

HERTS & ESSEX SITE INVESTIGATIONS

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GEOTECHNICAL ASSESSMENTS – ENVIRONMENTAL ASSESSMENT - DESKTOP STUDY – CONTAMINATED LAND

Report For :

Mr K.Palmer

Phase II ENVIRONMENTAL REPORT

Site location :

**Cuffley Motor Company
71 Station Road
Cuffley
Herts
EN6 4HZ**

April 2022

Report No. 14617

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DOCUMENT INFORMATION AND CONTROL SHEET

Client

Mr K.Palmer

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- ONC, HNC, P.G.Cert, P.G.Dip, M.Sc, (Geotechnical Engineering)
- SNIFFER modelling course
- CONSIM Groundwater Assessment Course.
- (28 Years in Geotechnical and Environmental Engineering)
- Asbestos Awareness Course;
- Non-Licensed Work with Asbestos Including>NNLW.
- Site Supervisors Safety Training Scheme, (SSSTS).

Document Status and Approval Schedule

Issue No	Status	Date	Prepared by : Rebecca Chamberlain Signature / Date	Technical review by : Chris Gray Martyn Smith Signature / Date	Checked By : Chris Gray Martyn Smith Signature / Date
1	Final	April 2022			

REPORT ISSUE RECORD

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1	HESI, (File Copy)	Paper	1	April 2022
2	Mr K.Palmer	PDF	1	April 2022
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EXECUTIVE SUMMARY
Phase II - Environmental Report

Client	Mr K.Palmer	
Site Location	Cuffley Motor Company Ltd, 71 Station Road, Cuffley. Herts. EN6 4HZ	
Existing Development	Car Sales Showroom	
Proposed Development	Erection of three storey residential block (with basement parking) comprising of 9no two bedroom and 3no one bedroom flats with associated access, off-street parking, amenity space and landscaping.	
Site Settings and Previous Uses	<p>From the earliest map reference the site is recorded as open land within the north of the site area, with an outbuilding within the south of the site area. From 1898 a pond is shown in place within the north east of the site area, until 1935 when the site area was developed to form a building, and there removing the pond, therefore potentially being infilled. In 1970 the building was redeveloped to form the footprint of the building that remains in place to date. The use of the site area is recorded as a showroom of use car sales, Below ground tanks are recorded in place within the site area.</p> <p>Surrounding the site area open land was in place until residential land as developed to the east, north and west. In 1983 to the west of the site area residential land was developed. Further from the site area to the west railway lines were developed 50 meters from the site area. To the south and south east of the site works and a car park area in place which remain in place to date.</p>	
Nearest Surface Water Feature	The nearest surface water feature is recorded as 147 meters to the southeast of the site which is recorded as Cuffley Brook.	
Geological and Hydrological Profile	Geology	
	Made Ground	Shallow Made Ground Anticipated, which may be deeper around the tanks and the location of the in filled pond Not Classified
	Lambeth Group	Clay, Silt And Sand Secondary Aquifer
Groundwater Abstractions	The nearest abstraction well is located 723 meters to the south of the site which is recorded as a Private Non-Industrial Amenity: Transfer Between Sources. The nearest Potable Water Supply is recorded 1913 meters to the north of the site area.	
Source Protection Zone	The site does not lie within a Source Protection Zone. .	
Potential Sources of Contamination	On Site	Off Site
	<ul style="list-style-type: none"> - Car sales show room & forecourt - Garage - Storage area & Gully - Below ground Tanks - Asbestos (roofing) - Former Out building - Infilled Pond 	<ul style="list-style-type: none"> - Sewage works - Car Park - Garage - Works - Food Depot - Electric Sub Station - etc
Previous Investigations	No reports relating to contaminated land are known to us at the time of writing this report relating to the site.	

INVESTIGATION WORKS AND RISK ASSESSMENT REPORTING

1 Introduction

We have been asked by Mr K.Palmer to undertake an investigation of the above site in order to assess the potential environmental impact of the historical use of the site on the proposed development. The development of this report has been completed utilising information and assessments completed by ourselves developed from a desk top study completed in February 2018.

2 Report Objectives

The objectives of this report are to assess and define the extent of contamination within the site as a result of the investigation works undertaken to date.

2.1 Limitations

The opinions expressed within this document and the comments and recommendations given, are based on the information gained, to date within a desktop study previously undertaken on the site. The interpretation of the data has been made by Herts & Essex Site Investigations.

Within any site investigation, materials sampled represent only a small proportion of the materials present on site. It is therefore possible that other conditions prevailing at the site which have not been revealed within the scope of this report, have not been taken into account. Where suspect materials are encountered during any further or future works within the site, additional specialist advice should be sought to assess whether any new information will materially affect the recommendations given within any physical ground investigation.

2.2 Planning Condition

Planning conditions relate to 6/2016/0887/MAJ at Welwyn Hatfield Borough Council Offices details of which the site area is recorded below :-



1.3 Decision Notice Relating to Contaminated Land

Condition 8 relates to contaminated land Part a) is covered within this report.

Condition 8.

No development other than that required to be carried out as part of an approved scheme of remediation shall commence until conditions A to D have been complied with. If unexpected contamination is found after development has begun, development must be halted on that part of the site affected by the unexpected contamination to the extent specified by the Local Planning Authority in writing until condition D has been complied with in relation to that contamination.

Reference : CSG /ENV/ 14617

Site at Cuffley Motor Company, 71 Station Road, Cuffley. EN6 4HZ

(a) Site Characterisation

An investigation and risk assessment, in addition to any assessment provided with the planning application, must be completed in accordance with a scheme to assess the nature and extent of any contamination on the site, whether or not it originates on the site. The investigation and risk assessment must be undertaken by competent persons and a written report of the findings must be produced. The contents of the scheme and the written report are subject to the approval in writing of the Local Planning Authority. The report of the findings must include:

(i) a survey of the extent, scale and nature of contamination

(ii) an assessment of the potential risks to:

- human health
- property (existing or proposed) including buildings, crops, livestock, pets, woodland and service lines and pipes
- adjoining land
- groundwaters and surface waters
- ecological systems
- archaeological sites and ancient monuments

(iii) an appraisal of remedial options, and proposal of the preferred option(s).

This must be conducted in accordance with DEFRA and the Environment Agency's 'Model Procedures for the Management of Land Contamination, CLR 11'.

(b) Submission of Remediation Scheme

A detailed remediation scheme to bring the site to a condition suitable for the intended use by removing unacceptable risks to human health, buildings and other property and the natural and historical environment must be prepared, and is subject to the approval in writing of the Local Planning Authority. The scheme must include all works to be undertaken, proposed remediation objectives and remediation criteria, timetable of works and site management procedures. The scheme must ensure that the site will not qualify as contaminated land under Part 2A of the Environmental Protection Act 1990 in relation to the intended use of the land after remediation.

(c) Implementation of Approved Remediation Scheme

The approved remediation scheme must be carried out in accordance with its terms prior to the commencement of development other than that required to carry out remediation. The Local Planning Authority must be given two weeks written notification of commencement of the remediation scheme works.

Following completion of measures identified in the approved remediation scheme, a verification report that demonstrates the effectiveness of the remediation carried out must be produced, and is subject to the approval in writing of the Local Planning Authority.

(d) Reporting of Unexpected Contamination

In the event that contamination is found at any time when carrying out the approved development that was not previously identified it must be reported in writing immediately to the Local Planning Authority. An investigation and risk assessment must be undertaken in accordance with the requirements of condition 1, and where remediation is necessary a remediation scheme must be prepared in accordance with the requirements of condition 2, which is subject to the approval in writing of the Local Planning Authority.

Following completion of measures identified in the approved remediation scheme a verification report must be prepared, which is subject to the approval in writing of the Local Planning Authority in accordance with condition C.

(e) Long Term Monitoring and Maintenance

Where indicated in the approved remediation scheme, a monitoring and maintenance scheme to include, monitoring the long-term effectiveness of the proposed remediation over the agreed period of years, and the provision of reports on the same must be prepared, both of which are subject to the approval in writing of the Local Planning Authority. Following completion of the measures identified in that scheme and when the remediation objectives have been achieved, reports that demonstrate the effectiveness of the monitoring and maintenance carried out must be produced, and submitted to the Local Planning Authority. This must be conducted in accordance with DEFRA and the Environment Agency's 'Model Procedures for the Management of Land Contamination, CLR 11'.

REASON: To ensure that risks from land contamination to the future users of the land and neighbouring land are minimised, together with those to controlled waters, property and ecological systems, and to ensure that the development can be carried out safely without unacceptable risks to workers, neighbours and others offsite in accordance with Policies R2 and R7 of the Welwyn Hatfield District Plan 2005.

3 Site Location and National Grid Reference

The site is located within a residential area of Cuffley in Hertfordshire, the details of which are summarised in Table 1 with the location plan of the site shown in Appendix 2, Sheet 1.

Table 1 Site Detail

Site Address :	Cuffley Motor Company Ltd 71 Station Road Cuffley Potters Bar EN6 4HZ
Site assessed under	Site Owners Request - Aid as part of planning
Current use of land :	Car Sale showroom
Previous use of site, (if known)	As above
Grid Reference	NGR 530780, 202770
Site Area	0.1 Hectares
Local Authority	Welwyn Hatfield Borough Council Offices
Gradient of the site	The site and the surrounding area slopes down to the south
Proximity of Controlled Waters, (if known)	The nearest surface water feature is recorded as 147 meters to the south east of the site which is recorded as Cuffley Brook, which flow to the north

4 Review of Previous Reports or Documents Relating to the Site

4.1 Site Details

- The existing site is in use as a motor vehicle sales showroom which has a forecourt across the front and side of the site and a small storage area at the rear. Approximately three underground tanks are known to exist within the site;
- The proposed development forms the erection of three storey residential block (with basement parking) comprising of 9no two bedroom and 3no one bedroom flats with associated access, off-street parking, amenity space and landscaping;
- The geology within the site is identified as Made Ground which may locally be excessive around tank areas or farms and seen to overlie the Lambeth Group. This in turn will overlie London Clay;
- From the earliest map reference the site is recorded as open land within the north of the site area, with an outbuilding within the south of the site area. From 1898 a pond is shown in place within the north east of the site area, until 1935 when the site area was developed to form a building, and there removing the pond, therefore potentially being infilled. In 1970 the building was redeveloped to form the footprint of the building that remains in place to date. The use of the site area is recorded as a showroom of use car sales, Below ground tanks are recorded in place within the site area;
- Surrounding the site area open land was in place until residential land as developed to the east, north and west. In 1983 to the west of the site area residential land was developed. Further from the site area to the west railway lines were developed 50 meters from the site area. To the south and south east of the site works and a car park area in place which remain in place to date;
- The nearest surface water feature is recorded as 147 meters to the southeast of the site which is recorded as Cuffley Brook;
- The nearest abstraction well is located 723 meters to the south of the site which is recorded as a Private Non-Industrial Amenity: Transfer Between Sources. The nearest Potable Water Supply is recorded 1913 meters to the north of the site area;
- The site does not lie within a Source Protection Zone.

