

ENVIRONMENTAL REPORT

Site Address:	Rear of Maple House, St James Court, Therfield, Hertfordshire. SG8 9FN
Report Date:	June 2024
Project No.:	18964
Prepared for:	Amie Donne & John King
Planning Application	North Herts Council 22/03300/FP



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GENERAL NOTES

This report has been prepared based on the findings of investigations into the site's conditions using current available data which has been recovered from Envirocheck to provide environmental data in relation to the site and surrounding area. Where possible, local sources have been researched to gain a better understanding of the site's conditions. As part of this review, research has been undertaken with the Local Authority and the Environment Agency to the site's condition.

We can confirm that this report has been prepared based on the information gained and that this information is not exhaustive, and that subsequent research may reveal additional facts that may influence the reporting. Where possible, this information has been researched.

All geological information has been researched using the British Geological Society website, (the geology viewer). The disclaimer associated with this portal confirms 'The British Geological Society accept no responsibility for omissions or misinterpretations of the data from their Data Bank as this may be old or obtained from non-BGS sources and may not represent current interpretation.

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The accuracy of map extracts cannot be guaranteed, and it should be recognized that different conditions on site may have existed between subsequent to the various map surveys.

We can confirm that within the assessment of the site, various websites have been visited and as such, we cannot confirm the validity of these sites and as such, this information is accepted de facto and without prejudice. Anyone relying on these sources does so at their own risk, however, Herts & Essex Site Investigations does undertake all reasonable care to ensure this data is relevant and correct.

It should be confirmed that the extent of review of this report has undertaken a broad review of on-site features which would promote a contamination ground risk, however, this does not include ecological features and in particular Japanese Knotweed which should be reviewed under separate cover.

A review of the site will be made to confirm the extent of obvious Asbestos products or sheet materials either on the surface of the site soil or evident above ground, however, does not constitute a full Asbestos Survey by any means. This should be sought under separate cover.

DOCUMENT INFORMATION AND CONTROL SHEET

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Document Status and Approval Schedule

Issue No	Status	Date	Prepared by:	Technical review
			Rebecca Chamberlain Signature / Date	by: Chris Gray Signature / Date
1	Final	18 th June 2024		

SUMMARY

Client	Amie Donne & John King		
Site Location	Land East Of Maple House, St James Court, Therfield, Hertfordshire. SG8 9FN		
Existing Development	Barn in use as storage, with a yard area within the north of the site.		
Proposed Development	Replacement of the existing building with a new structure to form a residential dwelling with driveway and garden.		
Site Settings and Previous Uses	The site area was recorded as a section of open land from the earliest map in 1878 until about 1975 when there are two building in place with the centre of the site, one of which remains in place to date and forms a storage barn. The second barn was removed in about 1994. Surrounding the site to the east the open land remains in place. The south of the site area the open land was used as recreational land from 1924 and remains to date. To the east of the site area there were residential dwelling developed from 1924 and these remains in place to date. To the north of the site area there are two larger barns in place about 30 meters from the site area from about 1999.		
Geological Profile		Depth (m)	Hydrological Profile
Made Ground	Loose brown sandy clayey TOPSOIL	0.10 – 0.30	Not Classified
	Compact reworked aggregate FILL brick and concrete rubble with silty sandy clay	0.50 - 0.80	
	Soft brown clay FILL with rare flint gravel and fine brick fragments	0.50	
Lowestoft Formation	Stiff orange brown CLAY with fine to medium chalk fragment	3.00+	Secondary Aquifer Undifferentiated
	Loose band of SAND/SILTS from 2.40-2.60m in WS3		
Groundwater	No groundwater was recorded within the excavation when the drilling was completed. To date, no long term monitoring had been completed and this information is based on short term observations while drilling was completed.		
Nearest Surface Water Feature	The nearest surface water feature is recorded as 151 meters to the southeast of the site which is recorded as a likely pond.		
Groundwater Abstractions	The nearest abstraction well is located 1903 meters to the north of the site which is recorded for Environmental: Transfer between sources. No potable water supplies are recorded surrounding the site.		
Source Protection Zone	The site lies within a zone 3 Source Protection Zone.		
Potential Sources of Contamination	Features On Site - Barn – storage/Yard - Historical barn	Features Off Site None	
Human Health Risk	The site has identified Made Ground and potentially contaminated ground. These risks form the following layers and associated contamination: - Isolated risk from Lead and PAHs. Based on the above, remedial measures will likely be required areas where pathways to receptors are in place.		
Workforce	The above human health risk is in place within the site area, will promote a low risk on a short-term bases to any workforce within the areas. Appropriate PPE / RPE should be worn and the soil contamination risk should be noted within any site inductions.		
Groundwater Risks	Risks to groundwater is considered low , although if groundwater is in place within the standpipe, testing for the elevated risks within the site is recommended.		
Vapour Risks	Chemical testing of the soils show that low risks are in place. Vapour risk is not in place.		
Gas Risks	Land gas risks are unlikely to impact on the site area.		
Construction Materials	Water main pipework has been considered and risk has been identified directly to any water main pipework developed at the site. Water main pipework can be laid in a protective pipework system. Any water main pipework should be laid in clean corridors in order to prevent future risk to workforce used in the maintenance and repair of any water main system.		
Phytotoxic Risks	Based on the BS3882:2015 standard and the testing completed to date no elevated risk are recorded in place.		
Further Works	It is recommended that additional works will be required for the site in order to complete assessments which are detailed as follows: - Additional testing should be completed to isolate the areas of risk. Testing for Lead and PAHs. Submit reports to Local Authority and Environment Agency for review and confirm the risks identified in this report along with the further works proposed are suitable and acceptable. The exact details of remediation required for the site should be assessed and reported in a Remediation Strategy Report in order to comply with current best practice.		

ENVIRONMENTAL ASSESSMENT - PHASE 2

1 Context and Objectives of this report

1.1 Introduction

We have been asked by Amie Donne & John King 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 HESI developed from a desktop study completed in June 2024.

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.

The assessment of the site in this report have been prepared in accordance with key guidance documents as follows: -

- National Planning Policy Framework.
- BS 10175:2011+A2:2017, (Investigation of potentially contaminated sites. Code of practice - Code of practice).
- Land contamination risk management (LCRM).
- DEFRA: Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance, (April 2012).
- Environment Agency, (2010) GPLC1 Guidance Principles for Land Contamination.

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 considered. 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

An application is in place with North Herts Council as follows:-

Application no: 22/03300/FP

Application details: Erection of one 4 bedroom dwelling and detached garage following demolition of existing barn including all associated ancillary and landscaping works.

Decision: Conditional Permission 15 Mar 2023.

3 Site Location and National Grid Reference

The site is located within a outskirts of Therfield a rural village with Hertfordshire, the details of which are summarised in Table 1 with the location plan of the site shown in Appendix 1, Sheet 1.

Table 1 *Site Detail*

Site Address:	Rear of Maple House, St James Court, Therfield, Hertfordshire. SG8 9FN
Site assessed under	Site Owners Request - Aid as part of planning and warranties.
Current use of land:	Storage Barn.
Previous use of site, (if known)	As above.
Grid Reference	NGR 533890, 237040
Site Area	0.3 Hectares.
Local Authority	North Herts Council.
Gradient of the site	The site forms a level area.
Proximity of Controlled Waters, (if known)	The nearest surface water feature is recorded as 151 meters to the southeast of the site area, where there is a pond with the garden of a residential dwelling.

4 Review of Previous Reports or Documents Relating to the Site

4.1 Site Details

- The site is recorded as an existing storage barn.
- The proposals are to remove the existing building and form a new residential dwelling.
- The site area was recorded as a section of open land from the earliest map in 1878 until about 1975 when there are two building in place with the centre of the site, one of which remains in place to date and forms a storage barn. The second barn was removed in about 1994.
- Surrounding the site to the east the open land remains in place. The south of the site area the open land was used as recreational land from 1924 and remains to date. To the east of the site area there was residential dwelling developed from 1924 and remains in place to date. To the north of the site area there are two larger barns in place about 30 meters from the site area.
- The ground conditions based on geological maps and BGS information shows the site to be located within an area recorded as Lowestoft Formation, (sandy, silty CLAY with flint and chalk). This is seen to overlies Chalk which will be in place to depth.
- The nearest surface water feature is recorded as 151 meters to the southeast of the site which is recorded as a likely pond.
- The nearest abstraction well is located 1903 meters to the north of the site which is recorded for Environmental: Transfer between sources. No potable water supplies are recorded surrounding the site.
- The site lies within a zone 3 Source Protection Zone.

4.2 Risks derived from DTS.

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

Source Risk

Features On Site

- Barn – storage/Yard
- Historical barn

Features Off Site

- None

Pathways

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

- Dermal Contact.
- Inhalation of dust and fibres.
- Ingestion of dust and fibres via home-grown produce with plant uptake.
- Inhalation of vapours from soils.
- Inhalation of vapours through contaminated groundwaters
- Ingestion of contaminated water through water main pipework.
- Leaching, lateral migration of shallow groundwater to a target receptor.
- Leaching, migration through fissures / cracks which may migrate to a groundwater receptor.
- Plant Uptake.
- Inhalation Asbestos dust and fibres (from Asbestos within the building).
- Inhalation Asbestos dust and fibres (from asbestos within the soil).

Receptors

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

- Human Health, (Site Development Personnel).
- Human Health, (Residents or staff).
- Adjoining Landowners, (unlikely).
- Flora.
- Groundwater.
- Abstraction wells.

5 Details of Preparatory Work

Preparatory works had been agreed with the client to gain access and undertake excavations within the site. This incorporates free access across the site area, access to within the building was not possible with the drilling rig at the time of the site investigation.

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 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 focus of the investigation was to confirm risks from the site which are detailed as follows: -

- Assessment of possible Asbestos in soils across the site area.
- Targeted sampling to access risk from around the barn and the yard area.
- Spatial sampling around the remainder of the site to provide a general assessment.

Initial Investigation – May 2024

- 5 No Competitor Rig Windowless Sampler borehole sunk to a maximum depth of 3 meters - Date of Works – June 2024.
- Chemical Sampling and Testing recovered from samples and sent to analytical chemist, (report date 27/03/2024).

