

ENVIRONMENTAL REPORT

Site Address:	Site at Stadium Way, Reading, Berkshire. RG30 6BX
Report Date:	September 2022
Project No.:	17590
Prepared for:	PSK Ltd
Planning Application	Reading Council – 190591



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LIST OF ABBREVIATIONS

BGS	British Geological Society
CIRIA	Construction Industry Research and Information Association
EA	Environment Agency
EFDC	Epping Forest District Council
GL	Ground Level
GW	Groundwater
HESI	Herts & Essex Site Investigations
LAPPC	Local Authority Pollution Prevention and Control
NOS	Not Otherwise Specified (waste material)
NHBC	National House-Building Council
OS	Ordnance Survey
PAH	Poly Aromatic Hydrocarbons
SPZ	Source Protection Zone
TPH	Total Petroleum Hydrocarbons
UFST	Underground Fuel Storage Tanks

GENERAL NOTES

This report has been prepared based on the findings of investigations into the site 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 conditions. As part of this review, research has been undertaken with the Local Authority and the Environment Agency as to the site 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 product or sheet materials either on the surface of the site soils 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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- HNC – Civil Engineering.
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- P.G. Diploma – Geotechnical Engineering, (Inc. Environmental Engineering)
- Master of Science, (Geotechnical Engineering), (Inc. Environmental Engineering)
- SNIFFER modelling course.
- CONSIM Groundwater Assessment Course.
- (30 Years in Geotechnical and Environmental Engineering)
- Asbestos Awareness Course.
- Non-Licensed Work with Asbestos Including>NNLW.
- Site Supervisors Safety Training Scheme, (SSSTS).
- First Aid Course in Construction – 3 Day Course – 3 years.
- CSCS Labourer Card.

Document Status and Approval Schedule

<i>Issue No</i>	<i>Status</i>	<i>Date</i>	<i>Prepared by: Rebecca Chamberlain Signature / Date</i>	<i>Technical review by: Chris Gray Signature / Date</i>
1	Final	September 2022		

SUMMARY

Client	PSK Ltd Error! Reference source not found. Error! Reference source not found.		
Site Location	Site at Stadium Way, Reading, Berkshire. RG30 6BX Error! Reference source not found.		
Existing Development	Parking Area, Vehicle Repair Workshop, Road.		
Proposed Development	Commercial Buildings		
Site Settings and Previous Uses	The site is recorded as an open parcel of land from 1881 with a small track running through the site. A building is also in place within the site from 1881 to 1971. Marshland is identified from 1932 until 1959 across the western part of the site with an additional track is shown in 1959. The site becomes a commercial site from 1971 onwards and is defined as broadly the site in place to date. Surrounding the site, railway land is in place from the earliest map record until present day. Significant development is in place from 1932 within the general area. New buildings are recorded immediately surrounding the site from 1959 until 1968 with the marshland both on and off site infilled or removed in 1971. The commercial estate is generally developed in and around 1968 – 1971.		
Geological and Hydrological Profile	Geology		Aquifer Classification
	Made Ground	Shallow Made Ground Anticipated	Not Classified
	Langley Member	Silt Sand, Silt and Gravel	Unproductive Stratum
	Lewes Chalk	Nodular Chalk	Principle Aquifer
Nearest Surface Water Feature	The nearest surface water feature is recorded as 354 metres to the north east of the site which is recorded as The River Thames. At this distance, the risk from the site is unlikely to form a risk.		
Groundwater Abstractions	The nearest abstraction well is located 213 metres to the north west of the site which is recorded as for sports ground facilities. The nearest potential potable water abstraction is identified as 326 metres to the north of the site for general farming and domestic.		
Source Protection Zone	The site does not lie within a Source Protection Zone		
Potential Sources of Contamination	On Site - Road, - Marshland - Buildings - Commercial Site - Vehicle Repair Garage	Off Site - Railway Land - New buildings - Cutting Infilled - Joinery Works - Electric Sub Station - General Commercial Development	
Previous Investigations	No reports relating to contaminated land are known to us at the time of writing this report relating to the site.		

Human Health Risk	No obvious contamination has been identified in place above a commercial land use standard. Testing completed confirms minimal risks 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. <i>Appropriate PPE / RPE should be worn and the soil contamination risk should be noted within any site inductions</i>
Groundwater Risks	Groundwater risk has generally been identified as low, although, it is likely that a piling risk assessment would be required to confirm the risk associated with the length of the proposed piles and the underlying Chalk Aquifer.
Vapour Risks	No obvious fuels have been identified within the site.
Gas Risks	No Land Gas risk are recorded in place. Six monitoring rounds have been completed on site within WS1 which confirms ground gas levels are minimal. The site has been classed as a CS 1 site in terms of ground gases.
Construction Materials	Water main pipework should be installed in Barrier Pipework.
Further Works	It is recommended that additional works will be required for the site in order to complete assessments which are detailed as follows: - Complete a piling risk assessment. 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, (BS 10175 & CLR 11).

ENVIRONMENTAL ASSESSMENT - PHASE 2

1 Context and Objectives of this report

1.1 Introduction

We have been asked by PSK Ltd 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 desk top study completed in July and through August 2022.

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.
- British Standards 10175:2011+A2:2017
- Land contamination risk management (LCRM)
- Contaminated Land Report, (CLR11) 11, 'Model Procedures for the Management of Contaminated Land', (2004).
- DEFRA: Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance, (April 2012)
- Environment Agency, (EA), GP3 'Groundwater Protection: Policy and Practice'.

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

A planning application is in place with Reading Council as follows:

Application No: 190591

Proposal : Demolition of 2 number existing single storey buildings, removal of telecoms plant. Replacement with new single unit for B1c, B2 and B8 use classes with ancillary offices including associated service areas, car parking and landscaping. Modified access onto Wigmore Lane.

3 Site Location and National Grid Reference

The site is located within a commercial and light industrial area of Reading, 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:	Site at Stadium Way, Reading, Berkshire. RG30 6BX
Site assessed under	Site Owners Request - Aid as part of planning and warranties
Current use of land:	Car Park and Vehicle Repair Garage
Previous use of site, (if known)	As above
Grid Reference	NGR 46900, 174260
Site Area	0.40 Hectares
Local Authority	Reading Council
Gradient of the site	The site forms a level area of land with a slight gradient which runs down to the north, (to the railway line), where an embankment leads up to the main line.
Proximity of Controlled Waters, (if known)	The nearest surface water feature is identified as 354 metres to the north east of the site and as such, is unlikely to be impacted on by the site features. This is recorded as the main body of the River Thames.

