77/1.6 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	0.73/1.7/3.5 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	0.06/0.16/0.37 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	42(19.7 ^{sol})/72(49.1 ^{sol})/96 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	13/13/13 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	25/26/26 ₍₁₎	Not Assessed
Pentachlorobenzene	Residential with plant uptake	Not Assessed	Not Assessed	5.8/12/22 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	19/30/38 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	1.2/3.1/7.0 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	640(43.0 ^{sol})/770(107 ^{sol})/830 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	100/100/100 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	190/190/190 ₍₁₎	Not Assessed

List 1J (Chlorobenzenes mg/kg) cont

Contaminant	Generic Exposure Scenario	Terramech (CLEA v1.06 & S4UL methodology)	Environment Agency SGV (CLEA v1.04)	CIEH/LQM S4UL 2015 Part8	DEFRA SP1010 'Final' C4SL December 2014
Hexachlorobenzene	Residential with plant uptake	Not Assessed	Not Assessed	1.3(0.2 ^{vap})/3.3(0.5 ^{vap})/4.9 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	4.1(0.2 ^{vap})/5.7(0.5 ^{vap})/6.7(1.2 ^{vap}) ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	0.47/1.1/2.5 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	110(0.2 ^{vap})/120/120 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	16/16/16 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	30/30/30 ₍₁₎	Not Assessed
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List 1K (Phenols & Chlorophenols mg/kg)

Contaminant	Generic Exposure Scenario	Terramech (CLEA v1.06 & S4UL methodology)	Environment Agency SGV (CLEA v1.04)	CIEH/LQM S4UL 2015 Part9	DEFRA SP1010 'Final' C4SL December 2014
Phenol	Residential with plant uptake	Not Assessed	Not Assessed	280/550/1100 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	750/1300/2300 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	66/140/280 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	760/1500/3200 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	760/1500/3200 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	760/1500/3200 ₍₁₎	Not Assessed
Chlorophenol	Residential with plant uptake	Not Assessed	Not Assessed	0.87/2.0/4.5 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	94/150/210 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	0.13/0.30/0.7 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	3500/4000/4300 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	620/620/620 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	1100/1100/1100 ₍₁₎	Not Assessed
Pentachlorophenol	Residential with plant uptake	Not Assessed	Not Assessed	0.22/0.52/1.2 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	27(16.4 ^{vap})/29/31 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	0.03/0.08/0.19 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	400/400/400 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	60/60/60 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	110/120/120 ₍₁₎	Not Assessed
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List 1L (Other mg/kg)

Contaminant	Generic Exposure Scenario	Terramech (CLEA v1.06 & S4UL methodology)	Environment Agency SGV (CLEA v1.04)	CIEH/LQM S4UL 2015 Part 10	DEFRA SP1010
Carbon Disulphide	Residential with plant uptake	Not Assessed	Not Assessed	0.14/0.29/0.62 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	0.14/0.29/0.62 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	4.8/10/23 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	11/22/47 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	11000/11000/12000 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	1300/1900/2700 ₍₁₎	Not Assessed
Hexachlorobutadiene	Residential with plant uptake	Not Assessed	Not Assessed	0.29/0.7/1.6 ₍₁₎	Not Assessed
	Residential without plant uptake	Not Assessed	Not Assessed	0.32/0.78/1.8 ₍₁₎	Not Assessed
	Allotment	Not Assessed	Not Assessed	0.25/0.61/1.4 ₍₁₎	Not Assessed
	Commercial	Not Assessed	Not Assessed	31/66/120 ₍₁₎	Not Assessed
	Public Open Space (Residential)	Not Assessed	Not Assessed	25/25/25 ₍₁₎	Not Assessed
	Public Open Space (Park)	Not Assessed	Not Assessed	48/50/51 ₍₁₎	Not Assessed
This table is not a list of potential contaminants at any one site All values are subject to ongoing review CIEH - Chartered Institute for Environmental Health LQM - Land Quality Management (commercial research) (1) xx/yy/zz SOM - Soil Organic Matter dependant at 1%/2.5%/6% (4) under review by Terramech S4UL values are the copyright of Land Quality Management Ltd and are reproduced with permission; Publication Number S4UL3262 All rights reserved			Terramech Investigations Limited 183 Long Lane Tilehurst Reading RG31 6YW Email - info@terramech.co.uk Tel 01189 439 910 Fax 01189 439 920 		

