Intelligent Ground Solutions

Phase II Contaminated Land Site Assessment

For D T Filling Stations Ltd

13 December 2024

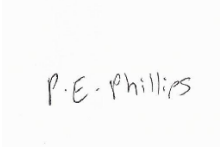
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Registered in England number 4638532.
Address Coniston House, Louisa Street, Idle, BD10 8NE. VAT number 809080436

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Peter Phillips Principal Project Manager		13 December 2024
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1.0 Introduction

Geo^2 Limited were commissioned by D T Filling Stations Ltd to conduct a Phase II Contaminated Land Site Assessment of:

Carbana,
1 Salop Road, Wrexham, LL13 7AF

The site is approximately 0.15 hectares in area and located at grid reference 333736, 349936.

The study was undertaken prior to the redevelopment of the site as a car wash and vehicle maintenance unit.

1.1 Scope of Works

The scope of the investigation has been designed with consideration of guidance on Planning Practice Guidance (Land Affected by Contamination), Land Contamination: Risk Management pages of the GOV.UK web pages and the relevant requirements of the National Planning Policy Framework (NPPF) (as revised 2023) (paragraphs 174 & 183-184).

The assessment has been undertaken consisting of a Phase I report review and preliminary risk assessment followed by an intrusive sub-surface ground investigation and generic quantitative risk assessment, conducted in order to establish the presence and extent of sub-surface contaminants, if any, resulting from the site's current and historic land use.

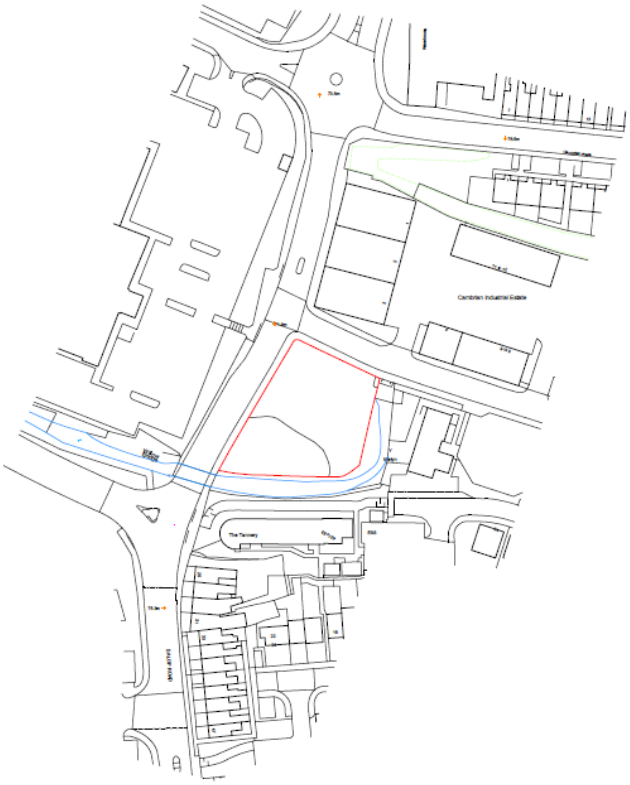
A ground and surface water sampling visit was undertaken on 11th November 2024. The intrusive investigation was conducted on 21st November 2024. The investigation was undertaken in accordance with Geo^2's Method Statement SMS SI 4495A. The findings of the investigation are presented herein.

2.0 Description of the Site and Surroundings

2.1 Site Description

The site is situated in the town of Wrexham, approximately 400m south of the town centre, with access provided by one ingress/egress point on the northern boundary, from Rivulet Road. It is currently a disused site which predominantly comprises an area of tarmac with a vegetated area in the south of the site. The River Gwenfro flows along the south and east boundaries of the site, flowing south-west to north-east.

The area shown within the red site boundary on Figure A below, will be referred to throughout this document as 'the site'.



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Figure A: Site Location Plan. Red is approximate site boundary. Blue indicates watercourse. Extract from Carbana Location Plan.

Geo^2 were instructed by DT Filling Stations to undertake a Phase II Environmental Assessment and intrusive investigation at the site. As part of this, Geo^2 were provided from the client with a Phase I Environmental Desk Study Report completed by Earth Environmental & Geotechnical in November 2021, a site layout and proposed layout plan, and planning correspondence between the local Contaminated Land Officer and planning team.

2.2 Site Walkover

A site walkover was undertaken on 11th of November 2024 with a photographic survey included in Appendix B. The site walkover findings are detailed below. A site walkover was also undertaken by Earth Environmental and Geotechnical as part of the Phase I desk study works (detailed in the Phase I report).

The site was observed to be predominantly occupied by a historical car park. An area of vegetation was present in the south of the site which was noted to be overgrown with access for a drilling rig only possible to a small portion of this area.

The site was observed to be bounded by a brick wall, with a wooden access gate along the northern boundary. A gas pipeline was identified crossing the stream in the north-east corner of the site before passing below ground. A service trace indicated that this pipeline then passes north into Rivulet Road.

The River Gwenfro bounds the site to the south and east, flowing south-west to north-east. It was noted that the river water level was approximately 2m below the ground level of the site and approximately 15cm deep.

The site walkover identified a historical monitoring well in the centre of the site (EX1). A historical well, marked on historical maps was also identified beneath a manhole in the north-east of the site.

The site was observed to be generally flat.

2.3 Site Infrastructure

2.3.1 Surfacing and Drainage

The site was noted to be predominantly surfaced in tarmac hardstanding, observed to be in fair condition. The southern area of the site was covered in dense vegetation.

A historical flooded well was identified in the north-west of the site. Historical borehole information from the British Geological Survey (BGS) indicates this well to be approximately 30 feet (9.1m) deep and noted on historical maps from 1899.

The Phase I report (discussed in Section 2.4 below) identified a drainage outlet discharging to the River Gwenfro in the south of the site. Dense vegetation during the Geo^2 walkover prevented this outlet from being further investigated.

A GPR service plan showing the location of services is provided in Appendix A.

2.4 Previous Works

Evidence of a previous investigation on site was noted, with one installed monitoring well present. This was named ‘EX1’ with the historical well being named ‘Well’ for sampling

purposes. These were monitored as part of the initial walkover of the site, with further information presented within Sections 5.8 and 6.3.

A 'Phase I GeoEnvironmental Desk Study' (Report ref: A4428/21), was undertaken by Earth Environmental & Geotechnical in November 2021 a copy of which was provided to Geo^2 by the client. It should be noted that Geo^2 have not independently verified the conclusions of the Phase I report.

A site visit was undertaken on 11th of November, the date of the originally planned site investigation. However, intrusive works on this date were cancelled due to a delay in receiving the relevant permissions. A walkover survey, service trace and sampling of groundwater from the existing historical wells and surface water from upstream and downstream of the River Gwenfro were completed. A letter report was issued following receipt of the laboratory analysis of the water samples. Please note a review of Generic Acceptance Criteria (GAC) has been undertaken since the writing of the water sampling letter report and as such GAC concentrations for Boron and Lead have been updated for this report. The results of laboratory analysis are also assessed in this report as part of the overarching site investigation works.

A list of previous reports undertaken for the site is provided below.

- Earth Environmental and Geotechnical – Phase I GeoEnvironmental Desk Study (Report ref: A4428/21) – November 2021
- Geo^2 – Groundwater and Stream Sampling Letter Report (Report ref: 24/4495.1.1) – November 2024

2.5 Site Surroundings

The site is located within the town of Wrexham.

Neighbouring properties include commercial units to the north and west, and residential properties the opposite side of the river to the south and east. Online mapping tools indicate the presence of a possible historical gas holder 30m to the east. This can be seen as a large circular concrete scar from aerial photography.

The site is bounded by Rivulet Road to the north, Salop Road to the west, and the River Gwenfro to the south and east.

2.6 Planning Summary

The Phase I report provides detailed information of planning applications for the site. In summary, a planning application was made in May 2000 for the continuation of hazardous substances consent for part of the site, with no further details provided. This was followed by an application for the demolition of the theatre building in April 2016, with Japanese Knotweed being noted on the riverbank as part of these works. A planning application was submitted in August 2020 for the

proposed development of a car wash and tyre fitting unit. This application was rejected on the grounds of the site being located within a Zone 2 floodplain and is at an unacceptable risk of flooding which could give rise to flooding offsite. The application was also rejected due to proposed access passing onto Salop Road. In September 2020 Wrexham Council issued a recommendation of a contaminated land phased investigation.

Geo^2 have also been provided with correspondence between the local Contaminated Land Officer and the planning team from June 2024, detailing the need for an intrusive investigation to be undertaken to assess the potential for contamination at the site. This correspondence is presented in Appendix F

2.7 Proposed Redevelopment

The site is proposed to be redeveloped as a car wash and vehicle maintenance unit. The latest proposed site layout plans that have been made available to Geo^2 indicate the presence of a vehicle maintenance building in the south-west corner of the site, with car wash units along the western site boundary. A bin store is to be located immediately to the south of the vehicle maintenance building and a pole sign is proposed in the north-west corner. An automated laundromat unit is proposed in the south-east corner with two vacuum and two air units proposed close to the eastern site boundary. The remainder of the site is to be covered in tarmac hardstanding and used for traffic routes, parking bays and waiting areas. A gully outfall is proposed on the eastern boundary discharging to the River Gwenfro. The ingress and egress point is proposed to be located in the north-east of the site along the northern boundary, passing onto Rivulet Road.

A figure detailing the proposed redevelopment is presented in Appendix A.

3.0 Desk Study

Information regarding the environmental setting of the site was obtained from the 'Phase I GeoEnvironmental Desk Study' (Report ref: A4428/21), undertaken by Earth Environmental & Geotechnical in November 2021. A copy of the Phase I report is presented in Appendix C.

Site Geology	British Geological Survey (BGS) data indicates bedrock comprises the Salop Formation (mudstone, sandstone and conglomerate) formed between 309.5 and 272.3 million years ago during the Carboniferous and Permian periods. Superficial deposits are indicated to comprise Alluvium – Clay, silt, sand and gravel formed between 11.8 thousand years ago and the present during the Quaternary period. There is one BGS borehole record for the site. No information regarding geology is provided however, it is indicated that a 30ft (9.1m) well was installed at the site with information being supplied by the Welsh National Water Development Authority when the site was known as Cambrian Leather Works (B). This relates to the location named 'Well' during the walkover and groundwater sampling. The Phase I report shows the site has a very low hazard rating for running sands, shrink/swell clays, compressible deposits and landslides. It is also indicated that the site has a negligible hazard rating for collapsible deposits and the dissolution of soluble rock.
Mining	The site is located within an identified coal mining area however, it is not located within a Development High Risk Area. There are no records of extractions, cavities or underground workings within 250m of the site.
Radon	The site is in a Radon Affected Area (5 to 10% of homes are estimated to be at or above the Action Level) and as such, basic radon protection measures are required.
Site Hydrogeology	The bedrock and superficial deposits are classified as a Secondary A aquifer. The site is located within a high groundwater vulnerability zone. The site is not located within a source protection zone. The Phase I report indicates there are 4 groundwater abstraction licence records within 2km of the site. The nearest of these is located 1km to the north-west. The report indicates there is 1 historical potable water abstraction licence record within 2km of the site belonging to the national trust. It is not indicated how far from the site this abstraction was or whether it is active. However, as the Phase I report indicates the nearest groundwater abstraction is 1km north-west of the site it can be assumed it is no closer than 1km to the site.

Site Hydrology	The nearest surface water feature is the River Gwenfro that bounds the site to the south and east. There are 7 surface water abstraction points within 2km with the nearest being located 567m north-west. The site is located in a Zone 2 and Zone 3 flood plain as designated by the Environment Agency. The risk of flooding from rivers and sea within 50m of the site is considered high.
Waste and Infilled Land	There are two EA/NRW records of historical landfill sites within 500m of the site with the nearest being located 450m to the east. There are two local authority and historical mapping records of historical landfill sites within 500m of the site with the nearest being located 479m to the west.
Sensitive Environmental Receptors	There are 2 Sites of Special Scientific Interest (SSSI) within 2km of the site with the nearest being located 1.6km south.

Table 1. Environmental Assessment of the Site.

4.0 Site History Summary

Residential properties were located on site from 1874, with a well being marked in the north-west corner of the site from 1899. The residential buildings were demolished with a works being constructed on site by 1958. This is noted as being part of the Cambrian Leather Works from circa 1966 to 1990. By 1994 the buildings on the site had been demolished and replaced with one building in the south-west corner labelled as the Wrexham Musical Theatre from circa 2007. The rest of the site is a tarmac car park. The theatre building was demolished by 2016 with the site comprising tarmac hard standing with a vegetated area in the south in the present day.

Important offsite historical land uses were also assessed in the Phase I report. A gas works is present to the east of the site, a tannery to the north and two breweries to the west in the earliest mapping from 1873. By 1899 the tannery has expanded and is now identified as the Cambrian Leather Works. The river was culverted from the north-east corner of the site at this time. By 1912 one of the breweries to the west had been redeveloped as a tram depot and an additional tank had been constructed at the gas works to the east. By circa 1966 three tanks at the gas works had been demolished and replaced with one large tank. The site is now identified as a gas holder station. The Cambrian Leather Works have been redeveloped into the Cambrian Industrial Estate by 1990. The Gas Holder Station was demolished by 2007 with residential properties constructed on the site (Willow Bridge Crescent and Cefn-y-Nant) by 2016.

5.0 Preliminary Risk Assessment

5.1 Source – Pathway – Receptor

UK legislation and guidance on assessing potentially contaminated land recommends the use of a risk assessment process based on a review of source/pathway/receptor relationships for various environmental media. The first stage of any risk assessment is to identify, using the desk study data and site information, the presence and extent of any hazard at the site, theoretical or demonstrable.

A key component of the overall risk assessment process is identification of "significant contaminant linkages" between contaminants and receptors. This can be accomplished through development of a site-specific conceptual model in which the potential contaminants, pathways and receptors identified on-site are described.

Each element can be defined as follows:

- **Contaminant source:** A substance either on or under the land and which has the potential to cause harm or pollution to human or environmental receptors.
- **Pathway:** A route or means by which a receptor can be exposed to or affected by a source.
- **Receptor:** A living organism or an ecological system, or controlled water, or property including buildings, crops and livestock.

The presence of all three of the above elements identifies a contamination linkage and a potentially unacceptable risk. To ensure that any risk present to, or, from the site can be appropriately managed each of these contamination linkages will be targeted by the investigation.

5.2 Hazard Identification

5.2.1 Potential On-Site Sources

Potentially contaminative on-site activities relate to the historic use of the site as a leather works between circa 1966 and 1990. This may have led to the deposition of tannery waste onsite. Infrastructure associated with the leather works such as above and underground storage tanks used for fuel storage may historically have been present which could have led to leaks and spills of hydrocarbons on site.

Made ground soils are anticipated across the site associated with phases of construction that have occurred since the mid-19th century, leading to the potential for asbestos fibres or fragments of asbestos containing materials (ACMs) in shallow made ground soils due to phases of works taking place pre-2000.

The site is currently vacant with no structures present. No evidence of underground infrastructure such as decommissioned tanks was identified during the walkover surveys.

The close proximity of the historical gasworks may have led to historical deposition of gasworks waste on site.

While not confirmed, Geo^2 consider it likely that local groundwater flow is to the south or east, towards the adjacent River Gwenfro. This watercourse is therefore considered at risk from any contamination arising from the site.

5.2.2 Potential Off-Site Sources

The historical use of land to the north as a tannery/leather works (of which the site was a part) is a potential source of tannery waste contamination. It is likely that fuels were stored in tanks at the leather works which could be a potential source of hydrocarbon contamination that could migrate beneath the site.

The historical gasworks to the east could be a potential source of gasworks contamination such as coal tar. Contamination arising from sources on this site may have the potential to migrate beneath the site. The presence of the river between the two sites is a likely mitigating factor.

5.3 Initial Conceptual Site Model

Contamination linkages arise as a result of the interconnection of the contaminant source, contamination pathways and potential receptors. These contamination linkages are used to design the site investigation (if required), guiding the type of investigation, location of exploratory boreholes and the required sample analysis.

5.4 Risk Estimation

The objective of the qualitative risk assessment is to determine the significance of the risk, if any, which may occur as a result of the creation of pollutant linkages, which connect a potential receptor to an identified potential contaminant source at the site.

The perceived risk is based on a consideration of both the likelihood of an event (probability) occurring, and the severity of the potential consequence. Classification of these two factors is detailed in Appendix G.

5.5 Preliminary Qualitative Risk Assessment

A qualitative risk assessment was undertaken in the Phase I report, in line with guidance provided in CIRIA's Contaminated Land Risk Assessment: a guide to good practice CIRIA C552, 2001. The purpose of this assessment was to determine the relative significance of the identified contamination linkages by assessing the probability of an impact occurring and by assessing the perceived severity of an impact to a receptor.

Those linkages considered of low risk or less in the Phase I report will not be considered any further in this assessment. Linkages considered to be more significant are identified as presenting potentially unacceptable risk to the identified receptor. Table 2 overleaf identifies the linkages that

pose a potential moderate risk or higher as identified in the Phase I report completed by Earth Environmental and Geotechnical. Further detail regarding the contamination linkages is provided in the Phase I report.

Following a review of the Phase I report Geo^2 have assessed a potential risk to the Secondary A aquifers underlying the site. This risk was characterised as Low in the Phase I report however, Geo^2 feel it is prudent to alter this assessment to accurately reflect the risk to groundwater.

Source	Pathway	Receptor	Preliminary Risk Assessment (Probability x Severity)
Potential soil contamination E.g., Heavy Metals, PAH, TPH, BTEX and ground gases.	Dermal contact, ingestion, and inhalation of soils dust	Future land users	**Moderate / Low** (Likely x Medium)
		Construction Workers	**Moderate / Low** (Low Likelihood x Medium)
	Lateral migration in surface waters	Surface water	**High** (High Likelihood x Medium)
	Vertical migration of contaminants in groundwater	Superficial and Bedrock Secondary A aquifers	**Moderate** (Likely x Medium)
	Vertical or lateral migration of ground gas	Current Site Users	**Moderate** (Likely x Medium)
		Adjacent land users	**Moderate / Low** (Low Likelihood x Medium)
		Future land users	**Moderate / Low** (Low Likelihood x Medium)
		Construction Workers	**Moderate / Low** (Low Likelihood x Medium)

Source	Pathway	Receptor	Preliminary Risk Assessment (Probability x Severity)
Asbestos Containing Material (ACM)	Assumed direct contact (missing from Phase I)	Future land users	**Moderate / Low** (Low Likelihood x Medium)
		Construction Workers	**Moderate / Low** (Low Likelihood x Medium)

Table 2. Identified Contamination Linkages from Phase I report

In order to provide an assessment of each of the identified contamination linkages, a shallow intrusive investigation was specified to obtain further information regarding the geology of the site and the quality of the soils and groundwater.

5.6 Site Investigation

Seven soil bores (WS1-5, WS7, WS9) were extended on 21st of November 2024, to a maximum depth of 5.0 metres below ground level (m bgl) at locations indicated on the GPR survey presented in Appendix A. The soil bores were constructed using window sampling techniques. As a result of the drilling techniques, relatively undisturbed soils were able to be obtained for field and laboratory analysis and for logging of ground conditions. Field analysis comprised the examination of each of the samples for visual and olfactory indications of contamination. Analysis was also conducted for volatile hydrocarbons using a photo-ionisation detector (PID).

The site investigation was limited in the south of the site due to an area of overgrown vegetation preventing access to much of this area. Borehole positions were chosen to provide good site coverage.

Table 3 below, shows the location rationale of boreholes.

Target / Rationale for Investigation Locations	Exploratory Hole						
	WS1	WS2	WS3	WS4	WS5	WS7	WS9
General site coverage	✓	✓	✓	✓	✓	✓	✓
Historical tannery to north				✓		✓	
Gas works to east					✓	✓	
Area of proposed building	✓	✓	✓				
River	✓	✓				✓	

Table 3. Exploratory Hole Location Rationale

5.7 Ground Conditions

The logs of the boreholes, which are presented in Appendix D, detail the ground conditions and the sampling depths together with the visual and olfactory characteristics of the soils. Soil Penetration Test (SPT) data is also presented in the logs. An approximate cross section is also shown in Appendix D.

WS1 and WS2 recorded made ground from the surface. These two locations were located in the area of overgrown vegetation in the south of the site. All other exploratory holes recorded hard standing over made ground, with hardstanding comprising tarmac.

Made ground across the site is described as a silty sand and gravel including mixed fill and brick proven to a maximum depth of 2.0m bgl. The base of the made ground was recorded between 1.0m and 2.0m bgl across the site.

Natural soils generally comprised soft to stiff gravelly silts and clays overlying wet gravel and cobbles. Water strikes were encountered between 1.7 and 3.0m in the soil bores. It is considered likely that natural superficial material is associated with river deposits given the proximity of the River Gwenfro.

No bedrock was encountered.

5.7.1 Observed Potential Contamination

Locations WS4 (northwest of the site), WS7 (east of the site) and WS9 (central to the site) identified hydrocarbon odour in the deeper gravels (2.0 – 3.8m bgl). An oily sheen was observed in this horizon in WS7 and WS9. PID readings were taken, peaking at 60.3ppm at 4.0m bgl in WS9.

A hydrocarbon odour was noted in the groundwater of the newly installed monitoring wells (WS2, WS3 and WS9), with a sheen being noted in the groundwater of WS2 and WS9. Oily streaks were also observed in the groundwater of WS9.

5.7.2 Obstructions

An obstruction was encountered at 1.0m in WS1 located in the south-west of the site. This is in the area of the historical theatre building on site.

All other exploratory holes were terminated upon refusal within the natural strata or at the desired depth.

5.8 Groundwater

Groundwater was encountered during the investigation; with three new monitoring wells being installed in WS2, WS3 and WS9.

Additionally, 2no existing monitoring wells were identified on site during the walkover, as indicated upon the GPR survey included in Appendix A. These have been labelled as EX1 and Well by Geo^2. EX1 is considered to be related to a historical investigation with 'Well' relating to the well observed on historical maps.

All monitoring wells were dipped with an interface probe to record any thickness of free phase fuel (LNAPL), groundwater and the base of the wells. The installation details of the historical monitoring wells are unknown.

It was also noted that the River Gwenfro is approximately 2m below the site surface level.

The groundwater monitoring data is detailed in Table 4, below.

Exploratory Hole	Depth to Product (m bgl)	Depth to Water (m bgl)	Depth to Base (m bgl)	Observations
EX1	-	1.535	3.560	
Well	-	0.241	8.230	Organic Sheen
WS2	-	1.550	2.070	Black sheen and hydrocarbon odour
WS3	-	1.440	2.900	Mild hydrocarbon odour
WS9	-	1.280	2.710	Hydrocarbon sheen and odour. Oily streaks observed.

Table 4. Groundwater Monitoring Data

The existing wells and upstream and downstream river samples were obtained during the initial visit of cancelled intrusive works on 11th November 2024 as detailed in the Geo^2 Groundwater Sampling Letter Report (Report Ref: Geo^2_4495.1.1)

Newly installed monitoring wells were sampled on the day of the site investigation on 21st November 2024.

The depths to groundwater on site correlate with the depth to the River Gwenfro and as such it should be assumed that the water bodies are in connectivity.

6.0 Laboratory Analysis

6.1 Analysis Rational

Six soil samples, five groundwater samples and two surface water samples (River Gwenfro) were selected for laboratory analysis for an environmental suite reflecting the historical onsite and offsite land use as a leather works/tannery, and the neighbouring historical gasworks land use in line with guidance provided in CIRIA's Contaminated Land Risk Assessment: a guide to good practise (CIRIA C552, 2001).

The soil samples were selected from a range of depths and from across the site, to gain an understanding of site-wide ground conditions.

All samples were placed in laboratory provided containers and stored in cool boxes prior to being transported to the laboratory under the laboratory's chain of custody documentation. The laboratory used for the ground investigation sample analysis on this occasion was Envirolab, a UKAS accredited laboratory.

6.2 Soils Analysis

All soil samples were analysed for TPH-GWG. Four made ground samples were analysed for CLEA metals with three of these also being analysed for Asbestos ID. Three samples were analysed for Volatile Organic Compounds (VOC) and Semi Organic Volatile Compounds (SVOC). Due to the site history as part of a leather works, three samples were analysed for Phenols, and Hexachlorocyclohexanes (HCH). Three samples were also analysed for Total Organic Carbon (TOC).

The analysis, conducted by a Gas Chromatography / Flame Ionisation Detector (GC/FID) and Gas Chromatography / Mass Spectrometry (GC / MS) comprised fractionation and speciation of hydrocarbons including analysis for benzene, toluene, ethylbenzene and xylenes (BTEX) and MTBE compounds. Selected samples were also analysed by:

- Heavy metals by IRIS emission spectroscopy.
- HCH, Volatile and semi volatile components (including PAHs), by GC/MS.
- Asbestos Containing Materials (ACMs) by polarised light microscopy / gravimetry.
- TOC by Combustion IR.

The results of soil analysis were compared using the following UK guidance:

- LQM/CIEH's Suitable for Use Levels (S4ULs)
- DEFRA Category 4 Screening Levels (C4SLs);
- EIC Soil Generic Assessment Criteria for Human Health (2010).

- SoBRA Development of Acute Generic Assessment Criteria for Assessing Risks to Human Health from Contaminants in Soil. April 2009 (AGAC)

6.2.1 Soil Testing Results

The results of laboratory analyses on the soil samples undertaken are presented in Appendix E.

Due to the site's proposed use as a car wash and vehicle maintenance unit, the soil analysis testing results have been compared against 'Commercial' end use Generic Assessment Criteria (GACs) thresholds. GAC concentrations associated with a conservative 1% Soil Organic Matter (SOM) have been utilised.

No contaminants have been recorded above Commercial GAC threshold concentrations.

6.3 Groundwater Analysis

6.3.1 Groundwater Samples

Groundwater samples were taken from wells EX1, Well, WS2, WS3 and WS9 with surface water samples being obtained from the River Gwenfro, upstream and downstream of the site. The samples were analysed for pH, CLEA metals, VOC, SVOC, BTEX and TPH-CWG.

The analysis, conducted by a Gas Chromatography / Flame Ionisation Detector (GC/FID) and Gas Chromatography / Mass Spectrometry (GC / MS) comprised fractionation and speciation of hydrocarbons including analysis for hydrocarbons, benzene, toluene, ethylbenzene and xylenes (BTEX) compounds and MTBE.

