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# Contaminated Land Phase Two Intrusive Investigation for proposed residential development at Land Adjacent 52 Ingham Road, Thornhill Lees, Dewsbury, Kirklees, WF12 0AQ.

Prepared for

MP Town Planning
111 Ravensthorpe Road
Thornhill Lees
Dewsbury
WF12 9EG.

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# Contents

## Introduction

Martin Environmental Solutions has been commissioned, to carry out a phase two intrusive investigation for a proposed residential development at land adjacent 52 Ingham Road, Thornhill Lees, Dewsbury, Kirklees, WF12 0AQ.

The Phase II Intrusive investigation follows a phase I report ref: 2568--1 by Martin Environmental Solutions produced in August 2023, which identified a potential for contamination to exist on site.

## The Site:

**Site Address*:*** 52 Ingham Road, Thornhill Lees, Dewsbury, Kirklees, WF12 0AQ.

Grid reference: 424618; 419590

An aerial photograph of the site is included in Figure 1.

## Current Site use:

The site currently consists of a grassed garden attached to the adjacent residential property. To the south a large field slopes up to the east. This has recently been converted in allotments. Existing housing lies to the north, to the east and on the opposite side of the road to the west.

## History of the Site & Summary of the Phase I report

A summary of the history of the site and surrounding area and the findings of the Phase I report are presented below.

| | | |
|---|---|---|
| Site History | On-Site | The site remained undeveloped until the 1930's when the properties to the north were constructed and it became a garden.<br>Between 1960-66 two structures are shown on site, one a domestic garage and the other a garden shed.<br>BY the early 1980's the shed structure is removed from the site.<br>The garage is removed from the site shortly after January 2002. |
| | Beyond Site Boundary | The earliest mapping identifies a railway ~400m to the north, with a Woolen Mill beyond the main road @75m away. A canalis located just beyond the mill.<br>By 1907 a tramway is shown to the south along LeeS Hill Road.<br>The properties to the north area built by 1930's along with a football ground on the far side of the road. The fields to the south are identified as allotments by 1937 an a housing estate has been built on the far side of the road over the football ground. |
| Geological Appraisal | Made Ground | No Made Ground is recorded. |
| | Geology | Urswick Limestone and Alston Formation overlaid with Glaciofluvial Deposits of Devensian, Sand and gravel. Deep coal mining; >53m below ground, are recorded below the site, no mine entries or shallow mining are identified in the area. Coal outcrops are identified to the north, but n ot under the site. No faults, fissues or break lines are present. |
| | Subsidence hazard | The hazard rating for compressible deposits, running sands shrink swell and landslides is very low/negligible. |
| | Mining | No Coal mining activities have been identified with the exception of deep coal mines below the site, greater than 53m below ground. |
| | Radon | 3-5% of properties above the action level of 200 Becquerel's per cubic metre. Basic Radon protection measures are required |

| | | |
|---|---|---|
| Environmental Appraisal | Industrial Land Uses | The only current potentially contaminative sites are electrical substations located 141m & 242m north and a historic above ground tan 74m northeast.<br>No permitted installations are recorded both historic waste oil burners over 400m away. |
| | Landfill Sites | No current or historic landfill sites exist within 250m of the site. |
| | Hydrogeology | Secondary A Aquifer in the Bedrock and Superficial geology.<br>Groundwater vulnerability is low in the surface geology and medium in the bedrock layer.<br>The ground and surface water abstractions licences are located 1Km away. |
| | Hydrology | The nearest watercourse is the canal 106m north |
| | Flood Risk | Site lies is not located within a flood zone and the risk of flooding is negligible. |
| | Other relevant details | |

| Pathway | Description | Identified sources | Receptor at risk | Probability | Consequence | Risk |
|---|---|---|---|---|---|---|
| 1 | Run off and seepage into groundwater from any spillages | Historic site use | Watercourse/ Environment | Low likelihood | Mild | Low |
| 2 | Migration of gases into the building. | Infilled / made ground | Future users | Unlikely | Medium | Low |
| 3 | Inhalation of gases/ vapours outside | Infilled / made ground | Construction workers/future users | Unlikely | Mild | Very Low |
| 4 | Inhalation of fine particles | Infilled / made ground | Construction workers/future users | Low likelihood | Medium | Moderate/ low |
| 5 | Direct ingestion of contaminated soil | Infilled / made ground | Construction workers | Low likelihood | Medium | Moderate/ low |
| 6 | In-direct ingestion of contaminated soil | Infilled / made ground | Future users | Low likelihood | Medium | Moderate/ low |
| 7 | Absorption via direct dermal contact with contaminated soil | Infilled / made ground | Construction workers/future users | Low likelihood | Mild | low |

## Investigation Context

As a result of the Phase I report a potential for contamination was identified due to the former use of the site as domestic garage units. This Phase II Intrusive investigation has therefore been undertaken to identify whether any contamination is present on site and whether it presents any significant risk to the identified receptors.

The Phase II investigation was undertaken on the 24th April 2025 to investigate the potential presence of contaminants.

As a result, the intrusive investigation has concentrated on the proposed garden areas and the area under the former garage. The potential for contamination from the following has been investigated;

- Total Petroleum Hydrocarbons, e.g. oils and fuel
- Polyaromatic Hydrocarbons e.g. Made Ground, burning,
- Heavy metals,
- Asbestos, e.g. garage structures, brakes.

## The Investigation

A site visit was conducted on the 24th April 2025 to undertake an intrusive investigation. Three trail pits were dug across the site with two samples taken from each location, identified in Figure 2.