List 1M (Natural Mineral Fibres quantified % weight in soil)

Contaminant	Generic Exposure Scenario	Terramech (CIRIA C733 methodology)	Environment Agency	CIEH/LQM	DEFRA
Chrysotile Asbestos	Residential with active gardening Sandy Soil	0.01%	Not assessed	Not assessed	Not assessed
	Residential with active gardening Int Soil	0.05%	Not assessed	Not assessed	Not assessed
	Residential with active gardening Clay Soil	0.1%	Not assessed	Not assessed	Not assessed
	Allotment Sandy Soil	0.002%	Not assessed	Not assessed	Not assessed
	Allotment Intermediate Soil	0.005%	Not assessed	Not assessed	Not assessed
	Allotment Clay Soil	0.01%	Not assessed	Not assessed	Not assessed
	Commercial Sandy Soil	0.05%	Not assessed	Not assessed	Not assessed
	Commercial Intermediate Soil	0.2%	Not assessed	Not assessed	Not assessed
	Commercial Clay Soil	0.25%	Not assessed	Not assessed	Not assessed
	Public Open Space Sandy Soil (Residential)	0.0015%	Not assessed	Not assessed	Not assessed
	Public Open Space Int Soil (Residential)	0.0025%	Not assessed	Not assessed	Not assessed
	Public Open Space Clay Soil (Residential)	0.001% (clay overtakes sand)	Not assessed	Not assessed	Not assessed
Amosite Asbestos	Residential with active gardening Sandy Soil	Any detectable concentration	Not assessed	Not assessed	Not assessed
	Residential with active gardening Int Soil	Any detectable concentration	Not assessed	Not assessed	Not assessed
	Residential with active gardening Clay Soil	Any detectable concentration	Not assessed	Not assessed	Not assessed
	Allotment Sandy Soil	Any detectable concentration	Not assessed	Not assessed	Not assessed
	Allotment Intermediate Soil	Any detectable concentration	Not assessed	Not assessed	Not assessed
	Allotment Clay Soil	Any detectable concentration	Not assessed	Not assessed	Not assessed
	Commercial Sandy Soil	0.001%	Not assessed	Not assessed	Not assessed
	Commercial Intermediate Soil	0.001%	Not assessed	Not assessed	Not assessed
	Commercial Clay Soil	0.009%	Not assessed	Not assessed	Not assessed
	Public Open Space Sandy Soil (Residential)	Any detectable concentration	Not assessed	Not assessed	Not assessed
	Public Open Space Int Soil (Residential)	Any detectable concentration	Not assessed	Not assessed	Not assessed
	Public Open Space Clay Soil (Residential)	Any detectable concentration	Not assessed	Not assessed	Not assessed
Crocidolite Asbestos	Residential with active gardening Sandy Soil	Any detectable concentration	Not assessed	Not assessed	Not assessed
	Residential with active gardening Int Soil	Any detectable concentration	Not assessed	Not assessed	Not assessed
	Residential with active gardening Clay Soil	Any detectable concentration	Not assessed	Not assessed	Not assessed
	Allotment Sandy Soil	Any detectable concentration	Not assessed	Not assessed	Not assessed
	Allotment Intermediate Soil	Any detectable concentration	Not assessed	Not assessed	Not assessed
	Allotment Clay Soil	Any detectable concentration	Not assessed	Not assessed	Not assessed
	Commercial Sandy Soil	Any detectable concentration	Not assessed	Not assessed	Not assessed
	Commercial Intermediate Soil	Any detectable concentration	Not assessed	Not assessed	Not assessed
	Commercial Clay Soil	Any detectable concentration	Not assessed	Not assessed	Not assessed
	Public Open Space Sandy Soil (Residential)	Any detectable concentration	Not assessed	Not assessed	Not assessed
	Public Open Space Int Soil (Residential)	Any detectable concentration	Not assessed	Not assessed	Not assessed
	Public Open Space Clay Soil (Residential)	Any detectable concentration	Not assessed	Not assessed	Not assessed
This table is not a list of potential contaminants at any one site All values are subject to ongoing review CIEH - Chartered Institute for Environmental Health LQM - Land Quality Management (commercial research) C733 – CIRIA - Construction Industry Research & Information Association – Asbestos in Made Ground Sect 13 Respirable fibre exposure estimation using published air-to-air relationships after Addison <i>et al</i> (1988). <i>Details</i> Dilution of airborne fibre concentrations from the point of origin has not been considered. Residential assume 90 hours per year gardening activities that result in dust being raised. (Addison et al 1988) Allotment assume 260 hours per year (2.5 hrs per day every weekend) of activities that result in dust being raised. Commercial assume 24 hours per year when service trenches could be excavated that results in dust being raised. Public Open space assume not more than four 8hr maintenance days per year (32hrs/yr) that result in dust being raised as well as game playing in summer hols when soil surface is dry and veg layer is compromised (6wks 8hrs/day + maintenance = 368hrs/yr) Limit of detection usually 0.001%			Terramech Investigations Limited 183 Long Lane Tilehurst Reading RG31 6YW Email - info@terramech.co.uk Tel 01189 439 910 Fax 01189 439 920		