4.2 Risks derived from DTS

As a result of the works undertaken, the following have been confirmed as the following :

Source Risk

On Site

- Car sales show room & forecourt
- Garage
- Storage area & Gully
- Below ground Tanks
- Asbestos (roofing)
- Former Out building
- Infilled Pond

Off Site

- Sewage works
- Car Park
- Garage
- Works
- Food Depot
- Electric Sub Station
- etc

Pathways

Potential pathways in place within the site area recorded as : -

- Dermal Contact;
- Ingestion of dust and fibres;
- Ingestion of home grown produce;
- Inhalation of dust and fibres;
- Ingestion of contaminated water through water main pipework;
- Inhalation of vapours from soils;
- Inhalation of vapours from groundwater;
- Inhalation Asbestos dust and fibres (from asbestos within the soil);
Migration to residents off site.

Receptors

Potential receptors in place within the site area recorded as : -

- Human Health, (Site Development Personnel);
- Human Health, (Residents or staff);
- Adjoining Land Owners, (unlikely);
- Flora, (Plant Growth);
- Buildings, Construction Materials, Services;
- Groundwater;
- Surface Water.

Table 2 **Pollutant Risk**

Risk Assessment	Land Use	Pollutant
		Soil, Groundwater & Vapour Risk
	Features On Site	
Risk Assessment A	- Car sales show room & forecourt - Garage - Storage area & Gully - Below ground Tanks - Asbestos (roofing)	Moisture Content, pH, Electrical Conductivity, Cyanide, (Free), Cyanide, (Total), Organic Matter, Boron, Sulfate, (2:1 water soluble), Chromium, (Hexavalent), Sulfate, (Total), Arsenic, Cadmium, Chromium, Copper, Mercury, Nickel, Lead, Zinc, Speciated PAH's, (EPA Priority 16), Phenols, Asbestos, Total Petroleum Hydrocarbons (aliphatic/ aromatic 8-Band)
		Soil Sampling Groundwater & Vapour Assessment
		Soil, Groundwater & Vapour Risk
	Historical Features On Site	
Risk Assessment B	-Out building -Infilled Pond	Moisture Content, pH, Electrical Conductivity, Cyanide, (Free), Cyanide, (Total), Organic Matter, Boron, Sulfate, (2:1 water soluble), Chromium, (Hexavalent), Sulfate, (Total), Arsenic, Cadmium, Chromium, Copper, Mercury, Nickel, Lead, Zinc, Speciated PAH's, (EPA Priority 16), Phenols, Asbestos, Total Petroleum Hydrocarbons (aliphatic/ aromatic 8-Band), Naphthalene, CO ₂ , CH ₄ .
		Soil Sampling Groundwater & Vapour Assessment
	Off Site Features	
Risk Assessment C	-Sewage works -Car Park -Garage -Works -Food Depot -Electric Sub Station	Groundwater & Vapour Risk Total Petroleum Hydrocarbons (aliphatic/ aromatic 8-Band), Naphthalene, VOC's, PCB's
		Groundwater & Vapour Assessment
Spatial Sampling, (General Assessment)		Moisture Content, pH, Electrical Conductivity, Cyanide, (Free), Cyanide, (Total), Organic Matter, Boron, Sulfate, (2:1 water soluble), Chromium, (Hexavalent), Sulfate, (Total), Arsenic, Cadmium, Chromium, Copper, Mercury, Nickel, Lead, Zinc, Speciated PAH's, (EPA Priority 16), Phenols, Asbestos.

5 **Details of Preparatory Work**

Preparatory works had originally been agreed with the client to gain access and undertake excavations within the site. This incorporates free access across the site area, The proposed investigation was not inhibited in any way and had free access across the site.

6 **Details of Investigation Objectives.**

Within the scope of this report, the objectives will form the following :-

- To anticipate regulatory action and provide sufficient data to overcome and answer any outstanding queries they may raise;
- Provide the relevant authorities sufficient information to satisfy any regulatory requirements set for the site;
- To ensure that the development, on completion, will be fit for the proposed use with all risk assessed and removed.
- It is proposed within this investigation to assess the suitability of the site for a new development which will incorporate residential structure and associated landscaping;

- In order to assess this suitability for development, it is proposed to use a source-pathway-receptor analogy, which, if broken, presents a reduced risk to the development.
- It is proposed to assess, where possible, sources of contamination within the site as a result of historical or ongoing use and whether these uses have pathways to receptors within the proposed development.

7 Summery of Work Undertaken

The scope of the works involved excavation of boreholes as well as hand samples to gain a better and more visual understanding of the site conditions. This was undertaken at locations around the site and broadly confirmed the findings of the visual inspection of the site.

Samples were taken in containers dependent upon the proposed sampling regime required and placed in cool boxes where they were transported directly to the analytical chemist for assessment. These works included the following :-

7.1 Investigation Works Completed

The investigation works completed are as detailed below :-

1. The focus of the investigation was to confirm risks from the site which are detailed as follows :-
 - a. Assessment of the external former works area and possible contamination of the ground through working and storage of vehicles across the site;
 - b. Assessment of below ground tank farms;
 - c. Assessment of the former forecourt area;
 - d. Installation of gas and groundwater monitoring pipework for assessment of the ground gases relating to landfill, (BH2 – 1.0m to 8.0m);
2. Spatial sampling around the remainder of the site to provide a general assessment.

Initial Investigation – February 2018

- 6No Competitor Rig boreholes sunk across the site to depths of 3.00 meters;
- 2No Shell & Auger Boreholes sunk within the site to assess geological profile at depth. Sunk to a depth of 20 meters;
- Installation of a standpipe to a depth of 8.00 meters within Borehole Two - Response zone between 1.00-8.00 meters;
- Chemical Sampling and Testing recovered from samples and sent to analytical chemist, (22nd February 2018).

7.2 Historic Investigation

- Prior to our involvement in the development of the site, no historic investigations are known to us.

8 Location Plans for Exploratory Excavations

The plans which detail the location of the site, existing site use, proposed site use and identification of features on the site that may promote a risk are shown in Appendix Two. The plans also confirm the location of the excavations made on the site and detail areas where risk has been identified for pictorial reference.

The areas of risk will be dictated by the risk classification given in this report and confirm where risk is in place relevant to the proposed end land use classification.

9 Description of Site Works and on/off Site Observations

In order to provide an easy understanding of the proposed development, we can confirm that the site will assess as a single section of land with the same proposed land use.

The Site.

The site has been reviewed and we can confirm that the geology within the site is as follows :-

- **Made Ground** : has been identified within the site to depths of between 0.20-0.70 meters and generally forms a uniform FILL material, formed by Hardstanding (Concrete and Tarmac);
- **London Clay** ; By examination of the geological profile, it would appear that London Clay encroaches on the site and is present within the upper geological profile of the site. This is identified as to depths of the close of all shallow boreholes and to depths of between 13.10-16.40 meters in the deep boreholes
- **Lambeth Group** : Has been identified to depths 13.10-16.40 meters and present to the close of the boreholes at 20 meters. This is identified as granular soils.
- **Groundwater** : Groundwater has not been identified within the scope of these works.

10 Contamination Assessment

10.1 Contamination

In order to assess the site, the site will be considered based on the historic land use of the site which will depict the extent of testing undertaken to consider risk within the area and additionally, the site will consider the proposed land use for assessment of whether target values have been exceeded for that particular land use. Considering the above, we will assess the site based on the following :-

Table 3 Table of Source risk contamination based on GQRA

Existing Land Use	Proposed Land Use	Window Sampler No.	Depth (m)	Sample Type	
Vehicle Sales Showroom	Residential Land	WS1	0.50-0.55m	Clay	PT/AJ250/ AJ60
		WS1	1.50-1.55m	Clay	AJ250
		WS2	0.40-0.45m	Clay	PT/ AJ250 / AJ60
		WS2	1.00-1.05m	Clay	AJ250
		WS2	2.00-2.05m	Clay	AJ250
		WS3	0.30-0.35m	Clay	PT/ AJ250
		WS4	1.50-1.55m	Clay	AJ250
		WS4	2.50-2.55m	Clay	AJ250
		WS5	1.00-1.05m	Clay	PT/AJ250
		WS6	0.20-0.25m	Made Ground	PT/ AJ250/ AJ60
		WS6	0.70-0.75m	Clay	AJ250
		BH1	0.90-0.95m	Clay	PT/ AJ250 / AJ60
		BH2	1.00-1.05m	Clay	PT/ AJ250 / AJ60
		BH2	2.05-2.10m	Clay	AJ250
		BH2	2.75-2.80m	Clay	AJ250

10.2 Human Health Risk

As part of a generic assessment of the subsoil conditions, a comparison has initially been made using Generic Quantitative Assessment Criteria, (GQRA), values for contaminants derived the Environment Agency in Soil Guideline Values released in August 2015, LQM / CIEH - S4UL's for Human Health Risk Assessment and also Category 4 Screening Values, (DEFRA), to evaluate whether the levels of contamination measured at the site exceed the human health risk levels which have been derived for the site. For the proposed land use of this site, we can confirm that Generic Quantitative Assessment Criteria have been identified for the site. This is the order in which the Health Criteria Values will be used.

We are aware that the CIEH have published a 'Position Statement' which confirms that they do not wish to be associated with Category 4 screening values under the planning regime and as such would revert back to their own values, although, we are also aware that Local Authorities recommend the use of these value, although this is dependant upon the council EHO. As detailed above, the order of progression will be EA - SGV's, LQM / CIEH Data and then C4SL data.