Sampling locations were spread across the site including under the former garage footprint, the front and rear proposed garden area.

Two samples were taken from each trail hole, the first approximately 250-300mm bgl and the second at 600mm bgl.

The samples were sent to Chemtech environmental a UKAS and MCERTs laboratory and each analysed for heavy metals, Total Petroleum Hydrocarbons (TPH) and Polyaromatic Hydrocarbons (PAH), and Asbestos.

## Results

The full sampling results are presented in Appendix 1, the sampling locations in Figure 2. The results have been compared against the LQM/CIEH S4UL's & the C4SL value for Lead for residential with homegrown produce end use. Soil organic matter ranged across the site ranged from 2.1-14.5%. The results of the sampling have been compared to the appropriate organic matter values for each sample .

The results for each sample are presented in Appendix 1, together with the relevant criterion for each contaminant. Details of each trail pits, including photographs are shown in Appendix 2. No ground water was encountered in any of the trail pits.

Soil encountered in the trail pits comprised Mainly of brown loamy sand with gravel and some stone. No obvious contamination was encountered in any of the trail holes.

The results of the samples identified no asbestos fibres present, in any of the samples.

Elevated levels of Arsenic were identified in trail pits 2 & 3 along with elevated Polyaromatic Hydrocarbons in all sample locations. The specific PAH's exceedances were Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(a)pyrene, Dibenzo(a,h)anthracene, Naphthalene.

No elevated Total Petroleum Hydrocarbons were identified.

| Contaminant | Assessment Criteria (residential with home grown) (mg/Kg) | Range identified on site (mg/Kg) | Pass/Fail |
|---|---|---|---|
| Arsenic | 37 | 14.7-**57.7** | **Fail**, |
| Cadmium | 11 | <1.6 | Pass |
| Chromium | 910 | 32.5-40.3 | Pass |
| Copper | 2400 | 82.8-1460.0 | Pass |
| Lead | 200 | 65-185 | Pass |
| Mercury | 40 | <0.7 | Pass |
| Nickel | 180 | 9.2-33.8 | Pass |
| Selenium | 250 | <3.0-4.6 | Pass |

| | | | | |
|---|---|---|---|---|
| Zinc | 3700 | | 218-614 | Pass |
| Asbestos | N/A | | N/A | Pass |
| **Petroleum Hydrocarbons** | | | | |
| | | | | |
| >C5-C6 Aliphatic (HS_1D_AL) | 42-160 | | <0.1 | Pass |
| >C6-C8 Aliphatic (HS_1D_AL) | 100-230 | | <0.1 | Pass |
| >C8-C10 Aliphatic (HS_1D_AL) | 27-65 | | <0.1 | Pass |
| >C10-C12 Aliphatic (EH_2D_AL) | 130-760 | | <1.0-2.7 | Pass |
| >C12-C16 Aliphatic (EH_2D_AL) | 1100-4300 | | 2.3-14.5 | Pass |
| >C16-C21 Aliphatic (EH_2D_AL) | 65000-110000 | | 4.1-34.9 | Pass |
| >C21-C35 Aliphatic (EH_2D_AL) | 65000-110000 | | 7.0-51.7 | Pass |
| >C35-C44 Aliphatic (EH_2D_AL) | 65000-110000 | | 1.5-13.7 | Pass |
| >C5-C7 Aromatic (HS_1D_AR) | 70-300 | | <0.01 | Pass |
| >C7-C8 Aromatic (HS_1D_AR) | 130-660 | | <0.01 | Pass |
| >C8-C10 Aromatic (HS_1D_AR) | 34-190 | | <0.01 | Pass |
| >C10-C12 Aromatic (EH_2D_AR) | 74-380 | | 4.1-14.9 | Pass |
| >C12-C16 Aromatic (EH_2D_AR) | 140-660 | | 12.9-75.1 | Pass |
| >C16-C21 Aromatic (EH_2D_AR) | 260-930 | | 41.3-562.0 | Pass |
| >C21-C35 Aromatic (EH_2D_AR) | 1100-1700 | | 96.3-1260.0 | Pass |
| >C35-C44 Aromatic (EH_2D_AR) | 1100-1700 | | 25.5-231.0 | Pass |
| | | | | |
| | | | | |
| **Polyaromatic hydrocarbons** | | | | |
| | **SOM** | | | |
| | 1% | 2.5% | 6% | |
| Naphthalene | 2.3 | 5.6 | 13 | 0.325-13.9 | Fail |
| Acenaphthylene | 170 | 420 | 920 | 0.208-0.904 | Pass |
| Acenaphthene | 210 | 510 | 1100 | 0.626-6.270 | Pass |
| Fluorene | 170 | 400 | 860 | 0.427-3.260 | Pass |
| Phenanthrene | 95 | 220 | 440 | 5.960-26.40 | Pass |
| Anthracene | 2400 | 5400 | 11000 | 1.610-6.730 | Pass |
| Fluoranthene | 280 | 560 | 890 | 14.8-58.5 | Pass |
| Pyrene | 620 | 1200 | 2000 | 12.6-49.0 | Pass |
| Benzo(a)anthracene | 7.2 | 11 | 13 | 5.48-28.3 | Fail |
| Chrysene | 15 | 22 | 27 | 5.84-25.3 | Pass |

| | | | | | |
|---|---|---|---|---|---|
| Benzo(b)fluoranthene | 2.6 | 3.3 | 3.7 | 5.91-34.2 | Fail |
| Benzo(k)fluoranthene | 77 | 93 | 100 | 2.28-15.3 | Pass |
| Benzo(a)pyrene | 2.2 | 2.7 | 3.0 | 5.79-34.2 | Fail |
| Indeno(1,2,3-cd)pyrene | 27 | 36 | 41 | 3.89-23.8 | Pass |
| Dibenzo(a,h)anthracene | 0.24 | 0.28 | 0.3 | 1.03-4.94 | Fail |
| Benzo(g,h,i)perylene | 320 | 340 | 350 | 3.42-23.1 | Pass |