4 Review of Previous Reports or Documents Relating to the Site

4.1 Site Details

- The site is recorded as an existing commercial estate and includes a parking area vehicle repair garages and a road system.
- The proposed development forms the construction of new commercial units with associated landscaping.
- The site is recorded as an open parcel of land from 1881 with a small track running through the site. A building is also in place within the site from 1881 to 1971. Marshland is identified from 1932 until 1959 across the western part of the site with an additional track is shown in 1959. The site becomes a commercial site from 1971 onwards and is defined as broadly the site in place to date.
- Surrounding the site, railway land is in place from the earliest map record until present day. Significant development is in place from 1932 within the general area. New buildings are recorded immediately surrounding the site from 1959 until 1968 with the marshland both on and off site infilled or removed in 1971. The commercial estate is generally developed in and around 1968 – 1971.
- The BGS reports the geology at the site to be Langley Silt Member which in turn overlies Lewes Nodular CHALK.
- The nearest surface water feature is recorded as 354 metres to the north east of the site which is recorded as The River Thames. At this distance, the risk from the site is unlikely to form a risk.

- The nearest abstraction well is located 213 metres to the north west of the site which is recorded as for sports ground facilities. The nearest potential potable water abstraction is identified as 326 metres to the north of the site for general farming and domestic.
- 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	Off Site
• Road, • Marshland • Buildings • Commercial Site • Vehicle Repair Garage	• Railway Land • New buildings • Cutting Infilled • Joinery Works • Electric Sub Station • General Commercial Development

Table 2 Pollutant Risk

Risk Assessment	Pollutant						
Soil, Groundwater & Vapour Risk							
Risk Assessment A	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, VOC's, BTEX, MTBE, CO ₂ , CH ₄ , PCB's.						
Soil Sampling Groundwater & Vapour Assessment							
Soil, Groundwater & Vapour Risk							
Risk Assessment B	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, VOC's, BTEX, MTBE, CO ₂ , CH ₄ , PCB's.						
Soil Sampling Groundwater & Vapour Assessment							
Spatial Sampling, (General Assessment)	<table> <tr> <td>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.</td><td>25-meter Centers In accordance with BS10175: 2011+A2:2017.</td></tr> <tr> <td>BS3882:2015</td><td></td></tr> <tr> <td>Asbestos</td><td>5-10-meter Centers In accordance with BS10175: 2011+A2:2017.</td></tr> </table>	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.	25-meter Centers In accordance with BS10175: 2011+A2:2017.	BS3882:2015		Asbestos	5-10-meter Centers In accordance with BS10175: 2011+A2:2017.
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BS3882:2015							
Asbestos	5-10-meter Centers In accordance with BS10175: 2011+A2:2017.						

Pathways

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

- Dermal Contact.
- Inhalation of dust and fibres.
- Ingestion of home-grown produce.
- Ingestion 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 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 Land Owners, (unlikely)
- Groundwater
- Surface water features

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 commercial land use standards.
- 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 parking areas, road systems vehicle repair workshops, railway land, marshland and commercial sites in general.
- Spatial sampling around the remainder of the site to provide a general assessment.

Initial Investigation – Jul y & August 2022

- 4 No Competitor Rig Windowless Sampler borehole sunk to a maximum depth of 3.00m - Date of Works – 24th July 2022.
- Installation of 1 No standpipes to a depth of 3.00 meters, (WS1) for the purpose of ground water and Land Gas assessments.
- Excavation of 3 No hand dug trial pits to recover samples.
- Chemical Sampling and Testing recovered from samples and sent to analytical chemist, (Date Received - 25th July 2022).

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.

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 3 **Geological Profile**

<i>Stratum</i>	<i>Description</i>	<i>Depth, Range (m)</i>	<i>Thickness, Range (m)</i>
	Tarmac & Concrete	0.13 - 0.26m	0.13 – 0.26m
MADE GROUND	Loose to compact brown clayey gravel FILL	0.50m	0.35m
	Loose to compact brown grey clay FILL with black staining and rare brick fragments	1.00m	0.80m
	SUPERFICIAL DEPOSITS		
	Soft to firm grey moderately silty slightly sandy CLAY	1.80m	0.40m
LANGLEY SILT MEMBER	Loose / Medium dense brown slightly claybound SAND & GRAVEL	1.60-3.00m	0.70-2.50m
	Dense brown SAND & GRAVEL	3.00m+	1.30-1.40m+
Ground Water	Groundwater was identified within the excavations at depths of between 1.31-2.42 metres. Long term monitoring is ongoing.		

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 single zone of development as detailed below: -

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 Sampling and Testing Schedule

Site Details			Sample ID							Testing Suite					RESULTS	
Existing Site Use	Proposed Site Use	Chemical Testing Date	stratum sampled	Depth Of Stratum (m b.g.l.)	Sample Location	Sample Depth (m)		HESI Suite 1	PAH' s, (Speciated)	TPH' S, (TPHCWG)	Asbestos	VOC' S	PCB' S	WAC TEST	Asbestos Quantification %	
COMMERCIAL UNITS	COMMERCIAL UNITS	20/07/2022	FILL	0.50	WS1	0.40	- 0.45	✓	✓	✓	✓					
			FILL	0.50	WS2	0.35	- 0.40	✓	✓	✓	✓					
			NAT	1.60	WS3	0.30	- 0.35	✓	✓	✓	✓					
			FILL	1.00	WS4	0.30	- 0.35	✓	✓	✓	✓	✓	✓		NO RISKS	
			FILL	1.00	WS4	0.90	- 0.95	✓	✓	✓	✓					
		9/08/2022	FILL	1.00	WS4	0.40	- 0.45							✓		
			FILL	0.80m+	TP1	0.30	- 0.35	✓	✓	✓	✓					
			FILL	0.80m+	TP2	0.10	- 0.15	✓	✓		✓					
			* Indicates the value which forms the lowest trigger level. Where PAH's are additionally tested within the VOC List. the highest values have been taken. 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												EXPOSURE LEVEL	

10.3 Sources of Risk within Soils

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

- No obvious risks in place, although, the level of Lead is marginally elevated but doesn't exceed COMMERCIAL values developed by Category 4 Screening Values of 2300mg/kg⁻¹.

10.4 Human Health Source Conclusions

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

Table 5 Soil Contamination Risks

<i>Risk Factor</i>	<i>Risks in place</i>	<i>Remediation</i>
Targeted Risks	NONE	
Spatial Risks	NONE	

10.5 Ground and Surface Water Source

The nearest surface water feature is recorded as 354 metres to the north east of the site which is recorded as The River Thames. At this distance, the risk from the site is unlikely to form a risk.

The nearest discharge consent is identified as 132 metres from the north east of the site which is recorded as Unknown into a freshwater stream or river.

The nearest pollution incident to controlled waters is identified as 29 metres to the south of the site. This is recorded as a minor incident from Oils – Unknown. The nearest significant pollution incident is recorded as 57 metres to the east of the site from Oils – Unknown. This was dated 1995 and as such, unlikely to impact on the site.