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 1. The plans also confirm the location of the excavations made on the site.

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 residential land use with potential for home grown produce.

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

Table 2 *Geological Profile*

Stratum	Description	Depth, Range (m)	Thickness, Range (m)
Made Ground	Loose brown sandy clayey TOPSOIL	0.10 – 0.30m	0.10 – 0.30m
	Compact reworked aggregate FILL brick and concrete rubble with silty sandy clay	0.50 - 0.80m	0.20 - 0.60m
	Soft brown clay FILL with rare flint gravel and fine brick fragments	0.50m	0.20m
Lowestoft Formation	Stiff orange brown CLAY with fine to medium chalk fragment	3.00m+	2.20 – 2.50m
	Loose band of SAND/SILTS from 2.40-2.60m in WS3		
Ground Water	No groundwater was recorded within the excavation when the drilling was completed. To date, no long term monitoring had been completed and this information is based on short term observations while drilling was completed.		

Table 3 *Groundwater Summary*

Location	Depth Water Struck (m)	Depth of Water (m)	Standing	Rate of Inflow
WS2	DRY			
WS3	DRY			
WS4	DRY			
WS5	DRY			
WS6	DRY			

Any comments in relation to groundwater is based on short term observations. Should groundwater monitoring be required, (which may impact on the development of the site), standpipes and inspections should be requested and completed. All current groundwater comments are based on limited information to date.

The various strata encountered within each test location recorded within the logs forming appendix 2.

At the time of logging the samples recovered from the site a further visual and olfactory inspection has been completed to note any potential sources of contamination or risk. The following was noted:

No significant depths of fill were in place within the site, within the fill no obvious sources of risk were seen in place, no odours were present to suggest risk.

The natural clay soils did not record any odours or sign of contamination.

Based on the above, the risk assessment and sampling proposals set out within the Desktop Study a suite of chemical tests were completed from across the site area as noted in Table 6 completed was undertaken in line with.

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.

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 LCRM, (Land Contamination Risk Management), for Human Health Risk Assessment. 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 dependent 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.

For ease of assessment, we can confirm that the site will be considered based on a single zone of development with the following land use: -

Zone 1

The Site

Residential Land Use with Homegrown Produce

A comparison of the data recovered from the sample analysis against the human health risk assessments for Residential Land Use with Homegrown Produce has been completed, the standards used are shown in the table below and where exceedance of the relevant generic guidance values have been identified, if any, these are detailed within Table 6. A complete copy of all the chemical data is recorded within the appendix of this report.

Table 4 Generic Guidance Values Criteria - Residential Land Use with Home Grown Produce

Pollutant	Allowable (mg/kg ⁻¹)	Level	Source
Asbestos	Absent /Present		
Inorganic Arsenic	37		S4UL
Beryllium	1.7		S4UL
Cadmium	11		S4UL
Chromium, (III)	910		S4UL
Chromium, (VI)	6		S4UL
Copper	2400		S4UL
Lead	200		At Risk Soils
Mercury, (Elemental)	1.2		S4UL
Mercury, (Inorganic)	40		S4UL
Mercury, (Methyl)	11		S4UL
Nickel	180		S4UL
Selenium	250		S4UL
Vanadium	410		S4UL
Zinc	3700		S4UL
Boron	290		S4UL
TPH, (Total)	>20 required assessment	Speciated	

Pollutant	Allowable Level (mg/kg-1)			Source
	1% SOM	2.5% SOM	6% SOM	
Naphthalene	2.3	5.6	13	
Acenaphthylene	170	420	920	
Acenaphthene	210	510	1100	
Flourene	170	400	860	
Phenanthrene	95	220	440	
Anthracene	2400	5400	11000	
Flouranthene	280	560	890	
Pyrene	620	1200	2000	
Benzo(a)anthracene	7.2	11	13	S4UL
Chrysene	15	22	27	
Benzo(b)flouranthene	2.6	3.3	3.7	
Benzo(k)flouranthene	77	93	100	
Benzo(a)pyrene	2.2	2.7	3	
Indeno(1,2,3-cd)pyrene	27	36	41	
Dibenzo(ah)anthracene	0.24	0.28	0.3	
Benzo(g,h,i)perylene	320	340	350	
Phenols	280	550	1100	LQM/CIEH (S4UL)

Table 5 **TPHs - Generic Guidance Values Criteria - Residential Land Use with Home Grown Produce**

Pollutant	1% Soil Organic Matter	2.5% Soil Organic Matter	6% Soil Organic Matter	Source
Total Petroleum Hydrocarbons				
Aliphatic Fractions				
EC > 5-6	42	78	160	S4UL
EC > 6-8	100	230	530	
EC > 8-10	27	65	150	
EC > 10-12	130	330	760	
EC > 12-16	1100	2400	4300	
EC > 16-35	65000	92000	110000	
EC > 35-44	65000	92000	110000	
Aromatic Fractions				
EC > 5-7	70	140	300	S4UL
EC > 7-8	130	290	660	
EC > 8-10	34	83	190	
EC > 10-12	74	180	380	
EC > 12-16	140	330	660	
EC > 16-21	260	540	930	
EC > 21-35	1100	1500	1700	
EC > 33–44	1100	1500	1700	
Aliphatic & Aromatic				
EC > 44-70	1600	1800	1900	S4UL

Table 6 Sampling and Testing Schedule

Site Details			Sample ID					Testing Suite							Elevated levels of contamination								
															Human Health Risk					Watermain pipework Risk			
Existing Site Use	Proposed Site Use	Chemical Testing Date	stratum sampled	Depth Of Stratum (m b.g.l)	Sample Location	Sample Depth (m)		Justification	HESI Suite 1*	PAHs, (Speciated)	TPHS, (TPHCWG)	Asbestos	WAC	DDTs (pestercides)	Type Of Asbestos Identified	Lead (mg/kg)	Organic Matter %	Benzo(a)pyrene (mgkg)	Dibenz(a,h)anthracene (mg/kg)	TPH Total (mg/kg)	pH	Arsenic	
Storage Barn and Yard Residential dwelling 7/6/24			TS	0.20	WS2	0.10	- 0.15	Storage Barn	✓	✓	✓	✓			NONE	40	8.1	7.0	1.2	110	8.7	17	
			Clay FILL	0.80	WS2	0.60	- 0.65	Spatial coverage				✓			NONE	-	-	-	-	-	-	-	
			TS	0.30	WS3	0.20	- 0.25	Yard				✓			NONE	-	-	-	-	-	-	-	
			Clay FILL	0.50	WS3	0.45	- 0.50	Spatial coverage	✓	✓	✓	✓		✓	NONE	21	2.3	<0.10	<0.10	<10	8.3	15	
			TS	0.30	WS4	0.10	- 0.15	Spatial coverage				✓	✓		NONE	-	-	-	-	-	-	-	
			Clay FILL	0.50	WS4	0.40	- 0.45	Storage Barn	✓			✓			NONE	65	4.8	<0.10	<0.10	-	8.4	13	
			TS	0.30	WS5	0.20	- 0.25	Spatial coverage	✓	✓	✓	✓			NONE	34	10	<0.10	<0.10	22	8.0	13	
			Clay FILL	0.60	WS5	0.50	- 0.55	Spatial coverage				✓			NONE	-	-	-	-	-	-	-	
			Clay FILL	0.50	WS6	0.40	- 0.45	Spatial coverage	✓	✓	✓	✓			NONE	12	3.2	0.32	0.20	<10	8.3	8.2	
			CLAY	3.00+	WS6	0.80	- 0.85	Spatial coverage	✓	✓		✓			NONE	230	0.86	<0.10	<0.10	-	8.6	18	
EXPOSURE LEVELS																Absent/ Presents	200	1% 2.5% 6%	2.2 2.7 3	0.24 0.28 0.3	50 –water main	less than 5 greater then 8	10
* HESI Suite 1 consists of Moisture Content, pH, Electrical Conductivity, Boron Sulfate, (2:1 water soluble), Cyanide, (Free), Cyanide, (Total), Sulphate (Total), Arsenic, Cadmium, Copper, Mercury, Nickel, Lead, Zinc, Chromium (Trivalent), Chromium, (Hexavalent), Phenols. Organic Matter Where PAHs are additionally tested within the VOC List. the highest values have been taken. # As an initial assessment for mercury where appropriate 1.2 mg/kg has been used where levels are elevated further assessments /discussion have been completed within this report. For the purposes of assessment where not stated otherwise Soil Organic Matter values of 2.5% has been used. All measurements are given in mg/kg - Sample not tested for the contaminant BOLD ITAIC (ORANGE) – denotes where the result is above the relevant exposure level for human health. BOLD (BLUE) – denotes where the result is above the relevant exposure level for watermain pipework. (GREEN) – denotes where results are above Phytotoxic levels based on BS3882:2015																							

10.3 Sources of Risk within Soils

Based on the information gained, we can confirm that areas of the site have recorded contamination in place above a human health risk level which can be confirmed as follows: -

- One isolated risk from PAHs are recorded in one location – WS2 (Dibenz(a,h)Anthracene and Benzo(a)pyrene) within the upper topsoil FILL, the lower clay fill did not recorded any elevated risks.
- One isolated level of lead is recorded within the location of WS6, this is recorded within the natural soils at a depth of 0.80m. No elevated Lead was recorded within the clay FILL above.
- In the location of WS2 there is slightly elevated total TPHs and across the rest of the site the pH is recorded as above 8 and there are elevated levels of arsenic which although not above a human health risk, may impact on water main pipework based on the WRAS criteria.

10.4 Human Health Source Conclusions

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

Table 7 Soil Contamination Risks – Human Health

<i>Risk Factor</i>	<i>Risks in place</i>	<i>Remediation</i>
Targeted Risks	PAHs Risk within topsoil FILL WS2 @ 0.10m Lead Risk within CLAY WS6 @ 0.80m	Remediation action required. Assume as Widespread. OR Additional sampling to comply with BS10175:2011, 5m grid and to confirm risk.
Spatial Risks	None	

10.5 Ground and Surface Water Source

The nearest surface water feature is recorded as 151 meters to the southeast of the site which is recorded as a likely pond.