The results of analyses of the water samples were compared to screening criteria sourced from the following legislation:

- World Health Organisation Guidelines of Drinking-Water Quality, 4th Edition, 2022.
- SoBRA Generic Assessment Criteria for Assessing Vapour Risks to Human Health from Volatile Contaminants in Groundwater.
- WFD 2015b - Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015
- SEPA 2014 - SEPA Assigning Groundwater Assessment Criteria for Pollutant Inputs (Aug 2014, v3) Resource Protection Value (Non-hazardous substances and Significant pollution)
- DWQS 2016 - The Water Supply (Water Quality) Regulations 2016 [UK Drinking Water Standard]

6.3.2 Groundwater Testing Results

The results of laboratory analyses on the groundwater sample undertaken are presented in Appendix E.

No exceedances above SoBRA Commercial GAC threshold levels have been recorded, indicating an unlikely risk to site end users or neighbouring residents from volatile contaminants in groundwater.

The groundwater results have been assessed relating to potential risks to controlled water receptors. Due to the surface watercourse bounding the site to the south and east, the groundwater testing results have been compared against inland surface water GAC thresholds (Water Framework Directive/Environmental Quality Standard). A comparison against potable water GAC was also undertaken.

A summary of the groundwater results, where analysis exceeding the relevant GACs is presented in Table 5 below and overleaf. A detailed summary showing laboratory data compared to GAC is presented in Appendix E.

The detailed results of laboratory analyses undertaken on groundwater samples are presented in Appendix E.

Contaminant	GAC (µg/l)	Maximum Concentration (µg/l)	Exceedance Location
Metals			
Cadmium	0.08 – 0.25	2.4	WS2, WS3
Copper	1.0 (bioavailable)	55	WS2, WS3
Chromium	4.7	18	Downstream, WS2, WS9
Lead	1.2 (bioavailable)	420	EX1, WS2, WS3, WS9
Nickel	4 (bioavailable)	29	WS2, WS3
Vanadium	20	30	EX1, WS2
Zinc	12.1 (bioavailable)	290	Well, EX1, WS2, WS3
SVOCs			
Anthracene	0.1	172	WS2
Benzo(a)pyrene	0.27	29	WS2
Fluoranthene	0.12	108	WS2

Contaminant	GAC (µg/l)	Maximum Concentration (µg/l)	Exceedance Location
Naphthalene	2	591	WS2, WS3, WS9
VOCs			
1,2,4-Trimethylbenzene	36	503	WS2, WS3, WS9
BTEX			
Toluene	74	108	WS2
Ethylbenzene	20	444	WS2, WS9
m & p Xylene	30	803	WS2, WS9
o-Xylene	30	437	WS2, WS9
TPHs			
Aliphatic >C8-C10	57	246	WS2
Aliphatic >C10-C12	37	866	WS2, WS9
Total Aliphatics	2500	2560	WS2
Aromatic >C7-C8	74	104	WS2
Aromatic >C8-C10	20	13800	EX1, WS2, WS3, WS9
Aromatic >C10-C12	100	57800	EX1, WS2, WS3, WS9
Aromatic >C12-C16	100	27100	EX1, WS2, WS3, WS9
Aromatic >C16-C21	90	3980	WS2, WS3, WS9
Aromatic >C21-C35	90	1080	WS2, WS9
Total Aromatics	2500	104000	WS2, WS9

Table 5. Groundwater Monitoring Data

Elevated concentrations of petroleum hydrocarbons, BTEX, SVOCs, metals and 1,2,4-Trimethylbenzene were identified above GAC in the groundwater at the site particularly in the newly installed monitoring wells (WS2, WS3 and WS9). Exceedances of petroleum hydrocarbon and metal GACs were also identified in EX1, the historical monitoring well onsite.

Exceedances of chromium GAC was identified onsite as well as in the Downstream sample (6µg/l) from the River Gwenfro. It should be noted that chromium concentrations were identified above laboratory detection limits in the Upstream sample (2µg/l) however, this concentration does not exceed chromium GAC for inland surface waters. With the concentration differences between the two samples being so small it is difficult to confidently

attribute the increase (4µg/l) to chromium levels on the site and it is likely that these are local background concentrations of the River Gwenfro.

An exceedance of Zinc GAC was also identified in the water sample obtained from the historical well on site (Well).

Exceedances of DWQS were also identified in EX1, WS2, WS3 and WS9. This indicates a potential risk to the Secondary A Aquifers underlying the site. However, due to the proximity of the River Gwenfro the primary receptor from contamination identified onsite is considered to be the surface water body.

A figure and cross section are presented in Appendix A as a visual tool for identifying areas of contamination at the site.

7.0 Risk Estimation

7.1 Discussion of Investigation Findings

7.1.1 Site Soils

Made ground soils were recorded as silty sand and gravel fill to depths of up to 2.0m bgl across the site.

Natural superficial deposits comprised gravelly silts and clays which in turn were underlain by wet gravel and cobbles. WS1 encountered an obstruction at 1.0m bgl. All other exploratory holes were terminated upon reaching the desired depth or refusal in natural soils.

Evidence of hydrocarbon contamination was identified in the natural soils of WS4, WS7 and WS9 during the advancement of the new exploratory holes.

The Preliminary Risk Assessment (Section 5.5) identified a potential Moderate risk to site end users and controlled waters from contamination within shallow site soils, reflecting the unknown depth of made ground soils, the sites historical use as a tannery/leather works.

Environmental laboratory assessment of shallow soil samples has recorded low concentrations of contamination that do not exceed Generic Assessment Criteria for Human Health in a commercial setting.

The highest concentrations of contaminants were identified in deep soils (4.0m bgl in WS9) however, these concentrations did not exceed Human Health GAC.

7.1.2 Controlled Waters

The Preliminary Risk Assessment (Section 5.5) identified a potential 'High' risk to the nearby surface water receptor adjacent to the south and east and a 'moderate' risk to the Secondary A Aquifers due to the sensitivity and proximity of these receptors.

Groundwater was encountered between 1.7m and 3.0m bgl in natural strata during the investigation. Three monitoring wells were installed in WS2, WS3 and WS9. Significant hydrocarbon, VOC, SVOC and heavy metal contamination was encountered in the groundwater, indicating that there is a potential risk to the surface water receptor via migration through the subsurface. Analysis of samples from the surface water body did not identify any hydrocarbon, VOC or SVOC contamination above laboratory detection limits. However, given that a potential source has been identified on site, and permeable strata has been identified underlying the site it can be assumed that a pathway may exist by which the contamination present on site has the potential to impact this receptor.

Concentrations of chromium were identified in the downstream sample above GAC however, these concentrations only marginally exceed upstream concentrations by 4µg/l.

Exceedances of Drinking Water Standards GAC were identified in the groundwater concentrations in EX1, WS2, WS3 and WS9. The nearest groundwater abstraction point is 1km to the north-west, some distance from the site.

However, due to the proximity of the River Gwenfro, it is assessed that the surface water is the key potential receptor from contamination identified at the site.

No concentrations of volatile hydrocarbon compounds presenting a potential vapour risk to Commercial site users were recorded in the groundwater samples.

No evidence of a potential contaminative source was identified during site works; however, it can be assumed that the contamination is likely to be associated with the sites historical use as a works. It is possible that the contamination has migrated from an offsite source associated with the historical land uses in the area (tannery, gasworks).

7.1.3 Ground Gases

The Preliminary Risk Assessment (Section 5.5) identified a potential 'Moderate / Low' risk to site end users from ground gases arising from potentially significant thicknesses of made ground soils with organic content underlying or close to the site.

However, the investigation recorded no significant thicknesses of made ground soils, encountered to a maximum depth of 2.00m bgl and that made ground deposits were lacking in putrescible material.

7.2 Limitations and Uncertainty

It is important to note that the investigation was restricted in areas due to the presence of overgrown vegetation in the south of the site.

Localised areas of deeper made ground around unidentified historical infrastructure cannot be discounted.

7.3 Qualitative Risk Assessment

Each of the identified potential contamination linkages in the preliminary conceptual site model (Section 5.5) is reviewed based upon the findings of the site investigation which allows a greater understanding of the ground conditions at the site, site observations, soil quality and chemical analysis.

The qualitative risk assessment is undertaken, detailed in Table 6 on the following pages, in line with guidance provided in CIRIA's Contaminated Land Risk Assessment: a guide to good practice CIRIA C552, 2001. The purpose of this assessment is to determine the relative significance of the identified contamination linkages by assessing the probability of an impact occurring and by assessing the perceived severity of an impact to a receptor.

The perceived risk is based on a consideration of both the likelihood of an event (probability) occurring, and the severity of the potential consequence. Classification of these two factors is detailed in Appendix G.

Those linkages considered of low risk or less on the basis of the available site data will not be considered any further in this assessment. Linkages considered to be more significant are identified as presenting potentially unacceptable risk to the identified receptor. In these instances, further works may be considered necessary.

Source	Pathway	Receptor	Comments	Preliminary Risk Assessment (Probability x Severity)	Requires further work?
Potential soil contamination E.g., Heavy Metals, PAH, TPH, BTEX and ground gases.	Dermal contact, ingestion, and inhalation of soils dust	Future land users	No exceedances of human health GAC were identified in any soil samples obtained during the investigation. The proposed hard cover use of the site will act to sever any pathways.	**Low** (Unlikely x Medium)	**No**
		Construction Workers	No exceedances of human health GAC were identified in any soil samples obtained during the investigation. Contaminant concentrations were however above laboratory detection limits and hotspots may be present that could potentially be exposed by excavation works during the redevelopment.	**Moderate / Low** (Low Likelihood x Medium)	**Yes (watching brief)**
	Lateral migration in surface waters	Surface water	Exceedances of inland surface water GAC were identified in groundwater at the site. Groundwater levels indicate that groundwater onsite is likely in connectivity with the surface water body.	**High** (High Likelihood x Medium)	**Yes**

Source	Pathway	Receptor	Comments	Preliminary Risk Assessment (Probability x Severity)	Requires further work?
	Vertical migration of contaminants in groundwater	Superficial and Bedrock Secondary A aquifers	Exceedances of DWQS GAC were identified within groundwaters on site. The distance to the nearest groundwater abstraction (1km) somewhat mitigates the risk.	**Moderate** (Likely x Medium)	**Yes**
	Vertical or lateral migration of ground gas	Current Site Users	Site is currently derelict and not occupied. No buildings are present on site within which harmful ground gasses could accumulate.	**Low** (Unlikely x Medium)	**No**
		Adjacent land users	No SoBRA exceedances in the groundwater samples were identified with no extensive thicknesses of made ground observed.	**Low** (Unlikely x Medium)	**No**
		Future land users	No SoBRA exceedances in the groundwater samples were identified with no extensive thicknesses of made ground observed. Use of the site for commercial purposes will reduce exposure times. The site is in a radon affected area and basic protection measures will be necessary.	**Low** (Unlikely x Medium)	**No**
		Construction Workers	No SoBRA exceedances in the groundwater samples were identified with no extensive thicknesses of made ground observed.	**Low** (Unlikely x Medium)	**No**

Source	Pathway	Receptor	Comments	Preliminary Risk Assessment (Probability x Severity)	Requires further work?
Asbestos Containing Material (ACM)	Assumed direct contact (missing from Phase I)	Future land users	No contaminants were identified in shallow soils that present a likely risk to site users or neighbouring residents, with existing hardstanding covering the majority of the site preventing contact with soils and no asbestos fibres identified in made ground soils. The proposed hardcover use of the site will act to sever this pathway.	**Low** (Unlikely x Medium)	**No**
		Construction Workers		**Low** (Unlikely x Medium)	**No**

Table 6. Summary of Qualitative Risk Assessment

8.0 Conclusions and Recommendations

A Phase II Contaminated Land Site Assessment of 1 Salop Road, Wrexham, LL13 7AF was undertaken prior to the potential redevelopment of the site as a car wash and vehicle maintenance unit.

The purpose of the assessment was to evaluate the potential for risk to be posed to human health and local surface water and groundwater receptors from historical industrial use of the site and local historical land uses.

The investigation generally recorded hardstanding over made ground of silty sand and gravel including mixed fill and brick up to between 1.0-2.0m bgl. The made ground was observed to be underlain by soft-stiff gravelly silts and clays, transitioning into wet gravel and cobbles.

Evidence of contamination was observed within the soil bores of WS4, WS7 and WS9. However, lab analysis recorded no concentrations of contaminants above Commercial threshold levels.

Two existing monitoring wells (Well & EX1) were noted by Geo^2 during the investigation, with three new wells, WS2, WS3 & WS9, also installed.

Laboratory analysis of groundwater samples recorded concentrations of hydrocarbon compounds, BTEX, SVOCs, VOCs and Metals above GACs, indicating a potential risk to surface water and groundwater. Due to the proximity of the River Gwenfro, the surface water body is considered the primary environmental receptor. Analysis of groundwater levels at the site suggest it is likely to be in connectivity with the river. Samples were obtained from upstream and downstream of the river with no concentrations of hydrocarbon, BTEX, VOC or SVOC compounds recorded above laboratory detection limits.

Concentrations of chromium were noted to exceed GAC in the groundwater on site and in the downstream sample. However, the increase in concentration between the upstream and downstream sample of 4µg/l is considered marginal and may be indicative of background concentrations rather than an impact caused by groundwater from the site.

It can be reasonably assumed that historical site activities are the source of the contaminative plume identified onsite. It is possible that the contamination is the result of offsite migration from neighbouring properties that have an industrial history such as the tannery/leather works to the north, of which the site was a part, and the gasworks to the east. No historical infrastructure such as underground storage tanks, was identified during the investigation and it is considered unlikely that the contamination is associated with a current issue. As such, it can be assumed the contamination is historical in nature and is likely to have been present for a number of years.

No evidence of volatile compounds of hydrocarbons presenting a risk to site users or neighbouring residents was identified during the investigation.

The shallow ground investigation undertaken in November 2024 has identified a **Low** risk to site end users and neighbouring residents from volatile contamination within soils and groundwater

and from contamination within shallow site soils. A **Low** risk is also considered suitable as no significant sources of noxious ground gases have been identified on or close to the site. It should be noted that the site is located in a radon affected area.

The identified contamination in exceedance of GACs, along with a plausible pathway is considered to present a **High** risk to surface water particularly given the proximity of the River Gwenfro. An impact to groundwater was identified on site in exceedance of GACs, indicating a **Moderate** risk to groundwater. This is mitigated by the lack of potable abstractions and distance to the nearest groundwater abstraction in the local area (1km north-west).

8.1 Recommendations

The following works are recommended to address the identified risk to surface water and receptors:

- As contaminant concentrations in onsite groundwater were found to exceed Generic Acceptance Criteria, consideration should be given to undertaking a Detailed Quantitative Risk Assessment (DQRA) to fully assess the risk to the adjacent receptors. This should include groundwater flow direction modelling based on current site data. Further characterisation may be required to accurately delineate the extent of the contaminative plume and revise the risk posed to the surface water body.
- Construction workers should be provided with appropriate PPE and welfare facilities if coming into contact with shallow soils during any future groundworks and have appropriate training.
- A watching brief should be imposed during any future groundworks to ensure that any impacts unidentified in the site investigation can be characterised and treated appropriately. Any unidentified contaminated material should be considered in the event of a redevelopment as costs for offsite disposal of these materials may be significant.

9.0 Report Limitations

This Report was prepared by Geo^2 for the sole and exclusive use of the Client and for the specific purpose for which Geo^2 was instructed. Unless explicitly agreed otherwise, in writing, this Report has been prepared under Geo^2's Standard Terms and Conditions.

Geo^2 does not intend, without its written consent through a formal letter of reliance or warranty, for this Report to be disseminated to any party other than the named Client or to be used or relied upon by any party other than the named Client. Use of the Report by any other party is unauthorised and such use is at the sole risk of the user. Any party using or relying upon this Report, other than the Client, agrees by virtue of its use to indemnify and hold harmless Geo^2 from and against all claims, losses and damages (of whatsoever nature and howsoever or whensoever arising), arising out of or resulting from the performance of the work by Geo^2.

The recommendations contained within this Report represent Geo^2's professional opinions, based upon the information detailed within the Report, exercising the reasonable skill and care to be expected of a professional consultant holding itself out as having the competence, experience, and resources necessary for the purpose of carrying out similar work in scope and character to the services performed. The Report needs to be considered in the light of the proposal and associated limitations of scope. The Report needs to be read and considered in full and isolated sections cannot be used without full reference to other elements of the Report and any previous works referenced within the Report.

10.0 References

British Standards Institute

BS10175:2011 "Investigation of potentially contaminated land sites – code of practice"

British Geological Society

Geology of Britain Viewer, https://mapapps2.bgs.ac.uk/geoindex/home.html

CIRIA

C552 Contaminated Land Risk Assessment, a guide to good practise, 2001.

C665, Assessing risks posed by hazardous ground gases to buildings, 2007.

CL:AIRE

Good Practice For Risk Assessment For Coal Mine Gas Emissions, October 2021.

Environmental Agency

Land Contamination Risk Management (LCRM) Guidance, 2020

The Coal Authority

Coal Authority Interactive Viewer, https://mapapps2.bgs.ac.uk/coalauthority/home.html

Zetica UXO

Risk Maps Viewer, https://zeticauxo.com/guidance/risk-maps/

Historical reports

Earth Environmental and Geotechnical – Phase I GeoEnvironmental Desk Study (Report ref: A4428/21) – November 2021

Geo^2 – Groundwater and Stream Sampling Letter Report (Report ref: 24/4495.1.1) – November 2024

Appendix A – Figures

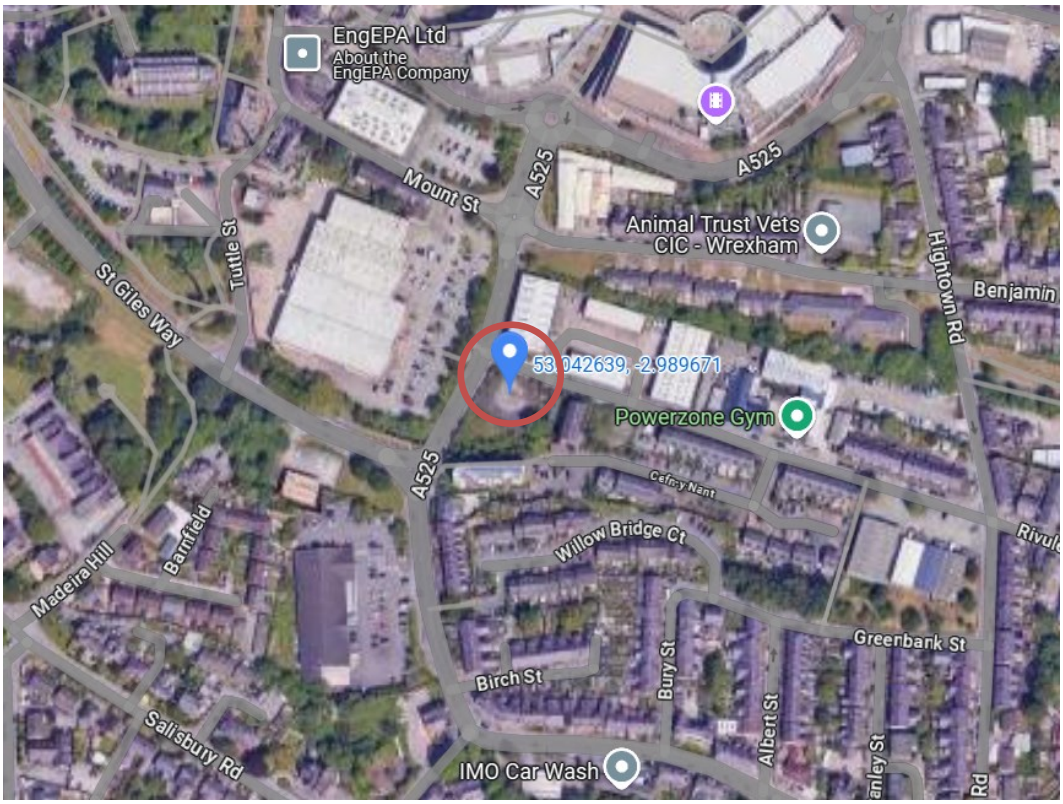


Figure 1 - Site Location

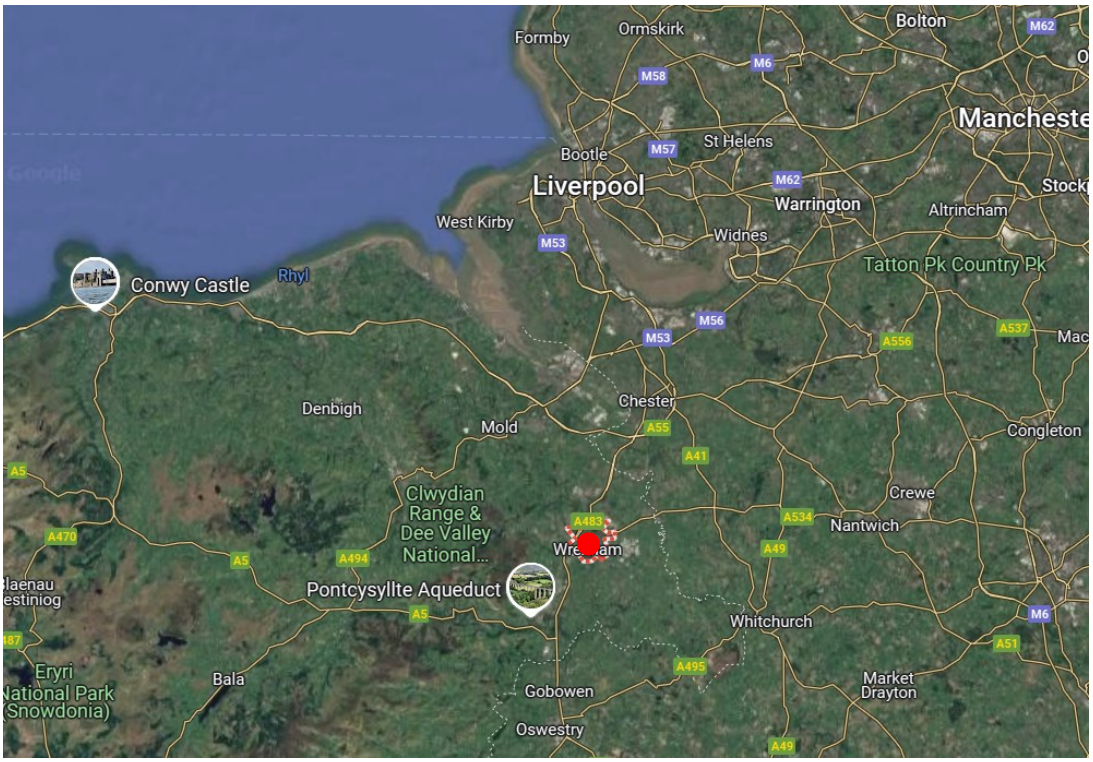


Figure 2 - Site Location

Ref: https://www.google.com/maps

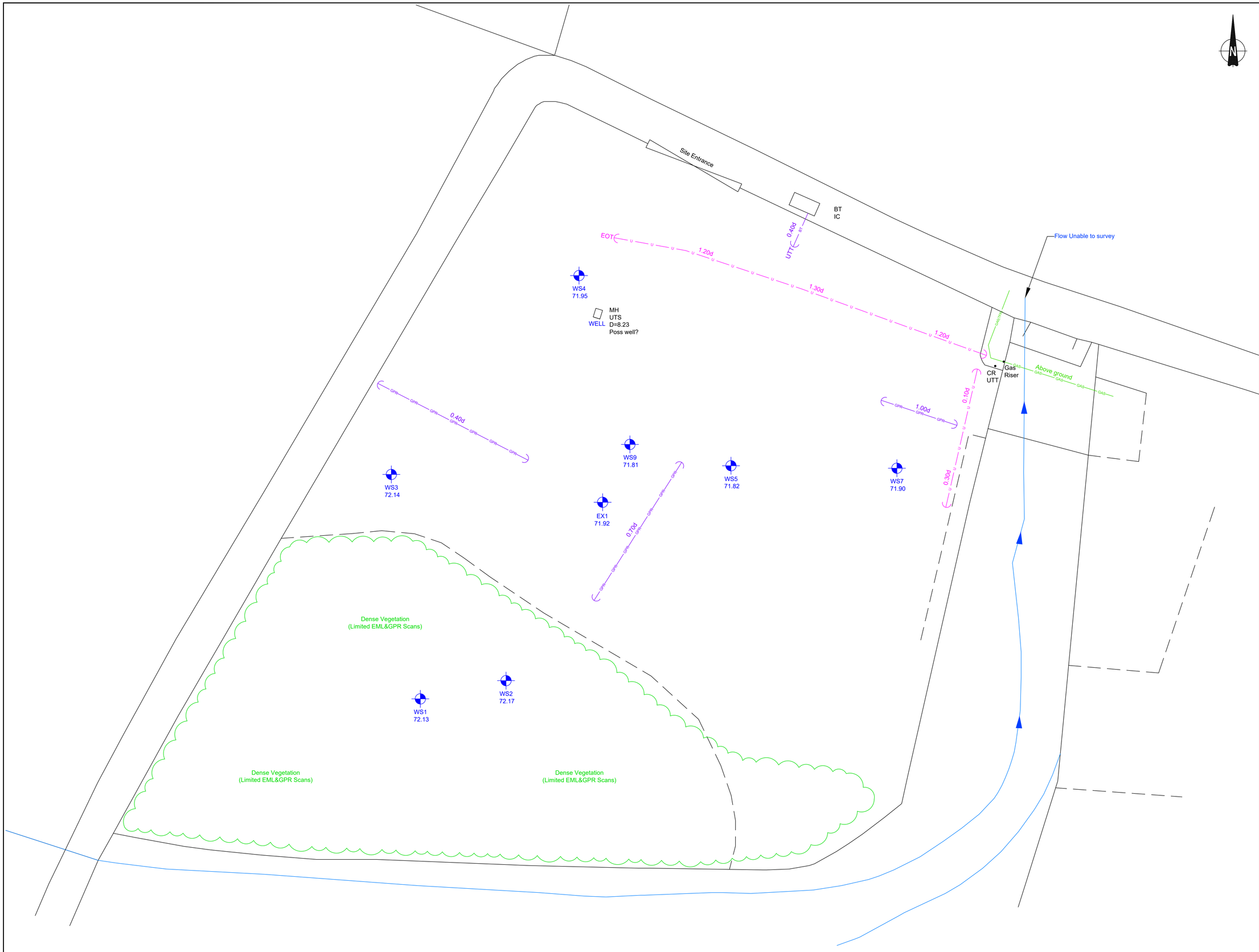
Figures 1 & 2 - 1 Salop Road, Wrexham, LL13 7AF

NOT TO SCALE

Geo² Remediation Limited, The Coniston, Louisa Street, Idle, West Yorkshire, BD10 8NE

Tel: (0113) 2575397

www.geo2.co.uk



LEGEND

- Foul Drainage
- Surface Drainage
- Combined Drainage
- Electricity
- Electricity High Voltage
- Electricity Low Voltage
- Gas
- Ground Probing Radar
- Water
- Cable Television
- Close Circuit Television
- Communication
- British Telecom
- Compressed Air
- Offset Fill-Line
- Oil Pipe
- Pipe
- Ventilation
- Fuel Line
- Vapour Recovery
- Gauge Line
- Telemetry
- Fibre Optics
- Unknown
- Fence
- Edge of Canopy
- Gully Run
- Electricity (TFR) Taken From Records
- BT (TFR) Taken From Records
- Gas (TFR) Taken From Records
- Water (TFR) Taken From Records
- End Of Trace
- Do Not Drill / Banded Pipes
- T TANK* - W= Water U=Unknown F=Foam P=Product C=Concrete
- Borehole
- Trial Pit Location
- Excavated Area
- Window Sample
- Soil Vapour Sample

ABBREVIATIONS

AR	Assumed Route	MW	Monitoring Well
BO	Bollard	NPV	No Pipes Visible
BO/ILL	Illuminated Bollard	OH	Overhead Service
BH	Borehole	OSA	Off Survey Area
BTB	British Telecom Box	OSBM	Ordnance Survey Bench Mark
BTIC	British Telecom Cover	PR	Pipe Riser
C/BOX	Control Box	P	Post
C/B FENCE	Closeboard Fence	P&R FENCE	Post & Rail Fence
CR	Cable Riser	RET WALL	Retaining Wall
CATV	Cable TV	RWP	Rain Water Pipe
CP	Catch Pit	RS	Road Sign
Co	Concrete	RE	Rodding Eye
CON	Conifer	S/A	Soakaway
CL	Cover Level	S/BIRCH	Silver Birch
d	Depth (in metres)	SAP	Sapling
D/CHAN	Drainage Channel	SEC FENCE	Security Fence
DP	Down Pipe	SL	Spot Light
ER	Earth Rod	SP	Soil Pipe
EIC	Electricity IC	ST	Stop Tap
EP	Electricity Pole	SV	Sluice Valve
EOC	Edge of Canopy	SVP	Soil Vent Pipe
EOT	End of Trace	SVS	Soil Vapour Sample
F/BED	Flower Bed	TBM	Temporary Bench Mark
FH	Fire Hydrant	TFR	Taken From Records
FS	Fire Switch	TL	Traffic Light
GV	Gas Valve	TP	Telegraph Pole
G	Gully	TS	Traffic Sensor
GPR	Ground Probing Radar	UTL	Unable to Locate
G/RUN	Gully Run	UTR	Unable to Raise
HT	Height	UTS	Unable to Survey
H/CHESTNUT	Horse Chestnut	UTT	Unable to Trace
H/THORN	Hawthorn	VR	Vapour Recovery
IC	Inspection Cover	VP	Vent Pipe
IL	Invert Level	WM	Water Meter
INT	Interceptor	WFC	Water Filled Chamber
KO	Kerb Outlet	WP	Waste Pipe
LP	Lamp Post	WR	Water Riser
LC	Lighting Column	WS	Window Sample
LH	Lamp Hole	U/S	Underside
MH	Manhole Cover	Ø	Pipe Diameter

General Notes:

Only Gas/Electric service plans provided at time of survey.