## Conclusions & Recommendations

Following the phase II investigation elevated levels of arsenic and Polyaromatic Hydrocarbons, were identified in some samples which would result in a Significant Possibility of Significant Harm to the identified receptors.

It is therefore proposed that the following remediation work is undertaken in order to break the Source-pathway-receptor pollutant linkage.

A minimum of **600mm clean imported cover system** to be placed over the gardens areas. Typically, 450mm subsoil and 150mm topsoil for landscaping areas. A suitable no dig barrier should be installed below the 600mm clean imported cover system. 400mm within hardstanding areas.

Suitable **testing of the imported material** shall be carried out to ensure it is contamination free. Sampling frequency will depend on the source of the new material and should following a sampling rate of 1 sample per 100m$^3$ if the source of green field and 1 sample per 50m$^3$ if the source if brownfield, a minimum of three samples should be obtained

It is also recommended that **Barrier pipe is used for new mains water connections** this and any other services should be laid in clean trenches and backfilled with clean imported stone. Excavated material shall be removed from site to a suitable disposal facility.

Waste transfer notes for all exported material shall be retained.

An updated conceptual model is provided below based on the original within the Phase I report.

A watching brief is recommended throughout the construction works. Any signs of any contamination should be fully investigated and appropriate measures taken to remove the source-pathway-receptor pollutant linkages.

Pre-remediation

| Pathway | Description | Identified sources | Receptor at risk | Probability | Consequence | Risk |
|---|---|---|---|---|---|---|
| 1 | Run off and seepage into groundwater from any spillages | PAH, Aresenic | Watercourse/ Environment | Unlikely | Medium | Low |
| 2 | Migration of gases into the building. | - | Future users | Unlikely | Medium | Low |
| 3 | Inhalation of gases/ vapours outside | - | Construction workers/future users | Unlikely | Mild | Very Low |
| 4 | Inhalation of fine particles | Arsenic, PAHs | Construction workers/future users | Likely | Medium | **Moderate** |
| 5 | Direct ingestion of contaminated soil | Arsenic, PAHs | Construction workers<br><br>Future users | Likely<br><br>Likely | Minor<br><br>Medium | **Moderate/ Low**<br><br>**Moderate** |
| 6 | In-direct ingestion of contaminated soil | Arsenic, PAHs | Future users | Likely | Medium | **Moderate** |
| 7 | Absorption via direct dermal contact with contaminated soil | Arsenic, PAHs | Construction workers/future users | Likely | Mild | **Moderate/ low** |

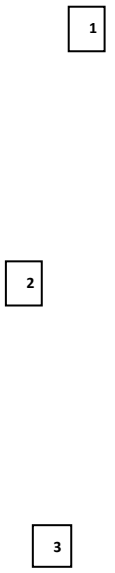
Post Remediation

| Pathway | Description | Identified sources | Receptor at risk | Probability | Consequence | Risk |
|---|---|---|---|---|---|---|
| 1 | Run off and seepage into groundwater from any spillages | PAH, heavy metals | Watercourse/ Environment | Unlikely | Medium | Low |
| 2 | Migration of gases into the building. | - | Future users | Unlikely | Medium | Low |
| 3 | Inhalation of gases/ vapours outside | - | Construction workers/future users | Unlikely | Mild | Very Low |
| 4 | Inhalation of fine particles | Asbestos, lead, arsenic, PAHs | Construction workers/future users | Unlikely | Medium | Low |
| 5 | Direct ingestion of contaminated soil | Lead, arsenic, PAHs | Future users | Unlikely | Medium | Low |
| 6 | In-direct ingestion of contaminated soil | Lead, arsenic, PAHs | Future users | Unlikely | Medium | Low |
| 7 | Absorption via direct dermal contact with contaminated soil | Lead, arsenic, PAHs | Future users | Unlikely | Mild | Very low |

| | | CONSEQUENCE | | | |
|---|---|---|---|---|---|
| | | Severe | Medium | Mild | Minor |
| PROBABILITY | High Likelihood | Very High Risk | High Risk | Moderate Risk | Moderate / Low Risk |
| | Likely | High Risk | Moderate Risk | Moderate / Low Risk | Low Risk |
| | Low Likelihood | Moderate Risk | Moderate / Low Risk | Low Risk | Very low Risk |
| | Unlikely | Moderate / Low Risk | Low Risk | Very low Risk | Very low Risk |

## Figure 1 – Aerial Photograph

## Figure 2 – Proposed Plan and Sampling Locations



# Appendix 1 – Soil Sample Results

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## ANALYTICAL TEST REPORT

| | |
|---|---|
| **Report Number** | 25-03904, issue number 1 |
| **Contract name:** | Standard Soil Suite |
| **Client reference:** | Ingham Rd |
| **Clients name:** | Martin Environmental Solutions Ltd |
| **Clients address:** | Martin Environmental Solutions Ltd<br>14 Hermitage Way<br>Lytham St Annes<br>Lancashire FY8 4FX |
| **Samples received:** | 28/04/2025 |
| **Analysis started:** | 28/04/2025 |
| **Analysis completed:** | 06/05/2025 |
| **Report issued:** | 06/05/2025 |