The nearest discharge consent is recorded 274 meters to the southwest of the site, for Sewage Discharges - Final/Treated Effluent - Not Water Company.

The published Environment Agency Groundwater Vulnerability Map of the area indicates the site to be located within an area classified as a Secondary Aquifer Undifferentiated. The underlying geology is recorded as a principal aquifer which is likely to be at depth within the chalk.

The nearest abstraction well is located 1903 meters to the north of the site which is recorded for Environmental: Transfer between sources. No potable water supplies are recorded surrounding the site.

The site lies within Zone 3 Source Protection Zone.

Isolated risk from **PAHs and Lead promotes low risk to groundwater.**

Considering the above, we can confirm that the likely current and historical impact of pollution on a groundwater system underlying the site will be minimal due to the superficial deposits forming a clay soil and the absence of a groundwater system or controlled surface water features.

10.6 Land Gas Assessments

In accordance with, BS 10175:2011, BS 8485:2007, CIRIA C665 and CIRIA R149, risks from land gas are not in place and as such, the risk assessment has confirmed that risk are unlikely.

In addition to this the clay soils within and likely around the site will reduce the risk of migration to the site area.

10.7 Vapour Risks

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

Table 8 Vapour Risk Assessment - Response Zone

Feature	Targeted Response Zone	Location to Target	Vapour risk
Barn	Made Ground	Around the feature	TPHs.
Historical barn		in the location of the former building	TPHs.
Yard		North of the site area	TPHs.

Chemical testing has been completed and no elevated level of these vaporous contamination have been recorded in place also when logging and sub-sampling a visual and olfactoral assessment of the soils have been completed, and no contamination that promotes a vapour risk has been encountered within the assessment completed to date.

10.8 Water Main Pipework

An assessment of risk in relation to water main pipework has been considered within the scope of the works and considering the pollution measured at the site. Based on a comparison of the WRAS Data and UKWIR, (Guidance for the selection of water supply pipework on brownfield sites), it can be seen that levels of contamination, (In the form of fuels, Arsenic and the pH level), have been identified and risk is directly in place to water main pipework. This would suggest that any new water main pipework should be installed using Protecta-Line pipework.

Considering the risk to the workforce used in the construction and possible future maintenance of water main pipework, risk is in place based on the standard human health risk, as detailed in Section 10.5. As such, we would suggest that if the site has not undergone full remediation, all water main pipework should be laid in clean corridors to prevent future harm to the workforce used in maintenance of the system. To confirm: -

Water main pipework should be laid in a Protecta-Line pipework system.

Any water main pipework should be laid in clean corridors in order to prevent future risk to workforce used in the maintenance and repair of any water main system.

10.9 Building Risks

Based on the information shown, we can confirm that the risk from explosive land gases is low based on the information identified. The justification for low ground gas risk has been identified and reviewed in Section 10.6.

Considering the risk from Sulphates to concrete we can confirm that the chemical testing has been completed.

Based on the information gained, we can confirm that a classification of DS1-AC1s should be adopted for the site. This would suggest that a conventional cement mix can be used for the development, although testing of the deeper soils should be completed.

10.10 Phytotoxic Risks

As an assessment of the chemical risk to plant growth the level of contaminant within the site have been compared to the levels provided within BS3882:2015 British Standard Topsoil.

Based on the testing completed no elevated levels are recorded in place, should soils be proposed for reuse within the site a full BS 3882:2015 test should be completed.

10.10 General Source Risk Conclusions

Table 9 **Source Risk Conclusions**

Receptor	Source	Pollutant	Location	Action
Human Health Risks				
	Soils	Lead, PAHs.	Isolated risk in the location of WS2 & WS6	Remediation required.
	Land Gases			
	Vapours			
	Workforce	Lead, PAHs.	Widespread Risk within the Fill	PPE.
Groundwater Risk				
	Groundwater			
Plant growth				
	Soils			
Building Materials				
	Soils	TPHs, Arsenic pH	Widespread risk within the Fill	Protective water main pipework

Additional testing is recommended to further assess the human health risks found within the location of WS2 and WS6, to aid in the density of sampling and also to isolate the extent of the targeted risks identified within the site.

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 10 Risk Assessment A

Contaminant	Receptors	Pathways	Mitigation / Discussion
TPHs, Arsenic, pH.	Site Users Construction Workers.	Direct contact. Inhalation dust and fibers. Dermal contact	Levels in place are not above a human health risk
		Ingestion of home-grown produce	Levels in place are not above a human health risk
		Ingestion of contaminated water through water main pipework	Remediation required OR Mitigation measure to be installed
		Inhalation of vapours	Levels within the soil are unlikely to promote vapor risks and PID testing is ongoing
		Inhalation of vapours through contaminated ground waters	Risk from the groundwater have not been identified as low based on the information gained.
	Adjoining Landowners	Direct contact. Inhalation dust and fibers. Dermal contact	Levels in place are not above a human health risk and therefore will not impact on adjoining landowners.
		Ingestion of home-grown produce	
		Ingestion of contaminated water through water main pipework	
		Inhalation of vapours	
		Inhalation of vapours through contaminated ground waters	
	Controlled Surface Water;	Leaching, lateral migration of shallow groundwater to a target receptor.	The distance from the site to the surface water feature will reduce the likelihood of risk
	Ground Water. Abstraction Well.	Leaching, migration through fissures / cracks which may migrate to a groundwater receptor.	Based on the levels in place risk to the groundwater is low based on the information gained.
	Flora	Plant Uptake Direct Contact	Based on BS 3882: 2015 there are no allowable levels for TPHs although the levels are not significant as such are unlikely to form a phytotoxic risk.

Table 11 **Risk Assessment B**

Contaminant	Receptors	Pathways	Mitigation / Discussion
PAHs, Lead.	Site Users Construction Workers.	Direct contact. Inhalation dust and fibers. Dermal contact	Remediation required. Appropriate PPE. Appropriate RAMs and MMP.
		Ingestion of home-grown produce	Remediation required.
		Ingestion of contaminated water through water main pipework	Remediation required OR Mitigation measure to be installed.
		Inhalation of vapours	No vapour risk from lead and PAH contamination identified.
		Inhalation of vapours through contaminated ground waters	No vapour risk from lead and PAH contamination identified.
	Adjoining Landowners	Direct contact. Inhalation dust and fibers. Dermal contact	These contaminants are unlikely to be highly mobile and as such are unlikely to impact on the adjoining land.
		Ingestion of home-grown produce	
		Ingestion of contaminated water through water main pipework	
		Inhalation of vapours	
		Inhalation of vapours through contaminated ground waters	
	Controlled Surface Water;	Leaching, lateral migration of shallow groundwater to a target receptor.	The distance from the site to the surface water feature will reduce the likelihood of risk.
	Ground Water. Abstraction Well.	Leaching, migration through fissures / cracks which may migrate to a groundwater receptor.	Based on the levels in place risk to the groundwater is low based on the information gained.
	Flora	Plant Uptake Direct Contact	Based on BS 3882: 2015 there are no allowable levels for Lead although the levels are not significant as such are unlikely to form a phytotoxic risk.

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.

Soft Landscaping - will form an area where risk is in place and as such, remedial measures are likely to be required.

Under Buildings - will effectively cap off any contamination and remove risk.

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 **are likely to** 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 there is isolated risk within the site area. Further testing is recommended to confirm the extent of risk.

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 12 *Outline Remediation Measures for end use of the site*

Land Use	Mitigation Measure	Any Additional Works	Depth to remove risk	Confirmation required.
Communal Areas & Shrub Planting Areas.	Isolated risk from Lead and PAHs – WS2 & WS6	Remediation Required.	Excavate a maximum of 0.60 meters of the contaminated layer, (defined within this report as the Made Ground) and confirm the geology at depth.	Validation works will be required. Validation of the base of excavation and validation of any soils brought onto the site.
	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).		If the contaminated layer is still in place, recover validation samples from the base of the excavation to confirm the contamination status of the soils for future assessment and record. Lay Geo-textile over this contaminated layer to warn future excavators that risk is present below.	
Hard Landscaping.	Hard landscaping will remove any risks through pathway removal. Must be a permanent feature, (not patio's).	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.	If clean soils are encountered, recover validation samples from the base to confirm that risk has been removed for validation purposes. This can be at any depth provided that clean soils are identified and recorded.	
	Patio's should assume a soft landscape finish.			
Under Buildings.	The building will remove any risks through pathway removal.			
Water Main.	Any new water main installations can be installed using Protecta-Line pipework.	None.	None.	To be confirmed with the relevant statutory authority.
	Any new water main pipework should be laid in clean corridors. Full removal of Asbestos should be completed as identified above.			
Controlled Waters – Surface Water & Ground Water.	Groundwater risks removed based on the current site condition.			
	Consider possible future development and pathway creation for contamination to impact on the underlying Secondary Aquifer.			

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

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

Table 13 **WAC testing Results**

Location	Depth (m)	Soil description	Classification	Reason
WS4	0.10-0.15	Loose brown sandy clayey TOPSOIL	INERT.	

15 Source Risk Conclusions

HUMAN HEALTH RISK

The site has identified Made Ground and potentially contaminated ground. These risks form the following layers and associated contamination: -

Isolated risk from **Lead and PAHs – WS2 & WS6 ONLY – Potentially further isolate with additional testing.**

Based on the above, **remedial measures will likely be required areas where pathways to receptors are in place.**

WORKFORCE

The above human health risk is in place within the site area, will promote a low risk on a short-term bases to any workforce within the areas. **Appropriate PPE / RPE should be worn and the soil contamination risk should be noted within any site inductions.**

GROUNDWATER RISKS

Risks to groundwater is considered low, although if groundwater is in place within the standpipe, testing for the elevated risks within the site is recommended.

VAPOUR RISKS

Chemical testing of the soils show that low risks are in place. Vapour risk is not in place.

GAS RISKS

Land gas risks are unlikely to impact on the site area.

CONSTRUCTION MATERIALS

Water main pipework has been considered and risk has been identified directly to any water main pipework developed at the site.

Water main pipework can be laid in a protective pipework system.

Any water main pipework should be laid in clean corridors in order to prevent future risk to workforce used in the maintenance and repair of any water main system.