It is possible that where exceedance of these values are recorded, a more Detailed, Qualitative Risk Assessment, (DQRA), could be completed using site specific scenarios and toxicological properties of the subsoil and site conditions to derive Site Specific Assessment Criteria, (SSAC), for the site. The assessment of testing has been completed as follows and reports the initial risks considered in place compared to GQRA

The site has been considered as Public Open Space Near Residential Housing :-

- **Zone 1** **The Site** **Residential land with plant uptake**

By comparison of the data recovered from the sample analysis against the human health risk assessments, it can be seen that exceedance of the relevant generic guidance values have been identified which are detailed as follows.

Table 4 **Source risk contamination based on GQRA for Residential Housing with Plant Uptake**

Location	Depth	TPH, Aliphatic C10-12	TPH, Aliphatic C12-C16	TPH, Aromatic C12-16	TPH, Aromatic C16-C21	Dibenzo[ah] anthracene
WS1	0.50-0.55m					
WS1	1.50-1.55m					
WS2	0.40-0.45m					
WS2	1.00-1.05m					
WS2	2.00-2.05m					
WS3	0.30-0.35m					
WS4	1.50-1.55m					
WS4	2.50-2.55m					
WS5	1.00-1.05m	390	2200	740	590	
WS6	0.20-0.25m					0.53
WS6	0.70-0.75m					
BH1	0.90-0.95m					
BH2	1.00-1.05m					
BH2	2.05-2.10m					
BH2	2.75-2.80m					
Residential Exposure Level		93	740	140	260	0.28

* Indicates the value which forms the lowest trigger level.

Some PAH's are additionally tested within the VOC List. The highest values have been taken.

For the purposes of assessment, Soil Organic Matter values of 2.5% has been used.

All measurements are given in mg/kg⁻¹

Reference : CSG /ENV/ 14617

Site at Cuffley Motor Company, 71 Station Road, Cuffley. EN6 4HZ

10.3 Source

Based on the information gained, we can confirm that some areas of the site has recorded contamination in place which can be confirmed as follows :-

- Based on the information gained, we can confirm that initially, very limited depths of made ground, if any, were in place below the surface hard cover. This can be confirmed as limited risk is in place below the hard landscaping sections of the site and whilst some FILL material is shown, insufficient amounts were in place for sampling;
- Where testing has been completed, very low level risk is identified in place with contamination marginally above the allowable level of risk for PAH's in one location and also some fuels in WS5 which is located down gradient of the underground fuel tank farm at a depth of approximately 1.00 meter deep;
- Based on the identified contamination results, we would suggest that Statistical Analysis will be required in order to consider the results in place and define any further works required.
- No Asbestos has been identified within the scope of the works undertaken;
- Risk to water main is considered likely to be in place and as such, Barrier Pipework is likely to be required.

10.4 Human Health Source Conclusions

Risk based on assessments of the site confirm that risk is in place as follows :-

The Site - Proposed End Use As Parkland

Risk Factor	Risks in place	Remediation
Targeted Risks	Dibenzo(a,h)anthracene Fuels	Isolated remediation to remove pollutant.
Spatial Risks	No widespread risks identified	
Additional Possible Risks	Marginally Elevated Fuels.	Consider additional sampling around underground tank farms.

10.5 Ground and Surface Water Source

The nearest surface water feature is recorded as 147 meters to the southeast of the site which is recorded as Cuffley Brook.

No discharge consents are recorded surrounding the site.

Two pollution incident to controlled waters is recorded as 156 meters to the south of the site which are recorded as Minor Incidents from Unknown Sewage and Oils – Unknown in 1996.

The published Environment Agency Groundwater Vulnerability Map of the area, (Sheet 40 Thames Estuary), indicates the site to be located within an area classified as a Secondary Aquifer.

The nearest abstraction well is located 723 meters to the south of the site which is recorded as a Private Non-Industrial Amenity: Transfer Between Sources. The nearest Potable Water Supply is recorded 1913 meters to the north of the site area.

The site does not lie within a Source Protection Zone.

The site based on the information gained, we can confirm that the data collected is not sufficient to classify the risk to groundwater at the site fully, although, in the absence of significant groundwater strikes, risk to ground water is low. Additional works will be required as follows :-

- Additional assessment of the level and extent of risk close to the underground fuel tank farms;
- Risk assessment and preparation of a site conceptual model to consider risks.

10.6 Vapour Risks

Considering the potential for vapour risk to be in place from various source as noted below, the following risk are in place.

Feature	Targeted Response Zone	Location to Target	Vapour or Gas risk
Fuels	Made Ground / Tank Farms	3 Locations	TPH's, Naphthalene.

Chemical testing has been completed and elevated level of these vaporous contamination have been recorded in place. Also when logging and sub-sampling these soils, a visual and olfactoral assessment of the soils have been completed and identified contamination that may promote a vapour risk.

10.7 Land Gas Assessments

Considering the potential for Land Gas risks due to the potential made ground and infilled gravel pit within the site area, Land Gas risk assessments must be completed. These will include the potential for contamination migration from on and off site sources which may be present in concentrations where risk is recorded.

Land gas monitoring should be specifically targeting the following land uses.

Feature	Targeted Response Zone	Location to Target	Vapour or Gas risk
Made ground and Infilled pond	Made Ground	Site Wide	Land Gases - CO ₂ , CH ₄ .

A visual appraisal has been made for any decomposable materials and fuels or organic compounds which may promote a risk, whilst sub-sampling soils at the site for chemical analysis. Based on this review, no visual risks were identified in place.

Testing confirms that there are no significantly high levels of organic matter within the soils. Which confirms that a low risk is likely to be in place.

10.8 General Source Risk Conclusions

The Site

Based on the information gained, we can confirm that initially, very limited depths of made ground, if any, were in place below the surface hard cover. This can be confirmed as limited risk is in place below the hard landscaping sections of the site and whilst some FILL material is shown, insufficient amounts were in place for sampling;

- **Dibenzo(a,h)anthracene is recorded as isolated to the location of WS6;**
- **Levels of Fuels have been identified in WS5 at a depth of 1.00 meters which are elevated;**
- **Vapour risk has a potential to be in place within the site;**
- **Risk to water main is in place and Barrier Pipework will be required for all areas of the site.**

Remediation works are therefore likely to be required where pathways are in place to receptors. This report confirms widespread contamination in place and therefore remediation works will be required to all sections of the site with appropriate validation.

11 Risk Assessment Based on Source Risk

Considering the presence of contamination which has been identified above, we confirm the following outlines the assessment of the site completed and way forward for the site.

Table 6 Risk Assessment A

Source	Receptors	Pathway	Mitigation / Discussion		
PAH's	Site Users, (current and future); Construction Workers; Adjacent Site Users, Fauna.	Direct contact	Risk is isolated to WS6		
		Ingestion dust and soil			
		Ingestion of soils attached to vegetation			
				Inhalation of asbestos fibers	Not Applicable
				Inhalation of vapours, (gas and organic)	No vapour risk from PAH contamination identified
				Explosive risk from Land Gas	Not Applicable
				Ingestion of contaminated water through water main pipework	No risk in place from PAH contamination identified
				Inhalation of vapours through contaminated ground waters	No vapour risk from PAH.
				Direct contact with contaminated ground waters	Groundwater risk has been identified as low based on the information gained.
		Surface Water.	Lateral migration of shallow groundwater to a target receptor.		
		Ground Water; Abstraction Well.	Migration through fissures / cracks which may migrate to a groundwater receptor.		
			Plants; Vegetation.	Plant uptake; Direct contact.	Plant Risks are considered Low based on assessments with ICRCCL old exposure levels. No specific plant risk assessment criteria is in place to date.
	Buildings; Construction Materials.	Direct contact with contaminated soils;	PAH's pose a low risk to the built environment.		
		Direct contact with contaminated groundwater	Groundwater risk has been identified as low based on the information gained.		

Table 7 Risk Assessment B

Source	Receptors	Pathway	Mitigation / Discussion	
Fuels	Site Users, (current and future); Construction Workers; Adjacent Site Users, Fauna.	Direct contact	Isolated risk identified to WS5, although, additional assessments around tank farms should be considered.	
		Ingestion dust and soil		
		Ingestion of soils attached to vegetation		
		Inhalation of asbestos fibers		Not Applicable
			Inhalation of vapours, (gas and organic)	Vapour risk is identified in place around the location of WS5, although, additional assessments around tank farms should be considered.
			Explosive risk from Land Gas	Not Applicable
			Ingestion of contaminated water through water main pipework	Risk is identified from fuels within the site. Barrier pipework is recommended.
			Inhalation of vapours through contaminated ground waters	No groundwater has been identified
			Direct contact with contaminated ground waters	
	Surface Water.	Lateral migration of shallow groundwater to a target receptor.	No groundwater has been identified	
	Ground Water; Abstraction Well.	Migration through fissures / cracks which may migrate to a groundwater receptor.		
	Plants; Vegetation.	Plant uptake; Direct contact.	Plant Risks are considered moderate based on assessments with ICRCCL old exposure levels. Plant growth is likely to be inhibited by fuels.	
	Buildings; Construction Materials.	Direct contact with contaminated soils;	Fuels if present is higher concentrations to that measured, may promote a risk to buildings and structures.	
Direct contact with contaminated groundwater		Groundwater risk has been identified as low based on the absence of identified groundwater		

12 Implications of the End Use of the Site

Within the assessment of the site completed within this report, we can confirm that existing source – pathway – receptor risk assessments are now in place based on actual site data. Based on the change in use of the site through this proposed development, it is possible that pathways to receptors will be either be removed or enhanced such that risk may be in place / removed.

The end use risks based on pathways are discussed below and relate to the site as a whole:-

- **Hard Landscaping** - will effectively cap off any contamination and remove risk, although, the placement of hard surfaces across the site should be confirmed as part of the planning application and not form a system of remediation that homeowners could remove as part of the ongoing habitation.
 - **We would suggest that any fuels identified within the site above a residential land use standard with plant uptake should be removed from the site and validated.**
- **Soft Landscaping** - will form an area where risk is in place and as such, remedial measures are likely to be required. Risks identified to WS5 and WS6 only.
- **Under Buildings** - will effectively cap off any contamination and remove risk. A hydrocarbon barrier will likely be required as a result of the presence of fuels;
- **Services** - By examination of the UKWIR, (Guidance for the selection of water supply pipes to be used in brownfield sites) we can confirm the risks associated with human health from water main feeds have been considered in place, as such, preventative measures **will** be required for the site. We would suggest that consultation with the relevant statutory authority will be required which may lead to all existing water mains being retained and any new water main installations being in '**Protecta-line**' pipework.