**Key**

| | |
|---|---|
| U | UKAS accredited test |
| M | MCERTS & UKAS accredited test |
| $ | Test carried out by an approved subcontractor |
| I/S | Insufficient sample to carry out test |
| U/S | Sample not suitable for testing |
| NAD | No Asbestos Detected |

**Approved by:** Abbie Neasham-Bourn
Senior Reporting Administrator

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## SAMPLE INFORMATION

**MCERTS (Soils):**

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

| Lab ref | Sample ID | Depth (m) | Sample description | Material removed | % Removed | % Moisture |
|---|---|---|---|---|---|---|
| 46132 | TP1A | 0.25 | Brown Loamy Sand with Gravel and Vegetation. | - | - | 14.4 |
| 46133 | TP1B | 0.60 | Brown Loamy Sand with Gravel and Vegetation. | - | - | 14.0 |
| 46134 | TP2A | 0.35 | Brown Loamy Sand with Gravel and Vegetation. | - | - | 12.9 |
| 46135 | TP2B | 0.60 | Brown Loamy Sand with Gravel and Vegetation. | - | - | 15.1 |
| 46136 | TP3A | 0.30 | Brown Loamy Sand with Gravel and Vegetation. | - | - | 15.9 |
| 46137 | TP3B | 0.60 | Brown Loamy Sand with Gravel and Vegetation. | - | - | 17.3 |

## DEVIATING SAMPLE INFORMATION

**Comments**
Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.
For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.
Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

**Key**

| | |
|---|---|
| a | Sampling date not provided |
| b | Sampling time not provided (waters only) |
| c | Sample not received in appropriate containers |
| d | Storage Temperature |
| e | Headspace present in sample container |
| f | Sample exceeded sampling to reciept |
| g | Sample exceeded holding time(s) |

| Lab ref | Sample ID | Depth (m) | Deviating | Tests (Reason for deviation) |
|---|---|---|---|---|
| 46132 | TP1A | 0.25 | N | |
| 46133 | TP1B | 0.60 | N | |
| 46134 | TP2A | 0.35 | N | |
| 46135 | TP2B | 0.60 | N | |
| 46136 | TP3A | 0.30 | N | |
| 46137 | TP3B | 0.60 | N | |

CHEMTECH environmental part of Cawood

## SOILS

| Lab Number | | | | | 46132 | 46133 | 46134 | 46135 | 46136 |
|---|---|---|---|---|---|---|---|---|---|
| Client Reference | | | | | SOIL | SOIL | SOIL | SOIL | SOIL |
| Sample ID | | | | | TP1A | TP1B | TP2A | TP2B | TP3A |
| Depth (m) | | | | | 0.25 | 0.60 | 0.35 | 0.60 | 0.30 |
| Sampling Date | | | | | 24/04/2025 | 24/04/2025 | 24/04/2025 | 24/04/2025 | 24/04/2025 |
| Test | Method | Accred | LoD | Units | | | | | |
| **Asbestos** | | | | | | | | | |
| Asbestos Identification | SUBCON | SU | 0 | - | NAD | NAD | NAD | NAD | NAD |
| **Metals** | | | | | | | | | |
| Arsenic | CE264 | U | 1.8 | mg/kg | 30.2 | 14.7 | 37.7 | 36.5 | 40.5 |
| Cadmium | CE264 | M | 1.6 | mg/kg | < 1.6 | < 1.6 | < 1.6 | < 1.6 | < 1.6 |
| Chromium | CE264 | U | 2 | mg/kg | 40.2 | 32.5 | 38.7 | 37.2 | 40.3 |
| Copper | CE264 | M | 1.6 | mg/kg | 98.6 | 1460 | 233 | 157 | 98.9 |
| Lead | CE264 | U | 2.3 | mg/kg | 179 | 65.0 | 185 | 164 | 172 |
| Mercury | CE264 | U | 0.7 | mg/kg | < 0.7 | < 0.7 | < 0.7 | < 0.7 | < 0.7 |
| Nickel | CE264 | M | 2.1 | mg/kg | 33.8 | 9.2 | 22.5 | 21.4 | 31.1 |
| Selenium | CE264 | U | 3 | mg/kg | < 3.0 | 4.6 | 3.4 | < 3.0 | < 3.0 |
| Zinc | CE264 | M | 4 | mg/kg | 218 | 614 | 359 | 265 | 267 |
| **Combustion** | | | | | | | | | |
| Moisture Content | CE001 | N | 0.1 | % | 14.4 | 14.0 | 12.9 | 15.1 | 15.9 |
| Soil Organic Matter | CE192 | N | 0.1 | % | 11.9 | 4.62 | 12.0 | 10.2 | 13.2 |
| **Polyaromatic hydrocarbons** | | | | | | | | | |
| Naphthalene | CE087 | M | 0.016 | mg/kg | 1.51 | 0.325 | 0.955 | 0.855 | 13.9 |
| Acenaphthylene | CE087 | M | 0.015 | mg/kg | 0.904 | 0.239 | 0.508 | 0.629 | 0.445 |
| Acenaphthene | CE087 | M | 0.013 | mg/kg | 2.55 | 0.626 | 2.04 | 1.27 | 6.27 |
| Fluorene | CE087 | U | 0.013 | mg/kg | 1.78 | 0.427 | 1.31 | 0.950 | 3.26 |
| Phenanthrene | CE087 | M | 0.014 | mg/kg | 26.4 | 5.96 | 19.1 | 15.5 | 20.9 |
| Anthracene | CE087 | U | 0.017 | mg/kg | 6.73 | 1.61 | 4.57 | 3.58 | 3.43 |
| Fluoranthene | CE087 | M | 0.017 | mg/kg | 58.5 | 14.8 | 40.5 | 33.4 | 22.3 |
| Pyrene | CE087 | M | 0.016 | mg/kg | 49.0 | 12.6 | 33.5 | 27.4 | 19.0 |
| Benzo(a)anthracene | CE087 | U | 0.012 | mg/kg | 28.3 | 6.83 | 19.1 | 16.5 | 10.4 |
| Chrysene | CE087 | M | 0.028 | mg/kg | 25.3 | 5.84 | 17.3 | 15.8 | 10.5 |
| Benzo(b)fluoranthene | CE087 | M | 0.02 | mg/kg | 34.2 | 7.33 | 21.9 | 19.5 | 12.1 |
| Benzo(k)fluoranthene | CE087 | M | 0.025 | mg/kg | 15.3 | 3.29 | 9.29 | 8.65 | 4.67 |
| Benzo(a)pyrene | CE087 | U | 0.019 | mg/kg | 34.2 | 6.41 | 19.7 | 17.3 | 10.8 |
| Indeno(1,2,3-cd)pyrene | CE087 | M | 0.019 | mg/kg | 23.8 | 5.72 | 16.1 | 14.9 | 7.46 |
| Dibenzo(a,h)anthracene | CE087 | M | 0.017 | mg/kg | 4.94 | 1.20 | 2.81 | 2.47 | 1.44 |