List 2 (Waste Acceptance Criteria (WAC) Analysis)			
	Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Solid Waste Analysis - Limit values for compliance			
Total Organic Carbon (%)	3	5	6
Loss on Ignition (%)	-	-	10
Sum of BTEX (mg/kg)	6	-	-
Sum of 7 PCBs (mg/kg)	1	-	-
Mineral Oil (mg/kg)	500	-	-
PAH Sum of 17 (mg/kg)	100	-	-
pH (pH Units)	-	>6	-
Eluate Analysis - Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)			
Arsenic	0.5	2	25
Barium	20	100	300
Cadmium	0.04	1	5
Chromium	0.5	10	70
Copper	2	50	100
Mercury	0.01	0.2	2
Molybdenum	0.5	10	30
Nickel	0.4	10	40
Lead	0.5	10	50
Antimony	0.06	0.7	5
Selenium	0.1	0.5	7
Zinc	4	50	200
Chloride	800	15000	25000
Fluoride	10	150	500
Sulphate as SO ₄	1000	20000	50000
Total Dissolved Solids	4000	60000	100000
Phenol Index	1	-	-
Dissolved Organic Carbon	500	800	1000
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List 3 (Generic Soil Screening Values for the Selection of Appropriate Water Supply Pipe Materials)							
		Pipe Material					
		All threshold concentrations in mg/kg					
	Parameter Group	PE	PVC	Barrier pipe (PE-Al-PE)	Wrapped Steel	Wrapped Ductile Iron	Copper
1	Extended VOC suite by purge and trap or headspace and GCMS with TICs	0.5	0.125	Pass	Pass	Pass	Pass
1A	+BTEX +MTBE	0.1	0.03	Pass	Pass	Pass	Pass
2	SVOCs by purge and trap or headspace and GCMS with TICs(aliphatic and aromatic C5 – C10	2	1.4	Pass	Pass	Pass	Pass
2E	+Phenols	2	0.4	Pass	Pass	Pass	Pass
2F	+Cresols and chlorinated phenols	2	0.04	Pass	Pass	Pass	Pass
3	Mineral Oil C11 – C20	10	Pass	Pass	Pass	Pass	Pass
4	Mineral Oil C21 – C40	500	Pass	Pass	Pass	Pass	Pass
5	Corrosive (Conductivity, Redox and pH)	Pass	Pass	Pass	Corrosive if pH <7 and conductivity >400µS/cm	Corrosive if pH <5 Eh not neutral and conductivity > 400mS/cm	Corrosive if pH <5 or >8 and Eh positive
Specific suites identified as relevant following site investigation							
2A	Ethers	0.5	1	Pass	Pass	Pass	Pass
2B	Nitrobenzene	0.5	0.4	Pass	Pass	Pass	Pass
2C	Ketones	0.5	0.02	Pass	Pass	Pass	Pass
2D	Aldehydes	0.5	0.02	Pass	Pass	Pass	Pass
6	Amines	Fail	Pass	Pass	Pass	Pass	Pass
This table is not a list of potential contaminants at any one site All values are subject to ongoing review. Table reproduced from <i>UKWIR Report Ref No 10/WM/03/21 (Table 3.1)</i> VOC = Volatile Organic Compounds (solvents) SVOC = Semi Volatile Organic Compounds GCMS = Gas Chromatography Mass Spectrometer TIC = Tentatively Identifiable compound BTEX = Benzene, Toluene, Ethyl Benzene & Xylene (VOCs) MTBE = Methyl tertiary butyl ether (petrol additive)				Terramech Investigations Limited 183 Long Lane Tilehurst Reading RG31 6YW Email - info@terramech.co.uk Tel 01189 439 910 Fax 01189 439 920			