PHYTOTOXIC RISKS

Based on the BS3882:2015 standard and the testing completed to date no elevated risk are recorded in place.

FURTHER WORKS

It is recommended that additional works will be required for the site in order to complete assessments which are detailed as follows: -

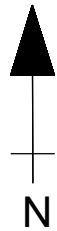
- Additional testing should be completed to isolate the areas of risk. Testing for Lead and PAHs.

Submit reports to Local Authority and Environment Agency for review and confirm the risks identified in this report along with the further works proposed are suitable and acceptable.

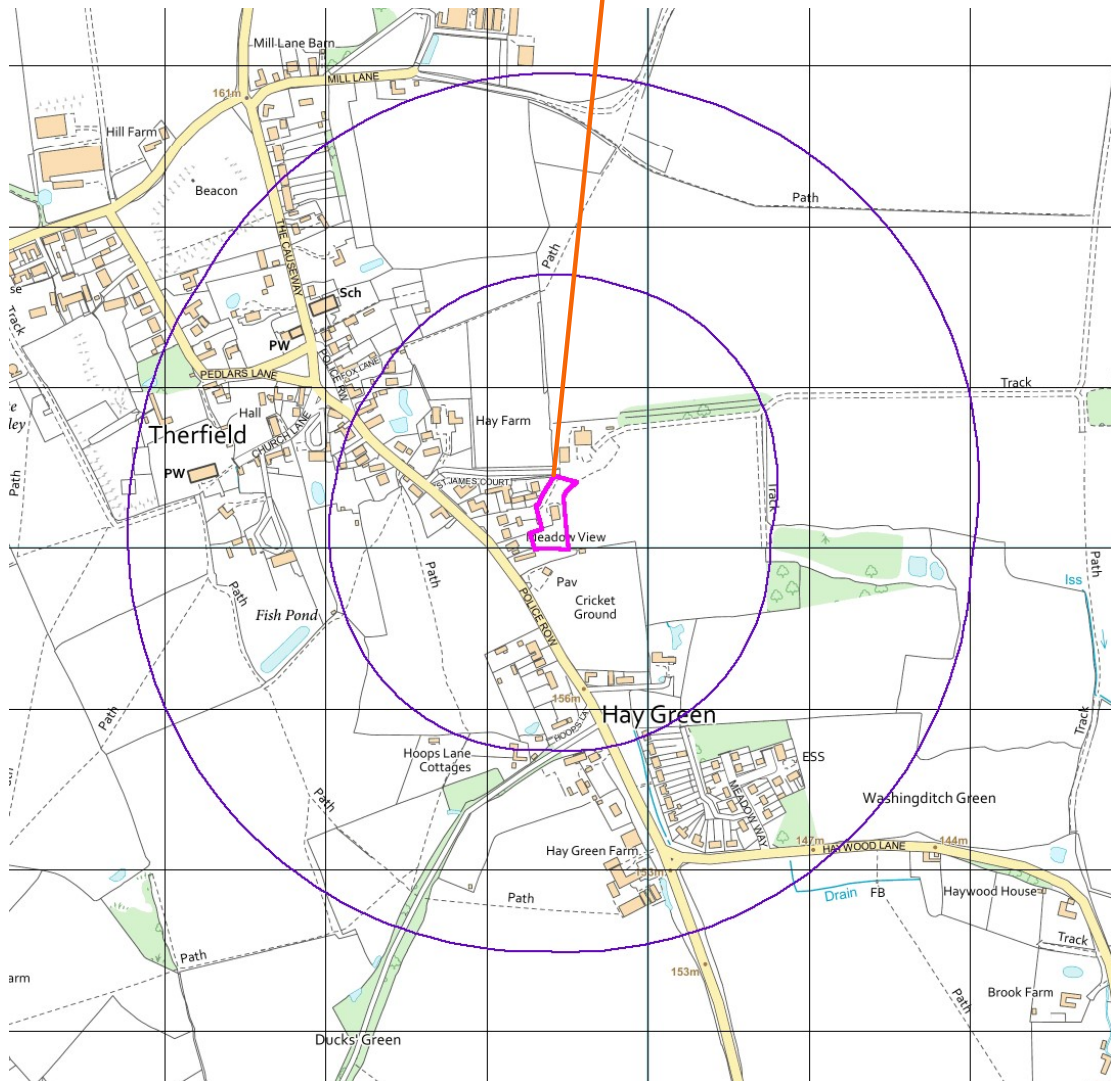
The exact details of remediation required for the site should be assessed and reported in a Remediation Strategy Report in order to comply with current best practice.