UTT Gas - TFR.

Large part of site overgrown UTS.

Some services may go undetected where active connections cannot be applied.

Hand Pits advised at WS locations.

AVOIN MAA SURVEYS LTD

32 Doncaster Road, Barnsley, South Yorkshire, S70 1TL.
Tel: 01226 292 377 Mobile: 07969 360287
E-Mail: scott@avoinmaasurveys.com & info@avoinmaasurveys.com
Website: www.avoinmaasurveys.com

Client

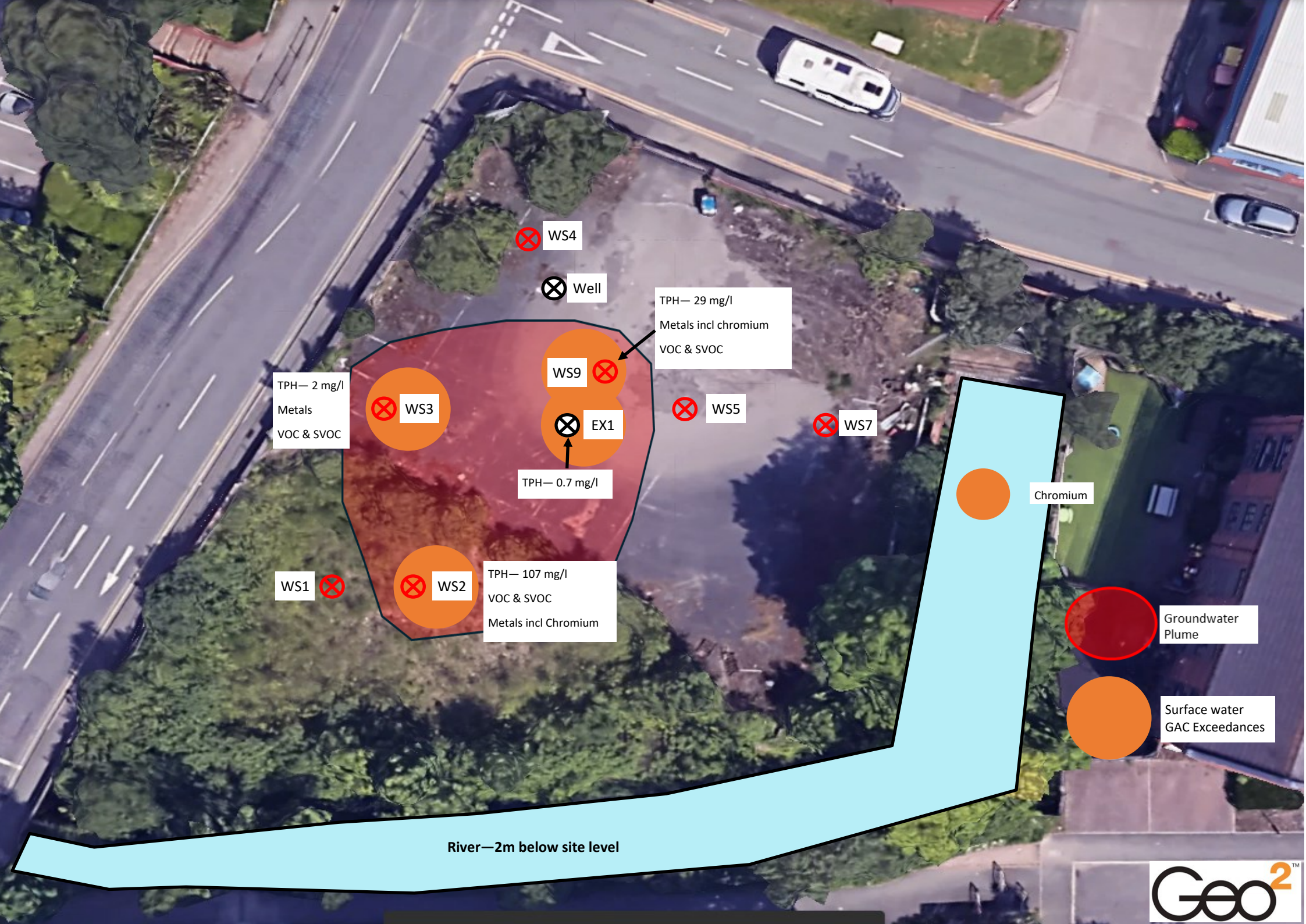
GEO2

Site Location

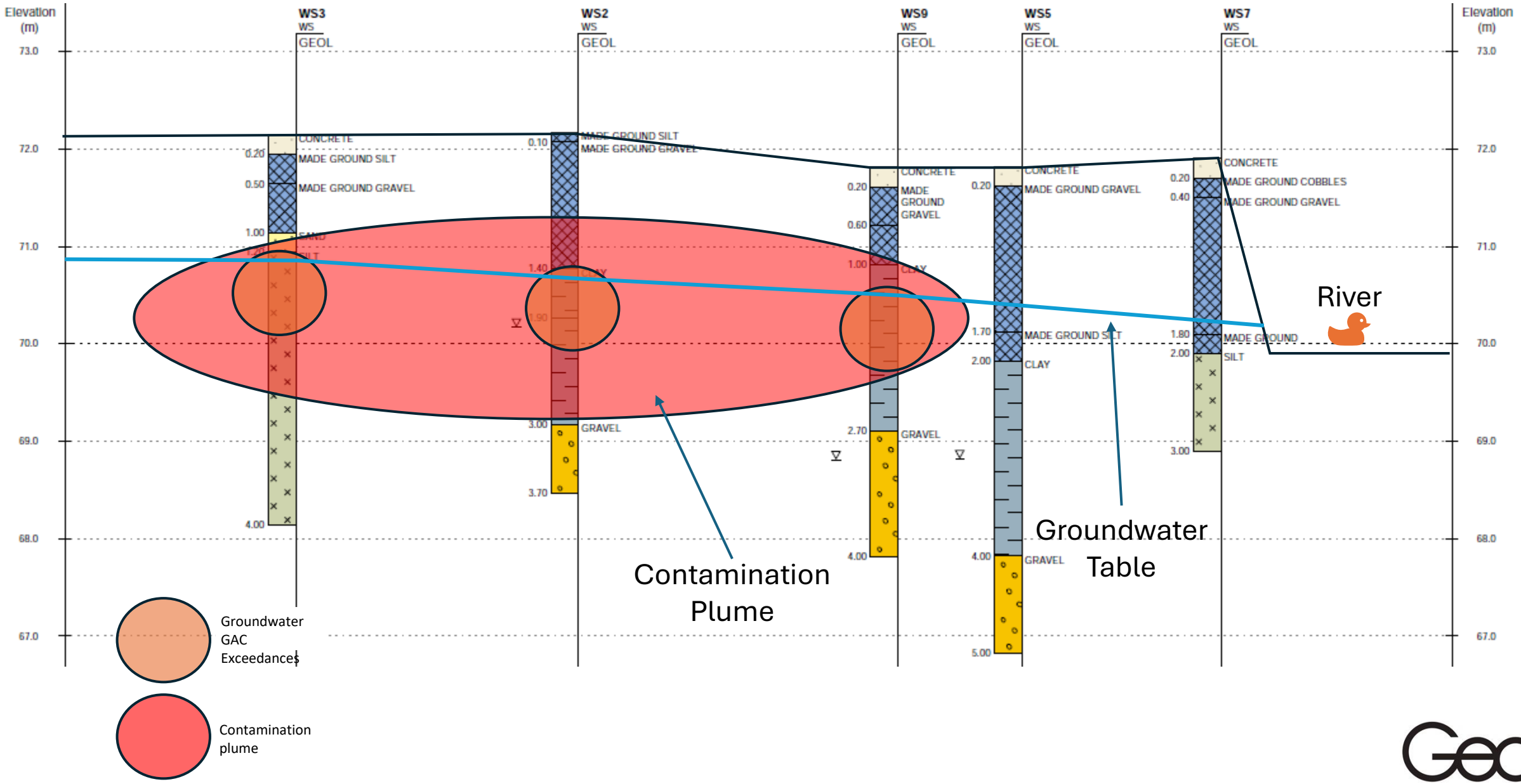
1 Salop Road
Wrexham
LL13 7AF

Surveyed by AD	Drawn by AC	Approved by -
Drawing No. 1124/GEO2/11333		Revision -
Scale 1:100 @ A1	Date 11/11/2024	Sheet No. 1 of 1

DISCLAIMER: The location of under ground services shown on this drawing has been determined using electro-magnetic (and/or ground probing radar, where requested) techniques and visual observations. the limitations of this drawing should be realised and no guarantee can be given that all services have been identified. This drawing may not include the location of all public services that may cross the site and therefore the relevant service drawings should be obtained from the appropriate utility company and used in conjunction with this drawing. Additional services, structures or other below ground obstructions not indicated on this drawing may be present on site. reference should be made to historical plans and as built drawings. Excavations in the vicinity of services should be carried out with due diligence ref: HSG47 document "avoiding dangers from underground services". Location accuracy is determined by refering to manufacturers guidelines for the systems deployed. Reference should be made to the latest version of AMS Ltd site procedures document for utility location surveys Please note ground penetrating radar depths are approximate only.


WS4
Well
TPH— 29 mg/l
Metals incl chromium
VOC & SVOC
WS9
TPH— 2 mg/l
Metals
VOC & SVOC
WS3
EX1
WS5
WS7
TPH— 0.7 mg/l
Chromium
WS1
WS2
TPH— 107 mg/l
VOC & SVOC
Metals incl Chromium
Groundwater Plume
Surface water GAC Exceedances
River—2m below site level

Groundwater Hydrocarbon Contamination



Appendix B – Photographic Survey

4495 – Salop Road – Photographic Survey 1

Image 1: Image of site from SE corner



Image 2: Image of SW corner of site, area of proposed building.



Image 3: Image of SE corner of site.



Image 4: Image of overgrown vegetation in S of site.



Image 5: Image of River Gwenfro.



Image 6: Image of River Gwenfro.



4495 – Salop Road – Photographic Survey 2

Image 7: Image of E area of site.



Image 8: Image of existing monitoring well (EX1).



Image 9: Image of monitoring of SB2.



Image 10: Image of soil bores.



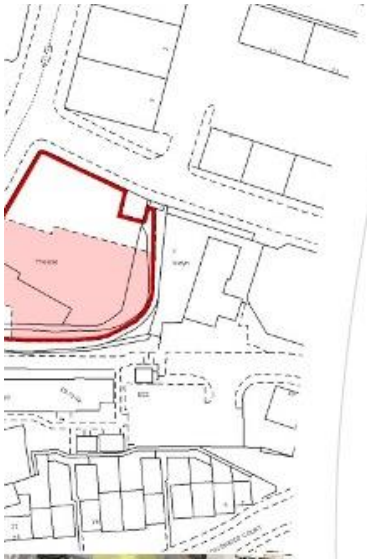
Image 11: Image of newly installed monitoring well.



Image 12: Image of proposed building area.



Appendix C – Phase I Geo-Environmental Desk Study Report







EARTH ENVIRONMENTAL
& GEOTECHNICAL

Phase 1 GeoEnvironmental Desk Study

Salop Road
Wrexham

November 2021

On behalf of

P1 Speedyfit Ltd

Earth Environmental & Geotechnical Ltd
Houldsworth Mill Business Centre
Houldsworth Street
Stockport
SK5 6DA

Tel : 01619756088

Email
headoffice@earthenvironmental.co.uk

www.earthenvironmental.co.uk

SALOP ROAD

WREXHAM

PHASE I GEOENVIRONMENTAL DESK STUDY

FOR

P1 SPEEDYFIT LTD

Earth Environmental & Geotechnical Ltd
Houldsworth Mill Business & Arts Centre
Houldsworth Street
Stockport
SK5 6DA

www.earthenvironmental.co.uk

Tel: 0161 975 6088

Report No. A4428/21 **NOVEMBER 2021**

Report Title:	**Salop Road, Wrexham** **Phase I GeoEnvironmental Desk Study**
Report Reference:	**A4428/21**
Client:	**P1 Speedyfit Ltd**
Issue Date:	**21st November 2021**
Drafted By:	**H Richards**
Reviewed By:	**A Czarnecki**
Authorised By:	**A Czarnecki**

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EARTH ENVIRONMENTAL & GEOTECHNICAL

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1.0 INTRODUCTION

Appointment

1.1 Earth Environmental & Geotechnical Ltd has been commissioned by P1 Speedyfit Ltd (the Client) to undertake a Phase I GeoEnvironmental Desk Study for the proposed development on the land at the junction of Salop Road and Rivulet, Wrexham.

1.2 It is understood that the Client wishes to construct a car wash and car maintenance centre comprising of a 405m^2 steel framed building, with a corrugated plastic roof, an antivandal security cabin, canopies, and water protection screen, all of which is designed to be dismantled.

1.3 Vehicle access is currently from Rivulet Road to the north of the site 13m from the junction with Salop Road.

1.4 Proposed development plans for the site are shown in Figure 1 and 2 below and overleaf.

Figure 1 Proposed Development Plan

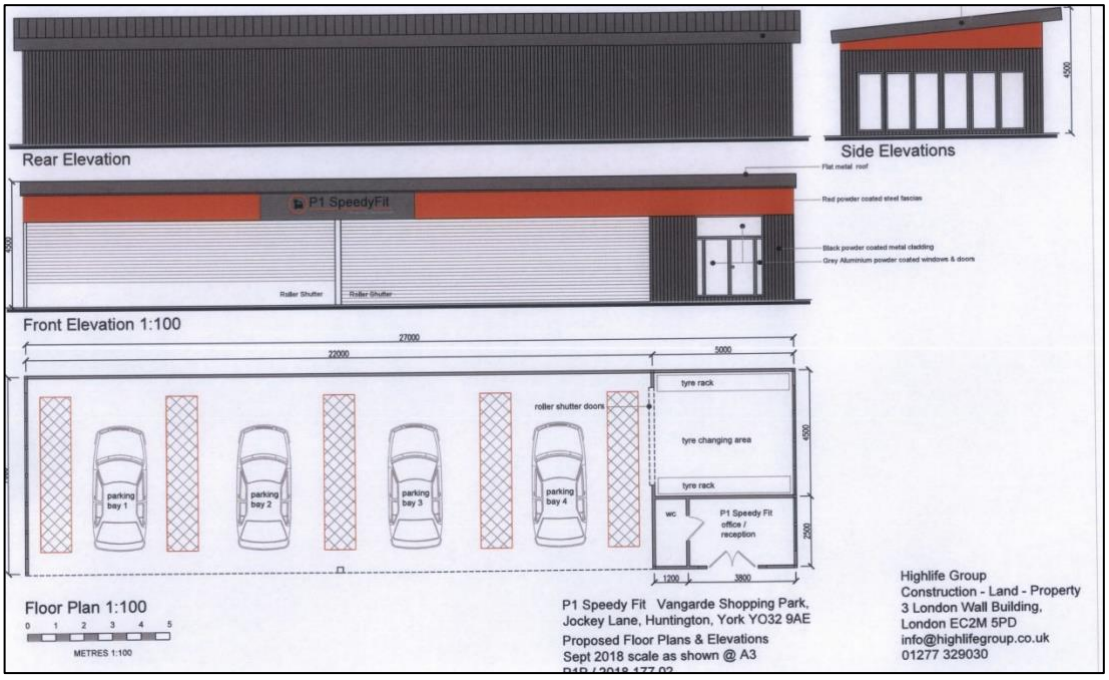
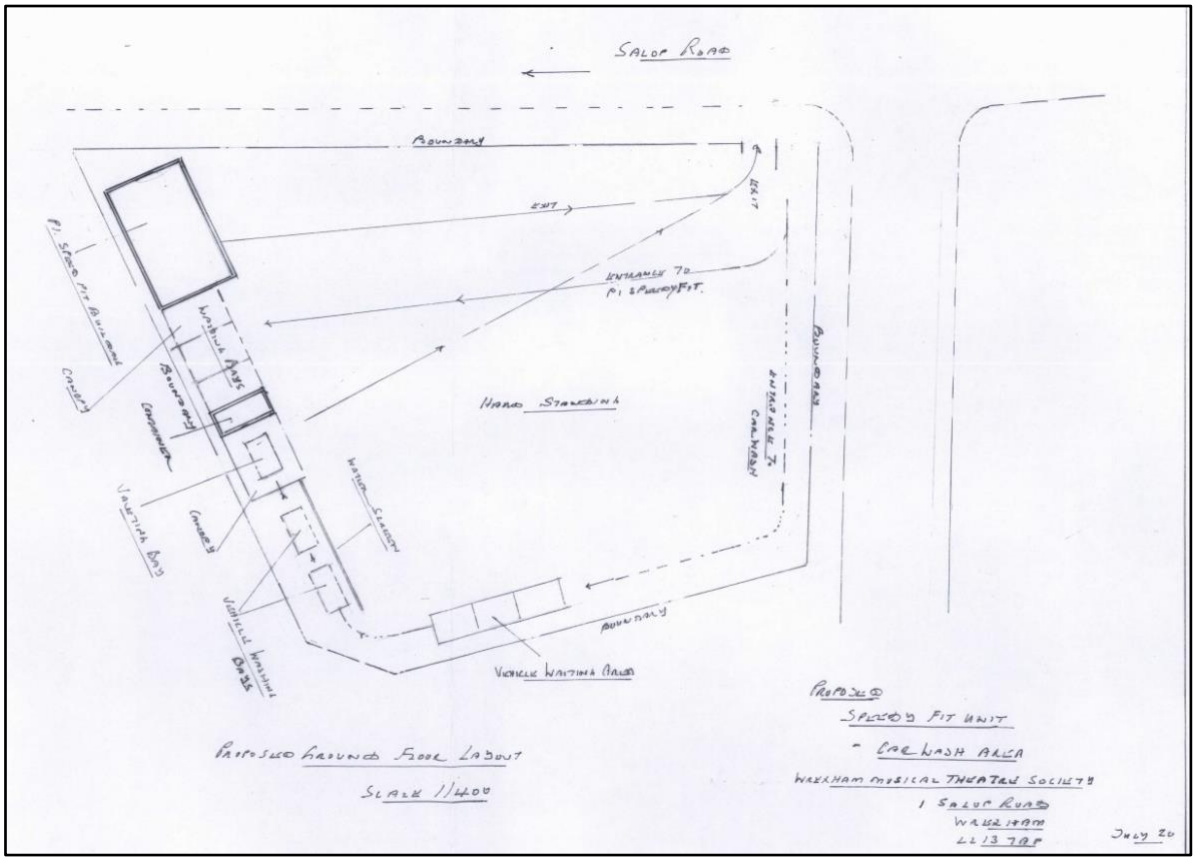


Figure 2 Proposed Development Plan 2



Objective

1.5 The purpose of the Desk Study is to collate available geological and environmental data for the site (and its environment) and provide a preliminary geotechnical and geo-environmental appraisal, with a site-specific conceptual model. This enables a preliminary assessment of geo-environmental risks to be undertaken and, if necessary, provides information for the design of a Phase 2 Ground Investigation.

Scope

1.6 The Phase I Environmental Desk Study comprises of a site reconnaissance visit and a review of the following information sources, some of which was provided by the client.

- British Geological Survey online maps.
- Google Earth imagery.
- Environment Agency online mapping data.
- Historical Ordnance Survey maps.
- The site and surrounding areas environmental, geological, and mining data presented in the site specific GroundSure Reports (Appendix 1).
- Coal Authority Interactive Viewer.
- Wrexham County Borough Council Planning Portal.

2.0 SITE LOCATION AND DESCRIPTION

2.1 The site is in Wrexham, Wales, approximately 0.5 km to the south of Wrexham Town Centre. The approximate National Grid Reference for the centre of the site is SJ 33736 49936 (X: 333736, Y: 349936) with the closest postcode being LL13 8DL.

2.2 The site is an irregular shaped parcel of land with current access via locked gates on Rivulet Road to the north of the site. The maximum dimensions of the proposed site are 55m northeast-southwest 45m northwest to southeast. The site occupies an area of approximately 0.15 hectares.

2.3 The site is currently vacant and surrounded by a low brick wall and having some asphalt hard standing with a few shrubs and tree saplings which have taken hold in the rubble in the southern third of the site.

2.4 There is a river (Afon Gwenfro) flowing under Willow Bridge on Salop Road at the southwest corner of the site, which follows the site boundary on its southern and eastern sides and flows north.

2.5 Wrexham Musical Theatre previously occupied the site and was demolished in 2016.

2.6 The general surrounding area comprises of a mix of late 19th Century brick terrace residential housing along with light industrial units, clothing retail outlets, supermarkets and building suppliers.

2.7 A location plan is shown below as Figure 2, together with a recent site photograph as Figure 3 (overleaf).

Figure 3 Site Location Plan

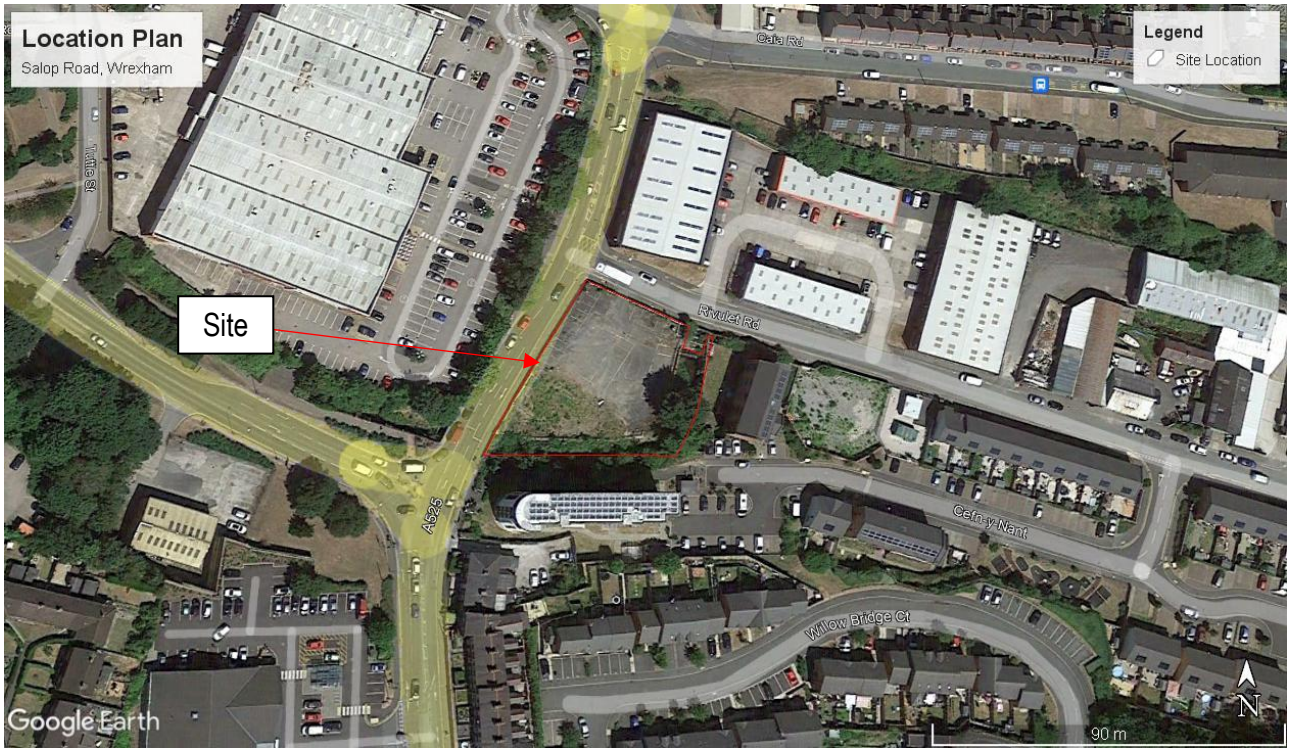


Figure 4 Site Photograph



Site Utility Services

2.8 As the site was occupied by a former theatre, connections for water, electricity and foul drainage are present. Site service plans have not been obtained for the site on behalf of the client.