The published Environment Agency Groundwater Vulnerability Map of the area indicates the site to be located within an area classified as an Unproductive Stratum. The underlying geology is recorded as a Principle Aquifer formed by Lewes Nodular Chalk.

The nearest abstraction well is located 213 metres to the north west of the site which is recorded as for sports ground facilities. The nearest potential potable water abstraction is identified as 326 metres to the north of the site for general farming and domestic.

The site does not lie within a Source Protection Zone.

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 presence of Langley Silt Member, (Unproductive Stratum) underlying the site and the absence of a groundwater system or controlled surface water features.

Should a piled foundation solution be proposed for the site, it is possible that a piling risk assessment may be required for the site.

10.6 Land Gas Assessments

In accordance with CLR11, BS 10175:2011, BS 8485:2007, CIRIA C665 and CIRIA R149, risks from land gas are not in place and as such, no risk has been identified and no action or testing completed.

Considering the potential for Land Gas risks due to the potential made ground and infilled cutting 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

Table 6 Land Gas Risk Assessment - Response Zone

Feature	Targeted Response Zone	Location to Target	Gas risk
Made ground and Infilled ground	Made Ground	Site Wide	Land Gases - CO ₂ , CH ₄ .
Infilled cutting – off site	Made Ground / any granular soils	Site Wide – migration on to the site	

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 a that low risks are in place.

In addition to this, we can confirm that land gas assessments have been completed at the site to confirm the level and extent of risk from possible on-site and off-site sources. Initial assessments of the site confirm the following:-

Table 7 **Gas Monitoring Results**

DATE	Monitoring Point Reference	Flow Range, (litres / hr)	Atmospheric Pressure Range, (Pascal's)	Methane, (% v / v)	Methane, (% LEL)	Carbon Dioxide, (% v / v)	Oxygen, (%v / v)	Water Level, (m.b.g.l)	Depth of Well, (m)	Vol of gas in well, (m³)
25/07/2022	WS1	0.0	1006	0.0	0.0	0.8	19.2	1.35	3.00	0.24m ³
3/08/2022	WS1	0.0	1011	0.0	0.0	0.7	19.1	1.38	3.00	0.24m ³
9/08/2022	WS1	0.0	1028	0.0	0.0	0.9	19.1	1.41	3.00	0.24m ³
16/08/2022	WS1	0.0	1021	0.0	0.0	0.7	19.0	1.37	3.00	0.24m ³
21/08/2022	WS1	0.0	1018	0.0	0.0	0.8	19.1	1.38	3.00	0.24m ³
1/09/2022	WS1	0.0	1012	0.0	0.0	1.0	18.9	1.40	3.00	0.24m ³

Based on this information, we can confirm that the classification for ground gas regime is low and classified as CS1.

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
Vehicle Repair Workshop			
Parking Areas			
Storage Areas			
Car Park			
Main Road			
Control of Major Accident Hazards Sites (COMAH)			
Planning Hazardous Substance Consents	Made ground / Granular soils	Site Wide	TPH's, Naphthalene, PCB's, BTEX. MTBE, VOC's
Marshland			
Railway Land			
New buildings			
Cutting Infilled			
Joinery Works			
Electric Sub Station			
General Commercial Development			

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 marginal levels of contamination, (In the form of PAH's), 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.

11 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)

Two WAC tests have been completed on samples from the site area as follows: -

Table 9 **WAC testing Results**

Location	Depth (m)	Soil description	Classification	Reason
WS4	0.40	Loose to compact brown grey clay FILL with black staining and rare brick fragments	INERT	
TP1	0.30	Loose to compact brown grey clay FILL with black staining and rare brick fragments	SNRW	Elevated – Total (Of 17) PAH's Total Dissolved Solids

12 Source Risk Conclusions

HUMAN HEALTH RISK

No elevated levels of contamination are recorded within the site area.

WORKFORCE

The lack of human health risk is in place within the site area, will promote a low risk to any workforce within the areas. **Appropriate PPE / RPE should be worn.**

GROUNDWATER RISKS

No sources of risk are recorded in place within the site area - **risks to groundwater is not in place.**

VAPOUR RISKS

Chemical testing of the soils show that no risks are in place. **Vapour risk is not in place.**

GAS RISKS

Based on a pragmatic approach to land gases, we can confirm that the ***classification for ground gas regime is low and classified as CS1.***

CONSTRUCTION MATERIALS

Construction materials have been considered and potential risk has been identified directly to any water main pipework developed at the site.

- ***Water main pipework can be laid in a protect-a-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.***

FURTHER WORKS

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.

Maintain a watching brief as follows:-

It should be noted that this investigation is undertaken in order to identify the extent of contamination as a result of historic and ongoing use. Should any areas of the site be encountered within the development that appear potentially contaminated through visual or olfactory assessment outside that discussed within this report, consultation with ourselves should be undertaken in order to identify the risk associated with the material.



Stadium Way, Reading, Berkshire RG30 6BX

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 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

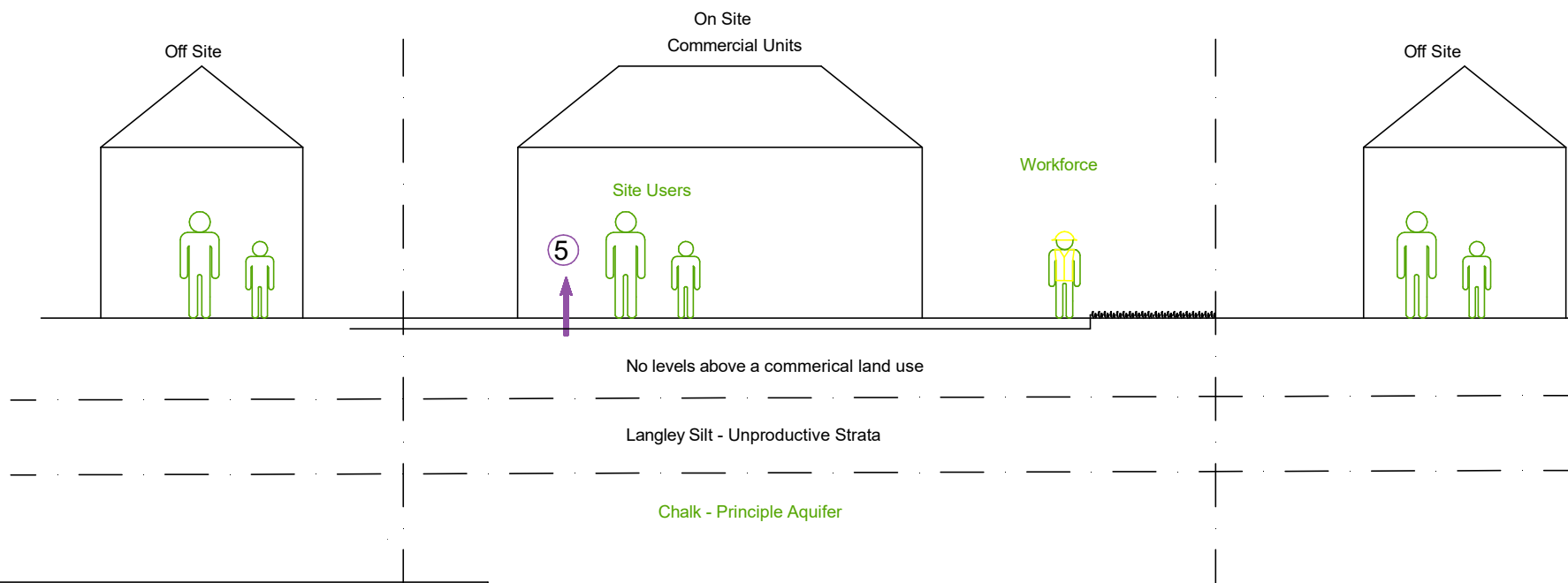
- ⑩ Leaching, lateral migration of shallow groundwater to a target receptor