Maple House, St James Court, Therfield, Hertfordshire. SG8 9FN

Location Plan

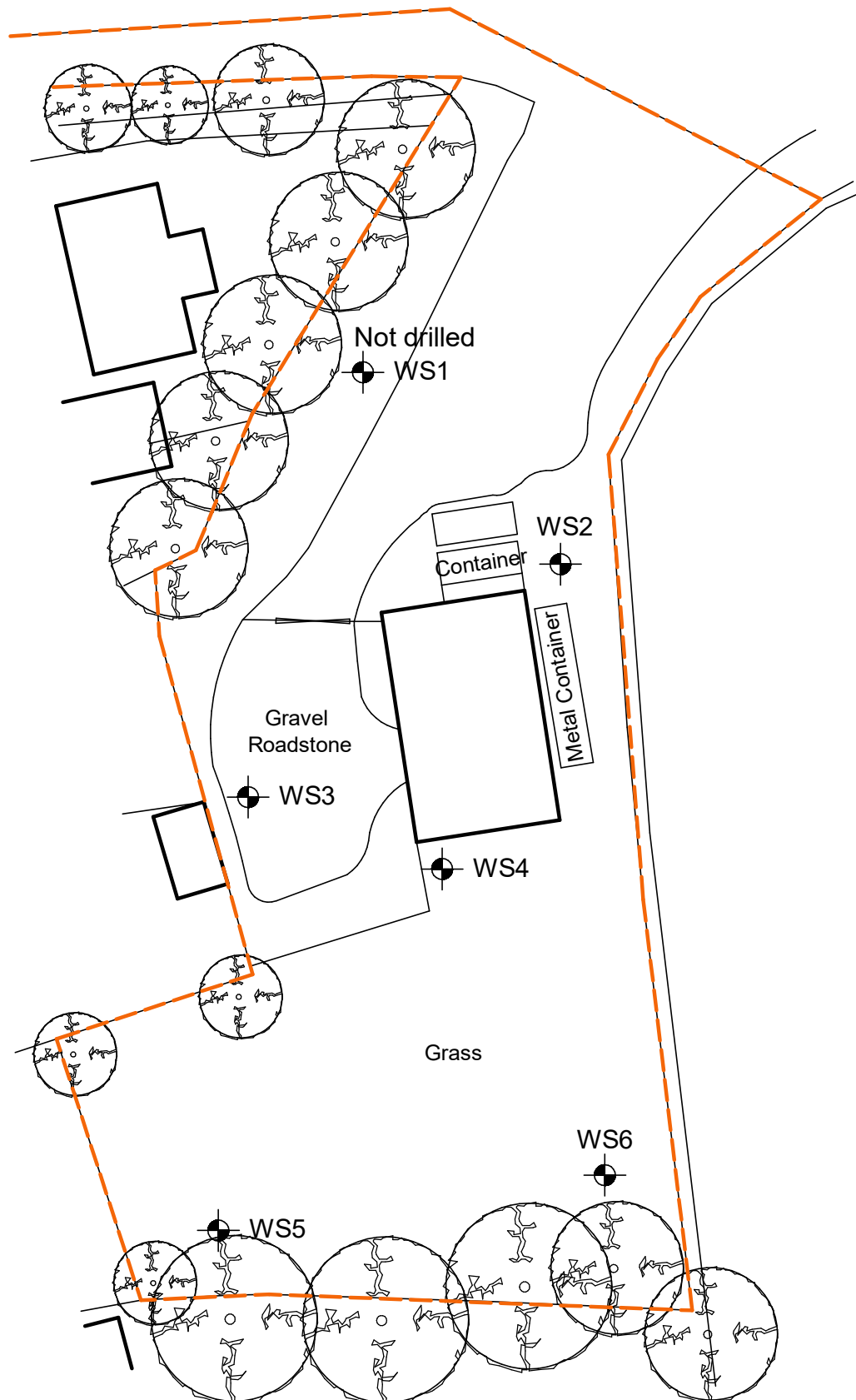


Site Plan



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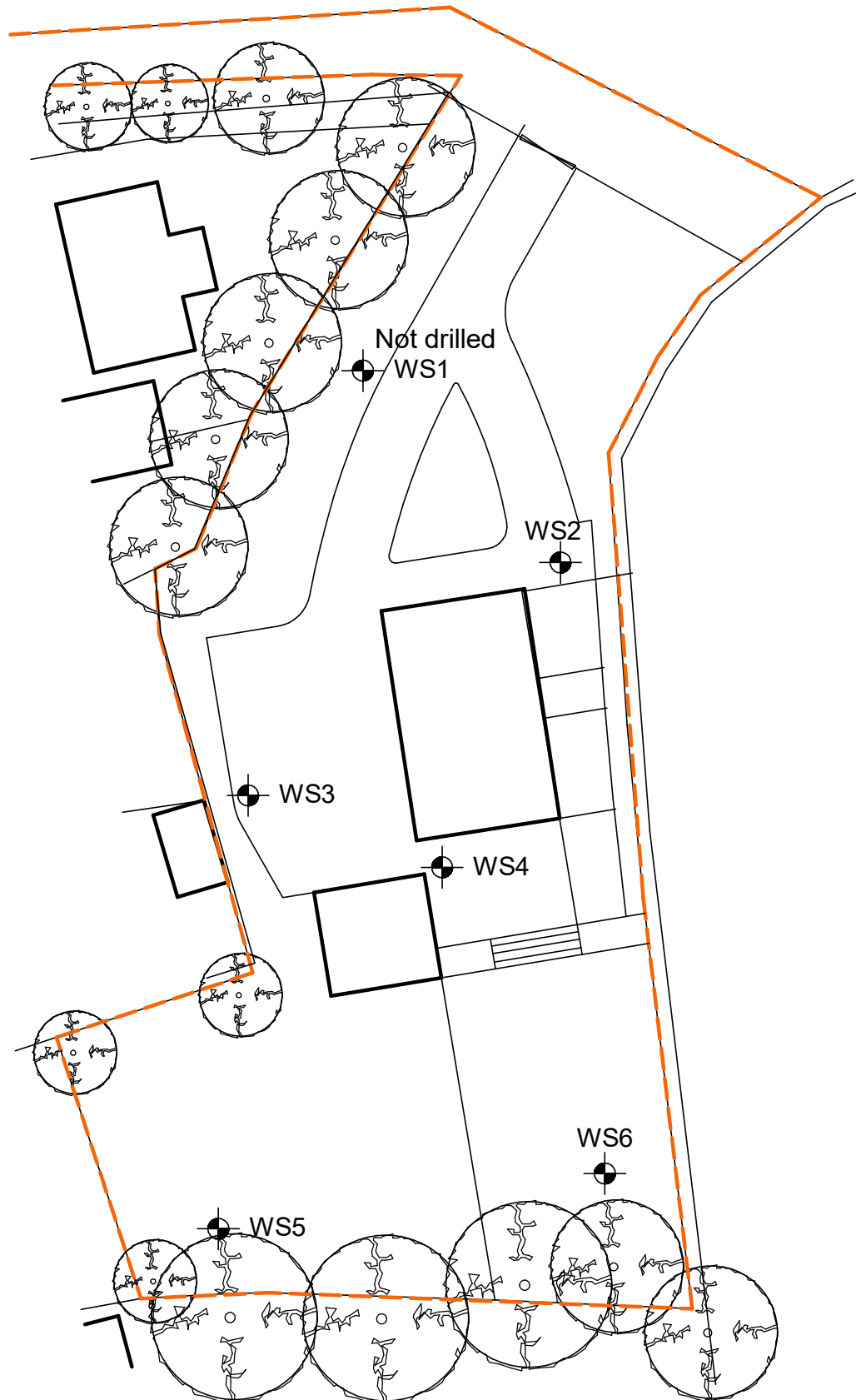
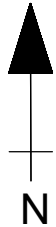
Existing Site Plan



Not to Scale
Sketch No. : ENV / 18964 / 01 / 02

Maple House, St James Court, Therfield, Hertfordshire. SG8 9FN

Proposed Site Plan



Not to Scale
Sketch No. : ENV / 18964 / 01 / 03

Maple House, St James Court, Therfield, Hertfordshire SG8 9FN

Window Sample Two

Description Of Stratum	Legend	Depth	Thickness (m)	Water Level	Samples			S.P.T N-Value or Vane Strength	VOC's (ppm)	Installations	Casing Depth, (m)
					No	Type	Depth (m)				
Loose brown sandy clayey TOPSOIL		0.20	0.20	DRY	1	U	GL - 1.00				
Compact reworked aggregate FILL brick and concrete rubble with silty sandy clay			0.60								
		0.80									
Stiff orange brown CLAY with fine to medium chalk fragment					2	U	1.00-2.00				1.00
			2.20		3	U	2.00 - 3.00				
Roots to 0.30m Borehole Complete at 3.00m		3.00									

Remarks

Key : U - Undisturbed Sample
(100mm diameter)

B - Bulk Sample
▼ - Water Struck

D - Disturbed Sample
≡ - Water Standing

W - Water Sample
T - Chemical Tub

N - SPT N-Value
V - Vane Test, (kN.m²)

Maple House, St James Court, Therfield, Hertfordshire SG8 9FN

Window Sample Three

Description Of Stratum	Legend	Depth	Thickness (m)	Water Level	Samples			S.P.T N-Value or Vane Strength	VOC's (ppm)	Installations	Casing Depth, (m)
					No	Type	Depth (m)				
Loose brown sandy clayey TOPSOIL		0.30	0.30	DRY	1	U	GL - 1.00				
Soft brown clay FILL with rare flint gravel and fine brick fragments		0.50	0.20								
Stiff orange brown CLAY with fine to medium chalk fragment											
					2	U	1.00-2.00				1.00
			2.50		3	U	2.00 - 3.00				
Loose band of SAND/SILTS from 2.40-2.60m											
Roots to 1.50m Borehole Complete at 3.00m		3.00									

Remarks

Key : U - Undisturbed Sample
(100mm diameter)

B - Bulk Sample
▼ - Water Struck

D - Disturbed Sample
≡ - Water Standing

W - Water Sample
T - Chemical Tub

N - SPT N-Value
V - Vane Test, (kN.m²)

Maple House, St James Court, Therfield, Hertfordshire SG8 9FN

Window Sample Four

Description Of Stratum	Legend	Depth	Thickness (m)	Water Level	Samples			S.P.T N-Value or Vane Strength	VOC's (ppm)	Installations	Casing Depth, (m)
					No	Type	Depth (m)				
Loose brown sandy clayey TOPSOIL		0.30	0.30	DRY	1	U	GL - 1.00				
Soft brown clay FILL with rare flint gravel and fine brick fragments		0.50	0.20								
Stiff orange brown CLAY with fine to medium chalk fragment											
					2	U	1.00-2.00				1.00
			2.50		3	U	2.00 - 3.00				
Roots to 1.50m Borehole Complete at 3.00m		3.00									

Remarks

Key : U - Undisturbed Sample
(100mm diameter)

B - Bulk Sample
- Water Struck

D - Disturbed Sample
- Water Standing

W - Water Sample
T - Chemical Tub

N - SPT N-Value
V - Vane Test, (kN.m²)

Maple House, St James Court, Therfield, Hertfordshire SG8 9FN

Window Sample Five

Description Of Stratum	Legend	Depth	Thickness (m)	Water Level	Samples			S.P.T N-Value or Vane Strength	VOC's (ppm)	Installations	Casing Depth, (m)
					No	Type	Depth (m)				
Loose brown sandy clayey TOPSOIL		0.30	0.30	DRY	1	U	GL - 1.00				
Soft brown clay FILL with rare flint gravel and fine brick fragments		0.60	0.30								
Stiff orange brown CLAY with fine to medium chalk fragment			2.40		2	U	1.00-2.00				1.00
					3	U	2.00 - 3.00				
Roots to 1.20m Borehole Complete at 3.00m		3.00									

Remarks

Key : U - Undisturbed Sample
(100mm diameter)

B - Bulk Sample
☒ - Water Struck

D - Disturbed Sample
☒ - Water Standing

W - Water Sample
T - Chemical Tub

N - SPT N-Value
V - Vane Test, (kN.m²)

Maple House, St James Court, Therfield, Hertfordshire SG8 9FN

Window Sample Six

Description Of Stratum	Legend	Depth	Thickness (m)	Water Level	Samples			S.P.T N-Value or Vane Strength	VOC's (ppm)	Installations	Casing Depth, (m)
					No	Type	Depth (m)				
Loose brown sandy clayey TOPSOIL		0.10	0.10	DRY	1	U	GL - 1.00				
Soft brown clay FILL with rare flint gravel and fine brick fragments			0.40								
		0.50									
Stiff orange brown CLAY with fine to medium chalk fragment					2	U	1.00-2.00				1.00
			2.50		3	U	2.00 - 3.00				
Roots to 0.70m Borehole Complete at 3.00m		3.00									

Remarks

Key : U - Undisturbed Sample
(100mm diameter)

B - Bulk Sample
 - Water Struck

D - Disturbed Sample
 - Water Standing

W - Water Sample
T - Chemical Tub

N - SPT N-Value
V - Vane Test, (kN.m²)

Maple House, St James Court, Therfield, Hertfordshire. SG8 9FN

Site Conceptual Model - Proposed Site Plan

Potential Pathways

Human Health

- ① Direct contact with contaminants in soil/dust or water
- ② Inhalation of contaminants through soil/dust/particles
- ③ Dermal Contact
- ④ Ingestion of home grown produce
- ⑤ Ingestion of contaminated water through water main pipework
- ⑥ Inhalation of Land Gases / Vapours From Soils
- ⑦ Inhalation of Vapours from Groundwater
- ⑧ Migration to off site Adjoining Land Owners

Flora

- ⑨ Plant uptake & direct contact with soil

Controlled Surface Water, Ground Water & Abstraction Well

- ⑩ Leaching, lateral migration of shallow groundwater to a target receptor

Off Site Sources

- A Migration of contamination to the site area
- B Migration of land gases/ vapours to the site area
- C Migration of contaminated groundwater to the site area

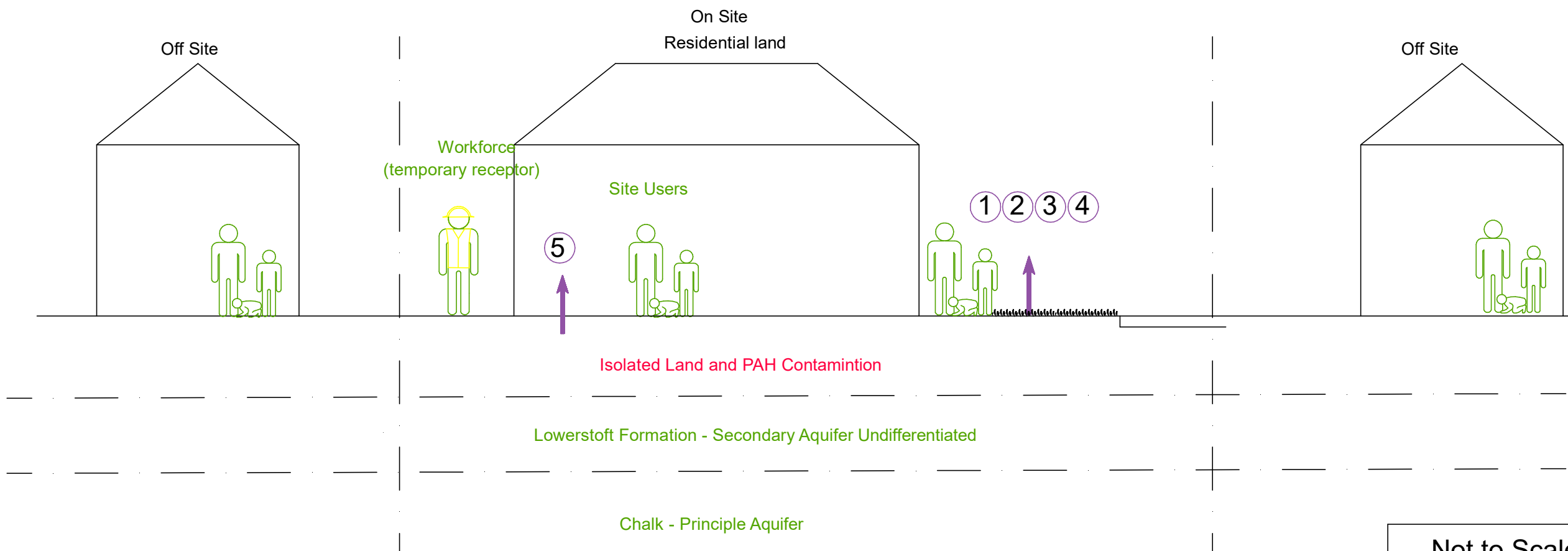
Key

Purple =Possible pathways

Green =Possible receptors

Red =Possible sources

Grey = Not in place within this site



Not to Scale
Sketch No. : ENV / 18964 / A / 01

Sampling Chain of Custody (CoC)

Please note that any testing scheduled where a matrix option is not selected may be subject to Non-Conformance.
Failure to complete all sections of this form may delay analysis.