2.9 The status of all services should be checked prior to any development (including site investigation) commencing.

3.0 ENVIRONMENTAL SETTING

3.1 The geology of the site is covered by British Geological Survey (BGS) online data and the site specific GroundSure Enviro+Geo Insight report (Appendix 1).

3.2 Environmental conditions are covered by Environment Agency (EA) and British Geological Survey (BGS) online data, and the site specific GroundSure Enviro+Geo Insight report (Appendix 1).

Geology

3.3 The BGS states that the site is underlain by artificial made ground deposits.

3.4 The site is underlain by superficial deposits of Alluvium (silt sand and gravel) and Clay.

3.5 The solid geology beneath the site is shown to be the Westphalian Salop Formation comprising of mudstone, sandstone, and conglomerate.

3.6 There are 2 records of linear features within 500m of the site boundary. The closest record refers to an inferred normal fault 338m west of the site.

3.7 There are no records of landslips within 500m of the site.

3.8 There are 24 BGS borehole records identified within 250m of the site. There is a borehole recorded on site referred to as Cambrian Leather Works (B) drilled to 9.1 m by the Welsh National Water Development Authority. No further information is available.

3.9 The site is in an area where the hazard rating is very low about running sands, shrink swell clays, compressible deposits, and landslides. The hazard rating is negligible about collapsible deposits and the dissolution of soluble rocks.

Ground Workings

3.10 There are 9 records of historical surface ground working features identified within 250m of the site boundary. The closest record refers to unspecified ground workings located 188m east of the site, dated 1910. Other records in the vicinity refer to unspecified workings and pits and a graveyard (199m northwest of the site)

Mining and Other Underground Workings

3.11 The site is located within an identified coal mining area. Reference to the Coal Authority Interactive viewer shows the site is not located within a Development High Risk Area.

3.12 There are 2 records of non-coal mining areas located within 1km of the site These refer to sporadic, vein mineral extraction. The closest being 334m west of the site.

3.13 There are no areas of brine extraction, gypsum extraction, tin mining, or clay mining on the site.

3.14 There are no records of natural cavities within 500m of the site.

3.15 There are no records for historical underground working features identified within 1km of the site.

Radon Potential

3.16 The site is in a Radon Affected Area where between 5% - 10% of the properties are above the Action Level. Therefore, basic radon protection measures are required.

Hydrogeology and Hydrology

3.17 The superficial deposits are classified by the Environment Agency (EA) as a Secondary A Aquifer The Alluvial deposits of sand and gravel have an intergranular flow type and a very high to very low permeability. The BGS states the following:

> ***Secondary A Aquifer*** *'Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.'*

3.18 The Salop Formation is classified by the Environment Agency (EA) as a Secondary A Aquifer.

3.19 The Salop Formation has a well-connected fracture flow type and a moderate to low permeability. The BGS states the following:

> ***Secondary A Aquifer*** *'Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.'*

3.20 The groundwater vulnerability and soil leaching potential of the site has been classified as a high vulnerability in the secondary aquifer of the superficial deposits. The BGS states:

> *'High Vulnerability – Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and absence of low permeability superficial deposits.*

3.21 There are 4 ground water abstraction licence records within 2km of the site. The closest record is un-named and is located 1km northeast of the site.

3.22 There are 7 surface water abstraction licence records within 2km of the site. The closest record refers to a historical effluent dilution licence to extract water from the River Gwenfro held by Wrexham County Borough located 567m northwest of the site.

3.23 There is 1 potable water abstraction licence record within 2km of the site relating to a historical licence belonging to the National Trust.

3.24 The site is not located within 500m of a Source Protection Zone or Source Protection Zone within a confined aquifer.

3.25 There are 9 water network entries within 250m of the site all relating to the non-tidal river Afron Gwenfro which is largely culverted through Wrexham town centre. The closest record is 1m east of the site and contains water year-round.

3.26 There are 7 surface water features identified within 250m of the site, all of which refer to the River Afron Gwenfro.

3.27 There is 1 records of a Water Framework Directive (WDF) surface water body located on site. The onsite record refers to the River Afron Gwenfro catchment. The water body had a failed chemical rating and good ecological rating in 2016.

3.28 There is 1 record of a Water Framework Directive (WDF) groundwater body located on-site. The record refers to the Dee Carboniferous Coal Measures which had a poor chemical rating in 2016.

Landfill & Waste Management Activity

3.29 There are no records for current Environment Agency/Natural Resource Wales landfill records within 500m of the site.

3.30 There are 2 records of historic landfill sites identified from Local Authority and high detail historical mapping, within 500m of the site.

3.31 There are 2 records of historic Environment Agency/Natural Resource Wales landfill sites within 500m of the site. The closest being Dunks No2 landfill, operated by Wrexham Borough Council 450m to the east.

3.32 There are no records of BGS/DoE non-operational landfill sites within 500m of the site.

3.33 There are 2 records of a historical landfill from the Local Authority and Historical Mapping records within 500m of the site. The closest being Parciau 479m west of the site.

3.34 There are 9 records of a waste treatment, transfer, or disposal site within 500m of the site. The closest record is held by Cambrian Electrical Factors Ltd for the storage of waste in a secure place, located 53m northeast of the site.

3.35 There are 3 records of historical waste sites within 500m of the site. The closest record refers to a “refuse destructor” dated 1912, located 75m west of the site.

3.36 There are 2 records of current Environment Agency/Natural Resources Wales licensed waste sites within 500m of the site. The closest record refers to a Metal Recycling Site at 49 Rivulet Road located 348m east of the site.

Industrial Land Use Information

3.37 There are 137 records of potentially contaminative historical land uses identified within 500m of the site. On site records refer to a gas works dated 1882 an industrial estate dated 1992 and unspecified works dated 1964. The closest off-site record refers to unspecified commercial / industrial use, located 1m east of the site, dated 1938. Other records in the vicinity refer to further leather works, a tannery, gas works, railway sidings, tanks, iron and brass foundry, ground workings, unspecified works, breweries, malthouses, flour mills, a smithy, unspecified pits, timber yards refuse heaps, gasometers, and unspecified tanks.

3.38 There are 20 records of current potentially contaminative land uses identified within 250m of the site. The closest record refers to an electricity substation 17m southeast of the site. Other

records in the vicinity refer to business parks and industrial estates, gas and electrical features, petrol stations, vehicle parts, repair and cleaning and accessories and construction and tool hire.

3.39 There are 56 records of historical tanks identified within 500m of the site. There is 1 onsite record which refers to gas works. The closest offsite record refers to a gas holder station located 2m east of the site, dated 1966.

3.40 There are 49 records of historical energy features identified within 500m of the site. There are 2 onsite records which refer to gas works dated 1874 and 1912. The closest offsite record refers to a gas holder station, located 2m east of the site, dated 1966.

3.41 There are 2 records for current petrol or fuel sites within 500m of the site the closest being Texaco fuel station on Kingsmill Road, 168m south of the site.

3.42 There are no records of historical petrol or fuel sites within 500m of the site.

3.43 There are 65 historical garage and motor vehicle repair site records identified within 500m of the site. The closest record refers to a garage located 169m south of the site, dated 1958.

3.44 There are no National Grid high voltage underground electricity transmission cables within 500m of the site.

3.45 There are no National Grid high-pressure gas transmission pipelines within 500m of the site.

3.46 There are 27 historical railway and tunnel features identified within 250m of the site. The closest record refers to railway sidings located 25m northeast of the site, dated 1912.

3.47 There are 3 historical railway lines identified within 250m of the site. The record refers to a historic railway located 53m north of the site.

3.48 There are no current active railway line records identified within 250m of the site.

3.49 There are no underground railway lines or tunnels identified within 250m of the site.

3.50 The site is not within 500m of the route of the High Speed 2 rail project.

3.51 The site is not within 500m of the route of the Crossrail 1 or 2 rail project.

Environmental Permits, Incidents and Registers

3.52 The Groundsure Report includes records of environmental permits, incidents, and registers within 500m of the site, which are summarised in Table 1 below.

Table 1: Environmental Permits, Incidents and Registers within 500m of the Site

Permit/Incident/Register	Number
Historical Licensed Industrial Activities (IPC)	0
Part A (1) and IPPC Authorised Activities	0
Pollutant Release to Surface Waters (Red List)	0
List 1 Dangerous Substances Inventory Sites	1
List 2 Dangerous Substances Inventory Sites	1
Part A (2) and Part B Activities and Enforcements	1
Category 3 or 4 Radioactive Substance Authorisations	0
Licensed Discharge Consents	20
Planning Hazardous Substance Consents and Enforcements	2
Dangerous or Hazardous (COMAH and NIHHS) Sites	1
Sites Determined as Contaminated Land under Part 2A EPA 1990	0
Regulated Explosive Sites	0
Pollutant Release to Public Sewer	0
Substantiated Pollution Incidents (Category 1 and 2)	4
Pollution Inventory Substances, Wastes and Radioactive Wastes	0

3.53 There is 1 record on List 1 of the Dangerous Substances Inventory Sites within 500m of the site. The closest record is for Sketchley Cleaners for mercury, cadmium and perchloroethylene 349m northwest of the site.

3.54 There is 1 record on List 2 of the Dangerous Substances Inventory Sites within 500m of the site. The closest record is for Sketchley Cleaners for arsenic, chromium, copper, lead, vanadium, and zinc, 349m northwest of the site.

3.55 There is 1 record of Part (2) and Part B Activities and Enforcements within 500m of the site. The closest record refers to Beechley Service Station for a historical Part B permit for unloading petrol into service stations, located 188m South of the site.

3.56 There are 20 records of Licensed Discharge Consents within 500m of the site. The record on site relates to sewage discharge of storm sewer overflow into the adjacent river.

3.57 There are 2 records of Planning Hazardous Substance Consents and Enforcements within 500m of the site. The closest record refers to a historical consent dated 1992 for Wrexham Holder Station, located 68m east of the site.

3.58 There is 1 record of Control of Major Accident Hazards (COMAH) located with 500m of the site. This record refers to a historical NIHHS site for British Gas located 9m east of the site.

3.59 There are 4 records of Substantiated Pollution Incidents within 500m of the site. The closest record refers to an unidentified pollutant located 382m east of the site. This incident dated 2001 had a category 3 (minor) impact on water, land, and air.

3.60 There are no other records of Environmental Permits, Incident or Registers within 500m of the site.

Environmentally Sensitive Sites

3.61 There are 2 records of Sites of Special Scientific Interest (SSSI) within 2km of the site. The closest record refers to Sontley Marsh, located 1.6km south of the site.

Ecology

3.62 An ecological assessment of the site falls outside the brief of this report. Where considered necessary, advice should be sought from an ecological specialist in this respect.

3.63 However, the site is classified as Urban Land.

Archaeology

3.64 An archaeological assessment falls outside the brief of this report. Where considered necessary, advice should be sought from an archaeological specialist in this respect.

3.65 However, there are 12 records of a Listed Building within 250m of the site, the closest being Grade II listed Willow Bridge 10m to the west. Salisbury Park 132m south of the site is recorded as being a conservation area by the local planning authority.

3.66 There are no records of World Heritage Sites, Scheduled Ancient Monuments or Registered Parks and Gardens with 250m of the site.

Potential Flood Risks

3.67 Detailed assessment of flood risks is outside the scope of this report. The site lies within an Environment Agency Zone 2 and Zone 3 floodplain.

3.68 The risk of flooding from rivers and sea (RoFRaS) within 50m of the site is considered **high.**

3.69 There are no records of historical flood events within 250m of the site.

3.70 There are no records of flood defences located within 250m of the site.

3.71 There are no records of areas benefitting from flood defences within 250m of the site.

3.72 There are no records of areas used for flood storage within 250m of the site.

3.73 The highest risk of surface water flooding occurring on-site is **1 in 30 years 0.3m – 1 m.**

3.74 The highest risk of groundwater flooding occurring on-site is **low**.

Previous Site Investigations

3.75 A planning application (reference WRC/P/2020/0494) was submitted to Wrexham County Bourgh Council in August 2020 by Mr Howard Fordland for the proposed development of a unit for fitting car tyres and a car wash. The application was refused in regard to the relevant policies in the Wrexham Unitary Development Plan: EC12 development and flood risk, GDP1 Development objectives and T8 Parking.

The reasons stated:

- The site lies withing a Zone 2 C2 and are at an unacceptable risk of flooding and could potentially give rise to flooding off site.
- The proposed site access onto Salop Road is likely to increase conflicting vehicular movements to the detriment of highway safety

Wrexham council issued recommendations of a contaminated land phased investigation because of the historical use of the site being a leather works and adjacent to a gas works (September 2020).

Wrexham council had concerns regarding the proposed site entrance which would be relocated from Rivulet Road to the corner of Salop and Rivulet Road which was deemed unacceptable and an access on the east side of the site was proposed with consideration given to the nearby water course.

Traffic generation and backing up of traffic due to excessive use of the site was a potential issue along with parking and turning provision.

The possibility that effluent and runoff from vehicle cleaning activities could potentially pollute the nearby water course and groundwater was a potential issue with the plans along with noise generation, dust management, and burning or waste relating to construction activities

3.76 A planning application (reference WRC/P/2016/0494) was submitted to Wrexham County Bourgh Council in April 2016 relating to the intended demolition of the Wrexham Theatre. A bat survey was carried out and non were found but the presence of Japanese knotweed was noted on the riverbank. The Musical Theatre was a brick building with a steel and timber roof. (See Figure 5 Overleaf)

3.77 A planning application (reference P/2000/0494) was submitted in May 2000 for the continuation of hazardous substances consent in part of the site. No further details are available.

Figure 5 Musical Theatre Demolished in 2016

1. Front and side elevation



2. Front elevation



4.0 SITE HISTORY

4.1 The historical development of the site has been determined by reference historical plans and Google Earth imagery. The reviewed historical plans comprise only readily available records and may be limited; however, the information available to date indicates that additional searches are unlikely to add to our understanding of the site. The earliest available historical mapping covering the site dates to 1873.

4.2 The site history is summarised in Table 2, below, followed by selected extracts from maps and aerial photographs.

Table 2: Summary of Site History

Date	On-Site History	Surrounding Land Use History
1873 1:2,500	The site has ten small buildings associated with it and a pump site. A river Afon Gwenfro runs along the east and south of the site flowing east. There are several trees on site.	There is a gas works to the east of the site, beyond which and to the north is open land to the river. There is a tannery on the north side of the river and residential terrace housing to the south of the site along Salop Road. On the west side of Salop Road, there are two breweries with malthouses To the south of the gas works are a series of treelined rectangular fields, possibly orchards.
1874 1:500	The site has several small residential buildings and trees, now identified as Havelock Square	No significant change other than a spring is identified to the south of the site, south of the river, behind a residential building on Salop Road.
1899 1:2,500	The site remains the same other than a well being marked in the northwest corner.	The railway line extends west-east along the previous trajectory of Mount Road. Rivulet Road has now been constructed north of the site and the tannery to the north side of the river has expanded and includes Cambrian Leather Works. There is a large “horse repository” (urban horse dealership) north of the railway line The residential housing has expanded to the south of the site to include terraces along Greenbank Street and Wrexham Pechan. There are breweries and malthouses on the west side of Salop Road The river is now culverted beneath the tannery. A school and congregational chapel have been constructed 250m to the southwest of the site near Madeira Hill and Salisbury Road.

Date	On-Site History	Surrounding Land Use History
1912 1:2,500	No significant change.	The larger brewery on the west side of Salop Road is now a tram depot belonging to the Wrexham corporation along with "electricity works" and public baths There is an additional tank at the gas works to the east of the site. There are chimneys noted on the maps at the gas works and tanneries Trees are no depicted in the open area south of the breweries on the west side of Salop Road. Terraced housing of Birch Street has been constructed 150m south of the site. Detached houses with large gardens are built along Salisbury Road.
1937 1:2,500	No significant change	Residential buildings on the west side of Salop Road, opposite the site have been demolished. There is a Public House on the previous brewery site at the junction of Willow and Salop roads. 200m to the west there is the Eagle iron and brass foundry
1958 1:1250 1958-1960 1:1250	Residential buildings on the site have been demolished and a "Works" consisting of 6 buildings along the west and north sides of the site, facing Salop and Rivulet roads respectively.	A tennis court and bowling green appear on the map opposite Birch Street and Salop Road, 100m south of the site.
1966-1971 1:1250	The site is now part of the Cambrian Leather Works and an additional building has been on the southern boundary.	The tannery site is now all listed as Cambrian Leather works. Which lies in the north side of Rivulet Road, opposite the site. Three of the tanks at the former gasworks have been demolished and replaced with one large tank and labelled a "gas holder station" There is a road haulage depot 75m southwest of the site, opposite the terraced houses on Salop Road. Willow Bridge over the River Gwenfro is mentioned at the junction of Salop and Willow roads.
1973 – 1975 1:1250	No significant change	A large supermarket and car park has been built on the site of the former horse repository and Eagle Fields Meadow
1975-1978 1:1250	The buildings located on the north side of the site facing Rivulet Road have been demolished.	No significant change

1988 - 1990 1:1250	The buildings remain the same however the site is not listed as part of the leather works.	The Cambrian leather works have now become the "Cambrian Industrial Estate. The railway line has been dismantled and houses have been constructed above its embankment to the north. Many of the buildings opposite the site have been demolished along with buildings related to the previous road haulage depot on the west side of Salop Road.
1990 – 1992 1:2,500 1990 – 1994 1:1250	The buildings on the site have been demolished and replaced with one large building on the southwest corner near to the river and a smaller construction on the corner at the junction of Salop and Rivulet Roads.	A sawmill exists to the east of the Cambrian Industrial Estate The building to the south of the river next to the site has been demolished Buildings opposite the site on Salop Road have been demolished and replaced with large steel framed retail buildings.
2003 1:2,500	No significant change.	No significant change
2006 Google Earth	No significant change.	The area of Eagles Meadow carpark and the supermarket 150m north of the site, have been demolished and prepared for building.
2007- 2009 Google Earth	The site has one large building (the Wrexham Musical Theatre on its southwest corner, the remainder is tarmac car park.	The Gasometer has been demolished and the former gasworks site is now derelict A Lidl Supermarket has been built on the site of the former depot, southwest of the site on Salop Road. Steel framed plumbing retail outlets have been built on part of the site of the former gasworks. The area of Eagles Meadow is now a large shopping complex.
2016 Google Earth	The theatre on the site has been demolished and the site is vacant with hard standing.	Residential housing has been constructed on the former gasworks site (Willow Bridge Crescent and Cefn-y-Nant) as well as the large oval building opposite the junction of St Giles way and Salop Road to the south of the site.
2021 Google Earth	The site is vacant with tarmac over most of the site with vegetation regenerating in the former theatre.	No significant change

Figure 6 OS Map Extract 1873

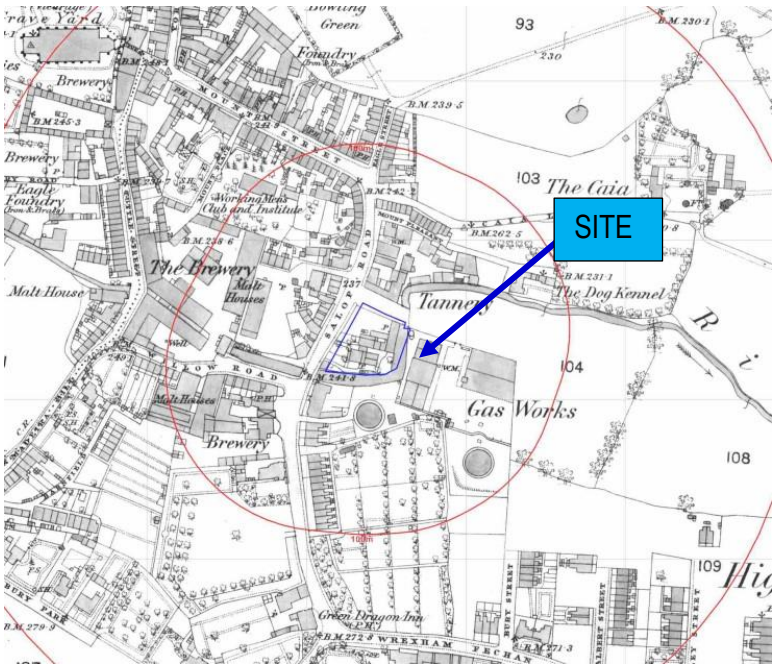


Figure 7 OS Map Extract 1899

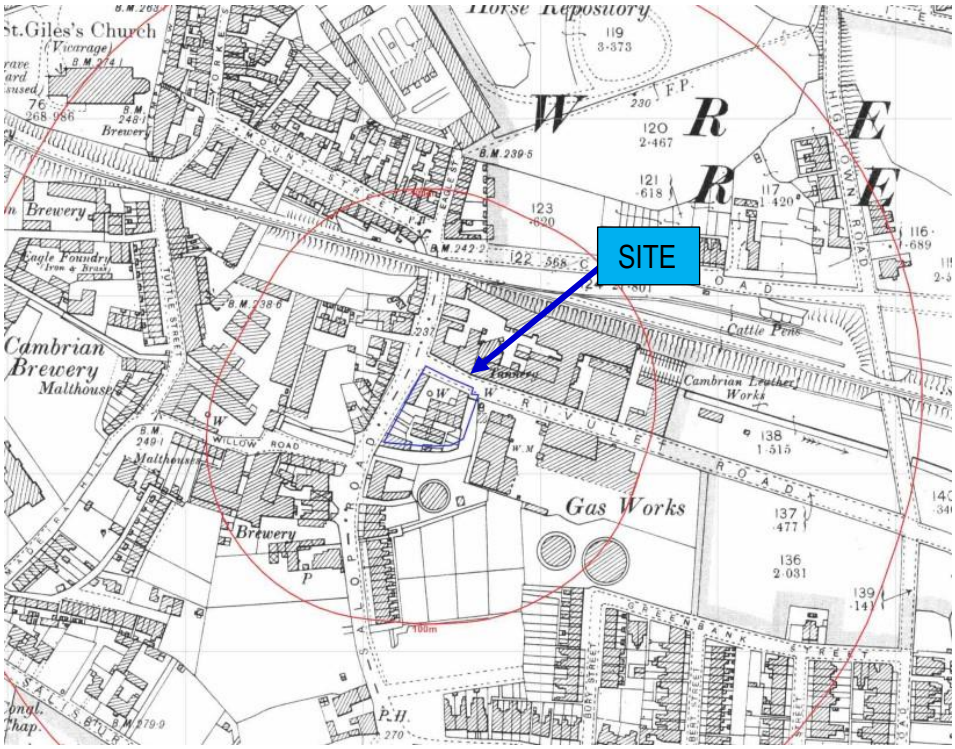


Figure 8 OS Map Extract 1958

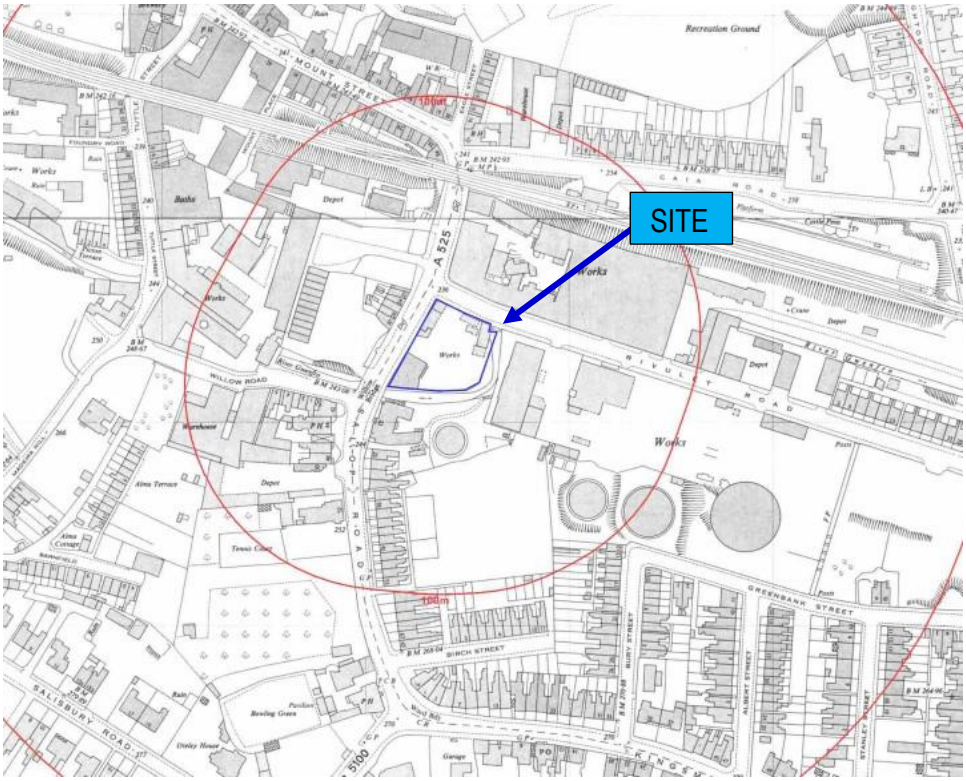


Figure 9 OS Map Extract 1990-92

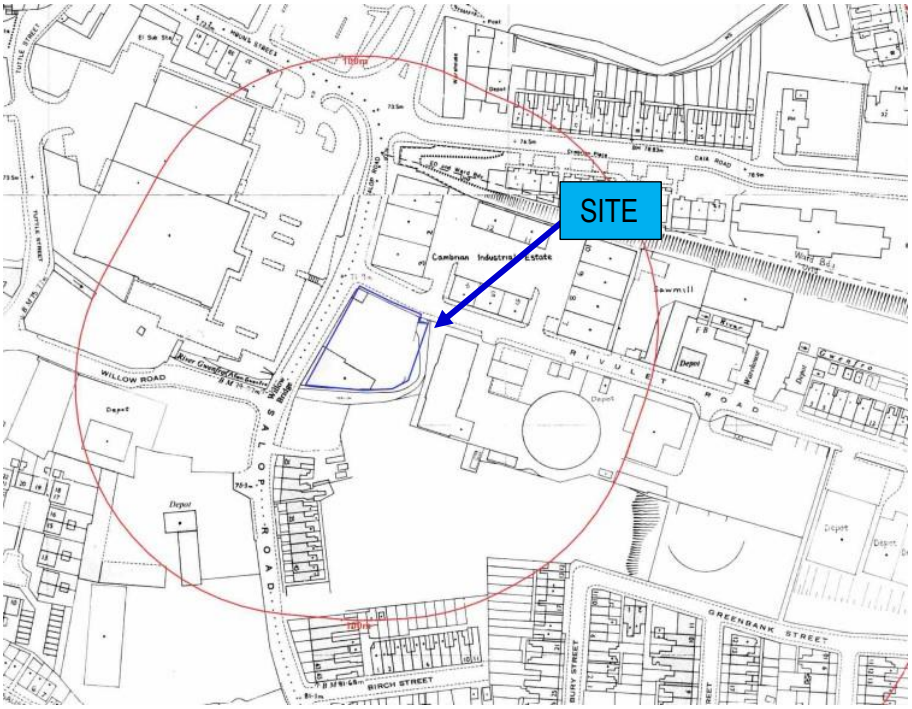


Figure 10 Aerial Photograph 2021



5.0 WALKOVER SURVEY

5.1 A walkover survey was completed on 16th November 2021. The photographs and notes from this survey are appended to this report as Appendix 2 and Appendix 3 respectively.