## SOILS

| Lab Number | | | | | 46132 | 46133 | 46134 | 46135 | 46136 |
|---|---|---|---|---|---|---|---|---|---|
| Client Reference | | | | | SOIL | SOIL | SOIL | SOIL | SOIL |
| Sample ID | | | | | TP1A | TP1B | TP2A | TP2B | TP3A |
| Depth (m) | | | | | 0.25 | 0.60 | 0.35 | 0.60 | 0.30 |
| Sampling Date | | | | | 24/04/2025 | 24/04/2025 | 24/04/2025 | 24/04/2025 | 24/04/2025 |
| Test | Method | Accred | LoD | Units | | | | | |
| Benzo(g,h,i)perylene | CE087 | M | 0.019 | mg/kg | 23.1 | 4.34 | 13.9 | 11.9 | 6.57 |
| Total PAH(16) | CE087 | N | 0.28 | mg/kg | 337 | 77.6 | 223 | 191 | 153 |
| Total Petroleum Hydrocarbons | | | | | | | | | |
| >C5-C6 Aliphatic (HS_1D_AL) | CE267 | N | 0.1 | mg/kg | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| >C6-C8 Aliphatic (HS_1D_AL) | CE267 | N | 0.1 | mg/kg | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| >C8-C10 Aliphatic (HS_1D_AL) | CE267 | N | 0.1 | mg/kg | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| >C10-C12 Aliphatic (EH_2D_AL) | CE250 | N | 1 | mg/kg | 2.7 | < 1.0 | 1.4 | 1.7 | 1.0 |
| >C12-C16 Aliphatic (EH_2D_AL) | CE250 | N | 0.5 | mg/kg | 14.5 | 2.3 | 5.0 | 6.5 | 3.7 |
| >C16-C21 Aliphatic (EH_2D_AL) | CE250 | N | 0.7 | mg/kg | 34.9 | 6.5 | 11.6 | 15.3 | 6.7 |
| >C21-C35 Aliphatic (EH_2D_AL) | CE250 | N | 4 | mg/kg | 51.7 | 10.3 | 22.5 | 26.6 | 11.4 |
| >C35-C44 Aliphatic (EH_2D_AL) | CE250 | N | 0.5 | mg/kg | 13.7 | 3.5 | 6.5 | 8.1 | 2.2 |
| >C5-C7 Aromatic (HS_1D_AR) | CE267 | N | 0.01 | mg/kg | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 |
| >C7-C8 Aromatic (HS_1D_AR) | CE267 | N | 0.01 | mg/kg | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 |
| >C8-C10 Aromatic (HS_1D_AR) | CE267 | N | 0.01 | mg/kg | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 |
| >C10-C12 Aromatic (EH_2D_AR) | CE250 | N | 0.6 | mg/kg | 14.9 | 4.7 | 6.5 | 9.6 | 6.0 |
| >C12-C16 Aromatic (EH_2D_AR) | CE250 | N | 1 | mg/kg | 75.1 | 19.4 | 29.2 | 46.2 | 21.5 |
| >C16-C21 Aromatic (EH_2D_AR) | CE250 | N | 2 | mg/kg | 562 | 129 | 214 | 312 | 85.2 |
| >C21-C35 Aromatic (EH_2D_AR) | CE250 | N | 4.5 | mg/kg | 1260 | 329 | 551 | 686 | 187 |
| >C35-C44 Aromatic (EH_2D_AR) | CE250 | N | 2 | mg/kg | 231 | 64.2 | 112 | 136 | 40.5 |