Required Information										Lab Contact Information		Type of Analysis													
Company Name: Herts and Essex Site Investigations Company Address: Unit J8, Peek Business Park, Woodside, Bishop's Stortford CM23 5RG Site Location: 18964 Project Reference: PO Number: As above Quote Number:										Delivery Information: Eurofins Chemtest Ltd 12 Depot Road Newmarket. CB8 0AL Contact Information: Phone: 01638 606070 Email: cs.team@chemtest.com Web: www.chemtest.com		Suite / Determinand													
Project Contact Name(s) Chris Gray Project Contact Email(s) csgrey@hesi.co.uk bmcculloch@hesi.co.uk rchamberlain@hesi.co.uk dhudd@hesi.co.uk Main Contact: Chris Gray Secondary Contact: Rebecca Chamberlain										Water Matrix Codes Ground Water (GW) Surface Water (SW) Drinking Water (DW) Land Leachate (LE) Prepared Leachate (PL) Untreated Sewage (US)		Other Codes Treated Sewage (TS) Trade Effluent (TE) Saline Water (SA) Process Water (PR) Recreational Water (RE) Unspecified Liquid (UNL)		Soils (S) Gas (G) Product (P) Sludge (SL) Unspecified Solid (UNS)		HESI Suite 1 TPHs (CWG) Asbestos (+ quant if found) 2 stage WAC test DDTs									
Sample Information										PLEASE DETAIL BELOW ANY POTENTIAL HAZARDS THAT MAY BE ASSOCIATED WITH THESE SAMPLES example; Anthrax, Radioactive, Explosives		ANALYSIS REQUIRED (please tick appropriately)													
Sample Date	Sample Time	Location	AGS Type	HESI Ref	Sample ID	Top Depth	Bottom Depth	MATRIX CODE	Container Type (see key below)																
SAMP_DATE	SAMP_TIME	LOCA_ID	SAMP_TYPE	SAMP_REF	SAMP_ID	SAMP_TOP	SAMP_BASE																		
29/05/2024		WS2		TS		0.10		S	PT / AJ250		X	X	X												
29/05/2024		WS2		SS		0.60		S	PT				X												
29/05/2024		WS3		TS		0.20		S	PT				X												
29/05/2024		WS3		SS		0.45		S	PT / AJ250		X	X	X		X										
29/05/2024		WS4		TS		0.10		S	PT / AJ250				X	X											
29/05/2024		WS4		SS		0.40		S	PT / AJ250		X		X												
29/05/2024		WS5		TS		0.20		S	PT / AJ250		X	X	X												
29/05/2024		WS5		SS		0.50		S	PT				X												
29/05/2024		WS6		SS		0.40		S	PT / AJ250		X	X	X												
29/05/2024		WS6		NAT		0.80		S	PT / AJ250		X		X												
HESI REF - DOES NOT NEED TO BE INCLUDED WITH YOUR REPORT																									
Client's signature:					Container Key: PB - 1L Plastic Bottle V - 40ml Vial AB - 1L Winchester PT - Plastic Tub AJ - 60/250 Amber Jar TT - Tenax Tube					Lab Use Only Consignment Condition: Received by: Arriving Temperature: Date and time:					Turnaround Time Agreed: 3 5 7 10 WAC 5 WAC 7 Other:										
Date of Collection																									



Final Report

Report No.: 24-17295-1

Initial Date of Issue: 14-Jun-2024

Re-Issue Details:

Client Herts & Essex Site Investigations

Client Address: Unit J8
Peek Business Park
Woodside
Bishops Stortford
Hertfordshire
CM23 5RG

Contact(s): Chris Gray
Dafydd Hudd
Rebecca Chamberlain
Ben McCulloch

Project 18964 MAPLE HOUSE

Quotation No.: **Date Received:** 03-Jun-2024

Order No.: 18964 **Date Instructed:** 03-Jun-2024

No. of Samples: 10

Turnaround (Wkdays): 5 **Results Due:** 07-Jun-2024

Date Approved: 14-Jun-2024

Approved By:

Details: David Smith, Technical Director

For details about application of accreditation to specific matrix types, please refer to the Table at the back of this report

Results - Soil

Project: 18964 MAPLE HOUSE

Client: Herts & Essex Site Investigations		Chemtest Job No.:	24-17295	24-17295	24-17295	24-17295	24-17295	24-17295	24-17295
Quotation No.:		Chemtest Sample ID.:	1815328	1815329	1815330	1815331	1815332	1815333	1815334
Order No.: 18964		Client Sample Ref.:	TS	SS	TS	SS	TS	SS	TS
		Sample Location:	WS2	WS2	WS3	WS3	WS4	WS4	WS5
		Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):	0.10	0.60	0.20	0.45	0.10	0.40	0.20
		Date Sampled:	29-May-2024	29-May-2024	29-May-2024	29-May-2024	29-May-2024	29-May-2024	29-May-2024
		Asbestos Lab:	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB
Determinand	HWOL Code	Accred.	SOP	Units	LOD				
ACM Type		U	2192		N/A	-	-	-	-
Asbestos Identification		U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture		N	2030	%	0.020	7.7		17	21
Stones and Removed Materials		N	2030	%	0.020	< 0.020		< 0.020	< 0.020
Soil Colour		N	2040		N/A	Brown	Brown	Brown	Brown
Other Material		N	2040		N/A	Stones and Roots	Stones	Roots	Stones and Roots
Soil Texture		N	2040		N/A	Loam	Loam	Clay	Clay
pH at 20C		M	2010		4.0	8.7		8.3	8.4
Electrical Conductivity (2:1)		N	2020	µS/cm	1.0	95		190	290
Boron (Hot Water Soluble)		M	2120	mg/kg	0.40	0.71		< 0.40	0.61
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010	< 0.010		< 0.010	< 0.010
Cyanide (Free)		M	2300	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Cyanide (Total)		M	2300	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Sulphate (Total)		U	2430	%	0.010	0.85		0.12	0.087
Arsenic		M	2455	mg/kg	0.5	17		15	13
Cadmium		M	2455	mg/kg	0.10	0.31		0.23	0.67
Copper		M	2455	mg/kg	0.50	27		21	30
Mercury		M	2455	mg/kg	0.05	0.08		0.06	0.12
Nickel		M	2455	mg/kg	0.50	42		44	34
Lead		M	2455	mg/kg	0.50	40		21	65
Selenium		M	2455	mg/kg	0.25	1.0		0.90	0.95
Zinc		M	2455	mg/kg	0.50	110		71	380
Chromium (Trivalent)		N	2490	mg/kg	1.0	40		36	37
Chromium (Hexavalent)		N	2490	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Aliphatic VPH >C5-C6	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05		< 0.05	< 0.05
Aliphatic VPH >C6-C7	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05		< 0.05	< 0.05
Aliphatic VPH >C7-C8	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05		< 0.05	< 0.05
Aliphatic VPH >C6-C8 (Sum)	HS_2D_AL	N	2780	mg/kg	0.10	< 0.10		< 0.10	< 0.10
Aliphatic VPH >C8-C10	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05		< 0.05	< 0.05
Total Aliphatic VPH >C5-C10	HS_2D_AL	U	2780	mg/kg	0.25	< 0.25		< 0.25	< 0.25
Aliphatic EPH >C10-C12 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00	2.1		2.3	< 2.0
Aliphatic EPH >C12-C16 MC	EH_2D_AL_#1	M	2690	mg/kg	1.00	2.6		< 1.0	< 1.0
Aliphatic EPH >C16-C21 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00	2.5		< 2.0	< 2.0
Aliphatic EPH >C21-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	3.00	11		< 3.0	5.9
Aliphatic EPH >C35-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00	< 10		< 10	< 10