List 3 (Generic Soil Screening Values for the Selection of Appropriate Water Supply Pipe Materials - Thames Water Utilities Ltd)	
Aliphatic C5 - C12	0.5 mg/kg
Aromatic C5 - C12	0.5 mg/kg
Aliphatic C12 - C21 (not chlorinated)	10 mg/kg
Aromatic C12 - C21 (not BTEX)	10 mg/kg
Aliphatic C21 - C35	500 mg/kg
Aromatic C21 - C35	500 mg/kg
Chlorinated short chain aliphatic hydrocarbons	0.5 mg/kg
Chlorinated short chain aromatic hydrocarbons	2 mg/kg
BTEX compounds	0.1 mg/kg
MTBE compounds	0.1 mg/kg
Naphthalene	5 mg/kg
Phenols (unless present with BTEX)	5 mg/kg
Phenols (in conjunction with BTEX)	2 mg/kg
Phenols (chlorinated)	2 mg/kg
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List 4 (Tier 1 Generic Soil Target Concentrations for Groundwater Protection - EA R&D 20 method)

Contaminant	Remedial Target (Mg/kg)
Arsenic	5.0 (Natural soils 0 to 35) ⁽³⁾
Cadmium	1.13
Chromium VI	10
Copper	255
Lead	590
Mercury (inorganic)	0.5
Nickel	10 (Average rural soils 21.1mg/kg) ⁽²⁾
Selenium	0.5
Zinc	105
Poly Cyclic Aromatics (Total Aromatics C ₅ to C ₄₄)	4.5 x 10 ⁻⁵ ⁽¹⁾
Total Petroleum Hydrocarbons (Aliphatic and Aromatic C ₅ to C ₄₄)	5.8 x 10 ⁻³ ⁽¹⁾
⁽¹⁾ organic carbon content sensitive, actual values should be used if possible	
⁽²⁾ Nickel in Rural soils 1.16 to 216mg/kg average 21.1 mg/kg (ref - EA SC050021 / Nickel SGV)	
⁽³⁾ Arsenic in Natural Soils 0 to 35mg/kg (ref - BGS Soils Beneath Our Feet website)	
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List 4 (Selected Generic Groundwater Screening Values mg/litre)

Contaminant Mg/litre	EQS Freshwater	EQS Saltwater	WHO (health)	WHO (ATO)	EU Drinking water	UK Drinking water
Antimony	-	-	0.005	-	0.005	0.005
Arsenic	0.05	0.025	0.01	-	0.01	0.01
Boron	0.002	0.007	0.0003	-	0.001	0.001
Cadmium	0.005	0.0025	0.003	-	0.005	0.005
Chromium	0.005-0.025	0.015	0.05	-	0.05	0.05
Copper	0.001-0.028	0.005	2	1	2	2
Lead	0.004-0.025	0.025	0.01	-	0.01	0.01
Mercury	0.001	0.0003	0.001	-	0.001	0.001
Molybdenum	-	-	0.07	-	-	-
Nickel	0.05-0.2	0.03	0.02	-	0.02	0.02
Selenium	-	-	0.01	-	0.01	0.01
Vanadium	0.02-0.06	0.1	-	-	-	-
Zinc	0.008-0.5	-	-	3	-	5
Hydrocarbons (dissolved/emulsion)	-	-	-	-	-	0.01
Poly-cyclic Aromatic Hydrocarbons	-	-	-	-	0.0001	0.0001
Benzene	0.3	0.3	0.01	-	0.001	0.001
Toluene	0.5	0.5	0.7	24-170	-	-
Ethylbenzene	-	-	0.3	-	-	-
Xylene	0.03	0.03	0.5	20-1800	-	-
Benzo (a) Pyrene	-	-	0.0007	-	0.00001	0.00001
Phenol	0.03	0.03	-	-	0.0005	0.0005
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