5.2 The site is currently accessed via a double gate on Rivulet Road to the north of the site.

5.3 The site is currently vacant land, surrounded by a brick wall and has a 3m wide river/stream on its south and east sides running north.

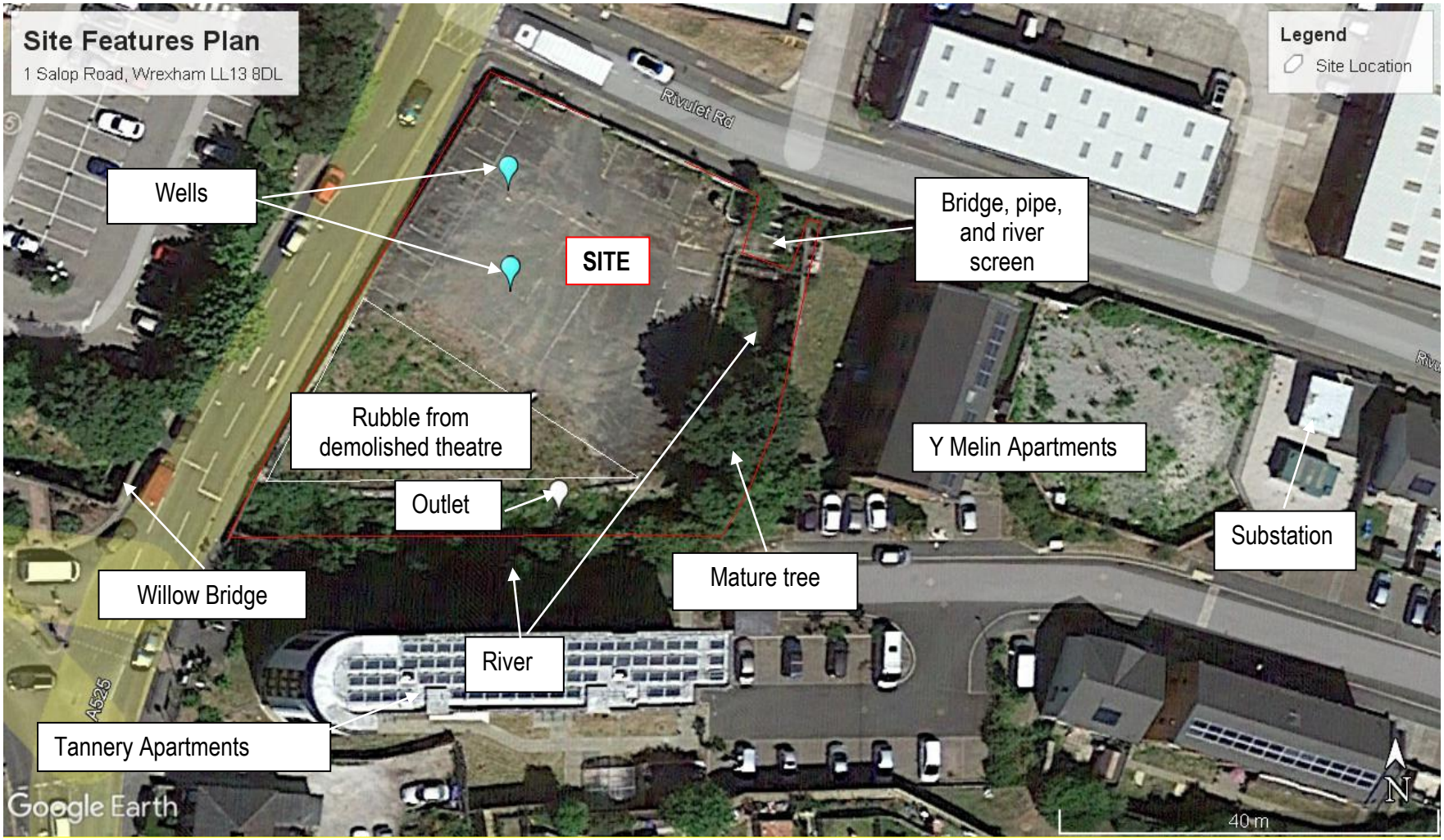
5.4 The site is flat and is all made ground with 75 % being asphalt and the remaining 25% being rubble from the demolished theatre. There are some low shrubs and one large sycamore tree.

5.5 The site has services to it: drains, a power cable, two wells and a wastewater outlet (draining into the river) were noted.

5.6 The site is surrounded by a mix of residential terraces, apartment buildings and light industrial / retail units and next to a busy junction. There is a grade II listed bridge adjoining the site.

5.7 A site features plan is presented as Figure 11 overleaf.

Figure 11 Site Features Plan



6.0 PRELIMINARY CONTAMINATION RISK ASSESSMENT

Introduction

6.1 The following paragraphs outline a Preliminary Risk Assessment (PRA) for the site based on the above desk study information as defined by DEFRA and the EA Model Procedures for the Management of Land Contamination, CLR11(2004).

6.2 Table 5 provides a Preliminary Conceptual Model (PCM) which considers the source-pathway-receptor linkages present alongside the likelihood, severity and risk level as defined within Table 3 and Table 4 below. The assessment of probability, a modified risk table, and certain consequence definitions are based on CIRIA C552 and CLR11.

6.3 Table 5 considers whether a pollution linkage is potentially present and provides a preliminary qualitative assessment of risk based on the information currently available. Where a possible linkage is identified, it does not necessarily mean that a significant risk exists but indicates that further information is required through appropriate site investigation to substantiate the conceptual model.

6.4 The PCM/PRA is based on a proposed commercial end use.

Table 3: Consequence, Probability and Risk

Probability	Consequence,	Risk
High Likelihood- There is a pollution linkage and an event either appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution	Very High – acute risk to the human health likely to result in significant harm. Risk of severe or irreversible effect on ground/surface water quality. Catastrophic damage to buildings / property.	Very High – there is a high potential that the source-pathway-receptor scenarios may give rise to harm to human health, or the environment and remedial action is likely to be required.
Likely – there is a pollution linkage, and all the elements are present, which means that it is probable an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.	High – Severe or irreversible effect on human health. Temporary severe or irreversible effect on ground/surface water quality. Reduction of water quality rendering groundwater or surface water unfit to drink and/or substantial adverse impact on groundwater dependant environmental receptors.	High – it is likely that the source-pathway-receptor scenarios may give rise to an impact on human health or the environment, which may require remediation and/or control measures to mitigate risks
Low likelihood– there is a pollutant linkage and circumstances are possible for an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term	Moderate – Long term or short-term moderate effect on human health. Moderate effect on ground/surface water quality, reversible with time. Reduced reliability of a supply at a groundwater or surface water abstraction source	Moderate – it is possible that the source-pathway-receptor scenarios may give rise to an impact on human health or the environment, however it is either relatively unlikely that such would be severe, or if any harm were to occur it is more likely that harm would be mild.
Unlikely – there is a pollution linkage, but circumstances are such that it is doubtful that an event would occur even in the very long term.	Low – Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc.) Slight effect on ground/surface water quality, reversible with time. Marginal reduced reliability of a supply at a groundwater or surface water abstraction source.	Low – it is possible that harm could arise at the source, however it is likely that this would at worst be mild.
		Very Low – it is unlikely that the source-pathway-receptor scenarios will give rise to an impact on human health or the environment.

Table 4: Estimation of Level of Risk by Comparison of Consequence and Probability

		Consequence			
		High	**Moderate**	**Low**	**Very low**
Probability	**High Likelihood**	Very High	High risk	Moderate risk	Moderate to low risk
	Likely	High risk	Moderate risk	Moderate to low risk	Low risk
	Low Likelihood	Moderate risk	Moderate to low risk	Low risk	Very low risk
	Unlikely	Moderate to low risk	Low risk	Very low risk	Very low risk

Potential Sources

6.5 Historically the site has been a series of residential buildings until the 1800s (Havelock Square) and then became part of the tannery and Cambrian Leather Works in the 1950s. In the 1990s there was a Musical Theatre on the site which was demolished in 2016.

6.6 Potential on-site sources of contamination include chemicals and heavy metals (Arsenic and Chromium) associated to the tanning process. Hazardous materials stored at the site for which there was a continuation of a licence applied for in May 2000. The presence of a historic gasworks adjacent to the east of the site suggests soil has the potential to harbour toxic waste such as hydrocarbon sludge, tar and spent oxide waste. Other potential sources of contamination (e.g., Asbestos) may be associated with the development and demolition of onsite buildings and surface ground workings.

6.7 Potential off-site sources of contamination include a gas works located immediately to the east of the site, ground gas associated with offsite developments, surface ground workings associated with the tanneries, foundries, railway sidings, timber yards, mills, and breweries in the area.

6.8 There is potential for the presence of contamination associated with the following:

- Areas of Made Ground from on and off-site developments
- Ground gas associated with Made Ground
- Leaks and spillages of fuels and oils associated with on site development.

6.9 Contaminants may therefore include heavy metals, hydrocarbons, asbestos, and ground gases (Carbon dioxide, methane.)

Potential Receptors

6.10 The following receptors have been considered for the construction and operational stages of the proposed redevelopment.

- Current site users;
- Adjacent land users;
- Future land users;
- Construction workers during site development works;
- Surface water and Groundwater within the underlying aquifer

Potential Pathways

6.11 The following pathways have been considered for the construction and operational stages of the proposed redevelopment.

- Dermal contact, ingestion, inhalation pathways of potentially contaminated soils.
- Downward vertical migration of leachate to surface waters and shallow groundwater.
- Vertical or lateral migration of ground gas.

Table 5: Preliminary Conceptual Model

Source	Pathway	Receptor	Probability	Consequence	Risk	Comment
Potential soil contamination E.g., Heavy Metals, PAH, TPH, BTEX and ground gases.	Dermal contact, ingestion, and inhalation of soils dust	Current Site Users	Unlikely	Moderate	Low	The site is currently a vacant lot of asphalt and rubble. The risk is therefore considered to be **LOW**.
		Adjacent land users	Unlikely	Moderate	Low	Residential properties overlook the site on the southern and eastern boundaries. There are also footpaths adjacent to the site on the western and northern sides. Usual dust control measures should be implemented as part of good site working practices during construction to reduce dust generation. Therefore, the risk is considered **LOW.**
		Future land users	Low Likelihood	Moderate	Moderate to Low	The proposed development consists of constructing a carwash and tyre fitting / car maintenance centre. Some of the site will be surfaced in hardstanding. The risk to future site users via direct exposure is **MODERATE.** This assessment is based on the potential for contamination to be present beneath the site.
		Construction Workers	Low Likelihood	Moderate	Moderate to Low	Construction workers may be exposed to potentially contaminated soils during construction works, however exposure duration will be short-term only. The risk to construction workers is considered **MODERATE.** Appropriate health and safety measures (in line with CDM and other relevant health and safety guidance) will reduce the risk to **LOW.**

Source	Pathway	Receptor	Probability	Consequence	Risk	Comment
	Downward vertical migration of leachate to shallow groundwater	Groundwater within the Underlying Aquifer	Low Likelihood	Moderate	Low	The underlying superficial soils are anticipated to be sand and gravel with intergranular flow high permeability. There are 4 abstraction licences within 2km. The groundwater vulnerability and soil leaching are high however most of the site will be covered with asphalt. The risk to groundwater is therefore considered **LOW.**
	Lateral migration in surface waters	Surface water	High Likelihood	Moderate	High Risk	There is a river that is located on along the southern and eastern boundaries of the site. Run off from car washing activities is likely and the drain overflow runs into the river. Therefore, the perceived risk to surface waters is **HIGH.**
	Vertical or lateral migration of ground gas	Current Site Users	Likely	Moderate	Moderate	The site is currently vacant and much of the area is anticipated to be of made ground. It is within a radon affected area with 5-10% of properties being affected. A historical gas works was located within 1m east of the site This risk to current site users is therefore **MODERATE.**
		Adjacent land users	Low Likelihood	Moderate	Moderate to Low	Residential properties predominantly surround the site as well as light industrial units and public walkways. Areas of Made Ground are anticipated. There is moderate potential for radon gas and basic radon protection measures are required. The risk to adjacent site users from ground gas is therefore considered **MODERATE TO LOW.**
		Future land users	Low Likelihood	Moderate	Moderate	The proposed development consists of constructing car wash and car maintenance unit. There is moderate potential for radon gas and basic radon protection measures should be implemented, therefore the risk is considered **MODERATE**
		Construction Workers	Low Likelihood	Moderate	Moderate to Low	Construction workers may be exposed to ground gas; however, the duration will be short term and the anticipated construction is not likely to take an extended amount of time. The risk to construction workers from ground gas is considered **MODERATE TO LOW.**
Asbestos Containing Material (ACM)		Current Site Users	Unlikely	Moderate	Low	The site is currently vacant with rubble in the southwest 1/3 of the site. Asbestos may be present on the site associated with the construction and demolition of onsite buildings. Asbestos is only harmful when disturbed. The risk to current site users is **LOW.**
		Adjacent land users	Unlikely	Moderate	Low	Residential properties, light industrial units and public walkways surround the site with Asbestos may be present on the site. Disturbance of soil during the construction phase may allow fibres to become airborne. Dust control measures

Source	Pathway	Receptor	Probability	Consequence	Risk	Comment
						(dampening down) should be implemented as part of good site working practices. Therefore, the risk is considered **LOW**.
		Future land users	Low Likelihood	Moderate	Moderate to Low	The proposed development consists of constructing car wash and car maintenance unit. Much of the site will be surfaced in hardstanding. The risk is therefore considered **MODERATE TO LOW.** A contamination assessment of the existing on-site soils would be required to determine the level of risk and necessary mitigation measures.
		Construction Workers	Low Likelihood	Moderate	Moderate to Low	Construction workers may be exposed to potential asbestos in Made Ground soils. However, this potential area is small. The risk is considered **MODERATE TO LOW.** A contamination assessment of the existing on-site soils would be required to determine the level of risk and necessary mitigation measures.

7.0 GEOTECHNICAL HAZARDS ASSOCIATED WITH THE DEVELOPMENT

7.1 In addition to the environmental hazards there are also geotechnical hazards associated with the stability of the ground including load bearing capacity, slope stability and effects of ground mining activities. Local Authorities follow NPPF (2012) which requires that a site is suitable for its new use considering of ground conditions and land instability, including from natural hazards to former activities such as mining. A summary of the geotechnical considerations is provided below in Table 6.

Table 6: Summary of Geotechnical Hazards

Geohazards:	
Highly Compressible Ground	Low risk
Collapsible Soils	Low risk
Swelling Clay	Low risk
Running Sand	Low risk
Ground Dissolution	Negligible risk.
Landslip	Negligible risk
Mining & Quarrying	The site is located within a Coal Mining Reporting Area but not within a Development High Risk Area. There are no mining activities reported on site. Therefore, the mining risk is considered very low.
Geotechnical Design Considerations	
Site Clearance	The site is generally vacant therefore very little site clearance will be necessary. However, there is a patch of rubble in the southeastern third of the site, which if found to contain asbestos would need remedial treatment. There is also a moderate amount of rubbish and a large steel crash barrier which may require removal.
Trees	There is only one mature tree on site on the banks of the river on the eastern side.
Existing Buildings/Obstructions	There are no buildings located on the site.
Foundations	The depth and type of proposed foundations would depend on the ground conditions present on site. There are artificial deposits of made ground present across most of the development plot and the superficial geology is potentially weak alluvium.

Geotechnical Design Considerations	
Floor Slabs	Again, an intrusive geotechnical investigation is recommended prior to any construction works to discover the most suitable floor slab design for the on-site ground conditions.
Groundwater	Exact groundwater conditions are not known at this stage. For more detailed knowledge of the groundwater regime, an intrusive geotechnical investigation would be needed. However, it is recorded that the site is underlain by Secondary A aquifers. The highest risk of groundwater flooding on site is recorded as low. There are two wells located on site.
Earthworks	The site lies relatively flat on the proposed development area and has brick walls around the perimeter. There is a concrete bund on the south side of the site above the bank of the river which slope 2 metres to the riverbed. Due to the site construction being intended to be dismantlable and taking up a relatively small proportion of the site, earthworks are not anticipated.
Slopes	The site has slopes on the riverbanks on the southern and eastern sides. A drop of approximately 2 m maximum exists between the site and the riverbed.
Retaining Walls	There is an approximately 2m brick retaining wall in the northeast corner of the site adjacent to the access bridge and river grill.
Chemically aggressive ground conditions	Chemically aggressive ground conditions are not expected at this site. However, an intrusive geotechnical investigation would be necessary to confirm this.

8.0 CONCLUSIONS & RECOMMENDATIONS

Conclusions

8.1 The proposed development of the site is the construction of a carwash, car maintenance unit and secure lockup.

8.2 Historically the site was depicted on maps dating from 1873 as a of a cluster of residences (Havelock Yard) until the 1950s when the site became part of the Cambrian Leather Works. It is immediately adjacent to an historical gasworks site (pre-1872-1990's).

8.3 Potential on-site sources of contamination include toxic chemicals and heavy metals (Arsenic and Cadmium) resulting from the historical tanning industry. Contaminants associated with the disposal of waste from the adjacent gasworks site. Ground gas and asbestos associated with the development and demolition of onsite buildings are possible. More recently, a licence to store hazardous waste at the site was reapplied for in May 2000.

8.4 Potential off-site sources of contamination include a historical gas works located 1m east of the and historical tanneries, timberyards, foundries, gasometers, tanks, and breweries within 500m of the site.

8.5 The site is underlain by made ground, below which are alluvial deposits, comprising of sand and gravel (Secondary A Aquifer) and clay. The solid geology comprises of Mudstones, sandstones, and conglomerates of the Salop Formation: (Secondary A Aquifer).

8.6 The site is in a Radon Affected Area, with 5%-10% of the properties above the Action Level and basic radon protection measures should be implemented.

8.7 Given the potential contaminative land uses, the overall risk from soil contamination to end users and construction workers is concluded to be **MODERATE - LOW.**

8.8 The risk to controlled waters (aquifers and rivers) is concluded to be **HIGH** based on the permeable soil properties, current drainage conditions and wells on site and the nature of the activities intended for the site.

8.9 The risk from ground gas to end users and construction workers is **MODERATE-LOW** given the anticipated extent of Made Ground and potential presence of gas from historical leatherworks / tanneries and the historical gas works located within the vicinity of the site.

8.10 The risk from asbestos to end users and construction workers is **MODERATE-LOW** given that there are no buildings on site and the residual rubble from the theatre demolition did not visually appear to have asbestos waste present. Also, the anticipated exposure during the construction process will be limited and that most of the site will be hardstanding.

8.11 The site is located within a Zone 2 and Zone 3 floodplain and the risk of surface water flooding is **HIGH** (1 in 30 years 0.3-1m). The risk of groundwater flooding is **LOW**.

Recommendations

8.12 An intrusive investigation should be undertaken to ensure the most up to date geotechnical parameters for the design foundations, floor slabs and pavement construction for the proposed new structures and surrounding area are gained.

8.13 As part of the geotechnical investigation, it is recommended that the samples of soil are recovered for contamination testing and to confirm whether these are still any potential risks.

8.14 A Flood Risk Assessment will need to accompany any future planning application as the lies on a Zone 2 and Zone 3 floodplain.

APPENDIX 1

GROUNDSURE REPORTS

APPENDIX 2

SITE PHOTOGRAPHS

<table>
<tr><td>Earth Environmental & Geotechnical Ltd

Tel: 0161 975 6088
Email: info@earthenvironmental.co.uk
Web: www.earthenvironmental.co.uk</td><td>SITE PHOTOGRAPHS

EARTH ENVIRONMENTAL & GEOTECHNICAL</td></tr>
<tr><td>Job No.: A4428/21</td><td>Site: 1 Salop Road, Wrexham d</td></tr>
<tr><td>Plate 1 Viewing south from the entrance towards the tannery housing association apartments</td><td>Plate 2 Viewing east from site entrance showing Y Melin apartments. And gate onto access bridge for river grill. And crash barrier.</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Date: 16th November 2021</td><td>Date: 16th November 2021</td></tr>
<tr><td>Plate 3 Viewing north showing the access gate from Rivulet Road and industrial estate opposite</td><td>Plate 4 Viewing northwest showing the boundary along Salop Road with low vegetation and brick walls.</td></tr>
<tr><td>
</td><td></td></tr>
<tr><td>Date: 16th November 2021</td><td>Date: 16th November 2021</td></tr>
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<tr><td>Job No.: A4428/21</td><td>Site: 1 Salop Road, Wrexham</td></tr>
<tr><td>Plate 5 Viewing east showing the river, grill, and flood measure along with plastic contamination.</td><td>Plate 6 Viewing south showing the retaining wall and the drain outlet with contamination</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Date: 16th November 2021</td><td>Date: 16th November 2021</td></tr>
<tr><td>Plate 7 Viewing southeast showing. the mature tree, apartment building and area of rubble in the south of the site.</td><td>Plate 8 Rubble material in the southwest of the site.</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Date: 16th November 2021</td><td>Date: 16th November 2021</td></tr>
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Figure 12 Site Walkover Photo Locations



APPENDIX 3

SITE WALKOVER NOTES

EARTH ENVIRONMENTAL & GEOTECHNICAL

WALK OVER SURVEY REPORT

Site: 1 Salop Road, Wrexham **Date:** 16th November 2021

Job No: A4428/21 **Undertaken By:** Heidi Richards

Purpose of Site Walkover:
1) Provide further information for the Desk Study Report;
2) Identify potential contamination sources, pathways, and receptors.
3) Identify geotechnical features and potential geohazards.
4) Determine locations for exploratory boreholes.

Desk Study features checked during site visit	**Feature and Information required**	**Present**	**Description / Comments**
Site Setting	Description required for: Town/Country/Suburb Setting Industrial/Residential/Retail Usage Current Site use (if undertaking security and access to the site)		 Urban setting. Surrounding areas is a mix of late 19th C brick terrace housing, modern blocks of flats and retail and light industrial brick and steel units. The site is currently a vacant lot
Evidence of Past Activities	Are there: Any relevant street names in area? Features or relics which indicate past history?	 Yes/~~No~~ Yes/~~No~~	The site is located on a corner of Salop and Rivulet Roads. To the east of Salop Road (A525) and to the south of Rivulet Road There is a busy intersection near the southwest corner of the site between Salop Road and St Giles Way. The flats to the south of the site are called the Tannery and there is a plaque on Willow Bridge dedicated by Willow Brewery.
Geographic Setting	Description required for: Low lying flood plain/dry valley/rolling hills etc.		The site is located within a depression and on the banks of the River (Afon Gwenfro) which at this point is a gently flowing stream approximately 3 m wide and 40-50 cm deep The banks of the stream have small bushes and saplings. Wrexham urban centre is one of rolling hills
Ground Conditions	Is there any evidence of: Mining, Mine entries Subsidence Landslip/slope erosion Former investigation works	 ~~Yes~~/No ~~Yes~~/No ~~Yes~~/No ~~Yes~~/No	There is no evidence of land slip, and the banks of the river are retained within brick walls or gently sloping

Desk Study features checked during site visit	**Feature and Information required**	**Present**	**Description / Comments**
Topography	Description required for: Are there apparent differences between site and surrounding area? (If yes describe the presence of retaining walls, and slopes). Is there evidence of Made Ground / Fill on site?	Yes/~~No~~ Yes/No	The site is surrounded by brick walls ranging from 0.6 – 1.5 m apart from a small area on the banks of the river to the south of the site where a low (40 cm) concrete bund is present There is an asphalt carpark occupying the northern 2/3rds of the side and the remaining area is rubble (from the demolished theatre?) and vegetation
Site Boundaries and Neighbours	Description required for: Type of boundary demarcation (if any) on each side of site, usage of adjacent land and name of industrial/commercial occupiers. Note any adjacent features such as water course and other potentially environmentally sensitive uses (residential, school, infirmary, SSSI etc)		The site is demarcated by brick walls ranging from 0.5 m to 1.5 m on the north, west and eastern sides. In the south partially enclosed in brick wall and cut stone wall in the southwest corner where it joins with the grade II listed Willow Bridge. In the southeast corner of the site is a low concrete bund on the banks of the river. A block of housing association flats (Y Melin and the Tannery) overlooks the site and housing association houses are adjacent on Rivulet Street.
Vegetation	Are there any vegetation/trees on or close to site (if yes describe locations, type, maturity, etc) Is there any evidence of poor health / distress?	Yes/~~No~~ ~~Yes~~/No	Buddleia bushes and birch saplings occupy the rubble area in the southwest of the site and around the edges. A large sycamore (approx. 12 m) is present on the banks of the river in the southeast corner of the site. N/A
Ground Surface	Are there areas of hardstanding and estimate the split between hard and soft cover? (If yes describe locations, types, and conditions). Is there any evidence of any spillages or staining?	Yes/~~No~~ ~~Yes/~~No	75 % of the site is covered by asphalt carpark the remaining 25% is 10-20 cm of rubble consisting of broken concrete, brick, glass, wood, and metal fragments. Nonvisible on the site walkover.

Desk Study features checked during site visit	**Feature and Information required**	**Present**	**Description / Comments**
Site Drainage	Are there any drain covers / soakaways (if yes describe locations) Are there any outfalls/water courses on site (note the condition of water courses in open water courses. discolouration, odour, eutrophication, oily sheen, gas bubbling water, clear or cloudy) Where a watercourse runs alongside or crosses a site are there any differences in visible water quality upstream and downstream of the site?	Yes/~~No~~ Yes/~~No~~ Yes/~~No~~	There is a drain cover approx.11 meters from the north boundary (Rivulet Road) and 9 meters from the west boundary (Salop Road side) of the site There is an out fall pipe / drain entering the river on the east side of the site where there is a footbridge / access to a flood measure and a grill to catch leaves and rubbish. There is also a disused plastic outlet into the river at the south end of the site. The river Afon Gwenfro runs alongside the south and east boundaries of the site towards the north and enters a culvert near the north eastern corner of the site. The drain here is depositing orange iron-stained water into the river. There is a moderate amount of plastic waste in the stream however a trout was observed
Electrical Equipment	Are there any electricity sub stations on or adjacent to the site? Are there any electrical transformers, capacitors, pylons etc on site?	Yes/~~No~~	A grey cable was noted on the south side of the site, exiting near the stream, and buried in rubbish in the carpark area. Possibly an electric cable. There is a substation 50 m from the site on Rivulet Road
Buildings	Is there any evidence of asbestos construction materials e.g., roofing, insulation materials. Do any buildings have basements? Do any buildings have a boiler room (if yes, describe fuel type and storage arrangements)?	~~Yes/~~No ~~Yes~~/No ~~Yes~~/No	No buildings located on site. However, there was a theatre which has been demolished and could have contained asbestos.