Results - Soil

Project: 18964 MAPLE HOUSE

Client: Herts & Essex Site Investigations		Chemtest Job No.:				24-17295	24-17295	24-17295	24-17295	24-17295	24-17295	24-17295
Quotation No.:		Chemtest Sample ID.:				1815328	1815329	1815330	1815331	1815332	1815333	1815334
Order No.: 18964		Client Sample Ref.:				TS	SS	TS	SS	TS	SS	TS
		Sample Location:				WS2	WS2	WS3	WS3	WS4	WS4	WS5
		Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):				0.10	0.60	0.20	0.45	0.10	0.40	0.20
		Date Sampled:				29-May-2024	29-May-2024	29-May-2024	29-May-2024	29-May-2024	29-May-2024	29-May-2024
		Asbestos Lab:				NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB
Determinand	HWOL Code	Accred.	SOP	Units	LOD							
Total Aliphatic EPH >C10-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	5.00	18			5.1			8.0
Total Aliphatic EPH >C10-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00	18			< 10			< 10
Aromatic VPH >C5-C7	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05			< 0.05			< 0.05
Aromatic VPH >C7-C8	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05			< 0.05			< 0.05
Aromatic VPH >C8-C10	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05			< 0.05			< 0.05
Total Aromatic VPH >C5-C10	HS_2D_AR	U	2780	mg/kg	0.25	< 0.25			< 0.25			< 0.25
Aromatic EPH >C10-C12 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00	< 1.0			< 1.0			< 1.0
Aromatic EPH >C12-C16 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00	< 1.0			2.2			3.7
Aromatic EPH >C16-C21 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00	13			< 2.0			2.2
Aromatic EPH >C21-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00	27			< 2.0			7.2
Aromatic EPH >C35-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	1.00	52			1.3			1.4
Total Aromatic EPH >C10-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	5.00	41			< 5.0			13
Total Aromatic EPH >C10-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	10.00	93			< 10			14
Total VPH >C5-C10	HS_2D_Total	U	2780	mg/kg	0.50	< 0.50			< 0.50			< 0.50
Total EPH >C10-C35 MC	EH_2D_Total_#1	U	2690	mg/kg	10.00	59			< 10			21
Total EPH >C10-C40 MC	EH_2D_Total_#1	N	2690	mg/kg	10.00	110			< 10			22
Organic Matter		M	2625	%	0.40	8.1			2.3		4.8	10
Naphthalene		M	2700	mg/kg	0.10	0.13			< 0.10		< 0.10	< 0.10
Acenaphthylene		M	2700	mg/kg	0.10	0.77			< 0.10		< 0.10	< 0.10
Acenaphthene		M	2700	mg/kg	0.10	0.20			< 0.10		< 0.10	< 0.10
Fluorene		M	2700	mg/kg	0.10	0.35			< 0.10		< 0.10	< 0.10
Phenanthrene		M	2700	mg/kg	0.10	5.9			< 0.10		< 0.10	< 0.10
Anthracene		M	2700	mg/kg	0.10	2.0			< 0.10		< 0.10	< 0.10
Fluoranthene		M	2700	mg/kg	0.10	12			< 0.10		< 0.10	0.38
Pyrene		M	2700	mg/kg	0.10	11			< 0.10		< 0.10	0.33
Benzo[a]anthracene		M	2700	mg/kg	0.10	6.5			< 0.10		< 0.10	0.57
Chrysene		M	2700	mg/kg	0.10	7.0			< 0.10		< 0.10	0.22
Benzo[b]fluoranthene		M	2700	mg/kg	0.10	8.9			< 0.10		< 0.10	< 0.10
Benzo[k]fluoranthene		M	2700	mg/kg	0.10	3.7			< 0.10		< 0.10	< 0.10
Benzo[a]pyrene		M	2700	mg/kg	0.10	7.0			< 0.10		< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene		M	2700	mg/kg	0.10	5.1			< 0.10		< 0.10	< 0.10
Dibenz(a,h)Anthracene		M	2700	mg/kg	0.10	1.2			< 0.10		< 0.10	< 0.10
Benzo[g,h,i]perylene		M	2700	mg/kg	0.10	4.7			< 0.10		< 0.10	< 0.10
Total Of 16 PAH's		M	2700	mg/kg	2.0	77			< 2.0		< 2.0	< 2.0
Alpha-HCH		N	2840	mg/kg	0.20				< 0.20			
Gamma-HCH (Lindane)		N	2840	mg/kg	0.20				< 0.20			
Beta-HCH		N	2840	mg/kg	0.20				< 0.20			

Results - Soil

Project: 18964 MAPLE HOUSE

Client: Herts & Essex Site Investigations		Chemtest Job No.:	24-17295	24-17295	24-17295	24-17295	24-17295	24-17295	24-17295
Quotation No.:		Chemtest Sample ID.:	1815328	1815329	1815330	1815331	1815332	1815333	1815334
Order No.: 18964		Client Sample Ref.:	TS	SS	TS	SS	TS	SS	TS
		Sample Location:	WS2	WS2	WS3	WS3	WS4	WS4	WS5
		Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):	0.10	0.60	0.20	0.45	0.10	0.40	0.20
		Date Sampled:	29-May-2024	29-May-2024	29-May-2024	29-May-2024	29-May-2024	29-May-2024	29-May-2024
		Asbestos Lab:	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB
Determinand	HWOL Code	Accred.	SOP	Units	LOD				
Delta-HCH		N	2840	mg/kg	0.20			< 0.20	
Heptachlor		N	2840	mg/kg	0.20			< 0.20	
Aldrin		N	2840	mg/kg	0.20			< 0.20	
Heptachlor Epoxide		N	2840	mg/kg	0.20			< 0.20	
Gamma-Chlordane		N	2840	mg/kg	0.20			< 0.20	
Alpha-Chlordane		N	2840	mg/kg	0.20			< 0.20	
Endosulfan I		N	2840	mg/kg	0.20			< 0.20	
4,4-DDE		N	2840	mg/kg	0.20			< 0.20	
Dieldrin		N	2840	mg/kg	0.20			< 0.20	
Endrin		N	2840	mg/kg	0.20			< 0.20	
4,4-DDD		N	2840	mg/kg	0.20			< 0.20	
Endosulfan II		N	2840	mg/kg	0.20			< 0.20	
Endrin Aldehyde		N	2840	mg/kg	0.20			< 0.20	
4,4-DDT		N	2840	mg/kg	0.20			< 0.20	
Endosulfan Sulphate		N	2840	mg/kg	0.20			< 0.20	
Methoxychlor		N	2840	mg/kg	0.20			< 0.20	
Endrin Ketone		N	2840	mg/kg	0.20			< 0.20	
Total Phenols		M	2920	mg/kg	0.10	< 0.10		< 0.10	< 0.10

Results - Soil

Project: 18964 MAPLE HOUSE

Client: Herts & Essex Site Investigations		Chemtest Job No.:				24-17295	24-17295	24-17295
Quotation No.:		Chemtest Sample ID.:				1815335	1815336	1815337
Order No.: 18964		Client Sample Ref.:				SS	SS	NAT
		Sample Location:				WS5	WS6	WS6
		Sample Type:				SOIL	SOIL	SOIL
		Top Depth (m):				0.50	0.40	0.80
		Date Sampled:				29-May-2024	29-May-2024	29-May-2024
		Asbestos Lab:				NEW-ASB	NEW-ASB	NEW-ASB
Determinand	HWOL Code	Accred.	SOP	Units	LOD			
ACM Type		U	2192		N/A	-	-	-
Asbestos Identification		U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture		N	2030	%	0.020		16	15
Stones and Removed Materials		N	2030	%	0.020		< 0.020	< 0.020
Soil Colour		N	2040		N/A	Brown	Brown	Brown
Other Material		N	2040		N/A	Stones and Roots	Stones and Roots	None
Soil Texture		N	2040		N/A	Clay	Clay	Clay
pH at 20C		M	2010		4.0		8.3	8.6
Electrical Conductivity (2:1)		N	2020	µS/cm	1.0		190	180
Boron (Hot Water Soluble)		M	2120	mg/kg	0.40		1.4	< 0.40
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010		< 0.010	< 0.010
Cyanide (Free)		M	2300	mg/kg	0.50		< 0.50	< 0.50
Cyanide (Total)		M	2300	mg/kg	0.50		< 0.50	< 0.50
Sulphate (Total)		U	2430	%	0.010		0.13	0.067
Arsenic		M	2455	mg/kg	0.5		8.2	18
Cadmium		M	2455	mg/kg	0.10		0.13	0.55
Copper		M	2455	mg/kg	0.50		14	140
Mercury		M	2455	mg/kg	0.05		< 0.05	0.72
Nickel		M	2455	mg/kg	0.50		27	35
Lead		M	2455	mg/kg	0.50		12	230
Selenium		M	2455	mg/kg	0.25		0.75	0.89
Zinc		M	2455	mg/kg	0.50		38	250
Chromium (Trivalent)		N	2490	mg/kg	1.0		24	29
Chromium (Hexavalent)		N	2490	mg/kg	0.50		< 0.50	< 0.50
Aliphatic VPH >C5-C6	HS_2D_AL	U	2780	mg/kg	0.05		< 0.05	
Aliphatic VPH >C6-C7	HS_2D_AL	U	2780	mg/kg	0.05		< 0.05	
Aliphatic VPH >C7-C8	HS_2D_AL	U	2780	mg/kg	0.05		< 0.05	
Aliphatic VPH >C6-C8 (Sum)	HS_2D_AL	N	2780	mg/kg	0.10		< 0.10	
Aliphatic VPH >C8-C10	HS_2D_AL	U	2780	mg/kg	0.05		< 0.05	
Total Aliphatic VPH >C5-C10	HS_2D_AL	U	2780	mg/kg	0.25		< 0.25	
Aliphatic EPH >C10-C12 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00		< 2.0	
Aliphatic EPH >C12-C16 MC	EH_2D_AL_#1	M	2690	mg/kg	1.00		< 1.0	
Aliphatic EPH >C16-C21 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00		< 2.0	
Aliphatic EPH >C21-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	3.00		< 3.0	
Aliphatic EPH >C35-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00		< 10	