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



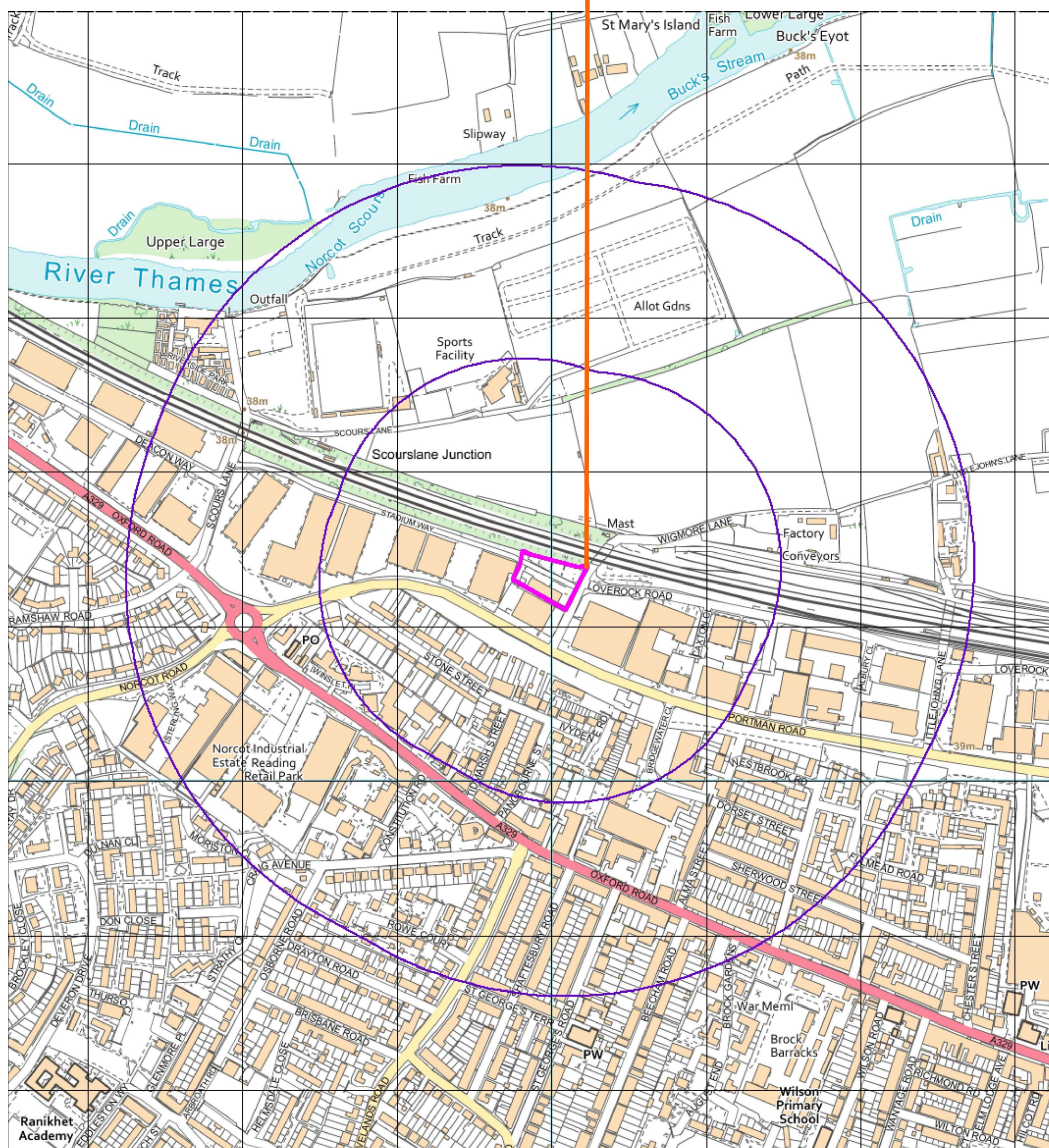
Not to Scale
Sketch No. : ENV / 17590 / A / 01