## SOILS

| Lab Number | | | | | 46137 |
|---|---|---|---|---|---|
| Client Reference | | | | | SOIL |
| Sample ID | | | | | TP38 |
| Depth (m) | | | | | 0.60 |
| Sampling Date | | | | | 24/04/2025 |
| **Test** | **Method** | **Accred** | **LoD** | **Units** | |
| **Asbestos** | | | | | |
| Asbestos Identification | SUBCON | SU | 0 | - | NAD |
| **Metals** | | | | | |
| Arsenic | CE264 | U | 1.8 | mg/kg | 57.7 |
| Cadmium | CE264 | M | 1.6 | mg/kg | < 1.6 |
| Chromium | CE264 | U | 2 | mg/kg | 35.1 |
| Copper | CE264 | M | 1.6 | mg/kg | 82.8 |
| Lead | CE264 | U | 2.3 | mg/kg | 108 |
| Mercury | CE264 | U | 0.7 | mg/kg | < 0.7 |
| Nickel | CE264 | M | 2.1 | mg/kg | 31.3 |
| Selenium | CE264 | U | 3 | mg/kg | < 3.0 |
| Zinc | CE264 | M | 4 | mg/kg | 270 |
| **Combustion** | | | | | |
| Moisture Content | CE001 | N | 0.1 | % | 17.3 |
| Soil Organic Matter | CE192 | N | 0.1 | % | 22.4 |
| **Polyaromatic hydrocarbons** | | | | | |
| Naphthalene | CE087 | M | 0.016 | mg/kg | 2.39 |
| Acenaphthylene | CE087 | M | 0.015 | mg/kg | 0.208 |
| Acenaphthene | CE087 | M | 0.013 | mg/kg | 4.11 |
| Fluorene | CE087 | U | 0.013 | mg/kg | 2.11 |
| Phenanthrene | CE087 | M | 0.014 | mg/kg | 17.6 |
| Anthracene | CE087 | U | 0.017 | mg/kg | 2.23 |
| Fluoranthene | CE087 | M | 0.017 | mg/kg | 17.2 |
| Pyrene | CE087 | M | 0.016 | mg/kg | 13.7 |
| Benzo(a)anthracene | CE087 | U | 0.012 | mg/kg | 5.48 |
| Chrysene | CE087 | M | 0.028 | mg/kg | 6.85 |
| Benzo(b)fluoranthene | CE087 | M | 0.02 | mg/kg | 5.91 |
| Benzo(k)fluoranthene | CE087 | M | 0.025 | mg/kg | 2.28 |
| Benzo(a)pyrene | CE087 | U | 0.019 | mg/kg | 5.79 |
| Indeno(1,2,3-cd)pyrene | CE087 | M | 0.019 | mg/kg | 3.89 |
| Dibenzo(a,h)anthracene | CE087 | M | 0.017 | mg/kg | 1.03 |

## SOILS

| Lab Number | | | | | 46137 |
|---|---|---|---|---|---|
| Client Reference | | | | | SOIL |
| Sample ID | | | | | TP38 |
| Depth (m) | | | | | 0.60 |
| Sampling Date | | | | | 24/04/2025 |
| **Test** | **Method** | **Accred** | **LoD** | **Units** | |
| Benzo(g,h,i)perylene | CE087 | M | 0.019 | mg/kg | 3.42 |
| Total PAH(16) | CE087 | N | 0.28 | mg/kg | 94.2 |
| **Total Petroleum Hydrocarbons** | | | | | |
| >C5-C6 Aliphatic (HS_1D_AL) | CE267 | N | 0.1 | mg/kg | < 0.10 |
| >C6-C8 Aliphatic (HS_1D_AL) | CE267 | N | 0.1 | mg/kg | < 0.10 |
| >C8-C10 Aliphatic (HS_1D_AL) | CE267 | N | 0.1 | mg/kg | < 0.10 |
| >C10-C12 Aliphatic (EH_2D_AL) | CE250 | N | 1 | mg/kg | < 1.0 |
| >C12-C16 Aliphatic (EH_2D_AL) | CE250 | N | 0.5 | mg/kg | 2.7 |
| >C16-C21 Aliphatic (EH_2D_AL) | CE250 | N | 0.7 | mg/kg | 4.1 |
| >C21-C35 Aliphatic (EH_2D_AL) | CE250 | N | 4 | mg/kg | 7.0 |
| >C35-C44 Aliphatic (EH_2D_AL) | CE250 | N | 0.5 | mg/kg | 1.5 |
| >C5-C7 Aromatic (HS_1D_AR) | CE267 | N | 0.01 | mg/kg | < 0.010 |
| >C7-C8 Aromatic (HS_1D_AR) | CE267 | N | 0.01 | mg/kg | < 0.010 |
| >C8-C10 Aromatic (HS_1D_AR) | CE267 | N | 0.01 | mg/kg | < 0.010 |
| >C10-C12 Aromatic (EH_2D_AR) | CE250 | N | 0.6 | mg/kg | 4.1 |
| >C12-C16 Aromatic (EH_2D_AR) | CE250 | N | 1 | mg/kg | 12.9 |
| >C16-C21 Aromatic (EH_2D_AR) | CE250 | N | 2 | mg/kg | 41.3 |
| >C21-C35 Aromatic (EH_2D_AR) | CE250 | N | 4.5 | mg/kg | 96.3 |
| >C35-C44 Aromatic (EH_2D_AR) | CE250 | N | 2 | mg/kg | 25.5 |