13 Outline Remediation Measures

Considering the above, we would suggest that the following outline remediation measures could be employed in order to develop the site based on the existing data. This will be based on the assumption that the entire site is contaminated.

13.1 Cover Systems - NHBC

The remedial measures are likely to include one of the following cover systems for the site :-

Engineered cover systems – designed to provide the complete separation of the receptor from the hazard and to perform a number of functions including limiting upward migration of contaminants due to capillary rise and controlling the downward infiltration of water.

Simple cover systems – to provide a reduction of the hazard to human health and to provide a suitable medium for plant growth.

Consultation within NHBC guidance documents, (Cover Systems for Land Regeneration), confirm that maximum depths of cover will be required for residential sites and overcome the inherent issues with earthworm activity, burrowing animals, effects of trees and plants, digging during garden activities and intermixing of leaf fall. Justification of this is included within the NHBC guidance document.

It is also recorded that as part of the review, a questionnaire was sent out to various Developers, Consultants and Regulators who all confirmed variable degrees of cover system based on the level of contamination which ranged from 0.30 meters to 3.00 meters, although, the report by NHBC removes these as conservative and the suggestion of a 0.60 meter cover system adopted by the report as a maximum depth of cover required to be sufficient.

It should be noted that these cover systems do not overcome the risks from soil gases, hydrocarbons, highly elevated Mercury or Arsenic, the groundwater or any controlled waters, significant contamination, deep excavations, services, slopes or areas where rabbit or badger populations are significant.

Table 8 Outline Remediation Measures for end use of the site

Land Use	Mitigation Measure	Depth to remove risk	Confirmation required.
Communal Areas	WS5 and WS6 Excavate and remove soils which are assessed to form a risk and placement of clean inert soils to a minimum depth of 0.60 meters. (See Cover Systems above for justification);	0.60m excavation and replacement of clean inert soils tested to confirm the infilled soils fall below the human health residential land use standards – Confirm level of contamination.	Validation Works will be required. Validation of sides and base of excavation and validation of any soils brought onto the site.
Shrub Planting Areas	Excavate and remove all fuel based contamination from the area of the tank farms	Excavate and remove contamination in full where fuels around the tank farm are identified.	
Hard Landscaping	Hard landscaping will remove any risks through pathway removal. Must be a permanent feature, (not patio's). Patio's should assume a soft landscape finish. Additionally, confirmation will be required from the Local or relevant Authority that hard landscaping areas will require specific permission to remove any and / or all hard surfaces which may expose contamination to human receptors.	None	Confirmation from relevant authority
Under Buildings	Install a hydrocarbon barrier in all habitable structures or validate full removal of fuels.		
Water Main	Any new water main installations can be installed using Barrier pipework.	None	To Be Confirmed with the relevant statutory authority
Controlled Waters – Surface Water Controlled Waters – Ground Water	Groundwater risks removed		

14 Waste Disposal

The Landfill Directive sets rigorous standards to reduce both our reliance on landfill and the environmental impact of wastes disposed of by landfill. Tighter operational and infrastructure standards limit the types and nature of waste that we can send to landfill and place greater restrictions on the location of landfill sites

The key points are:

- Certain kinds of waste cannot be landfilled.
- Landfills are classified according to whether they can accept hazardous, non-hazardous or inert wastes.
- Wastes can only be accepted at a landfill if they meet the waste acceptance criteria (WAC) for that class of landfill.
- Most wastes must be treated before you can send them to landfill.
- There are formal processes for identifying and checking wastes you must follow before wastes can be accepted at a landfill site.

The Council Decision lays down waste acceptance procedures (WAP). From this foundation landfill operators should build their own site-specific WAP. The Council Decision WAP must be used to determine whether a waste is suitable to go to landfill, and if so, to which class of landfill. The WAP consist of three steps to identify and periodically check the main characteristics of the waste (see Section 9):

- **Level 1:** basic characterisation. Before you can send a load of waste to landfill, you need to know its composition and properties so you can determine whether it is suitable for acceptance and at which class of site (see the Council Decision Annex, paragraph 1.1),
- **Level 2:** compliance testing. If you produce waste that is 'regularly arising', e.g. from an industrial process, you must periodically check the waste to ensure that those properties have not changed (see the Council Decision Annex, paragraph 1.2),
- **Level 3:** on-site verification. The operator must check each delivery at the landfill to verify that it is the expected waste and that it has not been contaminated in storage or transport (see the Council Decision Annex, paragraph 1.3).

Before a waste producer can take waste to a landfill site for disposal, they need to check the landfill site has the appropriate permit and must have completed the following:

- Duty of care transfer note/Hazardous Waste consignment note
- Pre-treatment declaration form
- Basic characterisation of the waste, to include:
 - Description of the waste
 - Waste code (using List of Wastes)
 - Composition of the waste (by testing, if necessary)
 - WAC testing (if required)

14.1 WAC Testing

Two WAC test has been completed on samples from the site area as follows:-

Table 9 WAC testing Results

Location	Depth (m)	Soil description	Classification	Reason
BH1	0.90-0.95	Soft Bluish Grey mottled brown slightly silty CLAY	INERT	
BH2	1.00-1.05	Soft Dark Grey gravelly sandy slightly silty CLAY	INERT	

15 Overview

The site has been reviewed based on the site being a single parcel of land. Contamination has been recorded in WS5 and WS6, although, is likely to be present as contamination from fuels in and around all tank farms locally.

We therefore confirm the following :-

- Contamination from PAH's to the area of Window Sampler 6 only;
- Likely isolated contamination extending away from the immediate tank farms in the three tank farm locations, (noted on plans), and confirmed by contamination in WS5 from fuels.
- Groundwater and surface water features are unlikely to be affected by the levels of contamination identified within the site and in the absence of groundwater at the site and depths of Clay identified;
- Risk to water main pipework has been identified and as such, Barrier Pipework will be required;
- A hydrocarbon barrier may be required in any habitable structure due to the presence of fuels
- Outline remediation measures have been suggested within this report in Table 7.
- Confirmation from the Local Authority that the level and extent of risk to a groundwater system is reduced;
- Confirmation from the Local Authority that the level and extent of contamination risk to human health is in place and appropriately assessed;
- Submission of this report as an interim report to the EA for consultation and Local Authority to confirm the condition of the site and the level and extent of assessment and proposals within this report are acceptable;
- Develop a Remediation Strategy Report.

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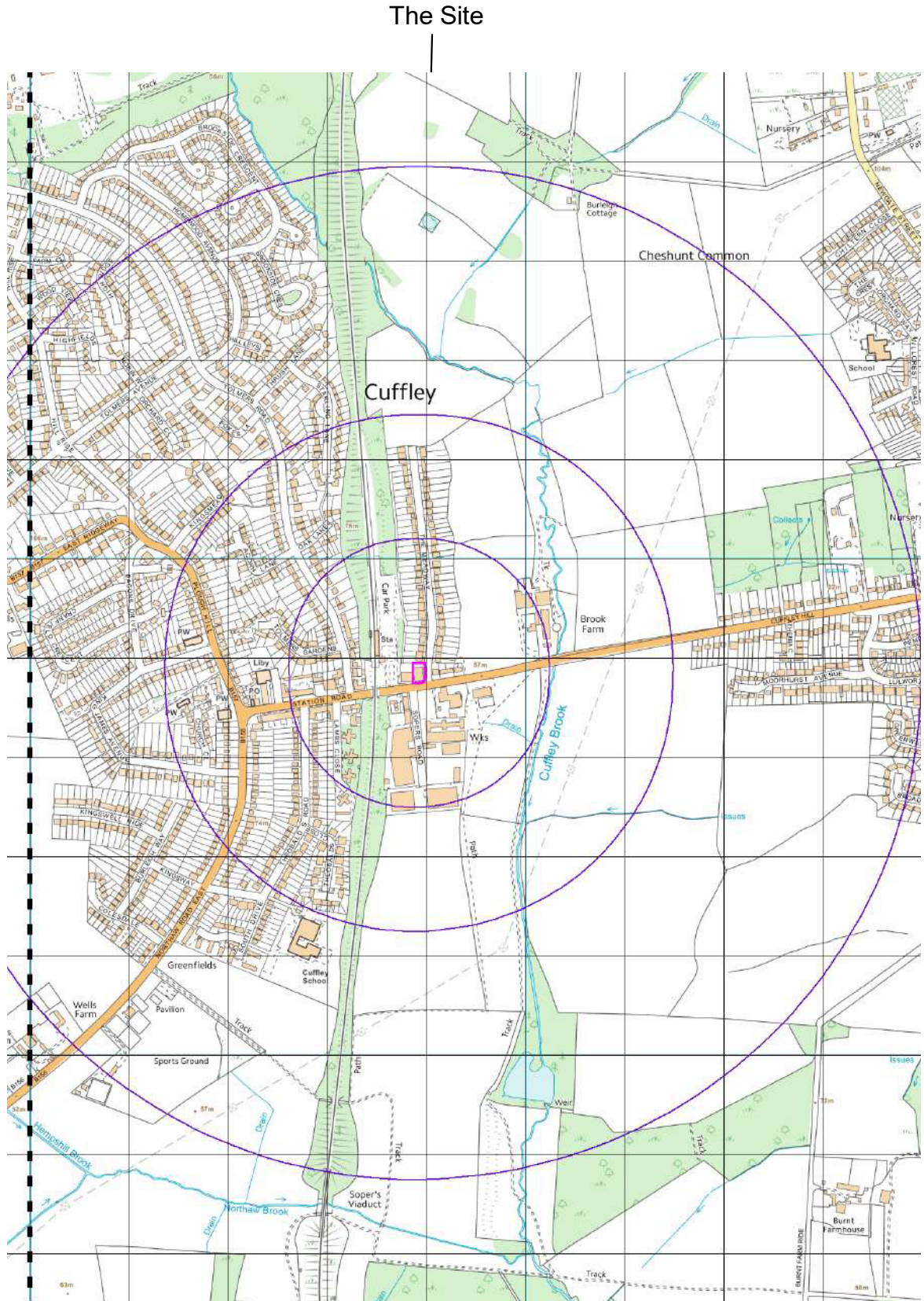
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Appendix No 2
Sheet No 1
Job No 14617
Date April 2022