Results - Soil

Project: 18964 MAPLE HOUSE

Client: Herts & Essex Site Investigations		Chemtest Job No.:				24-17295	24-17295	24-17295
Quotation No.:		Chemtest Sample ID.:				1815335	1815336	1815337
Order No.: 18964		Client Sample Ref.:				SS	SS	NAT
		Sample Location:				WS5	WS6	WS6
		Sample Type:				SOIL	SOIL	SOIL
		Top Depth (m):				0.50	0.40	0.80
		Date Sampled:				29-May-2024	29-May-2024	29-May-2024
		Asbestos Lab:				NEW-ASB	NEW-ASB	NEW-ASB
Determinand	HWOL Code	Accred.	SOP	Units	LOD			
Total Aliphatic EPH >C10-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	5.00		< 5.0	
Total Aliphatic EPH >C10-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00		< 10	
Aromatic VPH >C5-C7	HS_2D_AR	U	2780	mg/kg	0.05		< 0.05	
Aromatic VPH >C7-C8	HS_2D_AR	U	2780	mg/kg	0.05		< 0.05	
Aromatic VPH >C8-C10	HS_2D_AR	U	2780	mg/kg	0.05		< 0.05	
Total Aromatic VPH >C5-C10	HS_2D_AR	U	2780	mg/kg	0.25		< 0.25	
Aromatic EPH >C10-C12 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00		< 1.0	
Aromatic EPH >C12-C16 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00		< 1.0	
Aromatic EPH >C16-C21 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00		< 2.0	
Aromatic EPH >C21-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00		< 2.0	
Aromatic EPH >C35-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	1.00		< 1.0	
Total Aromatic EPH >C10-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	5.00		< 5.0	
Total Aromatic EPH >C10-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	10.00		< 10	
Total VPH >C5-C10	HS_2D_Total	U	2780	mg/kg	0.50		< 0.50	
Total EPH >C10-C35 MC	EH_2D_Total_#1	U	2690	mg/kg	10.00		< 10	
Total EPH >C10-C40 MC	EH_2D_Total_#1	N	2690	mg/kg	10.00		< 10	
Organic Matter		M	2625	%	0.40		3.2	0.86
Naphthalene		M	2700	mg/kg	0.10		< 0.10	< 0.10
Acenaphthylene		M	2700	mg/kg	0.10		< 0.10	< 0.10
Acenaphthene		M	2700	mg/kg	0.10		< 0.10	< 0.10
Fluorene		M	2700	mg/kg	0.10		< 0.10	< 0.10
Phenanthrene		M	2700	mg/kg	0.10		0.46	0.23
Anthracene		M	2700	mg/kg	0.10		< 0.10	0.15
Fluoranthene		M	2700	mg/kg	0.10		0.95	0.25
Pyrene		M	2700	mg/kg	0.10		0.85	0.25
Benzo[a]anthracene		M	2700	mg/kg	0.10		0.59	< 0.10
Chrysene		M	2700	mg/kg	0.10		0.50	< 0.10
Benzo[b]fluoranthene		M	2700	mg/kg	0.10		0.63	< 0.10
Benzo[k]fluoranthene		M	2700	mg/kg	0.10		0.31	< 0.10
Benzo[a]pyrene		M	2700	mg/kg	0.10		0.32	< 0.10
Indeno(1,2,3-c,d)Pyrene		M	2700	mg/kg	0.10		0.65	< 0.10
Dibenz(a,h)Anthracene		M	2700	mg/kg	0.10		0.20	< 0.10
Benzo[g,h,i]perylene		M	2700	mg/kg	0.10		0.98	< 0.10
Total Of 16 PAH's		M	2700	mg/kg	2.0		6.4	< 2.0
Alpha-HCH		N	2840	mg/kg	0.20			
Gamma-HCH (Lindane)		N	2840	mg/kg	0.20			
Beta-HCH		N	2840	mg/kg	0.20			

Results - Soil

Project: 18964 MAPLE HOUSE

Client: Herts & Essex Site Investigations		Chemtest Job No.:				24-17295	24-17295	24-17295
Quotation No.:		Chemtest Sample ID.:				1815335	1815336	1815337
Order No.: 18964		Client Sample Ref.:				SS	SS	NAT
		Sample Location:				WS5	WS6	WS6
		Sample Type:				SOIL	SOIL	SOIL
		Top Depth (m):				0.50	0.40	0.80
		Date Sampled:				29-May-2024	29-May-2024	29-May-2024
		Asbestos Lab:				NEW-ASB	NEW-ASB	NEW-ASB
Determinand	HWOL Code	Accred.	SOP	Units	LOD			
Delta-HCH		N	2840	mg/kg	0.20			
Heptachlor		N	2840	mg/kg	0.20			
Aldrin		N	2840	mg/kg	0.20			
Heptachlor Epoxide		N	2840	mg/kg	0.20			
Gamma-Chlordane		N	2840	mg/kg	0.20			
Alpha-Chlordane		N	2840	mg/kg	0.20			
Endosulfan I		N	2840	mg/kg	0.20			
4,4-DDE		N	2840	mg/kg	0.20			
Dieldrin		N	2840	mg/kg	0.20			
Endrin		N	2840	mg/kg	0.20			
4,4-DDD		N	2840	mg/kg	0.20			
Endosulfan II		N	2840	mg/kg	0.20			
Endrin Aldehyde		N	2840	mg/kg	0.20			
4,4-DDT		N	2840	mg/kg	0.20			
Endosulfan Sulphate		N	2840	mg/kg	0.20			
Methoxychlor		N	2840	mg/kg	0.20			
Endrin Ketone		N	2840	mg/kg	0.20			
Total Phenols		M	2920	mg/kg	0.10		< 0.10	< 0.10

Test Methods

SOP	Title	Parameters included	Method summary	Water Accred.
2010	pH Value of Soils	pH at 20°C	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 <30°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	Alkaline 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.	
2455	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-diphenylcarbazine.	
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.	
2690	EPH A/A Split	Aliphatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40 Aromatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40	Acetone/Heptane 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; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)	
2780	VPH A/A Split	Aliphatics: >C5–C6, >C6–C7,>C7–C8,>C8-C10 Aromatics: >C5–C7,>C7-C8,>C8–C10	Water extraction / Headspace GCxGC FID detection	
2840	Organochlorine (O-Cl) Pesticides in Soils by GC-MS	Organochlorine pesticide representative suite including DDT and its metabolites, 'drins' and HCH etc, plus client specific determinands	Dichloromethane 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.	

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- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

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

Charges may apply to extended sample storage.

Water Sample Category Key for Accreditation

- DW - Drinking Water
- GW - Ground Water
- LE - Land Leachate
- NA - Not Applicable

Report Information

PL - Prepared Leachate
PW - Processed Water
RE - Recreational Water
SA - Saline Water
SW - Surface Water
TE - Treated Effluent
TS - Treated Sewage
UL - Unspecified Liquid

Clean Up Codes

NC - No Clean Up
MC - Mathematical Clean Up
FC - Florisil Clean Up

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 - Aromatic only
2D - GC-GC – Double coil gas chromatography
#1 - EH_2D_Total but with humics mathematically subtracted
#2 - EH_2D_Total but with fatty acids mathematically subtracted
+ - Operator to indicate cumulative e.g. EH+EH_Total or EH_CU+HS_Total

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

Final Report

Report No.: 24-17297-1

Initial Date of Issue: 10-Jun-2024

Re-Issue Details:

Client Herts & Essex Site Investigations

Client Address: Unit J8
Peek Business Park
Woodside
Bishops Stortford
Hertfordshire
CM23 5RG

Contact(s): Chris Gray
Dafydd Hudd
Rebecca Chamberlain
Ben McCulloch

Project 18964 MAPLE HOUSE

Quotation No.: **Date Received:** 03-Jun-2024

Order No.: 18964 **Date Instructed:** 03-Jun-2024

No. of Samples: 1

Turnaround (Wkdays): 7 **Results Due:** 11-Jun-2024

Date Approved: 10-Jun-2024

Approved By:



Details: David Smith, Technical Director

For details about application of accreditation to specific matrix types, please refer to the Table at the back of this report

Results - 2 Stage WAC

Project: 18964 MAPLE HOUSE

Chemtest Job No: 24-17297							Landfill Waste Acceptance Criteria			
Chemtest Sample ID: 1815350							Limits			
Sample Ref: TS							Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill	
Sample ID:										
Sample Location: WS4										
Top Depth(m): 0.10										
Bottom Depth(m):										
Sampling Date: 29-May-2024										
Determinand	SOP	Accred.	Units							
Total Organic Carbon	2625	U	%				2.3	3	5	6
Loss On Ignition	2610	U	%				11	--	--	10
Total BTEX	2760	U	mg/kg				< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg				< 0.10	1	--	--
TPH Total WAC	2670	U	mg/kg				< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg				< 2.0	100	--	--
pH at 20C	2010	U					7.9	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg				0.019	--	To evaluate	To evaluate
Eluate Analysis			2:1 mg/l	8:1 mg/l	2:1 mg/kg	Cumulative mg/kg 10:1	Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg			
Arsenic	1455	U	0.0026	0.0018	0.0050	0.019	0.5	2	25	
Barium	1455	U	0.005	< 0.005	0.010	0.0054	20	100	300	
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5	
Chromium	1455	U	0.0012	0.0006	0.0024	0.0066	0.5	10	70	
Copper	1455	U	0.0038	0.0033	0.0073	0.0038	2	50	100	
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2	
Molybdenum	1455	U	0.0007	0.0003	0.0013	0.0032	0.5	10	30	
Nickel	1455	U	0.0027	0.0013	0.0052	0.014	0.4	10	40	
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50	
Antimony	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.06	0.7	5	
Selenium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.1	0.5	7	
Zinc	1455	U	0.010	0.005	0.019	0.058	4	50	200	
Chloride	1220	U	< 1.0	< 1.0	< 10	< 10	800	15000	25000	
Fluoride	1220	U	0.065	0.080	< 1.0	< 1.0	10	150	500	
Sulphate	1220	U	< 1.0	< 1.0	< 10	< 10	1000	20000	50000	
Total Dissolved Solids	1020	N	86	59	170	620	4000	60000	100000	
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-	
Dissolved Organic Carbon	1610	U	8.4	9.0	< 50	89	500	800	1000	

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	23

Leachate Test Information	
Leachant volume 1st extract/l	0.298
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.178

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Test Methods

SOP	Title	Parameters included	Method summary	Water Accred.
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity at 25°C and Total Dissolved Solids (TDS) in Waters	Conductivity Meter	
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.	
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).	
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation	
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.	
2010	pH Value of Soils	pH at 20°C	pH Meter	
2015	Acid Neutralisation Capacity	Acid Reserve	Titration	
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 <30°C.	
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930	
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.	
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.	
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID	
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 (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)	
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. Reported PCB 101 results may contain contributions from PCB 90 due to inseparable chromatography.	
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge	
650	Characterisation of Waste (Leaching WAC)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge	

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2D - GC-GC – Double coil gas chromatography
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#2 - EH_2D_Total but with fatty acids mathematically subtracted
+ - Operator to indicate cumulative e.g. EH+EH_Total or EH_CU+HS_Total

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