## METHOD DETAILS

| METHOD | TESTNAME | METHOD SUMMARY | ANALYSIS BASIS |
|---|---|---|---|
| CE267 | VPH in Soil | HS-GCFID | As submitted sample |
| CE250 | GCXGC in Solids | DCM Extraction and GCxGC-FID | As submitted sample |
| SUBCON | Asbestos Solid | HSG248 | Air Dried Sample |
| CE264 | Metals by ICP in Soil | ICPOES | Air dried sample |
| CE087 | PAH in Soil | DCM Extraction and GCMS | As submitted sample |

# REPORT INFORMATION

**Report No.:25-03904, issue number 1**

| Key | |
|---|---|
| U | ISO17025 Accredited Result |
| M | ISO17025 and MCERTS Accredited Result |
| N | Do not currently hold accreditation |
| ^ | MCERTS accreditation not applicable for sample matrix |
| * | ISO17025 accreditation not applicable for sample matrix |
| S | Subcontracted |
| I/S | Insufficient Sample |
| U/S | Unsuitable sample |
| N/T | Not tested |
| < | Means "less than" |
| > | Means "greater than" |

LOD refers to limit of detection, except in the case of pH soils and pH waters where it means limit of discrimination.
This report shall not be reproduced except in full, without prior written approval.
Opinions and interpretations expressed herein are outside the UKAS accreditation scope.
All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.
The results relate only to the sample received.
Unless otherwise stated, sample information has been provided by the client. This may affect the validity of the results.
Moisture Content Calculated on a Wet Weight basis
Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.
Sampling was undertaken by Chemtech Environmental Limited and is outside the UKAS accreditation scope.
Methods, procedures and performance data are available on request.
Results reported herein relate only to the material supplied to the laboratory.
BTEX compounds are identified by retention time only and may include interference from co-eluting compounds.
For soils and solids, all results are reported on a dry basis. Samples dried at no more than 30°C in a drying
For soils and solids, analytical results are inclusive of stones, where applicable.

**Sample Retention and Disposal**

All soil samples will be retained for a period of 4 weeks from the point of receipt
All water samples will be retained for a period of 2 weeks from the point of Reporting
Charges may apply to extended sample storage