Cuffley Motor Company Ltd, 71 Station Road, Cuffley. Herts. EN6 4HZ

Location Plan



Not to Scale
Sketch No. : DTS / 14617 / 02 / 01

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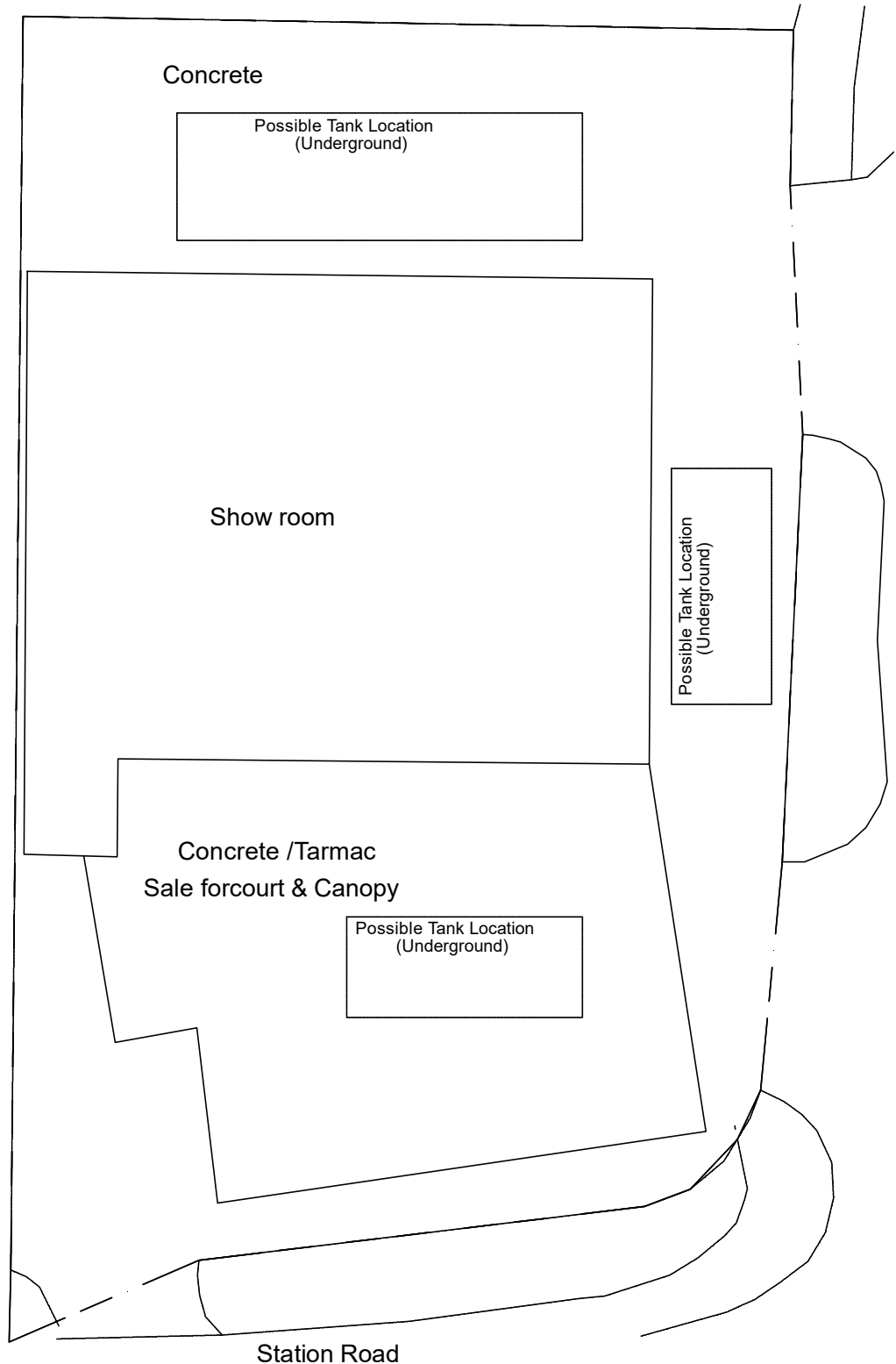
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Existing Site Plan



Not to Scale
Sketch No. : DTS / 14617 / 02 / 02

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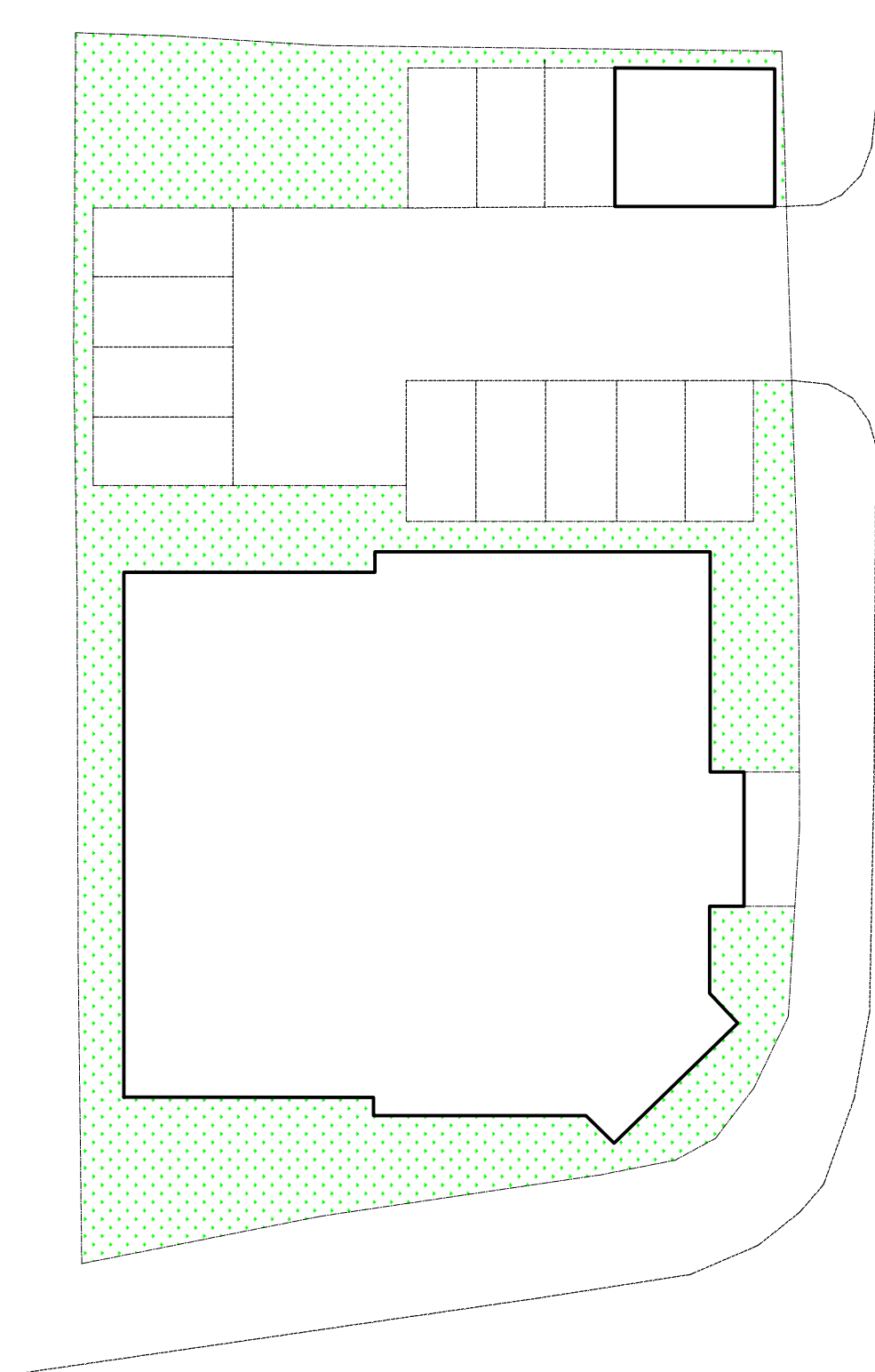
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Proposed Site Plan



Not to Scale
Sketch No. : DTS / 14617 / 02 / 03

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Appendix No. 3
Sheet No. 1
Job No. 14617
Date Feb 2018

Cuffley Motor Company Ltd, 71 Station Road, Cuffley. Herts. EN6 4HZ

Window Sampler One

Description of Strata	Legend	Depth	Thickness (m)	Water Level	Samples			S.P.T N-Value or Vane Strength	VOC (ppm)	Installation installed	Casing Depth(m)
					No.	Type	Depth (m)				
Concrete		0.30	0.30		1	U	GL-1.00				
Firm to stiff orange brown mottled grey brown slightly to moderately silty CLAY		1.20	1.20		2	U	1.00-2.00				1.00
Firm to stiff orange brown slightly silty CLAY		1.50	1.50		3	U	2.00-3.00				
Borehole closed at 3.00m		3.00									

Remarks:

Scale 1:25

Key : U—Undisturbed Sample (100mm diameter)

B —Bulk Sample
W—Water Struck

D —Disturbed Sample
S—Water Standing

W—Water Sample
T—Chemical Tub

N—S.P.T. N—Value
V—Vane Strength (kN/m²)

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Cuffley Motor Company Ltd, 71 Station Road, Cuffley. Herts. EN6 4HZ

Window Sampler Two

Description of Strata	Legend	Depth	Thickness (m)	Water Level	Samples			S.P.T N-Value or Vane Strength	VOC (ppm)	Installation installed	Casing Depth(m)
					No.	Type	Depth (m)				
Concrete		0.30	0.30		1	U	GL-1.00				
Firm to stiff orange brown mottled grey brown slightly to moderately silty CLAY			0.70								
		1.00			2	U	1.00-2.00				1.00
Firm to stiff orange brown slightly silty CLAY			2.00		3	U	2.00-3.00				
		3.00									
Borehole closed at 3.00m											

Remarks:

Scale 1:25

Key : U-Undisturbed Sample (100mm diameter)