Stadium Way, Reading, Berkshire RG30 6BX

Location Plan

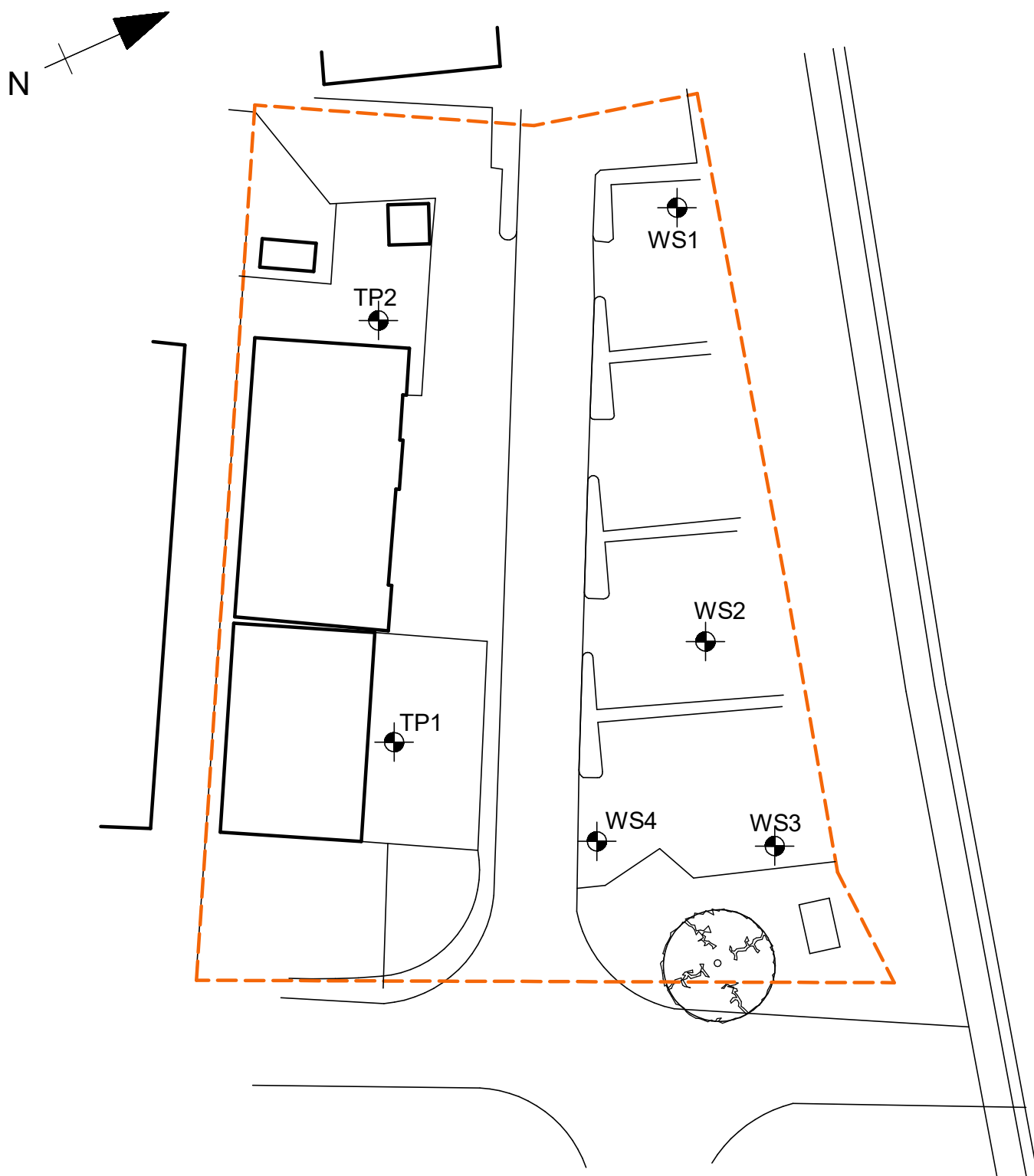


The Site



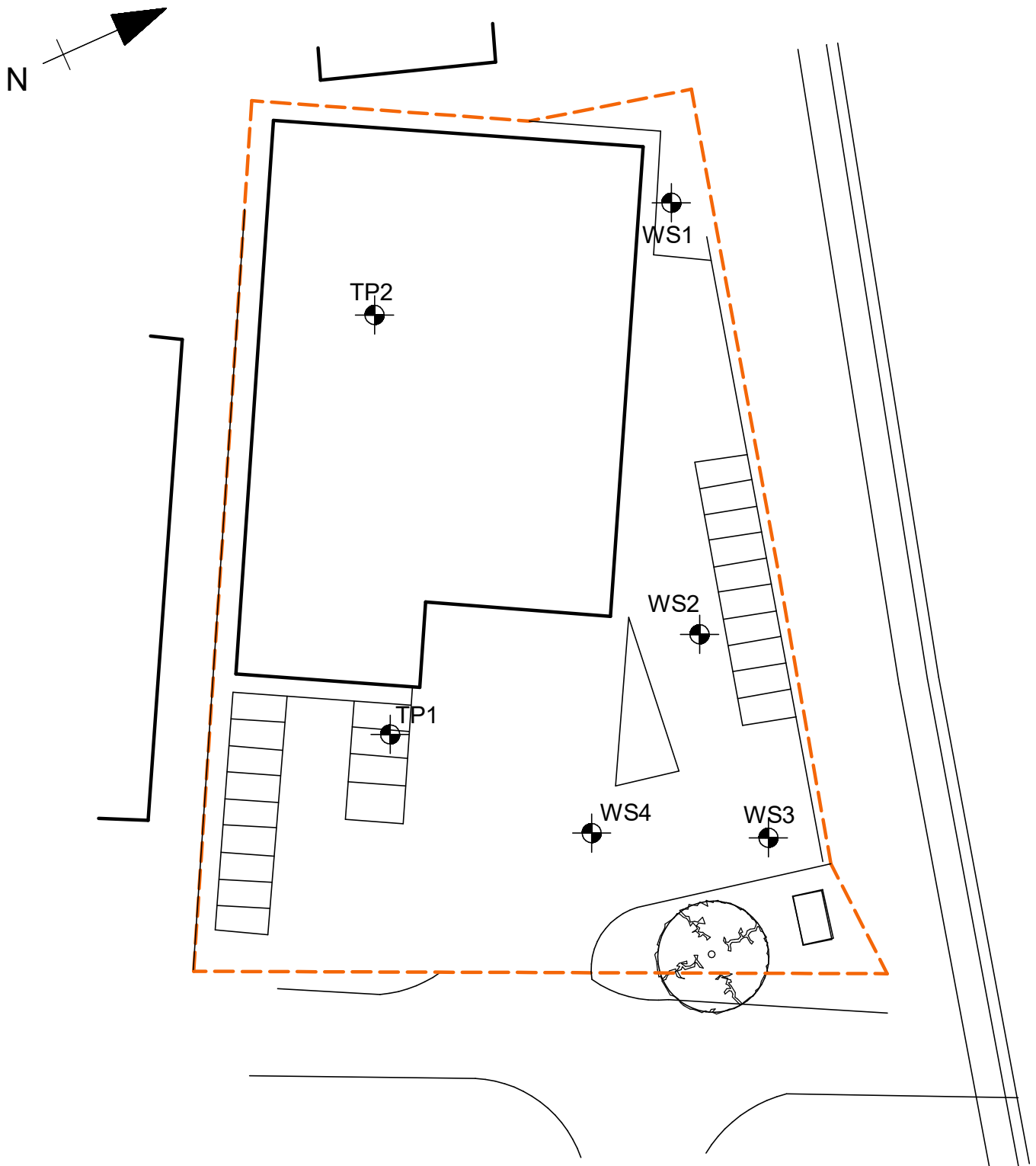
Stadium Way, Reading, Berkshire RG30 6BX

Existing Site Plan



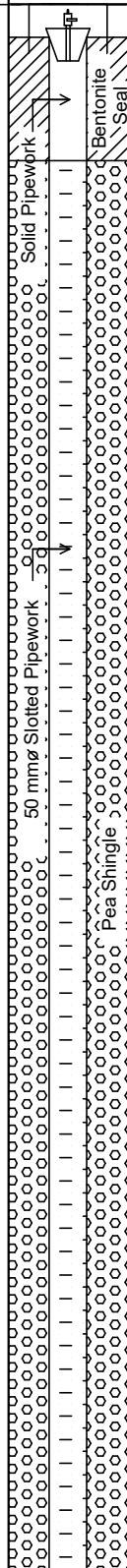
Stadium Way, Reading, Berkshire RG30 6BX