**TPH Classification - HWOL Acronym System**

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

Vat Reg No. 772 5703 18 Registered in England number 4284013

| Lab Number | | | 46132 | 46133 | 46134 | 46135 | 46136 | 46137 |
|---|---|---|---|---|---|---|---|---|
| **Client Reference** | | | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL |
| **Sample ID** | | | TP1A | TP1B | TP2A | TP2B | TP3A | TP3B |
| **Depth (m)** | | | 0.25 | 0.60 | 0.35 | 0.60 | 0.30 | 0.60 |
| **Sampling Date** | | | 24/04/2025 | 24/04/2025 | 24/04/2025 | 24/04/2025 | 24/04/2025 | 24/04/2025 |
| **Test** | **Method** | **Units** | | | | | | |
| **Asbestos** | | | | | | | | |
| Asbestos Identification | SUBCON | - | NAD | NAD | NAD | NAD | NAD | NAD |
| **Metals** | | | | | | | | |
| Arsenic | CE264 | mg/kg | 30.2 | 14.7 | 37.7 | 36.5 | 48.5 | 57.7 |
| Cadmium | CE264 | mg/kg | < 1.6 | < 1.6 | < 1.6 | < 1.6 | < 1.6 | < 1.6 |
| Chromium | CE264 | mg/kg | 40.2 | 32.5 | 38.7 | 37.2 | 40.3 | 35.1 |
| Copper | CE264 | mg/kg | 98.6 | 1460.0 | 233.0 | 157.0 | 98.9 | 82.8 |
| Lead | CE264 | mg/kg | 179.0 | 65.0 | 185.0 | 164.0 | 172.0 | 108.0 |
| Mercury | CE264 | mg/kg | < 0.7 | < 0.7 | < 0.7 | < 0.7 | < 0.7 | < 0.7 |
| Nickel | CE264 | mg/kg | 33.8 | 9.2 | 22.5 | 21.4 | 31.1 | 31.3 |
| Selenium | CE264 | mg/kg | < 3.0 | 4.6 | 3.4 | < 3.0 | < 3.0 | < 3.0 |
| Zinc | CE264 | mg/kg | 218.0 | 614.0 | 359.0 | 265.0 | 267.0 | 270.0 |
| **Combustion** | | | | | | | | |
| Moisture Content | CE001 | % | 14.4 | 14.0 | 12.9 | 15.1 | 15.9 | 17.3 |
| Soil Organic Matter | CE192 | % | 11.90 | 4.62 | 12.00 | 10.20 | 13.20 | 22.40 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Polyaromatic hydrocarbons** | | | | | | | | |
| Naphthalene | CE087 | mg/kg | 1.510 | 0.325 | 0.955 | 0.855 | 13.900 | 2.390 |
| Acenaphthylene | CE087 | mg/kg | 0.904 | 0.239 | 0.508 | 0.629 | 0.445 | 0.208 |
| Acenaphthene | CE087 | mg/kg | 2.550 | 0.626 | 2.040 | 1.270 | 6.270 | 4.110 |
| Fluorene | CE087 | mg/kg | 1.780 | 0.427 | 1.310 | 0.950 | 3.260 | 2.110 |
| Phenanthrene | CE087 | mg/kg | 26.400 | 5.960 | 19.100 | 15.500 | 20.900 | 17.600 |
| Anthracene | CE087 | mg/kg | 6.730 | 1.610 | 4.570 | 3.580 | 3.430 | 2.230 |
| Fluoranthene | CE087 | mg/kg | 58.500 | 14.800 | 40.500 | 33.400 | 22.300 | 17.200 |
| Pyrene | CE087 | mg/kg | 49.000 | 12.600 | 33.500 | 27.400 | 19.000 | 13.700 |
| Benzo(a)anthracene | CE087 | mg/kg | 28.300 | 6.830 | 19.100 | 16.500 | 10.400 | 5.480 |
| Chrysene | CE087 | mg/kg | 25.300 | 5.840 | 17.300 | 15.800 | 10.500 | 6.850 |
| Benzo(b)fluoranthene | CE087 | mg/kg | 34.200 | 7.330 | 21.900 | 19.500 | 12.100 | 5.910 |
| Benzo(k)fluoranthene | CE087 | mg/kg | 15.300 | 3.290 | 9.290 | 8.650 | 4.670 | 2.280 |
| Benzo(a)pyrene | CE087 | mg/kg | 34.200 | 6.410 | 19.700 | 17.300 | 10.800 | 5.790 |
| Indeno(1,2,3-cd)pyrene | CE087 | mg/kg | 23.800 | 5.720 | 16.100 | 14.900 | 7.460 | 3.890 |
| Dibenzo(a,h)anthracene | CE087 | mg/kg | 4.940 | 1.200 | 2.810 | 2.470 | 1.440 | 1.030 |
| Benzo(g,h,i)perylene | CE087 | mg/kg | 23.100 | 4.340 | 13.900 | 11.900 | 6.570 | 3.420 |
| Total PAH(16) | CE087 | mg/kg | 337.000 | 77.600 | 223.000 | 191.000 | 153.000 | 94.200 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Total Petroleum Hydrocarbons** | | | | | | | | |
| >C5-C6 Aliphatic (HS_1D_AL) | CE267 | mg/kg | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| >C6-C8 Aliphatic (HS_1D_AL) | CE267 | mg/kg | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| >C8-C10 Aliphatic (HS_1D_AL) | CE267 | mg/kg | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| >C10-C12 Aliphatic (EH_2D_AL) | CE250 | mg/kg | 2.7 | < 1.0 | 1.4 | 1.7 | 1.0 | < 1.0 |
| >C12-C16 Aliphatic (EH_2D_AL) | CE250 | mg/kg | 14.5 | 2.3 | 5.0 | 6.5 | 3.7 | 2.7 |
| >C16-C21 Aliphatic (EH_2D_AL) | CE250 | mg/kg | 34.9 | 6.5 | 11.6 | 15.3 | 6.7 | 4.1 |
| >C21-C35 Aliphatic (EH_2D_AL) | CE250 | mg/kg | 51.7 | 10.3 | 22.5 | 26.6 | 11.4 | 7.0 |
| >C35-C44 Aliphatic (EH_2D_AL) | CE250 | mg/kg | 13.7 | 3.5 | 6.5 | 8.1 | 2.2 | 1.5 |
| >C5-C7 Aromatic (HS_1D_AR) | CE267 | mg/kg | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 |
| >C7-C8 Aromatic (HS_1D_AR) | CE267 | mg/kg | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 |
| >C8-C10 Aromatic (HS_1D_AR) | CE267 | mg/kg | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 |
| >C10-C12 Aromatic (EH_2D_AR) | CE250 | mg/kg | 14.9 | 4.7 | 6.5 | 9.6 | 6.0 | 4.1 |
| >C12-C16 Aromatic (EH_2D_AR) | CE250 | mg/kg | 75.1 | 19.4 | 29.2 | 46.2 | 21.5 | 12.9 |
| >C16-C21 Aromatic (EH_2D_AR) | CE250 | mg/kg | 562.0 | 129.0 | 214.0 | 312.0 | 85.2 | 41.3 |
| >C21-C35 Aromatic (EH_2D_AR) | CE250 | mg/kg | 1260.0 | 329.0 | 551.0 | 686.0 | 187.0 | 96.3 |
| >C35-C44 Aromatic (EH_2D_AR) | CE250 | mg/kg | 231.0 | 64.2 | 112.0 | 136.0 | 40.5 | 25.5 |

# Appendix 2 – Trail pit logs

Overview of the site

## TP1 –northeast corner

| Trail Pit 1 – northeast corner | |
|---|---|
| 0.00-0.15m | grass, roots |
| 0.15-0.3m | sandy loam soil , some grit and small stones |
| 0.3-0.6m | sandy loam soil, more grit and stone, less organic matter |
| 0.6-0.8 | sandy loam soil, more grit and stone, less organic matter |

## TP2 – Centre of Site under former garage






| | |
|---|---|
| Trail Pit 2 –eastern boundary under former garage structure – no concrete | |
| 0.00-0.05m | concrete paving slab |
| 0.05-0.4m | sandy loam soil , some grit and small stones |
| 0.4-0.6m | sandy loam soil, more grit and stone, less organic matter |
| 0.6-0.9 | turning to clay, with grit |

## TP3 – (South) Western Corner – adjacent to road and neighbouring field






E06

Trail Pit 3 – southeast boundary

| | |
|---|---|
| 0.00-0.05m | grass, roots |
| 0.05-0.4m | Sandy loamy soil, grit, stone, glass and plastic fragments |
| 0.4-0.6m | Sandy loamy soil, some grit |
| 0.6-0.8m | sandy loamy soil, some coal fragments |

,