Desk Study features checked during site visit	Feature and Information required	Present	Description / Comments
Landfilling	Is there any evidence of gas protection measures (gas membrane, gravel-filled trenches, venting pipes, etc)?	~~Yes~~/No	N/A
Process Air Emissions	Point Source: Are there any stacks / vents / cooling towers / abatement equipment? Fugitive Source: is there any stockpiled material / windblown dust / vapour process?	~~Yes~~/No ~~Yes~~/No	N/A
Storage of fuels & Chemicals	Are there any drums / containers (if yes, describe quantity, full /empty, stored on hard standing / soft landscaping, bunding)? Are there any above ground fuel tanks (if yes, describe locations, volumes, how many, bunding, used / disused, condition?) Is there any evidence of underground fuel tanks (fuel pumps, covers, vent pipes, how many and how large, fill point, used / disused, and condition)?	~~Yes~~/No ~~Yes~~/No ~~Yes/~~No	N/A N/A N/A
Accidents	In the event of a large spillage would runoff affect any vulnerable watercourse/culverts? Are emergency procedures / equipment in place?	~~Yes/No~~ ~~Yes/~~No	Any spillage would likely enter the river through drains at the site which appear to drain directly into the river.

Desk Study features checked during site visit	**Feature and Information required**	**Present**	**Description / Comments**
Waste	Are there any waste skips present on site? Are waste storage facilities adequate? Is there any litter/fly tipped material?	Yes/~~No~~ ~~Yes~~/No Yes/~~No~~	There is a large industrial / retail wheely rubbish bin N/A There is a moderate amount of rubbish on site, mainly plastic waste, rubble, glass, and fabric. There are plastic bottles and other waste in the river.
Atmospheric	Are there any fumes, odours originating from site or affecting site from neighbouring sites?	Yes/~~No~~	There is a busy junction at the corner of Salop Road and St Giles way which is a source of air pollution from car exhausts.
Access / Further Investigations	If a Phase 2 Investigation is likely to be required, describe any access problems including headroom where relevant, services, overhead cables, restricted access areas, confined spaces, trafficked areas, etc that are likely to affect investigation scope/techniques. Identify possible site office and storage locations. Identify possible water supply		There is one mature tree on the south east corner of the site on the banks of the river which overhangs the site. Most of the site is made ground The access is via double gates 4.5 m wide on the north side of the site onto Rivulet Road. Possible water supply is the river however there is water to the site and a stop tap has been located on the pavement on north side of the site approximately 5 m from the site entrance. Two well sites were identified 6m from Salop Road boundary and 9 m from Rivulet Road boundary and another 14m from Salop Road and 20 m from Rivulet Road boundary. Steel crash barriers exist on the eastern side of the site. And a gate and footbridge to access the river grill, large pipe, drain, and flood measure are present in the north eastern corner of the site. There is also a rusty capped off pipe in north western side of the site, close to the wall the purpose of which could not be ascertained.
Site Environs	Are there any local features that could have a harmful influence e.g., landfill, industrial processes, railway land? Are there any sensitive water features/courses near to the site?	Yes/~~No~~ Yes/~~No~~	The site was previously a tannery/ leather works and the surrounding area a gas works. It is also the site off a demolished theatre so there is the possibility that chemicals and asbestos harmful to health could be on site. The Afon Gwenfro river will be sensitive to disruption. The grade II listed bridge is adjacent to site and the stone cut wall extend into the site's southern boundary.
Local Knowledge / Anecdotal Evidence			N/A
Site Dimensions	Describe shape of Site in plan and measure dimensions.		The maximum dimensions of the proposed site are 55m northeast to southwest and 45m northwest to southeast. The site occupies an area of approximately 0.15 hectares.

APPENDIX 4

REPORT LIMITATIONS

LIMITATIONS

This contract was completed by Earth Environmental & Geotechnical Ltd based on a defined programme and scope of works and terms and conditions agreed with the client. This report was compiled with all reasonable skill, and care, bearing in mind the project objectives, the agreed scope of works, the prevailing site conditions, the budget, and staff resources allocated to the project.

Other than that, expressly contained in the above paragraph, Earth Environmental & Geotechnical Ltd provides no other representation or warranty whether express or implied, is made in relation to the services. Unless otherwise agreed this report has been prepared exclusively for the use and reliance of the client in accordance with generally accepted consulting practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon, or transferred to, by any other party without the written agreement of a Director of Earth Environmental & Geotechnical Ltd.

If a third party relies on this report, it does so wholly at its own and sole risk and Earth Environmental & Geotechnical Ltd disclaims any liability to such parties.

It is Earth Environmental & Geotechnical Ltd understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was an important factor in determining the scope and level of the services. Should the purpose for which the report is used, or the proposed use of the site change, this report will no longer be valid and any further use of, or reliance upon the report in those circumstances by the client without Earth Environmental & Geotechnical Ltd review and advice shall be at the client's sole and own risk.

The report was written in 2021 and should be read considering any subsequent changes in legislation, statutory requirements, and industry best practices. Ground conditions can also change over time and further investigations, or assessment should be made if there is any significant delay in acting on the findings of this report. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of Earth Environmental & Geotechnical Ltd. In the absence of such written advice of Earth Environmental & Geotechnical Ltd, reliance on the report in the future shall be at the client's own and sole risk. Should Earth Environmental & Geotechnical Ltd be requested to review the report in the future, Earth Environmental & Geotechnical Ltd shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between Earth Environmental & Geotechnical Ltd and the client.

The observations and conclusions described in this report are based solely upon the services that were provided pursuant to the agreement between the client and Earth Environmental & Geotechnical Ltd. Earth Environmental & Geotechnical Ltd has not performed any observations, investigations, studies or testing not specifically set out or mentioned within this report.

Earth Environmental & Geotechnical Ltd is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, Earth Environmental & Geotechnical Ltd did not seek to evaluate the presence on or off the site of electromagnetic fields, lead paint, radon gas or other radioactive materials.

The services are based upon Earth Environmental & Geotechnical Ltd observations of existing physical conditions at the site gained from a walkover survey of the site together with Earth Environmental & Geotechnical Ltd interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The findings and recommendations contained in this report are based in part upon information provided by third parties, and whilst Earth Environmental & Geotechnical Ltd have no reason to doubt the accuracy and that it has been provided in full of those it was requested from, the items relied on have not been verified.

No responsibility can be accepted for errors within third party items presented in this report. Further Earth Environmental & Geotechnical Ltd was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the services. Earth Environmental & Geotechnical Ltd is not liable for any inaccurate information, misrepresentation of data or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to Earth Environmental & Geotechnical Ltd and including the doing of any independent investigation of the information provided to Earth Environmental & Geotechnical Ltd save as otherwise provided in the terms of the contract between the client and Earth Environmental & Geotechnical Ltd.

Where field investigations have been carried out these have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions can also be variable and as investigation excavations only allow examination of the ground at discrete locations. The potential exists for ground conditions to be encountered which are different to those considered in this report. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition, chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and Earth Environmental & Geotechnical Ltd] based on an understanding of the available operational and historical information, and it should not be inferred that other chemical species are not present.

The groundwater conditions entered on the exploratory hole records are those observed at the time of investigation. The normal speed of investigation usually does not permit the recording of an equilibrium water level for any one water strike. Moreover, groundwater levels are subject to seasonal variation or changes in local drainage conditions and higher groundwater levels may occur at other times of the year than were recorded during this investigation.

Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan but is (are) used to present the general relative locations of features on, and surrounding, the site.

Appendix D – Exploratory Hole Logs

Borehole Log

WS1

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
WS	333728.40	349925.56	72.13	1:25

Project Name	Project No.	Start Date	End Date
Carbana Wrexham	4495	2024-11-21	2024-11-21

Client
Carbana Group

Contractor
RP Drilling Ltd

Consultant
Geo2

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Samples and Tests: Type/ Ref	Samples and Tests: Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Strata: Description
						(0.50)		MADE GROUND: Brown sandy cobbley GRAVEL, medium to coarse, subrounded to subangular of mixed lithologies and brick.
		0.50	PID	0.00	71.63	0.50		MADE GROUND: Soft dark brown/grey sandy gravelly SILT.
						(0.50)		
		1.00	SPT	N=50 (2,6/32,18 for 20mm)	71.13	1.00		*End of Borehole at 1.00m*

Remarks
Refusal on hard surface at 1.0m bgl

Method, Plant, Stability, Dimensions

Logger

Borehole Log

WS1

SUPPLEMENTARY INFO

Hole Type	Easting	Northing	Ground Level (m)	Scale
WS	333728.40	349925.56	72.13	1:25

Project Name	Project No.	Start Date	End Date
Carbana Wrexham	4495	2024-11-21	2024-11-21

Client	Contractor	Consultant
Carbana Group	RP Drilling Ltd	Geo2

SPT - Details

Top Depth (m)	Type	Results	Casing Depth (m)	Water Depth (m)	Hammer Serial No.	Energy Ratio
1.00	S	N=50 (2,6/32,18 for 20mm)				

Remarks

Refusal on hard surface at 1.0m bgl

Method, Plant, Stability, Dimensions **Logger**

Borehole Log

WS2

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
WS	333733.32	349926.60	72.17	1:25

Project Name	Project No.	Start Date	End Date
Carbana Wrexham	4495	2024-11-21	2024-11-21

Client
Carbana Group

Contractor
RP Drilling Ltd

Consultant
Geo2

Inst/ Backfill	Water Levels	Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Legend	Description
		0.00	PID	1.50	72.07	(0.10) 0.10		MADE GROUND: Firm black gravelly SILT, fine to medium, subangular gravels with organics present.
								MADE GROUND: Brown sandy cobbley GRAVEL, medium to coarse, subrounded to subangular of mixed lithologies and brick
						(1.30)		
		1.00	SPT	N=14 (2,4/4,4,4,2)				
		1.00	ES					
					70.77	1.40		Soft brown gravelly CLAY, fine to coarse, subrounded to subangular of mixed lithologies. Becoming firmer.
		1.50	PID	0.00				
						(0.50)		
	▽				70.27	1.90		Stiff to very stiff gravelly CLAY, fine to medium, subrounded of mixed lithologies, becoming gravellier.
		2.00	SPT	N=10 (6,6/2,2,3,3)				Water strike (2.00m)
						(1.10)		
		2.50	PID	0.00				
		3.00	SPT	N=28 (3,4/6,6,6,10)	69.17	3.00		Brown clayey GRAVEL, coarse, rounded to subrounded bedrock gravels with stiff clay matrix.
						(0.70)		
		3.50	PID	0.00				
		3.70	SPT	N=50 (9,9/16,16,12,6 for 60mm)	68.47	3.70		*End of Borehole at 3.70m*

Remarks

Method, Plant, Stability, Dimensions

Logger

Borehole Log

WS2

SUPPLEMENTARY INFO

Hole Type	Easting	Northing	Ground Level (m)	Scale
WS	333733.32	349926.60	72.17	1:25

Project Name	Project No.	Start Date	End Date
Carbana Wrexham	4495	2024-11-21	2024-11-21

Client	Contractor	Consultant
Carbana Group	RP Drilling Ltd	Geo2

Water Strike - General

Struck (m)	Seal Depth (m)	Casing Depth (m)	Date and Time	Remarks
2.00				

Water Strike - Details

Struck (m)	Rose To (m)	Time (mins)	Remarks
2.00			

SPT - Details

Top Depth (m)	Type	Results	Casing Depth (m)	Water Depth (m)	Hammer Serial No.	Energy Ratio
1.00	S	N=14 (2,4/4,4,4,2)				
2.00	S	N=10 (6,6/2,2,3,3)				
3.00	S	N=28 (3,4/6,6,6,10)				
3.70	S	N=50 (9,9/16,16,12,6 for ...				

Remarks

Method, Plant, Stability, Dimensions **Logger**

Borehole Log

WS3

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
WS	333726.74	349938.42	72.14	1:25

Project Name	Project No.	Start Date	End Date
Carbana Wrexham	4495	2024-11-21	2024-11-21

Client
Carbana Group

Contractor
RP Drilling Ltd

Consultant
Geo2

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
						(0.20)		CONCRETE
					71.94	0.20		MADE GROUND: Stiff red/black gravelly SILT, fine to coarse, subangular to angular of brick, mudstone and mixed lithologies
						(0.30)		
		0.50 0.50	PID ES	1.30	71.64	0.50		MADE GROUND: Red GRAVEL, fine to coarse, subangular to angular of mixed lithologies and brick.
						(0.50)		
					71.14	1.00		Brown silty SAND
						(0.20)		
					70.94	1.20		Soft dark brown gravelly SILT, medium to coarse, subrounded with occasional angular cobbles.
		1.50	PID	1.50				
		2.50	PID	2.30		(2.80)		
	▽							
		3.50	PID	1.40				
					68.14	4.00		*End of Borehole at 4.00m*

Remarks

Method, Plant, Stability, Dimensions

Logger

Borehole Log

WS3

SUPPLEMENTARY INFO

Hole Type	Easting	Northing	Ground Level (m)	Scale
WS	333726.74	349938.42	72.14	1:25

Project Name	Project No.	Start Date	End Date
Carbana Wrexham	4495	2024-11-21	2024-11-21

Client	Contractor	Consultant
Carbana Group	RP Drilling Ltd	Geo2

Water Strike - General

Struck (m)	Seal Depth (m)	Casing Depth (m)	Date and Time	Remarks
3.00				

Water Strike - Details

Struck (m)	Rose To (m)	Time (mins)	Remarks
3.00			

Remarks

Method, Plant, Stability, Dimensions **Logger**

Borehole Log

WS4

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
WS	333737.50	349949.82	71.82	1:25

Project Name	Project No.	Start Date	End Date
Carbana Wrexham	4495	2024-11-21	2024-11-21

Client
Carbana Group

Contractor
RP Drilling Ltd

Consultant
Geo2

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
						(0.20)		CONCRETE
					71.62	0.20		MADE GROUND: Grey/red silty sandy cobbley GRAVEL, medium to coarse, subangular to angular of mixed lithologies and brick.
		0.50	PID	2.20				
						(0.80)		
		1.00	SPT	N=3 (1,0/1,1,0,1)	70.82	1.00		MADE GROUND: Firm brown gravelly SILT, subangular, fine to medium of mixed lithologies and brick
						(0.70)		
		1.50	PID	1.40				
	▽				70.12	1.70		Dark grey silty GRAVEL, fine to coarse, rounded to subrounded of mixed lithologies.
		2.00	SPT	N=0 (1,0/0,0,0,0)				
		2.50	PID	14.80				
						(2.10)		
		3.00	SPT	N=0 (0,1/0,0,0,0)				
		3.50	PID	13.70				
					68.02	3.80		Dark grey firm gravelly SILT, fine to coarse, rounded to subrounded of mixed lithologies with mild hydrocarbon odour
		4.00 4.00	SPT ES	N=0 (0,1/0,0,0,0)				
						(1.20)		
		4.50	PID	16.30				
		5.00	SPT	N=3 (1,1/1,0,1,1)	66.82	5.00		*End of Borehole at 5.00m*

Remarks

Method, Plant, Stability, Dimensions

Logger

Borehole Log

WS4

SUPPLEMENTARY INFO

Hole Type	Easting	Northing	Ground Level (m)	Scale
WS	333737.50	349949.82	71.82	1:25

Project Name	Project No.	Start Date	End Date
Carbana Wrexham	4495	2024-11-21	2024-11-21

Client	Contractor	Consultant
Carbana Group	RP Drilling Ltd	Geo2

Water Strike - General

Struck (m)	Seal Depth (m)	Casing Depth (m)	Date and Time	Remarks
1.70				

Water Strike - Details

Struck (m)	Rose To (m)	Time (mins)	Remarks
1.70			

SPT - Details

Top Depth (m)	Type	Results	Casing Depth (m)	Water Depth (m)	Hammer Serial No.	Energy Ratio
1.00	S	N=3 (1,0/1,1,0,1)				
2.00	S	N=0 (1,0/0,0,0,0)				
3.00	S	N=0 (0,1/0,0,0,0)				
4.00	S	N=0 (0,1/0,0,0,0)				
5.00	S	N=3 (1,1/1,0,1,1)				

Remarks

Method, Plant, Stability, Dimensions **Logger**

Borehole Log

WS5

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
WS	333746.21	349938.92	71.82	1:25

Project Name	Project No.	Start Date	End Date
Carbana Wrexham	4495	2024-11-21	2024-11-21

Client
Carbana Group

Contractor
RP Drilling Ltd

Consultant
Geo2

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
					71.82	(0.20)		CONCRETE
					71.62	0.20		MADE GROUND: Grey/brown silty sandy GRAVEL, medium to coarse, subrounded to angular of mixed lithologies and brick
		0.50 0.50	PID ES	0.10				
						(1.50)		
		1.50	PID	0.30				
					70.12	1.70		MADE GROUND: Drk grey soft sandy gravelly SILT, fine to medium, subrounded to subangular of mixed litholoigies.
						(0.30)		
					69.82	2.00		Soft to firm brown gravelly cobbly CLAY, fine to coarse, rounded to subrounded gravels of mixed lithologies. Limited Recovery (2.00 - 3.00m)
		2.50	PID	3.10				
	▽					(2.00)		Water strike (3.00m)
		3.50	PID	0.30				
					67.82	4.00		Brown sandy cobbly GRAVEL, medium to coarse, rounded to subrounded of bedrock.
		4.50	PID	0.50		(1.00)		
					66.82	5.00		*End of Borehole at 5.00m*

Remarks

Method, Plant, Stability, Dimensions

Logger

Borehole Log

WS5

SUPPLEMENTARY INFO

Hole Type	Easting	Northing	Ground Level (m)	Scale
WS	333746.21	349938.92	71.82	1:25

Project Name	Project No.	Start Date	End Date
Carbana Wrexham	4495	2024-11-21	2024-11-21

Client	Contractor	Consultant
Carbana Group	RP Drilling Ltd	Geo2

Water Strike - General

Struck (m)	Seal Depth (m)	Casing Depth (m)	Date and Time	Remarks
3.00				

Water Strike - Details

Struck (m)	Rose To (m)	Time (mins)	Remarks
3.00			

Remarks

Method, Plant, Stability, Dimensions **Logger**

Borehole Log

WS7

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
WS	333755.73	349938.78	71.90	1:25

Project Name	Project No.	Start Date	End Date
Carbana Wrexham	4495	2024-11-21	2024-11-21

Client
Carbana Group

Contractor
RP Drilling Ltd

Consultant
Geo2

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
						(0.20)		CONCRETE
					71.70	0.20		MADE GROUND: Red/brown gravelly COBBLES of brick and mixed lithologies.
						(0.20)		
					71.50	0.40		MADE GROUND: Black sandy GRAVEL, fine, subrounded to subangular gravels with low density.
		0.50	PID	1.00				
		1.00 1.00	SPT ES	N=0 (1,0/0,0,0,0)		(1.40)		
		1.50	PID	0.90				
					70.10	1.80		MADE GROUND: Red/brown sandy GRAVEl, fine to coarse, subrounded to angular of mixed lithologies and brick.
						(0.20)		
		2.00	SPT	N=8 (1,1/1,2,2,3)	69.90	2.00		Soft brown gravelly cobbly SILT. Medium to coarse, subrounded bedrock with mild hydrocarbon odour and sheen
		2.50	PID	2.20		(1.00)		
		3.00	SPT	N=50 (10,8/13,13,11,13 for 60mm)	68.90	3.00		*End of Borehole at 3.00m*

Remarks

Method, Plant, Stability, Dimensions

Logger

Borehole Log

WS7

SUPPLEMENTARY INFO

Hole Type	Easting	Northing	Ground Level (m)	Scale
WS	333755.73	349938.78	71.90	1:25

Project Name	Project No.	Start Date	End Date
Carbana Wrexham	4495	2024-11-21	2024-11-21

Client	Contractor	Consultant
Carbana Group	RP Drilling Ltd	Geo2

SPT - Details

Top Depth (m)	Type	Results	Casing Depth (m)	Water Depth (m)	Hammer Serial No.	Energy Ratio
1.00	S	N=0 (1,0/0,0,0,0)				
2.00	S	N=8 (1,1/1,2,2,3)				
3.00	S	N=50 (10,8/13,13,11,13 fo...				

Remarks

Method, Plant, Stability, Dimensions **Logger**

Borehole Log

WS9

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
WS	333740.42	349940.14	71.81	1:25

Project Name	Project No.	Start Date	End Date
Carbana Wrexham	4495	2024-11-21	2024-11-21

Client
Carbana Group

Contractor
RP Drilling Ltd

Consultant
Geo2

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
						(0.20)		CONCRETE
					71.61	0.20		MADE GROUND: Black sandy GRAVEL, fine, subrounded to subangular of mixed lithiologies and satined.
		0.50	PID	0.90		(0.40)		
					71.21	0.60		MADE GROUND: Brown sandy cobbley GRAVEL, medium to coarse, subrounded to subangular of mixed lithologies and brick
						(0.40)		
					70.81	1.00		Soft brown gravelly CLAY, fine to coarse, subrounded to subangular of mixed lithologies. Occasional cobbles.
		1.50	PID	0.00				
						(1.70)		
		2.50	PID	0.00				
					69.11	2.70		Brown/grey sandy GRAVEL. Black stained gravels, strong hydrocarbon odour and sheen with occasional cobbles
	▽							Water strike (3.00m)
						(1.30)		
		3.50	PID	0.00				
		4.00 4.00	PID ES	60.30	67.81	4.00		*End of Borehole at 4.00m*

Remarks

Method, Plant, Stability, Dimensions

Logger

Borehole Log

WS9

SUPPLEMENTARY INFO

Hole Type	Easting	Northing	Ground Level (m)	Scale
WS	333740.42	349940.14	71.81	1:25

Project Name	Project No.	Start Date	End Date
Carbana Wrexham	4495	2024-11-21	2024-11-21

Client	Contractor	Consultant
Carbana Group	RP Drilling Ltd	Geo2

Water Strike - General

Struck (m)	Seal Depth (m)	Casing Depth (m)	Date and Time	Remarks
3.00				

Water Strike - Details

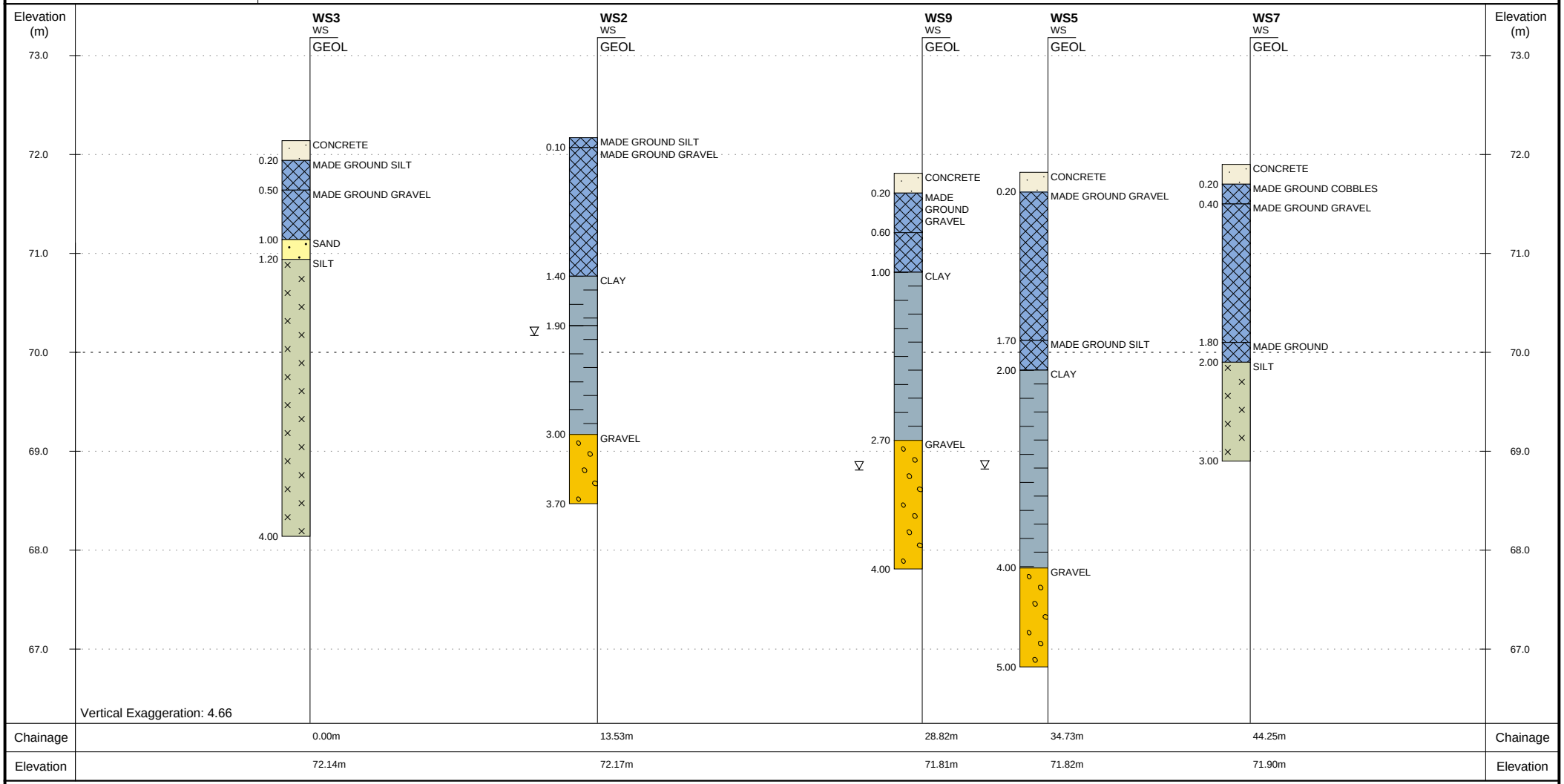
Struck (m)	Rose To (m)	Time (mins)	Remarks
3.00			