Proposed Site Plan



Stadium Way, Reading, Berkshire RG30 6BX

Window Sample One

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)								
Tarmac		0.06	0.06	Water level at 1.31m on completion	1	U	0.26-1.00	N=15			1.00				
Concrete		0.26	0.20												
Soft grey very silty CLAY		0.50	0.24												
Loose light brown saturated silty claybound SAND & GRAVEL			0.90		2	U	1.00-2.00								
		1.40													
Soft to firm grey moderately silty slightly sandy CLAY		1.80	0.40		3	U	2.00 - 3.00								
Medium dense brown SAND & GRAVEL			1.20												
Borehole Complete at 3.00m		3.00						N=24							

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)



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Date July 2022

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)				
</												

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

Stadium Way, Reading, Berkshire RG30 6BX

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)				
Tarmac		0.05	0.05	Water level at 1.37m on completion							
Concrete		0.13	0.08								
Loose to medium dense brown slightly claybound SAND & GRAVEL					1	U	0.15-1.00				
			1.47								
					2	U	1.00-2.00	N=6			1.00
		1.60									
Dense brown SAND & GRAVEL				▼	3	U	2.00 - 3.00	N=17			
			1.40								
Borehole Complete at 3.00M		3.00						N=17			

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)

Stadium Way, Reading, Berkshire RG30 6BX

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)				
	Tarmac		0.10	0.10	Water level at 2.42m on completion	1	U	0.15-1.00	N=19			1.00
	Concrete		0.20	0.10								
	Loose to compact brown grey clay FILL with black staining and rare brick fragments			0.80								
1.0			1.00									
	Medium dense brown slightly claybound SAND & GRAVEL			0.70								
			1.70									
	Dense brown SAND & GRAVEL			1.30	3	U	2.00 - 3.00	N=26				
2.0												
3.0	Borehole Complete at 3.00M		3.00						N=22			

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)

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Date July 2022

Trial Pit One

[illegible]

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)



Appendix No	2
Sheet No	6
Job No	17590
Date	July 2022

Trial Pit Two

[illegible]

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)

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.

[illegible]

Chris Gray

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Herts,
WD18 8YS

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e: reception@i2analytical.com

Analytical Report Number : 22-73298

Project / Site name:	Stadium Way (Loverock Road) Reading, Berkshire, RG30 6BX	Samples received on:	25/07/2022
Your job number:	17590	Samples instructed on/ Analysis started on:	25/07/2022
Your order number:	17590	Analysis completed by:	01/08/2022
Report Issue Number:	1	Report issued on:	01/08/2022
Samples Analysed:	5 soil samples		


Signed:

Adam Fenwick
Technical Reviewer
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 22-73298

Project / Site name: Stadium Way (Loverock Road) Reading, Berkshire, RG30 6BX

Your Order No: 17590

Lab Sample Number	2361830	2361831	2361832	2361833	2361834
Sample Reference	WS1	WS2	WS3	WS4	WS4
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.40	0.35	0.30	0.30	0.90
Date Sampled	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	11	13
Total mass of sample received	kg	0.001	NONE	0.6	1.2

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	DSA	DSA	DSA	BPA	BPA

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.6	8.2	8.4	7.9	7.9
Electrical Conductivity	µS/cm	10	ISO 17025	160	160	170	530	210
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Free Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	83	210	350	1200	580
Water Soluble Sulphate as SO4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	31	40	31	650	98
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.015	0.02	0.015	0.33	0.049
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	15.4	20.2	15.4	327	49.1
Organic Matter (automated)	%	0.1	MCERTS	1.5	0.3	1.2	3	3.2

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.53	0.33	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.14	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.81	0.72	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.79	0.72	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.49	0.56	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.28	0.39	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.35	0.47	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.22	0.35	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.34	0.46	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.24	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.29	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	3.95	4.53	< 0.80
-----------------------------	-------	-----	--------	--------	--------	------	------	--------

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	6.8	4.4	8.7	17	20
Boron (water soluble)	mg/kg	0.2	MCERTS	< 0.2	0.3	0.8	1.2	0.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (III)	mg/kg	1	NONE	32	13	25	23	31
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	32	13	25	23	31
Copper (aqua regia extractable)	mg/kg	1	MCERTS	120	14	97	120	39
Lead (aqua regia extractable)	mg/kg	1	MCERTS	17	22	60	1800	99
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	0.4	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	18	6.2	17	24	23
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	46	19	57	270	120

Analytical Report Number: 22-73298

Project / Site name: Stadium Way (Loverock Road) Reading, Berkshire, RG30 6BX

Your Order No: 17590

Lab Sample Number	2361830	2361831	2361832	2361833	2361834
Sample Reference	WS1	WS2	WS3	WS4	WS4
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.40	0.35	0.30	0.30	0.90
Date Sampled	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	5.4	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	21	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	98	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35) EH_CU+HS_1D_AL	mg/kg	10	MCERTS	< 10	< 10	< 10	120	< 10

TPH-CWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	< 10	< 10	28	< 10
TPH-CWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	< 10	< 10	100	< 10
TPH-CWG - Aromatic (EC5 - EC35) EH_CU+HS_1D_AR	mg/kg	10	MCERTS	< 10	< 10	< 10	130	< 10

Analytical Report Number: 22-73298

Project / Site name: Stadium Way (Loverock Road) Reading, Berkshire, RG30 6BX

Your Order No: 17590

Lab Sample Number				2361830	2361831	2361832	2361833	2361834
Sample Reference				WS1	WS2	WS3	WS4	WS4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.35	0.30	0.30	0.90
Date Sampled				20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

VOCs

Chloromethane	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
Chloroethane	µg/kg	1	NONE	-	-	-	< 1.0	-
Bromomethane	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
Vinyl Chloride	µg/kg	1	NONE	-	-	-	< 1.0	-
Trichlorofluoromethane	µg/kg	1	NONE	-	-	-	< 1.0	-
1,1-Dichloroethene	µg/kg	1	NONE	-	-	-	< 1.0	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,1-Dichloroethane	µg/kg	1	MCERTS	-	-	-	< 1.0	-
2,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Trichloromethane	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,2-Dichloroethane	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,1-Dichloropropene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	-	-	< 1.0	-
Benzene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Tetrachloromethane	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Trichloroethene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Dibromomethane	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Bromodichloromethane	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
Toluene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
Dibromochloromethane	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
Tetrachloroethene	µg/kg	1	NONE	-	-	-	< 1.0	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
Chlorobenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
p & m-Xylene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Styrene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Tribromomethane	µg/kg	1	NONE	-	-	-	< 1.0	-
o-Xylene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Isopropylbenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Bromobenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
n-Propylbenzene	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
2-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
4-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
tert-Butylbenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
sec-Butylbenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Butylbenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	-