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T-Chemical Tub

N-S.P.T. N-Value
V-Vane Strength (kN/m²)

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Window Sampler Three

Description of Strata	Legend	Depth	Thickness (m)	Water Level	Samples			S.P.T. N-Value or Vane Strength	VOC (ppm)	Installation installed	Casing Depth(m)
					No.	Type	Depth (m)				
Concrete		0.20	0.20		1	U	GL-1.00				
Firm to stiff orange brown slightly mottled grey slightly silty CLAY					2	U	1.00-2.00				1.00
			2.80		3	U	2.00-3.00				
		3.00									
Borehole closed at 3.00m											

Remarks:

Scale 1:25

Key : U-Undisturbed Sample (100mm diameter)

B -Bulk Sample
W-Water Struck

D -Disturbed Sample
S-Water Standing

W-Water Sample
T-Chemical Tub

N-S.P.T. N-Value
V-Vane Strength (kN/m²)

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Window Sampler Four


Description of Strata	Legend	Depth	Thickness (m)	Water Level	Samples			S.P.T N-Value or Vane Strength	VOC (ppm)	Installation installed	Casing Depth(m)
					No.	Type	Depth (m)				
Tarmac (0.03) over concrete		0.30	0.30		1	U	GL-1.00				
Firm to stiff orange brown slightly silty CLAY					2	U	1.00-2.00				1.00
			2.70		3	U	2.00-3.00				
Borehole closed at 3.00m		3.00									

Remarks:

Scale 1:25

Key : U-Undisturbed Sample (100mm diameter)

B -Bulk Sample
 -Water Struck

D -Disturbed Sample
 -Water Standing

W-Water Sample
 T-Chemical Tub

N-S.P.T. N-Value
 V-Vane Strength (kN/m²)

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Window Sampler Five

Description of Strata	Legend	Depth	Thickness (m)	Water Level	Samples			S.P.T N-Value or Vane Strength	VOC (ppm)	Installation installed	Casing Depth(m)
					No.	Type	Depth (m)				
Tarmac (0.03m) over Concrete		0.30	0.30		1	U	GL-0.70				
Crushed Concrete FILL		0.70	0.40								
Borehole closed at 0.70m											

Remarks:

Scale 1:25

Key : U-Undisturbed Sample (100mm diameter)

B -Bulk Sample
W-Water Struck

D -Disturbed Sample
S-Water Standing

W-Water Sample
T-Chemical Tub

N-S.P.T. N-Value
V-Vane Strength (kN/m²)

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Window Sampler Six

Description of Strata	Legend	Depth	Thickness (m)	Water Level	Samples			S.P.T N-Value or Vane Strength	VOC (ppm)	Installation installed	Casing Depth(m)
					No.	Type	Depth (m)				
Concrete		0.20	0.20		1	U	GL-1.00				
Loose brown reworked clay FILL		0.30	0.10								
Concrete		0.50	0.20								
Firm to stiff orange brown mottled grey brown slightly to moderately silty CLAY with occasional flint gravel		1.00	0.50								
Firm to stiff orange brown slightly silty CLAY			1.50		2	U	1.00-2.00				1.00
					3	U	2.00-3.00				
		2.50									
Firm to stiff orange brown slightly silty CLAY occasional rounded gravel			0.50								
		3.00									
Borehole closed at 3.00m											

Remarks:

Scale 1:25

Key : U-Undisturbed Sample (100mm diameter)

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S-Water Standing

W-Water Sample
T-Chemical Tub

N-S.P.T. N-Value
V-Vane Strength (kN/m²)

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Cuffley Motor Company Ltd, 71 Station Road, Cuffley. Herts. EN6 4HZ

Borehole One Continued

Description of Strata	Legend	Depth	Thickness (m)	Water Level	Samples			S.P.T N-Value or Vane Strength	VOC (ppm)	Installation installed	Casing Depth(m)
					No.	Type	Depth (m)				
As above			3.40								
		11.0			9	U	11.00				
		12.0			11	D	12.00	N=50+			
Dense light brown SAND			4.30								
		13.0			12	D	13.50	N=50+			
		14.0			13	D	15.00	N=50+			
		15.0			14	U	16.50	N=50+			
Dense orange brown SAND with rounded GRAVEL		16.40									
		17.0			1	B	18.00	N=50+			
		18.0	3.60								
		19.0			15	D	19.50	N=50+		19.50	
Borehole closed at 20.00m		20.00									

Remarks:

Scale 1:50

Key : U-Undisturbed Sample (100mm diameter)

B.-Bulk Sample
 -Water Struck

D -Disturbed Sample
 -Water Standing

W-Water Sample
 T-Chemical Tub

N-S.P.T. N-Value
 V-Vane Strength (kN/m²)

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Cuffley Motor Company Ltd, 71 Station Road, Cuffley. Herts. EN6 4HZ

Borehole Two

Description of Strata	Legend	Depth	Thickness (m)	Water Level	Samples			S.P.T N-Value or Vane Strength	VOC (ppm)	Installation installed	Casing Depth(m)
					No.	Type	Depth (m)				
Tarmac over reinforced concrete		0.25	0.25								
Soft dark grey gravelly sandy slightly silty CLAY		1.25	1.25								
Soft to firm brown mottled grey slightly silty sandy CLAY		1.50	0.70		1	U	1.60				
Soft to firm brown sandy slightly silty CLAY		2.20	0.70		2	U	2.30				
Firm to stiff brown claybound GRAVEL		2.90	1.00				2.90	N=22			
Stiff brown slightly silty sandy CLAY		3.90	0.45		3	U	3.90				
Stiff grey brown mottled slightly silty CLAY		4.35	0.45								
Stiff grey silty silty CLAY		4.80			4	U	5.00				
			4.00		5	U	6.50				
					6	U	8.00				
Stiff brown sandy silty CLAY		8.60									
becoming very sandy from 9.40			4.30		7	U	9.50				

Remarks:

Scale 1:50

Key : U—Undisturbed Sample (100mm diameter)

B —Bulk Sample
 —Water Struck

D —Disturbed Sample
 —Water Standing

W—Water Sample
 T—Chemical Tub

N—S.P.T. N—Value
 V—Vane Strength (kN/m²)

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Cuffley Motor Company Ltd, 71 Station Road, Cuffley. Herts. EN6 4HZ


Borehole Two Continued

Description of Strata	Legend	Depth	Thickness (m)	Water Level	Samples			S.P.T N-Value or Vane Strength	VOC (ppm)	Installation installed	Casing Depth(m)
					No.	Type	Depth (m)				
As above											
			4.30		8	U	11.00				
							12.50	N=50+			
		13.10									
Dense light brown SAND					14	D	13.30	N=50+			
			3.20								
					15	D	15.00	N=50+			
		16.30									
Dense orange brown SAND with rounded GRAVEL					16	U	16.40	N=50+			
			3.70								
					1	B	18.00	N=50+			
										19.00	
					17	D	19.50	N=50+			
Borehole closed at 20.00m		20.00									

Remarks:

Scale 1:50

Key : U—Undisturbed Sample (100mm diameter)

B —Bulk Sample
 —Water Struck

D —Disturbed Sample
 —Water Standing

W—Water Sample
 T—Chemical Tub

N—S.P.T. N—Value
 V—Vane Strength (kN/m²)

Final Report

Report No.: 18-05273-1

Initial Date of Issue: 27-Feb-2018

Client: Herts & Essex Site Investigations

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Contact(s): Chris Gray
Rebecca Chamberlain

Project: 14517 Cuffley Motor Company Ltd, 71
Station Road, Cuffley

Quotation No.: **Date Received:** 23-Feb-2018

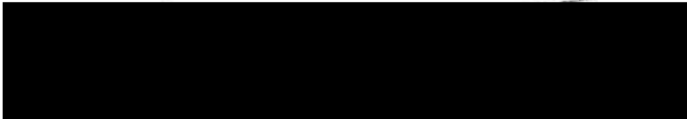
Order No.: **Date Instructed:** 23-Feb-2018

No. of Samples: 11

Turnaround (Wkdays): 3 **Results Due:** 27-Feb-2018

Date Approved: 27-Feb-2018

Approved By:

Details:  Martin Dyer, Laboratory Manager

Project: 14517 Cuffley Motor Company Ltd, 71 Station Road, Cuffley

Client: Herts & Essex Site Investigations		Chemtest Job No.:		18-05273	18-05273	18-05273	18-05273	18-05273	18-05273	18-05273	18-05273	18-05273	18-05273
Quotation No.:	Chemtest Sample ID.:		583398	583399	583400	583401	583402	583403	583404	583405	583406	583406	583406
Order No.:	Client Sample Ref.:		WS1	WS1	WS2	WS2	WS2	WS3	WS4	WS4	WS5	WS5	WS5
	Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):		0.50	1.50	0.40	1.00	2.00	0.30	1.50	2.50	1.00	1.00	1.00
	Bottom Depth (m):		0.55	1.55	0.45	1.05	2.05	0.35	1.55	2.55	1.05	1.05	1.05
	Date Sampled:		22-Feb-2018	22-Feb-2018	22-Feb-2018	22-Feb-2018	22-Feb-2018	22-Feb-2018	22-Feb-2018	22-Feb-2018	22-Feb-2018	22-Feb-2018	22-Feb-2018
	Asbestos Lab:		COVENTRY		COVENTRY			COVENTRY			COVENTRY		COVENTRY
Determinand	Accred.	SOP	Units	LOD									
ACM Type	U	2192		N/A	-			-			-		-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected			No Asbestos Detected			No Asbestos Detected		No Asbestos Detected
Moisture	N	2030	%	0.020	25	20	18	20	21	20	22	20	10
Stones and Removed Materials	N	2030	%	0.020	< 0.020		< 0.020			< 0.020			< 0.020
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones, Brick	NONE	Stones	Stones	NONE	NONE	Stones
Soil Texture	N	2040		N/A	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Loam	Sand
pH	U	2010		N/A	8.0		8.0			8.5			10.7
Electrical Conductivity (2:1)	N	2020	µS/cm	1.0	270		310			280			1000
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	0.86		1.5			0.72			1.7
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.019		0.038			0.040			1.4
Cyanide (Free)	U	2300	mg/kg	0.50	< 0.50		< 0.50			< 0.50			< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50		< 0.50			< 0.50			< 0.50
Sulphate (Total)	U	2430	%	0.010	0.054		0.082			0.053			0.70
Arsenic	U	2450	mg/kg	1.0	10		11			9.4			35
Cadmium	U	2450	mg/kg	0.10	0.21		0.23			0.23			0.23
Copper	U	2450	mg/kg	0.50	19		13			13			22
Mercury	U	2450	mg/kg	0.10	< 0.10		0.10			< 0.10			< 0.10
Nickel	U	2450	mg/kg	0.50	21		22			18			22
Lead	U	2450	mg/kg	0.50	110		29			17			21
Zinc	U	2450	mg/kg	0.50	72		50			48			91
Chromium (Trivalent)	N	2490	mg/kg	1.0	28		23			30			35
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50		< 0.50			< 0.50			< 0.50
Organic Matter	U	2625	%	0.40	1.9		1.1			1.1			0.45
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	10	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	19
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	28	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	390
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	44	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	2200
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	2800
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1000
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	82	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	6400
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Project: 14517 Cuffley Motor Company Ltd, 71 Station Road, Cuffley