Remarks

Method, Plant, Stability, Dimensions **Logger**

Draft CS

Project Name	Project No.	Vertical Scale	Horizontal Scale
Carbana Wrexham	4495	1:57	1:264
Client	**Contractor**	**Consultant**	



MADE GROUND | CONCRETE | CLAY | SILT | SAND | GRAVEL

WATER LEVELS

REST

STRIKE

Created using Pebble Geo

Appendix E – Environmental Testing Results

envirolab
Hattersley Science & Technology Park
Stockport Road, Hattersley, SK14 3QU

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 24/11176
Issue Number: 1 **Date:** 26 November, 2024

Client:
Geo2 Remediation Ltd
Coniston House,
Louisa Street
Bradford
BD10 8NE

Project Manager: Adam Wilson/Peter Phillips
Project Name: Salop Road (SR)
Project Ref: 4495
Order No: 4495/lab
Date Samples Received: 13/11/24
Date Instructions Received: 18/11/24
Date Analysis Completed: 26/11/24

Approved by:



Richard Wong
Client Manager

UKAS TESTING
1247

Envirolab Job Number: 24/11176

Client Project Name: Salop Road (SR)

Client Project Ref: 4495

Lab Sample ID	24/11176/1	24/11176/2	24/11176/3	24/11176/4				Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	Upstream	Downstream	Well	EX1						
Depth to Top										
Depth To Bottom										
Date Sampled	11-Nov-24	11-Nov-24	11-Nov-24	11-Nov-24						
Sample Type	WATER - SW	WATER - SW	WATER - EW	WATER - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
pH (w)$_{A}^{\#}$	7.80	7.87	7.14	6.96				pH	0.01	A-T-031w
Arsenic (dissolved)$_{A}^{\#}$	<1	<1	8	11				µg/l	1	A-T-025w
Boron (dissolved)$_{A}^{\#}$	61	63	27	<100				µg/l	10	A-T-025w
Barium (dissolved)$_{A}^{\#}$	59	59	43	515				µg/l	1	A-T-025w
Beryllium (dissolved)$_{A}^{\#}$	<1	<1	<1	<10				µg/l	1	A-T-025w
Cadmium (dissolved)$_{A}^{\#}$	<0.2	<0.2	<0.2	<2.0				µg/l	0.2	A-T-025w
Copper (dissolved)$_{A}^{\#}$	<4	<4	<4	<40				µg/l	4	A-T-025w
Chromium (dissolved)$_{A}^{\#}$	2	6	4	<10				µg/l	1	A-T-025w
Chromium (hexavalent) (w)$_{A}^{\#}$	<0.01	<0.01	<0.01	<0.01				mg/l	0.01	A-T-040w
Chromium (trivalent) (w)	<0.01	<0.01	<0.01	<0.01				mg/l	0.01	Calc
Lead (dissolved)$_{A}^{\#}$	<1	<1	1	41				µg/l	1	A-T-025w
Mercury (dissolved)$_{A}^{\#}$	<0.1	<0.1	<0.1	<1.0				µg/l	0.1	A-T-025w
Nickel (dissolved)$_{A}^{\#}$	<2	<2	<2	<20				µg/l	2	A-T-025w
Selenium (dissolved)$_{A}^{\#}$	<1	<1	<1	<10				µg/l	1	A-T-025w
Vanadium (dissolved)$_{A}^{\#}$	<1	<1	<1	30				µg/l	1	A-T-025w
Zinc (dissolved)$_{A}^{\#}$	<2	<2	40	290				µg/l	2	A-T-025w

Envirolab Job Number: 24/11176

Client Project Name: Salop Road (SR)

Client Project Ref: 4495

Lab Sample ID	24/11176/1	24/11176/2	24/11176/3	24/11176/4				Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	Upstream	Downstream	Well	EX1						
Depth to Top										
Depth To Bottom										
Date Sampled	11-Nov-24	11-Nov-24	11-Nov-24	11-Nov-24						
Sample Type	WATER - SW	WATER - SW	WATER - EW	WATER - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
SVOC (w)										
1,2,4-Trichlorobenzene$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
1,2-Dichlorobenzene$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
1,3-Dichlorobenzene$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
1,4-Dichlorobenzene$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
2,4,5-Trichlorophenol$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
2,4,6-Trichlorophenol$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
2,4-Dichlorophenol$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
2,4-Dimethylphenol$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
2,4-Dinitrotoluene$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
2,6-Dinitrotoluene$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
2-Chloronaphthalene$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
2-Chlorophenol$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
2-Methylnaphthalene$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
2-Methylphenol$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
2-Nitrophenol$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
4-Bromophenyl phenyl ether$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
4-Chloro-3-methylphenol$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Bis(2-chloroisopropyl)ether$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
3+4-Methylphenol$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
4-Nitrophenol$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Acenaphthene$_A$	<1	<1	<1	16				µg/l	1	A-T-052w
Acenaphthylene$_A$	<1	<1	<1	1				µg/l	1	A-T-052w
Anthracene$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Bis(2-chloroethyl)ether$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Bis(2-chloroethoxy)methane$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Bis(2-ethylhexyl)phthalate$_A$	<10	<10	<10	<10				µg/l	10	A-T-052w
Benzo(a)anthracene$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Butylbenzyl phthalate$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Benzo(b)fluoranthene$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Benzo(k)fluoranthene$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Benzo(a)pyrene$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Benzo(ghi)perylene$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w

Envirolab Job Number: 24/11176

Client Project Name: Salop Road (SR)

Client Project Ref: 4495

Lab Sample ID	24/11176/1	24/11176/2	24/11176/3	24/11176/4				Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	Upstream	Downstream	Well	EX1						
Depth to Top										
Depth To Bottom										
Date Sampled	11-Nov-24	11-Nov-24	11-Nov-24	11-Nov-24						
Sample Type	WATER - SW	WATER - SW	WATER - EW	WATER - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
Carbazole$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Chrysene$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Dibenzofuran$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
n-Dibutylphthalate$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
n-Dioctylphthalate$_A$	<10	<10	<10	<10				µg/l	10	A-T-052w
n-Nitroso-n-dipropylamine$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Diethyl phthalate$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Dimethyl phthalate$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Dibenzo(ah)anthracene$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Fluorene$_A$	<1	<1	<1	3				µg/l	1	A-T-052w
Fluoranthene$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Hexachlorobutadiene$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Hexachlorobenzene SVOC$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Pentachlorophenol SVOC$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Phenol$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Hexachloroethane$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Nitrobenzene$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Naphthalene$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Isophorone$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Phenanthrene$_A$	<1	<1	<1	1				µg/l	1	A-T-052w
Pyrene$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Indeno(1,2,3-cd)pyrene$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w
Perylene$_A$	<1	<1	<1	<1				µg/l	1	A-T-052w

Envirolab Job Number: 24/11176

Client Project Name: Salop Road (SR)

Client Project Ref: 4495

Lab Sample ID	24/11176/1	24/11176/2	24/11176/3	24/11176/4				Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	Upstream	Downstream	Well	EX1						
Depth to Top										
Depth To Bottom										
Date Sampled	11-Nov-24	11-Nov-24	11-Nov-24	11-Nov-24						
Sample Type	WATER - SW	WATER - SW	WATER - EW	WATER - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
VOC (w)										
Dichlorodifluoromethane$_{A}$	<1	<1	<1	<1				µg/l	1	A-T-006w
Chloromethane$_{A}$	<10	<10	<10	<10				µg/l	10	A-T-006w
Vinyl Chloride$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-006w
Bromomethane$_{A}^{\#}$	<1^{U}	<1^{U}	<1^{U}	<1^{U}				µg/l	1	A-T-006w
Chloroethane$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-006w
Trichlorofluoromethane$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-006w
trans 1,2-Dichloroethene$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-006w
Dichloromethane$_{A}$	<5	<5	<5	<5				µg/l	5	A-T-006w
Carbon Disulphide$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-006w
1,1-Dichloroethene$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-006w
1,1-Dichloroethane$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-006w
cis 1,2-Dichloroethene$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-006w
Bromochloromethane$_{A}^{\#}$	<5	<5	<5	<5				µg/l	5	A-T-006w
Chloroform$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-006w
2,2-Dichloropropane$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-006w
1,2-Dichloroethane$_{A}^{\#}$	<2	<2	<2	<2				µg/l	2	A-T-006w
1,1,1-Trichloroethane$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-006w
1,1-Dichloropropene$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-006w
Benzene$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-006w
Carbon Tetrachloride$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-006w
Dibromomethane$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-006w
1,2-Dichloropropane$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-006w
Bromodichloromethane$_{A}^{\#}$	<10	<10	<10	<10				µg/l	10	A-T-006w
Trichloroethene$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-006w
cis 1,3-Dichloropropene$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-006w
trans 1,3-Dichloropropene$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-006w
1,1,2-Trichloroethane$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-006w
Toluene$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-006w
1,3-Dichloropropane$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-006w
Dibromochloromethane$_{A}^{\#}$	<3	<3	<3	<3				µg/l	3	A-T-006w
1,2-Dibromoethane$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-006w
Tetrachloroethene$_{A}$	<1	<1	<1	<1				µg/l	1	A-T-006w

Envirolab Job Number: 24/11176

Client Project Name: Salop Road (SR)

Client Project Ref: 4495

Lab Sample ID	24/11176/1	24/11176/2	24/11176/3	24/11176/4				Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	Upstream	Downstream	Well	EX1						
Depth to Top										
Depth To Bottom										
Date Sampled	11-Nov-24	11-Nov-24	11-Nov-24	11-Nov-24						
Sample Type	WATER - SW	WATER - SW	WATER - EW	WATER - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
1,1,1,2-Tetrachloroethane$_A$	<1	<1	<1	<1				µg/l	1	A-T-006w
Chlorobenzene$_A^\#$	<1	<1	<1	<1				µg/l	1	A-T-006w
Ethylbenzene$_A^\#$	<1	<1	<1	11				µg/l	1	A-T-006w
m & p Xylene$_A^\#$	<1	<1	<1	1				µg/l	1	A-T-006w
Bromoform$_A^\#$	<3	<3	<3	<3				µg/l	3	A-T-006w
Styrene$_A^\#$	<1	<1	<1	<1				µg/l	1	A-T-006w
1,1,2,2-Tetrachloroethane$_A$	<1	<1	<1	<1				µg/l	1	A-T-006w
o-Xylene$_A^\#$	<1	<1	<1	7				µg/l	1	A-T-006w
1,2,3-Trichloropropane$_A^\#$	<1	<1	<1	<1				µg/l	1	A-T-006w
Isopropylbenzene$_A^\#$	<1	<1	<1	3				µg/l	1	A-T-006w
Bromobenzene$_A^\#$	<1	<1	<1	<1				µg/l	1	A-T-006w
2-Chlorotoluene$_A^\#$	<1	<1	<1	<1				µg/l	1	A-T-006w
n-propylbenzene$_A^\#$	<1	<1	<1	1				µg/l	1	A-T-006w
4-Chlorotoluene$_A^\#$	<1	<1	<1	<1				µg/l	1	A-T-006w
1,2,4-Trimethylbenzene$_A^\#$	<1	<1	<1	<1				µg/l	1	A-T-006w
4-Isopropyltoluene$_A^\#$	<1	<1	<1	<1				µg/l	1	A-T-006w
1,3,5-Trimethylbenzene$_A^\#$	<1	<1	<1	<1				µg/l	1	A-T-006w
1,2-Dichlorobenzene$_A^\#$	<1	<1	<1	<1				µg/l	1	A-T-006w
1,4-Dichlorobenzene$_A^\#$	<1	<1	<1	<1				µg/l	1	A-T-006w
sec-Butylbenzene$_A^\#$	<1	<1	<1	<1				µg/l	1	A-T-006w
tert-Butylbenzene$_A^\#$	<2	<2	<2	<2				µg/l	2	A-T-006w
1,3-Dichlorobenzene$_A^\#$	<1	<1	<1	<1				µg/l	1	A-T-006w
n-butylbenzene$_A^\#$	<1	<1	<1	<1				µg/l	1	A-T-006w
1,2-Dibromo-3-chloropropane$_A^\#$	<2	<2	<2	<2				µg/l	2	A-T-006w
1,2,4-Trichlorobenzene$_A^\#$	<3	<3	<3	<3				µg/l	3	A-T-006w
1,2,3-Trichlorobenzene$_A^\#$	<3	<3	<3	<3				µg/l	3	A-T-006w
Hexachlorobutadiene$_A^\#$	<1	<1	<1	<1				µg/l	1	A-T-006w

Envirolab Job Number: 24/11176

Client Project Name: Salop Road (SR)

Client Project Ref: 4495

Lab Sample ID	24/11176/1	24/11176/2	24/11176/3	24/11176/4				Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	Upstream	Downstream	Well	EX1						
Depth to Top										
Depth To Bottom										
Date Sampled	11-Nov-24	11-Nov-24	11-Nov-24	11-Nov-24						
Sample Type	WATER - SW	WATER - SW	WATER - EW	WATER - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
TPH CWG (w) with Clean Up										
Ali >C5-C6 (w)$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-022w
Ali >C6-C8 (w)$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-022w
Ali >C8-C10 (w)$_{A}^{\#}$	<5	<5	<5	8				µg/l	5	A-T-055w
Ali >C10-C12 (w)$_{A}^{\#}$	<5	<5	<5	10				µg/l	5	A-T-055w
Ali >C12-C16 (w)$_{A}^{\#}$	<5	<5	<5	<5				µg/l	5	A-T-055w
Ali >C16-C21 (w)$_{A}^{\#}$	<5	<5	<5	<5				µg/l	5	A-T-055w
Ali >C21-C35 (w)$_{A}^{\#}$	<5	<5	<5	16				µg/l	5	A-T-055w
Total Aliphatics (w)$_{A}^{\#}$	<5	<5	<5	34				µg/l	5	Calc-As Recd
Aro >C5-C7 (w)$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-022w
Aro >C7-C8 (w)$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-022w
Aro >C8-C10 (w)$_{A}$	<5	<5	<5	98				µg/l	5	A-T-055w
Aro >C10-C12 (w)$_{A}^{\#}$	<5	<5	<5	326				µg/l	5	A-T-055w
Aro >C12-C16 (w)$_{A}^{\#}$	<5	<5	<5	308				µg/l	5	A-T-055w
Aro >C16-C21 (w)$_{A}^{\#}$	<5	<5	<5	33				µg/l	5	A-T-055w
Aro >C21-C35 (w)$_{A}^{\#}$	<10	<10	<10	<10				µg/l	10	A-T-055w
Total Aromatics (w)$_{A}^{\#}$	<10	<10	<10	765				µg/l	10	Calc-As Recd
TPH (Ali & Aro >C5-C35) (w)$_{A}$	<10	<10	<10	799				µg/l	10	Calc-As Recd
BTEX - Benzene (w)$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-022w
BTEX - Toluene (w)$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-022w
BTEX - Ethyl Benzene (w)$_{A}^{\#}$	<1	<1	<1	11				µg/l	1	A-T-022w
BTEX - m & p Xylene (w)$_{A}^{\#}$	<1	<1	<1	1				µg/l	1	A-T-022w
BTEX - o Xylene (w)$_{A}^{\#}$	<1	<1	<1	9				µg/l	1	A-T-022w
MTBE (w)$_{A}^{\#}$	<1	<1	<1	<1				µg/l	1	A-T-022w

Report Notes

General

•This report shall not be reproduced, except in full, without written approval from Envirolab.
•The client Sample No, Client Sample ID, Depth to top, Depth to Bottom and Date Sampled are all provided by the client and can affect the validity of results.
•The results reported herein relate only to the material supplied to the laboratory.
•The residue of any samples contained within this report, and any received within the same delivery, will be disposed of **four weeks** after the initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of **six months** after the initial Asbestos testing is completed.
•Analytical results reflect the quality of the sample at the time of analysis only.
•Opinions and Interpretations expressed are outside our scope of accreditation.
•A deviating sample report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.
•If a sample is outside of the calibration range or affected by interferences then it may need diluting. This will result in the limit of detection (LOD) being raised.
•Subcontracted Analysis: Please see the appended report for any deviations, current LODs and accreditation status of the test.

Key

Superscript "#"	Accredited to ISO 17025
Superscript "M"	Accredited to MCertS
Superscript "U"	Individual result not accredited
None of the above symbols	Analysis unaccredited
Subscript "A"	Analysis performed on as-received Sample
Subscript "D"	Analysis performed on the dried sample, crushed to pass 2mm sieve.
Subscript "D" on Asbestos	Analysis performed on a dried aliquot of sample provided.
Subscript "^"	Analysis has dependant options against results. Details appear in the comments of your Sample receipt
IS	Insufficient Sample for analysis
US	Unsuitable Sample for analysis
NDP	No Determination Possible
NAD	No Asbestos Detected
Trace	Asbestos found not suitable for Gravimetric Quantification – not enough to accurately weigh.
N/A	Not applicable

Asbestos

Identification: Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis
"Trace Asbestos Identified" will be reported if there is not enough present to verify the type.
Quantification: Generally a 2 stage process including visual identification, hand picking and weighing, and fibre counting. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres). "TRACE" will be reported as a quantification result.
PLEASE INFORM THE LABORATORY IF YOU WOULD LIKE THE STAGE 3 SEDIMENTATION PROCESS CARRIED OUT. Note this will be subcontracted.

Assigned Matrix Codes

1	SAND	6	CLAY/LOAM	A	Contains Stones
2	LOAM	7	OTHER	B	Contains Construction Rubble
3	CLAY	8	Asbestos Bulk (Only Asbestos ID accredited)	C	Contains visible hydrocarbons
4	LOAM/SAND	9	Incinerator Ash (some Metals accredited)	D	Contains glass / metal
5	SAND/CLAY			E	Contains roots / twigs
Note: 7,8,9 matrices are not covered by our ISO 17025 or MCertS accreditation, unless stated above.					

Soil Chemical Analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH by method A-T-007:
For waters, free and visible oils are excluded from the sample used for analysis, so the reported result represents the dissolved phase only.
Results "with Clean up" indicates samples cleaned up with Silica during extraction.

EPH CWG (method A-T-055) from TPH CWG:
EPH CWG results have humics mathematically subtracted through instrument calculation.
Where these humic substances have been identified in any IDs from "TPH CWG with clean up" please note that the concentration is **NOT** included in the quantified results but present in the ID for information.

Electrical Conductivity of water by method A-T-037:
Results greater than 12900µS/cm @ 25^0C / 11550µS/cm @ 20^0C fall outside the calibration range and as such are unaccredited.

Please contact your client manager if you require any further information.

Envirolab Deviating Samples Report

Hattersley Science & Technology Park, Stockport Road, Hattersley, SK14 3QU
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: Geo2 Remediation Ltd, Coniston House,, Louisa Street, Bradford, BD10 8NE

Project No: 24/11176

Date Received: 18/11/2024 (am)

Project: Salop Road (SR)

Cool Box Temperatures (°C): 11.2

Clients Project No: 4495

Lab Sample ID	24/11176/1	24/11176/2	24/11176/3	24/11176/4
Client Sample No				
Client Sample ID/Depth	Upstream	Downstream	Well	EX1
Date Sampled	11/11/24	11/11/24	11/11/24	11/11/24
Deviation Code				
A7 (no HNO3)	✓	✓	✓	✓
F	✓	✓	✓	✓

Key

A7 (no HNO3) *No HNO3 preserved bottle provided (dissolved metals will be deviating)*

F *Maximum holding time exceeded between sampling date and analysis for analytes listed below*

HOLDING TIME EXCEEDANCES

Lab Sample ID	24/11176/1	24/11176/2	24/11176/3	24/11176/4
Client Sample No				
Client Sample ID/Depth	Upstream	Downstream	Well	EX1
Date Sampled	11/11/24	11/11/24	11/11/24	11/11/24
pH (w)	✓	✓	✓	✓

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Envirolab Analysis Dates

Lab Sample ID	24/11176/1	24/11176/2	24/11176/3	24/11176/4
Client Sample No				
Client Sample ID/Depth	Upstream	Downstream	Well	EX1
Date Sampled	11/11/24	11/11/24	11/11/24	11/11/24
A-T-006w	19/11/2024	19/11/2024	19/11/2024	19/11/2024
A-T-022w	19/11/2024	19/11/2024	19/11/2024	19/11/2024
A-T-025w	26/11/2024	26/11/2024	26/11/2024	26/11/2024
A-T-031w	20/11/2024	20/11/2024	20/11/2024	20/11/2024
A-T-040w	18/11/2024	18/11/2024	18/11/2024	18/11/2024
A-T-052w	21/11/2024	21/11/2024	21/11/2024	21/11/2024
A-T-055w	20/11/2024	20/11/2024	20/11/2024	20/11/2024
Calc	21/11/2024	21/11/2024	21/11/2024	21/11/2024
Calc-As Recd	20/11/2024	20/11/2024	20/11/2024	20/11/2024

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

End of Report

envirolab
Hattersley Science & Technology Park
Stockport Road, Hattersley, SK14 3QU

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 24/11441
Issue Number: 1 **Date:** 02 December, 2024

Client:
Geo2 Remediation Ltd
Coniston House,
Louisa Street
Bradford
BD10 8NE

Project Manager: Adam Ridsdale/Adam Wilson
Project Name: Wrexham
Project Ref: 4495
Order No: 3349
Date Samples Received: 22/11/24
Date Instructions Received: 25/11/24
Date Analysis Completed: 02/12/24

Approved by:



Richard Wong
Client Manager

UKAS TESTING
1247

Envirolab Job Number: 24/11441

Client Project Name: Wrexham

Client Project Ref: 4495

Lab Sample ID	24/11441/1	24/11441/2	24/11441/3					Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS2	WS3	WS9							
Depth to Top										
Depth To Bottom										
Date Sampled	21-Nov-24	21-Nov-24	21-Nov-24							
Sample Type	WATER - EW	WATER - EW	WATER - EW							
Sample Matrix Code	N/A	N/A	N/A							
pH (w)$_{A}^{\#}$	7.50	7.82	8.72					pH	0.01	A-T-031w
Arsenic (dissolved)$_{A}^{\#}$	42	10	5					µg/l	1	A-T-025w
Boron (dissolved)$_{A}^{\#}$	156	126	49					µg/l	10	A-T-025w
Barium (dissolved)$_{A}^{\#}$	985	564	58					µg/l	1	A-T-025w
Beryllium (dissolved)$_{A}^{\#}$	<5	<1	<1					µg/l	1	A-T-025w
Cadmium (dissolved)$_{A}^{\#}$	2.4	0.7	<0.2					µg/l	0.2	A-T-025w
Copper (dissolved)$_{A}^{\#}$	55	20	<4					µg/l	4	A-T-025w
Chromium (dissolved)$_{A}^{\#}$	18	3	8					µg/l	1	A-T-025w
Chromium (hexavalent) (w)$_{A}^{\#}$	<0.01	<0.01	<0.01					mg/l	0.01	A-T-040w
Chromium (trivalent) (w)	0.02	<0.01	<0.01					mg/l	0.01	Calc
Lead (dissolved)$_{A}^{\#}$	420	188	7					µg/l	1	A-T-025w
Mercury (dissolved)$_{A}^{\#}$	<0.5	<0.1	<0.1					µg/l	0.1	A-T-025w
Nickel (dissolved)$_{A}^{\#}$	29	7	<2					µg/l	2	A-T-025w
Selenium (dissolved)$_{A}^{\#}$	6	2	2					µg/l	1	A-T-025w
Vanadium (dissolved)$_{A}^{\#}$	29	8	9					µg/l	1	A-T-025w
Zinc (dissolved)$_{A}^{\#}$	257	24	3					µg/l	2	A-T-025w

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Client Sample ID	WS2	WS3	WS9							
Depth to Top										
Depth To Bottom										
Date Sampled	21-Nov-24	21-Nov-24	21-Nov-24							
Sample Type	WATER - EW	WATER - EW	WATER - EW							
Sample Matrix Code	N/A	N/A	N/A							
SVOC (w)										
1,2,4-Trichlorobenzene$_A$	<10	<10	<1					µg/l	1	A-T-052w
1,2-Dichlorobenzene$_A$	<10	<10	<1					µg/l	1	A-T-052w
1,3-Dichlorobenzene$_A$	<10	<10	<1					µg/l	1	A-T-052w
1,4-Dichlorobenzene$_A$	<10	<10	<1					µg/l	1	A-T-052w
2,4,5-Trichlorophenol$_A$	<10	<10	<1					µg/l	1	A-T-052w
2,4,6-Trichlorophenol$_A$	<10	<10	<1					µg/l	1	A-T-052w
2,4-Dichlorophenol$_A$	<10	<10	<1					µg/l	1	A-T-052w
2,4-Dimethylphenol$_A$	<10	<10	<1					µg/l	1	A-T-052w
2,4-Dinitrotoluene$_A$	<10	<10	<1					µg/l	1	A-T-052w
2,6-Dinitrotoluene$_A$	<10	<10	<1					µg/l	1	A-T-052w
2-Chloronaphthalene$_A$	<10	<10	<1					µg/l	1	A-T-052w
2-Chlorophenol$_A$	<10	<10	<1					µg/l	1	A-T-052w
2-Methylnaphthalene$_A$	>997	61	645					µg/l	1	A-T-052w
2-Methylphenol$_A$	<10	<10	<1					µg/l	1	A-T-052w
2-Nitrophenol$_A$	<10	<10	<1					µg/l	1	A-T-052w
4-Bromophenyl phenyl ether$_A$	<10	<10	<1					µg/l	1	A-T-052w
4-Chloro-3-methylphenol$_A$	<10	<10	<1					µg/l	1	A-T-052w
Bis(2-chloroisopropyl)ether$_A$	<10	<10	<1					µg/l	1	A-T-052w
3+4-Methylphenol$_A$	<10	<10	<1					µg/l	1	A-T-052w
4-Nitrophenol$_A$	<10	<10	<1					µg/l	1	A-T-052w
Acenaphthene$_A$	>431	15	126					µg/l	1	A-T-052w
Acenaphthylene$_A$	93	<10	<1					µg/l	1	A-T-052w
Anthracene$_A$	172	<10	<1					µg/l	1	A-T-052w
Bis(2-chloroethyl)ether$_A$	<10	<10	<1					µg/l	1	A-T-052w
Bis(2-chloroethoxy)methane$_A$	<10	<10	<1					µg/l	1	A-T-052w
Bis(2-ethylhexyl)phthalate$_A$	<100	<100	<10					µg/l	10	A-T-052w
Benzo(a)anthracene$_A$	56	<10	<1					µg/l	1	A-T-052w
Butylbenzyl phthalate$_A$	<10	<10	<1					µg/l	1	A-T-052w
Benzo(b)fluoranthene$_A$	23	<10	<1					µg/l	1	A-T-052w
Benzo(k)fluoranthene$_A$	<10	<10	<1					µg/l	1	A-T-052w
Benzo(a)pyrene$_A$	29	<10	<1					µg/l	1	A-T-052w
Benzo(ghi)perylene$_A$	<10	<10	<1					µg/l	1	A-T-052w