Analytical Report Number: 22-73298

Project / Site name: Stadium Way (Loverock Road) Reading, Berkshire, RG30 6BX

Your Order No: 17590

Lab Sample Number				2361830	2361831	2361832	2361833	2361834
Sample Reference				WS1	WS2	WS3	WS4	WS4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.35	0.30	0.30	0.90
Date Sampled				20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		
Hexachlorobutadiene				µg/kg	1	MCERTS	-	< 1.0
1,2,3-Trichlorobenzene				µg/kg	1	ISO 17025	-	< 1.0

PCBs by GC-MS

PCB Congener 28	mg/kg	0.001	MCERTS	-	-	-	< 0.001	-
PCB Congener 52	mg/kg	0.001	MCERTS	-	-	-	< 0.001	-
PCB Congener 101	mg/kg	0.001	MCERTS	-	-	-	< 0.001	-
PCB Congener 118	mg/kg	0.001	MCERTS	-	-	-	< 0.001	-
PCB Congener 138	mg/kg	0.001	MCERTS	-	-	-	< 0.001	-
PCB Congener 153	mg/kg	0.001	MCERTS	-	-	-	< 0.001	-
PCB Congener 180	mg/kg	0.001	MCERTS	-	-	-	< 0.001	-

Total PCBs by GC-MS

Total PCBs	mg/kg	0.007	MCERTS	-	-	-	< 0.007	-
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U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 22-73298

Project / Site name: Stadium Way (Loverock Road) Reading, Berkshire, RG30 6BX

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2361830	WS1	None Supplied	0.4	Light brown clay and sand with gravel.
2361831	WS2	None Supplied	0.35	Light brown clay and sand with gravel.
2361832	WS3	None Supplied	0.3	Light brown clay and sand with gravel.
2361833	WS4	None Supplied	0.3	Brown loam and clay with gravel and vegetation.
2361834	WS4	None Supplied	0.9	Brown loam and clay with gravel and vegetation.

Analytical Report Number : 22-73298

Project / Site name: Stadium Way (Loverock Road) Reading, Berkshire, RG30 6BX

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Electrical conductivity of soil	Determination of electrical conductivity in soil by electrometric measurement.	In-house method	L031-PL	D	ISO 17025
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE

Analytical Report Number : 22-73298

Project / Site name: Stadium Way (Loverock Road) Reading, Berkshire, RG30 6BX

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Sample Deviation Report



Analytical Report Number : 22-73298

Project / Site name: Stadium Way (Loverock Road) Reading, Berkshire, RG30 6BX

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis. Please note that the associated result(s) may be unreliable and should be interpreted with care.

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
WS1	None Supplied	S	2361830	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS1	None Supplied	S	2361830	b	TPHCWG (Soil)	L088/76-PL	b
WS2	None Supplied	S	2361831	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS2	None Supplied	S	2361831	b	TPHCWG (Soil)	L088/76-PL	b
WS3	None Supplied	S	2361832	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS3	None Supplied	S	2361832	b	TPHCWG (Soil)	L088/76-PL	b
WS4	None Supplied	S	2361833	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS4	None Supplied	S	2361833	b	TPHCWG (Soil)	L088/76-PL	b
WS4	None Supplied	S	2361833	b	Volatile organic compounds in soil	L073B-PL	b
WS4	None Supplied	S	2361834	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS4	None Supplied	S	2361834	b	TPHCWG (Soil)	L088/76-PL	b



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Final Report

Report No.: 22-30485-1
Initial Date of Issue: 18-Aug-2022
Client Herts & Essex Site Investigations
Client Address: The Old Post Office
Wellpond Green
Standon
Ware
Hertfordshire
SG11 1NJ
Contact(s): Chris Gray
Dafydd Hudd
Rebecca Chamberlain
Project 17590 Stadium Way (Loverock Road)
Reading, Berkshire

Quotation No.:		Date Received:	11-Aug-2022
Order No.:	17590	Date Instructed:	11-Aug-2022
No. of Samples:	2		
Turnaround (Wkdays):	5	Results Due:	17-Aug-2022
Date Approved:	18-Aug-2022		

Approved By:



Details: Stuart Henderson, Technical
Manager

Results - Soil

Project: 17590 Stadium Way (Loverock Road) Reading, Berkshire

Client: Herts & Essex Site Investigations	Chemtest Job No.:				22-30485	22-30485
Quotation No.:	Chemtest Sample ID.:				1485321	1485322
	Sample Location:				TP1	TP2
	Sample Type:				SOIL	SOIL
	Top Depth (m):				0.3	0.1
	Date Sampled:				09-Aug-2022	09-Aug-2022
	Asbestos Lab:				DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD		
ACM Type	U	2192		N/A	Fibres/Clumps	Fibres/Clumps
Asbestos Identification	U	2192		N/A	Chrysotile	Chrysotile
Asbestos by Gravimetry	U	2192	%	0.001	0.030	0.043
Total Asbestos	U	2192	%	0.001	0.030	0.043
Moisture	N	2030	%	0.020	6.1	4.8
Stones and Removed Materials	N	2030	%	0.020	< 0.020	< 0.020
Soil Colour	N	2040		N/A	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones
Soil Texture	N	2040		N/A	Clay	Gravel
pH	U	2010		4.0	10.1	10.2
Electrical Conductivity (2:1)	N	2020	µS/cm	1.0	2200	2200
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	< 0.40	< 0.40
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.085	0.013
Cyanide (Free)	U	2300	mg/kg	0.50	< 0.50	< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50
Sulphate (Total)	U	2430	%	0.010	< 0.010	0.049
Arsenic	U	2455	mg/kg	0.5	6.1	2.4
Cadmium	U	2455	mg/kg	0.10	0.17	0.10
Copper	U	2455	mg/kg	0.50	59	29
Mercury	U	2455	mg/kg	0.05	0.06	< 0.05
Nickel	U	2455	mg/kg	0.50	11	4.5
Lead	U	2455	mg/kg	0.50	42	27
Zinc	U	2455	mg/kg	0.50	100	65
Chromium (Trivalent)	N	2490	mg/kg	1.0	15	5.6
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	0.72	0.88
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0