Client: Herts & Essex Site Investigations		Chemtest Job No.:		18-05273	18-05273	18-05273	18-05273	18-05273	18-05273	18-05273	18-05273	18-05273
Quotation No.:	Chemtest Sample ID.:	583398	583399	583400	583401	583402	583403	583404	583405	583406		
Order No.:	Client Sample Ref.:	WS1	WS1	WS2	WS2	WS2	WS3	WS4	WS4	WS5		
	Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL		
	Top Depth (m):	0.50	1.50	0.40	1.00	2.00	0.30	1.50	2.50	1.00		
	Bottom Depth (m):	0.55	1.55	0.45	1.05	2.05	0.35	1.55	2.55	1.05		
	Date Sampled:	22-Feb-2018	22-Feb-2018	22-Feb-2018	22-Feb-2018	22-Feb-2018	22-Feb-2018	22-Feb-2018	22-Feb-2018	22-Feb-2018		
	Asbestos Lab:	COVENTRY		COVENTRY			COVENTRY			COVENTRY		
Determinand	Accred.	SOP	Units	LOD								
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	1.5	< 1.0	< 1.0	< 1.0	< 1.0	20
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	740
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	590
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	210
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	1600
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	84	< 10	< 10	< 10	< 10	8000
Naphthalene	U	2700	mg/kg	0.10	< 0.10		< 0.10		< 0.10			< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10		< 0.10		< 0.10			< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10		< 0.10		< 0.10			< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10		< 0.10		< 0.10			< 0.10
Phenanthrene	U	2700	mg/kg	0.10	< 0.10		< 0.10		< 0.10			< 0.10
Anthracene	U	2700	mg/kg	0.10	< 0.10		< 0.10		< 0.10			< 0.10
Fluoranthene	U	2700	mg/kg	0.10	< 0.10		< 0.10		< 0.10			< 0.10
Pyrene	U	2700	mg/kg	0.10	< 0.10		< 0.10		< 0.10			< 0.10
Benzo[a]anthracene	U	2700	mg/kg	0.10	< 0.10		< 0.10		< 0.10			< 0.10
Chrysene	U	2700	mg/kg	0.10	< 0.10		< 0.10		< 0.10			< 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10		< 0.10		< 0.10			< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10		< 0.10		< 0.10			< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10		< 0.10		< 0.10			< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10		< 0.10		< 0.10			< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10		< 0.10		< 0.10			< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10		< 0.10		< 0.10			< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0	< 2.0		< 2.0		< 2.0			< 2.0
Dichlorodifluoromethane	N	2760	µg/kg	1.0	< 1.0		< 1.0					
Chloromethane	U	2760	µg/kg	1.0	< 1.0		< 1.0					
Vinyl Chloride	U	2760	µg/kg	1.0	< 1.0		< 1.0					
Bromomethane	U	2760	µg/kg	20	< 20		< 20					
Chloroethane	N	2760	µg/kg	2.0	< 2.0		< 2.0					
Trichlorofluoromethane	U	2760	µg/kg	1.0	< 1.0		< 1.0					
1,1-Dichloroethene	U	2760	µg/kg	1.0	< 1.0		< 1.0					
Trans 1,2-Dichloroethene	U	2760	µg/kg	1.0	< 1.0		< 1.0					
1,1-Dichloroethane	U	2760	µg/kg	1.0	< 1.0		< 1.0					
cis 1,2-Dichloroethene	U	2760	µg/kg	1.0	< 1.0		< 1.0					
Bromochloromethane	N	2760	µg/kg	5.0	< 5.0		< 5.0					

Project: 14517 Cuffley Motor Company Ltd, 71 Station Road, Cuffley

Client: Herts & Essex Site Investigations		Chemtest Job No.:		18-05273	18-05273	18-05273	18-05273	18-05273	18-05273	18-05273	18-05273	18-05273
Quotation No.:	Chemtest Sample ID.:	583398	583399	583400	583401	583402	583403	583404	583405	583406		
Order No.:	Client Sample Ref.:	WS1	WS1	WS2	WS2	WS2	WS3	WS4	WS4	WS5		
	Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL		
	Top Depth (m):	0.50	1.50	0.40	1.00	2.00	0.30	1.50	2.50	1.00		
	Bottom Depth (m):	0.55	1.55	0.45	1.05	2.05	0.35	1.55	2.55	1.05		
	Date Sampled:	22-Feb-2018	22-Feb-2018	22-Feb-2018	22-Feb-2018	22-Feb-2018	22-Feb-2018	22-Feb-2018	22-Feb-2018	22-Feb-2018		
	Asbestos Lab:	COVENTRY		COVENTRY			COVENTRY			COVENTRY		
Determinand	Accred.	SOP	Units	LOD								
Trichloromethane	U	2760	µg/kg	1.0	< 1.0							
1,1,1-Trichloroethane	U	2760	µg/kg	1.0	< 1.0							
Tetrachloromethane	U	2760	µg/kg	1.0	< 1.0							
1,1-Dichloropropene	N	2760	µg/kg	1.0	< 1.0							
Benzene	U	2760	µg/kg	1.0	< 1.0							
1,2-Dichloroethane	U	2760	µg/kg	2.0	< 2.0							
Trichloroethene	U	2760	µg/kg	1.0	< 1.0							
1,2-Dichloropropane	U	2760	µg/kg	1.0	< 1.0							
Dibromomethane	U	2760	µg/kg	1.0	< 1.0							
Bromodichloromethane	U	2760	µg/kg	5.0	< 5.0							
cis-1,3-Dichloropropene	N	2760	µg/kg	10	< 10							
Toluene	U	2760	µg/kg	1.0	< 1.0							
Trans-1,3-Dichloropropene	N	2760	µg/kg	10	< 10							
1,1,2-Trichloroethane	U	2760	µg/kg	10	< 10							
Tetrachloroethene	U	2760	µg/kg	1.0	< 1.0							
1,3-Dichloropropane	N	2760	µg/kg	2.0	< 2.0							
Dibromochloromethane	N	2760	µg/kg	10	< 10							
1,2-Dibromoethane	U	2760	µg/kg	5.0	< 5.0							
Chlorobenzene	U	2760	µg/kg	1.0	< 1.0							
1,1,1,2-Tetrachloroethane	U	2760	µg/kg	2.0	< 2.0							
Ethy benzene	U	2760	µg/kg	1.0	< 1.0							
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0							
o-Xylene	U	2760	µg/kg	1.0	< 1.0							
Styrene	U	2760	µg/kg	1.0	< 1.0							
Tribromomethane	N	2760	µg/kg	1.0	< 1.0							
Isopropylbenzene	U	2760	µg/kg	1.0	< 1.0							
Bromobenzene	U	2760	µg/kg	1.0	< 1.0							
1,2,3-Trichloropropane	N	2760	µg/kg	50	< 50							
N-Propylbenzene	N	2760	µg/kg	1.0	< 1.0							
2-Chlorotoluene	U	2760	µg/kg	1.0	< 1.0							
1,3,5-Trimethylbenzene	U	2760	µg/kg	1.0	< 1.0							
4-Chlorotoluene	N	2760	µg/kg	1.0	< 1.0							
Tert-Butylbenzene	N	2760	µg/kg	1.0	< 1.0							
1,2,4-Trimethylbenzene	U	2760	µg/kg	1.0	< 1.0							
Sec-Butylbenzene	N	2760	µg/kg	1.0	< 1.0							
1,3-Dichlorobenzene	U	2760	µg/kg	1.0	< 1.0							

Project: 14517 Cuffley Motor Company Ltd, 71 Station Road, Cuffley

Client: Herts & Essex Site Investigations	Chemtest Job No.:		18-05273	18-05273	18-05273	18-05273	18-05273	18-05273	18-05273	18-05273	18-05273
Quotation No.:	Chemtest Sample ID.:		583398	583399	583400	583401	583402	583403	583404	583405	583406
Order No.:	Client Sample Ref.:		WS1	WS1	WS2	WS2	WS2	WS3	WS4	WS4	WS5
	Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):		0.50	1.50	0.40	1.00	2.00	0.30	1.50	2.50	1.00
	Bottom Depth (m):		0.55	1.55	0.45	1.05	2.05	0.35	1.55	2.55	1.05
	Date Sampled:		22-Feb-2018	22-Feb-2018	22-Feb-2018	22-Feb-2018	22-Feb-2018	22-Feb-2018	22-Feb-2018	22-Feb-2018	22-Feb-2018
	Asbestos Lab:		COVENTRY		COVENTRY			COVENTRY			COVENTRY
Determinand	Accred.	SOP	Units	LOD							
4-Isopropyltoluene	N	2760	µg/kg	1.0	< 1.0			< 1.0			
1,4-Dichlorobenzene	U	2760	µg/kg	1.0	< 1.0			< 1.0			
N-Butylbenzene	N	2760	µg/kg	1.0	< 1.0			< 1.0			
1,2-Dichlorobenzene	U	2760	µg/kg	1.0	< 1.0			< 1.0			
1,2-Dibromo-3-Chloropropane	N	2760	µg/kg	50	< 50			< 50			
1,2,4-Trichlorobenzene	U	2760	µg/kg	1.0	< 1.0			< 1.0			
Hexachlorobutadiene	N	2760	µg/kg	1.0	< 1.0			< 1.0			
1,2,3-Trichlorobenzene	N	2760	µg/kg	2.0	< 2.0			< 2.0			
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0	< 1.0			< 1.0			
PCB 28	U	2815	mg/kg	0.010				< 0.010			
PCB 52	U	2815	mg/kg	0.010				< 0.010			
PCB 90+101	U	2815	mg/kg	0.010				< 0.010			
PCB 118	U	2815	mg/kg	0.010				< 0.010			
PCB 153	U	2815	mg/kg	0.010				< 0.010			
PCB 138	U	2815	mg/kg	0.010				< 0.010			
PCB 180	U	2815	mg/kg	0.010				< 0.010			
Total PCBs (7 Congeners)	N	2815	mg/kg	0.10				< 0.10			
Total Phenols	U	2920	mg/kg	0.30	< 0.30			< 0.30	< 0.30		< 0.30