Results - Soil

Project: 17590 Stadium Way (Loverock Road) Reading, Berkshire

Client: Herts & Essex Site Investigations	Chemtest Job No.:				22-30485	22-30485
Quotation No.:	Chemtest Sample ID.:				1485321	1485322
	Sample Location:				TP1	TP2
	Sample Type:				SOIL	SOIL
	Top Depth (m):				0.3	0.1
	Date Sampled:				09-Aug-2022	09-Aug-2022
	Asbestos Lab:				DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD		
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10
Naphthalene	U	2700	mg/kg	0.10	0.26	0.49
Acenaphthylene	U	2700	mg/kg	0.10	1.1	0.54
Acenaphthene	U	2700	mg/kg	0.10	0.67	0.27
Fluorene	U	2700	mg/kg	0.10	0.40	0.53
Phenanthrene	U	2700	mg/kg	0.10	1.3	0.91
Anthracene	U	2700	mg/kg	0.10	0.56	0.28
Fluoranthene	U	2700	mg/kg	0.10	6.2	2.1
Pyrene	U	2700	mg/kg	0.10	6.4	1.8
Benzo[a]anthracene	U	2700	mg/kg	0.10	4.0	1.9
Chrysene	U	2700	mg/kg	0.10	2.9	1.1
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	6.0	2.4
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	1.9	0.71
Benzo[a]pyrene	U	2700	mg/kg	0.10	4.4	1.6
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	4.7	2.1
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	3.3	1.3
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	5.0	1.7
Total Of 16 PAH's	U	2700	mg/kg	2.0	49	20
Total Phenols	U	2920	mg/kg	0.10	< 0.10	< 0.10

Test Methods

SOP	Title	Parameters included	Method summary
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	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.
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; 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)
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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Sample Retention and Disposal

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Charges may apply to extended sample storage

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

customerservices@chemtest.com



Final Report

Report No.: 22-30489-1
Initial Date of Issue: 22-Aug-2022
Client Herts & Essex Site Investigations
Client Address: The Old Post Office
Wellpond Green
Standon
Ware
Hertfordshire
SG11 1NJ
Contact(s): Chris Gray
Dafydd Hudd
Rebecca Chamberlain
Project 17590 Stadium Way (Loverock road)
Reading, Berkshire

Quotation No.:		Date Received:	11-Aug-2022
Order No.:	17590	Date Instructed:	11-Aug-2022
No. of Samples:	2		
Turnaround (Wkdays):	7	Results Due:	19-Aug-2022
Date Approved:	22-Aug-2022		

Approved By:

Details: Stuart Henderson, Technical
Manager

Results - 2 Stage WAC

Project: 17590 Stadium Way (Loverock road) Reading, Berkshire

Chemtest Job No: 22-30489							Landfill Waste Acceptance Criteria			
Chemtest Sample ID: 1485340							Limits			
Sample Ref:							Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill	
Sample ID:										
Sample Location: WS4										
Top Depth(m): 0.4										
Bottom Depth(m):										
Sampling Date: 09-Aug-2022										
Determinand	SOP	Accred.	Units							
Total Organic Carbon	2625	M	%				0.87	3	5	6
Loss On Ignition	2610	M	%				15	--	--	10
Total BTEX	2760	M	mg/kg				< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg				< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg				< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg				< 2.0	100	--	--
pH	2010	M					10.6	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg				0.013	--	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	0.0047	0.0063	0.0095	0.060	0.5	2	25	
Barium	1455	U	0.031	0.021	0.061	0.22	20	100	300	
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5	
Chromium	1455	U	< 0.0005	0.0035	< 0.0005	0.029	0.5	10	70	
Copper	1455	U	0.014	0.015	0.027	0.022	2	50	100	
Mercury	1455	U	< 0.00005	0.00005	< 0.00005	0.00045	0.01	0.2	2	
Molybdenum	1455	U	0.016	0.0042	0.031	0.061	0.5	10	30	
Nickel	1455	U	0.0028	0.0031	0.0056	0.030	0.4	10	40	
Lead	1455	U	0.0016	0.028	0.0032	0.24	0.5	10	50	
Antimony	1455	U	0.014	0.0080	0.028	0.090	0.06	0.7	5	
Selenium	1455	U	0.0019	0.0011	0.0038	0.013	0.1	0.5	7	
Zinc	1455	U	0.006	0.028	0.012	0.25	4	50	200	
Chloride	1220	U	14	3.6	28	53	800	15000	25000	
Fluoride	1220	U	0.57	0.47	1.1	4.9	10	150	500	
Sulphate	1220	U	95	20	190	320	1000	20000	50000	
Total Dissolved Solids	1020	N	170	99	340	1100	4000	60000	100000	
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-	
Dissolved Organic Carbon	1610	U	34	27	67	280	500	800	1000	

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	1.9

Leachate Test Information	
Leachant volume 1st extract/l	0.347
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.285

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.

Results - 2 Stage WAC

Project: 17590 Stadium Way (Loverock road) Reading, Berkshire

Chemtest Job No: 22-30489							Landfill Waste Acceptance Criteria			
Chemtest Sample ID: 1485341							Limits			
Sample Ref:							Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill	
Sample ID:										
Sample Location: TP1										
Top Depth(m): 0.3										
Bottom Depth(m):										
Sampling Date: 09-Aug-2022										
Determinand	SOP	Accred.	Units							
Total Organic Carbon	2625	M	%				2.3	3	5	6
Loss On Ignition	2610	M	%				7.2	--	--	10
Total BTEX	2760	M	mg/kg				< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg				< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg				< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg				150	100	--	--
pH	2010	M					10.1	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg				0.015	--	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	0.010	0.012	0.021	0.11	0.5	2	25	
Barium	1455	U	0.017	0.014	0.034	0.15	20	100	300	
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5	
Chromium	1455	U	0.0070	0.0037	0.014	0.042	0.5	10	70	
Copper	1455	U	0.014	0.023	0.028	0.026	2	50	100	
Mercury	1455	U	0.00006	0.00011	0.00013	0.0010	0.01	0.2	2	
Molybdenum	1455	U	0.062	0.015	0.12	0.23	0.5	10	30	
Nickel	1455	U	0.0006	0.0022	0.0012	0.019	0.4	10	40	
Lead	1455	U	0.0008	0.013	0.0016	0.11	0.5	10	50	
Antimony	1455	U	0.0072	0.0057	0.014	0.059	0.06	0.7	5	
Selenium	1455	U	0.0016	0.0013	0.0032	0.014	0.1	0.5	7	
Zinc	1455	U	0.003	0.022	0.005	0.19	4	50	200	
Chloride	1220	U	3.3	2.4	< 10	26	800	15000	25000	
Fluoride	1220	U	1.3	0.50	2.6	6.4	10	150	500	
Sulphate	1220	U	25	7.4	50	110	1000	20000	50000	
Total Dissolved Solids	1020	N	110	860	220	7300	4000	60000	100000	
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-	
Dissolved Organic Carbon	1610	U	21	54	< 50	480	500	800	1000	

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	7.2

Leachate Test Information	
Leachant volume 1st extract/l	0.336
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.310

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
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity 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	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 <37°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; 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)
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
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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