Project: 14517 Cuffley Motor Company Ltd, 71 Station Road, Cuffley

Client: Herts & Essex Site Investigations		Chemtest Job No.:		18-05273	18-05273
Quotation No.:	Chemtest Sample ID.:		583407	583408	
Order No.:	Client Sample Ref.:		WS6	WS6	
	Sample Type:		SOIL	SOIL	
	Top Depth (m):		0.20	0.70	
	Bottom Depth (m):		0.25	0.75	
	Date Sampled:		22-Feb-2018	22-Feb-2018	
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
ACM Type	U	2192		N/A	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected
Moisture	N	2030	%	0.020	15
Stones and Removed Materials	N	2030	%	0.020	< 0.020
Soil Colour	N	2040		N/A	Brown
Other Material	N	2040		N/A	Stones
Soil Texture	N	2040		N/A	Clay
pH	U	2010		N/A	11.0
Electrical Conductivity (2:1)	N	2020	µS/cm	1.0	720
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	0.88
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.45
Cyanide (Free)	U	2300	mg/kg	0.50	< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50
Sulphate (Total)	U	2430	%	0.010	0.29
Arsenic	U	2450	mg/kg	1.0	18
Cadmium	U	2450	mg/kg	0.10	0.82
Copper	U	2450	mg/kg	0.50	37
Mercury	U	2450	mg/kg	0.10	0.15
Nickel	U	2450	mg/kg	0.50	26
Lead	U	2450	mg/kg	0.50	100
Zinc	U	2450	mg/kg	0.50	250
Chromium (Trivalent)	N	2490	mg/kg	1.0	28
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50
Organic Matter	U	2625	%	0.40	4.0
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0

Project: 14517 Cuffley Motor Company Ltd, 71 Station Road, Cuffley

Client: Herts & Essex Site Investigations		Chemtest Job No.:		18-05273	18-05273
Quotation No.:	Chemtest Sample ID.:		583407	583408	
Order No.:	Client Sample Ref.:		WS6	WS6	
	Sample Type:		SOIL	SOIL	
	Top Depth (m):		0.20	0.70	
	Bottom Depth (m):		0.25	0.75	
	Date Sampled:		22-Feb-2018	22-Feb-2018	
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	4.8
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	13
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	18
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	18
Naphthalene	U	2700	mg/kg	0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10
Phenanthrene	U	2700	mg/kg	0.10	< 0.10
Anthracene	U	2700	mg/kg	0.10	< 0.10
Fluoranthene	U	2700	mg/kg	0.10	2.8
Pyrene	U	2700	mg/kg	0.10	3.1
Benzo[a]anthracene	U	2700	mg/kg	0.10	1.3
Chrysene	U	2700	mg/kg	0.10	2.6
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	2.2
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	1.3
Benzo[a]pyrene	U	2700	mg/kg	0.10	1.5
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	0.94
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	0.53
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	1.4
Total Of 16 PAH's	U	2700	mg/kg	2.0	18
Dichlorodifluoromethane	N	2760	µg/kg	1.0	< 1.0
Chloromethane	U	2760	µg/kg	1.0	< 1.0
Vinyl Chloride	U	2760	µg/kg	1.0	< 1.0
Bromomethane	U	2760	µg/kg	20	< 20
Chloroethane	N	2760	µg/kg	2.0	< 2.0
Trichlorofluoromethane	U	2760	µg/kg	1.0	< 1.0
1,1-Dichloroethene	U	2760	µg/kg	1.0	< 1.0
Trans 1,2-Dichloroethene	U	2760	µg/kg	1.0	< 1.0
1,1-Dichloroethane	U	2760	µg/kg	1.0	< 1.0
cis 1,2-Dichloroethene	U	2760	µg/kg	1.0	< 1.0
Bromochloromethane	N	2760	µg/kg	5.0	< 5.0

Project: 14517 Cuffley Motor Company Ltd, 71 Station Road, Cuffley

Client: Herts & Essex Site Investigations		Chemtest Job No.:		18-05273	18-05273
Quotation No.:	Chemtest Sample ID.:		583407	583408	
Order No.:	Client Sample Ref.:		WS6	WS6	
	Sample Type:		SOIL	SOIL	
	Top Depth (m):		0.20	0.70	
	Bottom Depth (m):		0.25	0.75	
	Date Sampled:		22-Feb-2018	22-Feb-2018	
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
Trichloromethane	U	2760	µg/kg	1.0	< 1.0
1,1,1-Trichloroethane	U	2760	µg/kg	1.0	< 1.0
Tetrachloromethane	U	2760	µg/kg	1.0	< 1.0
1,1-Dichloropropene	N	2760	µg/kg	1.0	< 1.0
Benzene	U	2760	µg/kg	1.0	< 1.0
1,2-Dichloroethane	U	2760	µg/kg	2.0	< 2.0
Trichloroethene	U	2760	µg/kg	1.0	< 1.0
1,2-Dichloropropane	U	2760	µg/kg	1.0	< 1.0
Dibromomethane	U	2760	µg/kg	1.0	< 1.0
Bromodichloromethane	U	2760	µg/kg	5.0	< 5.0
cis-1,3-Dichloropropene	N	2760	µg/kg	10	< 10
Toluene	U	2760	µg/kg	1.0	< 1.0
Trans-1,3-Dichloropropene	N	2760	µg/kg	10	< 10
1,1,2-Trichloroethane	U	2760	µg/kg	10	< 10
Tetrachloroethene	U	2760	µg/kg	1.0	< 1.0
1,3-Dichloropropane	N	2760	µg/kg	2.0	< 2.0
Dibromochloromethane	N	2760	µg/kg	10	< 10
1,2-Dibromoethane	U	2760	µg/kg	5.0	< 5.0
Chlorobenzene	U	2760	µg/kg	1.0	< 1.0
1,1,1,2-Tetrachloroethane	U	2760	µg/kg	2.0	< 2.0
Ethy benzene	U	2760	µg/kg	1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0
Styrene	U	2760	µg/kg	1.0	< 1.0
Tribromomethane	N	2760	µg/kg	1.0	< 1.0
Isopropylbenzene	U	2760	µg/kg	1.0	< 1.0
Bromobenzene	U	2760	µg/kg	1.0	< 1.0
1,2,3-Trichloropropane	N	2760	µg/kg	50	< 50
N-Propylbenzene	N	2760	µg/kg	1.0	< 1.0
2-Chlorotoluene	U	2760	µg/kg	1.0	< 1.0
1,3,5-Trimethylbenzene	U	2760	µg/kg	1.0	< 1.0
4-Chlorotoluene	N	2760	µg/kg	1.0	< 1.0
Tert-Butylbenzene	N	2760	µg/kg	1.0	< 1.0
1,2,4-Trimethylbenzene	U	2760	µg/kg	1.0	< 1.0
Sec-Butylbenzene	N	2760	µg/kg	1.0	< 1.0
1,3-Dichlorobenzene	U	2760	µg/kg	1.0	< 1.0

Project: 14517 Cuffley Motor Company Ltd, 71 Station Road, Cuffley

Client: Herts & Essex Site Investigations	Chemtest Job No.:		18-05273	18-05273	
Quotation No.:	Chemtest Sample ID.:		583407	583408	
Order No.:	Client Sample Ref.:		WS6	WS6	
	Sample Type:		SOIL	SOIL	
	Top Depth (m):		0.20	0.70	
	Bottom Depth (m):		0.25	0.75	
	Date Sampled:		22-Feb-2018	22-Feb-2018	
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
4-Isopropyltoluene	N	2760	µg/kg	1.0	< 1.0
1,4-Dichlorobenzene	U	2760	µg/kg	1.0	< 1.0
N-Butylbenzene	N	2760	µg/kg	1.0	< 1.0
1,2-Dichlorobenzene	U	2760	µg/kg	1.0	< 1.0
1,2-Dibromo-3-Chloropropane	N	2760	µg/kg	50	< 50
1,2,4-Trichlorobenzene	U	2760	µg/kg	1.0	< 1.0
Hexachlorobutadiene	N	2760	µg/kg	1.0	< 1.0
1,2,3-Trichlorobenzene	N	2760	µg/kg	2.0	< 2.0
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0	< 1.0
PCB 28	U	2815	mg/kg	0.010	
PCB 52	U	2815	mg/kg	0.010	
PCB 90+101	U	2815	mg/kg	0.010	
PCB 118	U	2815	mg/kg	0.010	
PCB 153	U	2815	mg/kg	0.010	
PCB 138	U	2815	mg/kg	0.010	
PCB 180	U	2815	mg/kg	0.010	
Total PCBs (7 Congeners)	N	2815	mg/kg	0.10	
Total Phenols	U	2920	mg/kg	0.30	< 0.30

SOP	Title	Parameters included	Method summary
1815	Polychlorinated Biphenyls (PCB) ICES7 Congeners in Waters by GC-MS	ICES7 PCB congeners	Solvent extraction / GCMS detection
2010	pH Value of Soils	pH	pH Meter
2020	Electrical Conductivity	Electrical conductivity (EC) of aqueous extract or calcium sulphate solution for topsoil	Measurement of the electrical resistance of a 2:1 water/soil extract.
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Al kaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5-C6, >C6-C8,>C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35- C44Aromatics: >C5-C7, >C7-C8, >C8- C10, >C10-C12, >C12-C16, >C16- C21, >C21- C35, >C35- C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

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

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.co.uk