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Client Sample No										
Client Sample ID	WS2	WS3	WS9							
Depth to Top										
Depth To Bottom										
Date Sampled	21-Nov-24	21-Nov-24	21-Nov-24							
Sample Type	WATER - EW	WATER - EW	WATER - EW							
Sample Matrix Code	N/A	N/A	N/A							
Carbazole$_A$	11	<10	<1					µg/l	1	A-T-052w
Chrysene$_A$	48	<10	<1					µg/l	1	A-T-052w
Dibenzofuran$_A$	70	<10	10					µg/l	1	A-T-052w
n-Dibutylphthalate$_A$	<10	<10	<1					µg/l	1	A-T-052w
n-Dioctylphthalate$_A$	<100	<100	<10					µg/l	10	A-T-052w
n-Nitroso-n-dipropylamine$_A$	<10	<10	<1					µg/l	1	A-T-052w
Diethyl phthalate$_A$	<10	<10	<1					µg/l	1	A-T-052w
Dimethyl phthalate$_A$	<10	<10	<1					µg/l	1	A-T-052w
Dibenzo(ah)anthracene$_A$	<10	<10	<1					µg/l	1	A-T-052w
Fluorene$_A$	>430	<10	50					µg/l	1	A-T-052w
Fluoranthene$_A$	108	<10	<1					µg/l	1	A-T-052w
Hexachlorobutadiene$_A$	<10	<10	<1					µg/l	1	A-T-052w
Hexachlorobenzene SVOC$_A$	<10	<10	<1					µg/l	1	A-T-052w
Pentachlorophenol SVOC$_A$	<10	<10	<1					µg/l	1	A-T-052w
Phenol$_A$	<10	<10	<1					µg/l	1	A-T-052w
Hexachloroethane$_A$	<10	<10	<1					µg/l	1	A-T-052w
Nitrobenzene$_A$	<10	<10	<1					µg/l	1	A-T-052w
Naphthalene$_A$	151	52	591					µg/l	1	A-T-052w
Isophorone$_A$	<10	<10	<1					µg/l	1	A-T-052w
Phenanthrene$_A$	>362	<10	38					µg/l	1	A-T-052w
Pyrene$_A$	157	<10	<1					µg/l	1	A-T-052w
Indeno(1,2,3-cd)pyrene$_A$	<10	<10	<1					µg/l	1	A-T-052w
Perylene$_A$	<10	<10	<1					µg/l	1	A-T-052w

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Client Sample No										
Client Sample ID	WS2	WS3	WS9							
Depth to Top										
Depth To Bottom										
Date Sampled	21-Nov-24	21-Nov-24	21-Nov-24							
Sample Type	WATER - EW	WATER - EW	WATER - EW							
Sample Matrix Code	N/A	N/A	N/A							
VOC (w)										
Dichlorodifluoromethane$_A$	<1	<1	<1					µg/l	1	A-T-006w
Chloromethane$_A$	<10	<10	<10					µg/l	10	A-T-006w
Vinyl Chloride$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-006w
Bromomethane$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-006w
Chloroethane$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-006w
Trichlorofluoromethane$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-006w
trans 1,2-Dichloroethene$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-006w
Dichloromethane$_A$	<5	<5	<5					µg/l	5	A-T-006w
Carbon Disulphide$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-006w
1,1-Dichloroethene$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-006w
1,1-Dichloroethane$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-006w
cis 1,2-Dichloroethene$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-006w
Bromochloromethane$_A^{\#}$	<5	<5	<5					µg/l	5	A-T-006w
Chloroform$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-006w
2,2-Dichloropropane$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-006w
1,2-Dichloroethane$_A^{\#}$	<2	<2	<2					µg/l	2	A-T-006w
1,1,1-Trichloroethane$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-006w
1,1-Dichloropropene$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-006w
Benzene$_A^{\#}$	1	<1	<1					µg/l	1	A-T-006w
Carbon Tetrachloride$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-006w
Dibromomethane$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-006w
1,2-Dichloropropane$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-006w
Bromodichloromethane$_A^{\#}$	<10	<10	<10					µg/l	10	A-T-006w
Trichloroethene$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-006w
cis 1,3-Dichloropropene$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-006w
trans 1,3-Dichloropropene$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-006w
1,1,2-Trichloroethane$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-006w
Toluene$_A^{\#}$	108	7	9					µg/l	1	A-T-006w
1,3-Dichloropropane$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-006w
Dibromochloromethane$_A^{\#}$	<3	<3	<3					µg/l	3	A-T-006w
1,2-Dibromoethane$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-006w
Tetrachloroethene$_A$	<1	<1	<1					µg/l	1	A-T-006w

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Date Sampled	21-Nov-24	21-Nov-24	21-Nov-24							
Sample Type	WATER - EW	WATER - EW	WATER - EW							
Sample Matrix Code	N/A	N/A	N/A							
1,1,1,2-Tetrachloroethane$_A$	<1	<1	<1					µg/l	1	A-T-006w
Chlorobenzene$_A^\#$	<1	<1	<1					µg/l	1	A-T-006w
Ethylbenzene$_A^\#$	372	20	82					µg/l	1	A-T-006w
m & p Xylene$_A^\#$	660	9	124					µg/l	1	A-T-006w
Bromoform$_A^\#$	<3	<3	<3					µg/l	3	A-T-006w
Styrene$_A^\#$	<8	<1	<1					µg/l	1	A-T-006w
1,1,2,2-Tetrachloroethane$_A$	<1	<1	<1					µg/l	1	A-T-006w
o-Xylene$_A^\#$	329	23	70					µg/l	1	A-T-006w
1,2,3-Trichloropropane$_A^\#$	<1	<1	<1					µg/l	1	A-T-006w
Isopropylbenzene$_A^\#$	84	10	27					µg/l	1	A-T-006w
Bromobenzene$_A^\#$	<1	<1	<1					µg/l	1	A-T-006w
2-Chlorotoluene$_A^\#$	<1	<1	<1					µg/l	1	A-T-006w
n-propylbenzene$_A^\#$	34	3	14					µg/l	1	A-T-006w
4-Chlorotoluene$_A^\#$	<1	<1	<1					µg/l	1	A-T-006w
1,2,4-Trimethylbenzene$_A^\#$	503	37	229					µg/l	1	A-T-006w
4-Isopropyltoluene$_A^\#$	17	<1	6					µg/l	1	A-T-006w
1,3,5-Trimethylbenzene$_A^\#$	171	3	68					µg/l	1	A-T-006w
1,2-Dichlorobenzene$_A^\#$	<1	<1	<1					µg/l	1	A-T-006w
1,4-Dichlorobenzene$_A^\#$	<1	<1	<1					µg/l	1	A-T-006w
sec-Butylbenzene$_A^\#$	<2	<1	<1					µg/l	1	A-T-006w
tert-Butylbenzene$_A^\#$	<2	<2	<2					µg/l	2	A-T-006w
1,3-Dichlorobenzene$_A^\#$	<1	<1	<1					µg/l	1	A-T-006w
n-butylbenzene$_A^\#$	<7	<1	<2					µg/l	1	A-T-006w
1,2-Dibromo-3-chloropropane$_A^\#$	<2	<2	<2					µg/l	2	A-T-006w
1,2,4-Trichlorobenzene$_A^\#$	<3	<3	<3					µg/l	3	A-T-006w
1,2,3-Trichlorobenzene$_A^\#$	<3	<3	<3					µg/l	3	A-T-006w
Hexachlorobutadiene$_A^\#$	<1	<1	<1					µg/l	1	A-T-006w

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Client Sample No										
Client Sample ID	WS2	WS3	WS9							
Depth to Top										
Depth To Bottom										
Date Sampled	21-Nov-24	21-Nov-24	21-Nov-24							
Sample Type	WATER - EW	WATER - EW	WATER - EW							
Sample Matrix Code	N/A	N/A	N/A							
TPH CWG (w) with Clean Up										
Ali >C5-C6 (w)$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-022w
Ali >C6-C8 (w)$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-022w
Ali >C8-C10 (w)$_A^{\#}$	246	<50	<50					µg/l	5	A-T-055w
Ali >C10-C12 (w)$_A^{\#}$	866	<50	152					µg/l	5	A-T-055w
Ali >C12-C16 (w)$_A^{\#}$	747	<50	79					µg/l	5	A-T-055w
Ali >C16-C21 (w)$_A^{\#}$	<25	<50	<50					µg/l	5	A-T-055w
Ali >C21-C35 (w)$_A^{\#}$	1700	<50	468					µg/l	5	A-T-055w
Total Aliphatics (w)$_A^{\#}$	3560	<50	699					µg/l	5	Calc-As Recd
Aro >C5-C7 (w)$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-022w
Aro >C7-C8 (w)$_A^{\#}$	104	6	7					µg/l	1	A-T-022w
Aro >C8-C10 (w)$_A$	13800	381	3490					µg/l	5	A-T-055w
Aro >C10-C12 (w)$_A^{\#}$	57800	1430	16100					µg/l	5	A-T-055w
Aro >C12-C16 (w)$_A^{\#}$	27100	424	8310					µg/l	5	A-T-055w
Aro >C16-C21 (w)$_A^{\#}$	3980	96	434					µg/l	5	A-T-055w
Aro >C21-C35 (w)$_A^{\#}$	1080	<100	137					µg/l	10	A-T-055w
Total Aromatics (w)$_A^{\#}$	104000	2340	28500					µg/l	10	Calc-As Recd
TPH (Ali & Aro >C5-C35) (w)$_A$	107000	2340	29200					µg/l	10	Calc-As Recd
BTEX - Benzene (w)$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-022w
BTEX - Toluene (w)$_A^{\#}$	104	6	7					µg/l	1	A-T-022w
BTEX - Ethyl Benzene (w)$_A^{\#}$	444	20	82					µg/l	1	A-T-022w
BTEX - m & p Xylene (w)$_A^{\#}$	803	11	126					µg/l	1	A-T-022w
BTEX - o Xylene (w)$_A^{\#}$	437	29	85					µg/l	1	A-T-022w
MTBE (w)$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-022w

Report Notes

General

•This report shall not be reproduced, except in full, without written approval from Envirolab.
•The client Sample No, Client Sample ID, Depth to top, Depth to Bottom and Date Sampled are all provided by the client and can affect the validity of results.
•The results reported herein relate only to the material supplied to the laboratory.
•The residue of any samples contained within this report, and any received within the same delivery, will be disposed of **four weeks** after the initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of **six months** after the initial Asbestos testing is completed.
•Analytical results reflect the quality of the sample at the time of analysis only.
•Opinions and Interpretations expressed are outside our scope of accreditation.
•A deviating sample report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.
•If a sample is outside of the calibration range or affected by interferences then it may need diluting. This will result in the limit of detection (LOD) being raised.
•Subcontracted Analysis: Please see the appended report for any deviations, current LODs and accreditation status of the test.

Key

Superscript "#"	Accredited to ISO 17025
Superscript "M"	Accredited to MCertS
Superscript "U"	Individual result not accredited
None of the above symbols	Analysis unaccredited
Subscript "A"	Analysis performed on as-received Sample
Subscript "D"	Analysis performed on the dried sample, crushed to pass 2mm sieve.
Subscript "D" on Asbestos	Analysis performed on a dried aliquot of sample provided.
Subscript "^"	Analysis has dependant options against results. Details appear in the comments of your Sample receipt
IS	Insufficient Sample for analysis
US	Unsuitable Sample for analysis
NDP	No Determination Possible
NAD	No Asbestos Detected
Trace	Asbestos found not suitable for Gravimetric Quantification – not enough to accurately weigh.
N/A	Not applicable

Asbestos

Identification: Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis
"Trace Asbestos Identified" will be reported if there is not enough present to verify the type.
Quantification: Generally a 2 stage process including visual identification, hand picking and weighing, and fibre counting. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres). "TRACE" will be reported as a quantification result.
PLEASE INFORM THE LABORATORY IF YOU WOULD LIKE THE STAGE 3 SEDIMENTATION PROCESS CARRIED OUT. Note this will be subcontracted.

Assigned Matrix Codes

1	SAND	6	CLAY/LOAM	A	Contains Stones
2	LOAM	7	OTHER	B	Contains Construction Rubble
3	CLAY	8	Asbestos Bulk (Only Asbestos ID accredited)	C	Contains visible hydrocarbons
4	LOAM/SAND	9	Incinerator Ash (some Metals accredited)	D	Contains glass / metal
5	SAND/CLAY			E	Contains roots / twigs
Note: 7,8,9 matrices are not covered by our ISO 17025 or MCertS accreditation, unless stated above.					

Soil Chemical Analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH by method A-T-007:
For waters, free and visible oils are excluded from the sample used for analysis, so the reported result represents the dissolved phase only.
Results "with Clean up" indicates samples cleaned up with Silica during extraction.

EPH CWG (method A-T-055) from TPH CWG:
EPH CWG results have humics mathematically subtracted through instrument calculation.
Where these humic substances have been identified in any IDs from "TPH CWG with clean up" please note that the concentration is **NOT** included in the quantified results but present in the ID for information.

Electrical Conductivity of water by method A-T-037:
Results greater than 12900µS/cm @ 25^0C / 11550µS/cm @ 20^0C fall outside the calibration range and as such are unaccredited.

Please contact your client manager if you require any further information.

Envirolab Deviating Samples Report

Hattersley Science & Technology Park, Stockport Road, Hattersley, SK14 3QU
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: Geo2 Remediation Ltd, Coniston House,, Louisa Street, Bradford, BD10 8NE

Project No: 24/11441

Date Received: 25/11/2024 (am)

Project: Wrexham

Cool Box Temperatures (°C): 6.3 & 6.4

Clients Project No: 4495

Lab Sample ID	24/11441/1	24/11441/2	24/11441/3
Client Sample No			
Client Sample ID/Depth	WS2	WS3	WS9
Date Sampled	21/11/24	21/11/24	21/11/24
Deviation Code			
A7 (no HNO3)	✓	✓	✓
F	✓	✓	✓

Key

A7 (no HNO3) *No HNO3 preserved bottle provided (dissolved metals will be deviating)*

F *Maximum holding time exceeded between sampling date and analysis for analytes listed below*

HOLDING TIME EXCEEDANCES

Lab Sample ID	24/11441/1	24/11441/2	24/11441/3
Client Sample No			
Client Sample ID/Depth	WS2	WS3	WS9
Date Sampled	21/11/24	21/11/24	21/11/24
pH (w)	✓	✓	✓

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Envirolab Analysis Dates

Lab Sample ID	24/11441/1	24/11441/2	24/11441/3
Client Sample No			
Client Sample ID/Depth	WS2	WS3	WS9
Date Sampled	21/11/24	21/11/24	21/11/24
A-T-006w	27/11/2024	27/11/2024	27/11/2024
A-T-022w	27/11/2024	27/11/2024	27/11/2024
A-T-025w	29/11/2024	29/11/2024	28/11/2024
A-T-031w	26/11/2024	26/11/2024	26/11/2024
A-T-040w	25/11/2024	25/11/2024	25/11/2024
A-T-052w	02/12/2024	02/12/2024	27/11/2024
A-T-055w	28/11/2024	27/11/2024	27/11/2024
Calc	29/11/2024	28/11/2024	28/11/2024
Calc-As Recd	28/11/2024	27/11/2024	27/11/2024

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

End of Report

envirolab
Hattersley Science & Technology Park
Stockport Road, Hattersley, SK14 3QU

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 24/11442
Issue Number: 1 **Date:** 02 December, 2024

Client:
Geo2 Remediation Ltd
Coniston House,
Louisa Street
Bradford
BD10 8NE

Project Manager: Adam Ridsdale/Adam Wilson
Project Name: Wrexham
Project Ref: 4495
Order No: 3349
Date Samples Received: 22/11/24
Date Instructions Received: 25/11/24
Date Analysis Completed: 02/12/24

Approved by:



Gemma Berrisford
Deputy Client Services Supervisor

Envirolab Job Number: 24/11442

Client Project Name: Wrexham

Client Project Ref: 4495

Lab Sample ID	24/11442/1	24/11442/2	24/11442/3	24/11442/4	24/11442/5	24/11442/6		Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS2	WS3	WS4	WS5	WS7	WS9				
Depth to Top	1.00	0.50	4.00	0.50	1.00	4.00				
Depth To Bottom										
Date Sampled	21-Nov-24	21-Nov-24	21-Nov-24	21-Nov-24	21-Nov-24	21-Nov-24				
Sample Type	SOIL	SOIL	SOLID	SOIL	SOIL	SOLID				
Sample Matrix Code	4ABE	4ABE	7	4A	4A	7				
% Stones >10mm$_A$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		% w/w	0.1	A-T-044
Phenols - Total by HPLC$_A$	-	-	<0.2	-	<0.2	<0.2		mg/kg	0.2	A-T-050s
Total Organic Carbon$_D^{M\#}$	0.71	-	2.80^U	0.28	-	-		% w/w	0.03	A-T-032s
Arsenic$_D^{M\#}$	3	10	-	3	5	-		mg/kg	1	A-T-024s
Barium$_D$	101	202	-	75	643	-		mg/kg	1	A-T-024s
Beryllium$_D$	<0.5	1.4	-	<0.5	4.1	-		mg/kg	0.5	A-T-024s
Boron (water soluble)$_D^{M\#}$	<1.0	1.1	-	<1.0	<1.0	-		mg/kg	1	A-T-027s
Cadmium$_D^{M\#}$	<0.5	1.5	-	<0.5	1.9	-		mg/kg	0.5	A-T-024s
Copper$_D^{M\#}$	13	42	-	14	106	-		mg/kg	1	A-T-024s
Chromium$_D^{M\#}$	15	20	-	13	34	-		mg/kg	1	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	-	<1	<1	-		mg/kg	1	A-T-040s
Chromium (trivalent)	15	20	-	13	34	-		mg/kg	1	Calc
Lead$_D^{M\#}$	30	301	-	71	235	-		mg/kg	1	A-T-024s
Mercury$_D$	<0.17	0.34	-	<0.17	<0.17	-		mg/kg	0.17	A-T-024s
Nickel$_D^{M\#}$	12	23	-	19	44	-		mg/kg	1	A-T-024s
Selenium$_D^{M\#}$	<1	2	-	<1	<1	-		mg/kg	1	A-T-024s
Vanadium$_D^{M\#}$	15	28	-	12	57	-		mg/kg	1	A-T-024s
Zinc$_D^{M\#}$	44	283	-	53	463	-		mg/kg	5	A-T-024s
alpha-Hexachlorocyclohexane (HCH)$_A$	-	-	<0.01	-	<0.01	<0.01		mg/kg	0.01	A-T-056
beta-Hexachlorocyclohexane (HCH)$_A$	-	-	<0.01	-	<0.01	<0.01		mg/kg	0.01	A-T-056
delta-Hexachlorocyclohexane (HCH)$_A$	-	-	<0.01	-	<0.01	<0.01		mg/kg	0.01	A-T-056

Envirolab Job Number: 24/11442

Client Project Name: Wrexham

Client Project Ref: 4495

Lab Sample ID	24/11442/1	24/11442/2	24/11442/3	24/11442/4	24/11442/5	24/11442/6		Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS2	WS3	WS4	WS5	WS7	WS9				
Depth to Top	1.00	0.50	4.00	0.50	1.00	4.00				
Depth To Bottom										
Date Sampled	21-Nov-24	21-Nov-24	21-Nov-24	21-Nov-24	21-Nov-24	21-Nov-24				
Sample Type	SOIL	SOIL	SOLID	SOIL	SOIL	SOLID				
Sample Matrix Code	4ABE	4ABE	7	4A	4A	7				
Asbestos in Soil (inc. matrix) ^										
Asbestos in soil$_D^{\#}$	-	NAD	-	NAD	NAD	-				A-T-045
Asbestos Matrix (visual)$_D$	-	-	-	-	-	-				A-T-045
Asbestos Matrix (microscope)$_D$	-	-	-	-	-	-				A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_D$	-	N/A	-	N/A	N/A	-				A-T-045

Envirolab Job Number: 24/11442

Client Project Name: Wrexham

Client Project Ref: 4495

Lab Sample ID	24/11442/1	24/11442/2	24/11442/3	24/11442/4	24/11442/5	24/11442/6		Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS2	WS3	WS4	WS5	WS7	WS9				
Depth to Top	1.00	0.50	4.00	0.50	1.00	4.00				
Depth To Bottom										
Date Sampled	21-Nov-24	21-Nov-24	21-Nov-24	21-Nov-24	21-Nov-24	21-Nov-24				
Sample Type	SOIL	SOIL	SOLID	SOIL	SOIL	SOLID				
Sample Matrix Code	4ABE	4ABE	7	4A	4A	7				
SVOC										
4-Bromophenyl phenyl ether$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
Hexachlorobenzene$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
Diethyl phthalate$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
Dimethyl phthalate$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
Dibenzofuran$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
Carbazole$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
Butylbenzyl phthalate$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
Bis(2-ethylhexyl)phthalate$_A$	-	-	<500	-	1410	<5000		µg/kg	500	A-T-052s
Bis(2-chloroethoxy)methane$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
Bis(2-chloroethyl)ether$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
4-Nitrophenol$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
3+4-Methylphenol$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
4-Chloro-3-methylphenol$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
2-Nitrophenol$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
2-Methylphenol$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
1,2,4-Trichlorobenzene$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
2-Chlorophenol$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
2,6-Dinitrotoluene$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
2,4-Dinitrotoluene$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
2,4-Dimethylphenol$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
2,4-Dichlorophenol$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
2,4,6-Trichlorophenol$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
2,4,5-Trichlorophenol$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
1,4-Dichlorobenzene$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
1,3-Dichlorobenzene$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
1,2-Dichlorobenzene$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
2-Chloronaphthalene$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
2-Methylnaphthalene$_A$	-	-	<100	-	245	3540		µg/kg	100	A-T-052s
Acenaphthylene$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
Acenaphthene$_A$	-	-	<100	-	<100	1690		µg/kg	100	A-T-052s
Anthracene$_A$	-	-	<100	-	<100	1280		µg/kg	100	A-T-052s
Benzo(a)anthracene$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s

Envirolab Job Number: 24/11442

Client Project Name: Wrexham

Client Project Ref: 4495

Lab Sample ID	24/11442/1	24/11442/2	24/11442/3	24/11442/4	24/11442/5	24/11442/6		Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS2	WS3	WS4	WS5	WS7	WS9				
Depth to Top	1.00	0.50	4.00	0.50	1.00	4.00				
Depth To Bottom										
Date Sampled	21-Nov-24	21-Nov-24	21-Nov-24	21-Nov-24	21-Nov-24	21-Nov-24				
Sample Type	SOIL	SOIL	SOLID	SOIL	SOIL	SOLID				
Sample Matrix Code	4ABE	4ABE	7	4A	4A	7				
Benzo(b)fluoranthene$_A$	-	-	<100	-	145	<1000		µg/kg	100	A-T-052s
Benzo(k)fluoranthene$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
Benzo(a)pyrene$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
Benzo(ghi)perylene$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
Chrysene$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
Fluoranthene$_A$	-	-	<100	-	<100	1170		µg/kg	100	A-T-052s
Fluorene$_A$	-	-	<100	-	<100	1390		µg/kg	100	A-T-052s
Indeno(1,2,3-cd)pyrene$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
Phenanthrene$_A$	-	-	<100	-	<100	4800		µg/kg	100	A-T-052s
Pyrene$_A$	-	-	<100	-	<100	1690		µg/kg	100	A-T-052s
Naphthalene$_A$	-	-	<100	-	233	3740		µg/kg	100	A-T-052s
Dibenzo(ah)anthracene$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
Bis(2-chloroisopropyl)ether$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
Phenol$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
Pentachlorophenol$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
n-Nitroso-n-dipropylamine$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
n-Dioctylphthalate$_A$	-	-	<500	-	<500	<5000		µg/kg	500	A-T-052s
n-Dibutylphthalate$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
Nitrobenzene$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
Isophorone$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
Hexachloroethane$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
Hexachlorobutadiene$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s
Perylene$_A$	-	-	<100	-	<100	<1000		µg/kg	100	A-T-052s

Envirolab Job Number: 24/11442

Client Project Name: Wrexham

Client Project Ref: 4495

Lab Sample ID	24/11442/1	24/11442/2	24/11442/3	24/11442/4	24/11442/5	24/11442/6		Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS2	WS3	WS4	WS5	WS7	WS9				
Depth to Top	1.00	0.50	4.00	0.50	1.00	4.00				
Depth To Bottom										
Date Sampled	21-Nov-24	21-Nov-24	21-Nov-24	21-Nov-24	21-Nov-24	21-Nov-24				
Sample Type	SOIL	SOIL	SOLID	SOIL	SOIL	SOLID				
Sample Matrix Code	4ABE	4ABE	7	4A	4A	7				
VOC										
Dichlorodifluoromethane$_{A}$	-	-	<25	-	<25	<1		µg/kg	1	A-T-006s
Chloromethane$_{A}$	-	-	<250	-	<250	<10		µg/kg	10	A-T-006s
Vinyl Chloride (Chloroethene)$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s
Bromomethane$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s
Chloroethane$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s
Trichlorofluoromethane$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s
1,1-Dichloroethene$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s
Carbon Disulphide$_{A}^{\#}$	-	-	<25^{U}	-	<25	1^{U}		µg/kg	1	A-T-006s
Dichloromethane$_{A}$	-	-	<125	-	<125	<5		µg/kg	5	A-T-006s
trans 1,2-Dichloroethene$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s
1,1-Dichloroethane$_{A}^{\#}$	-	-	<25^{U}	-	<25^{U}	<1^{U}		µg/kg	1	A-T-006s
cis 1,2-Dichloroethene$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s
2,2-Dichloropropane$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s
Bromochloromethane$_{A}^{\#}$	-	-	<125^{U}	-	<125^{U}	<5^{U}		µg/kg	5	A-T-006s
Chloroform$_{A}^{\#}$	-	-	<25^{U}	-	<25^{U}	<1^{U}		µg/kg	1	A-T-006s
1,1,1-Trichloroethane$_{A}^{\#}$	-	-	<25^{U}	-	<25^{U}	<1^{U}		µg/kg	1	A-T-006s
1,1-Dichloropropene$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s
Carbon Tetrachloride$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s
1,2-Dichloroethane$_{A}^{\#}$	-	-	<50^{U}	-	<50^{U}	<2^{U}		µg/kg	2	A-T-006s
Benzene$_{A}^{\#}$	-	-	<25^{U}	-	<25	1^{U}		µg/kg	1	A-T-006s
Trichloroethene$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s
1,2-Dichloropropane$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s
Dibromomethane$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s
Bromodichloromethane$_{A}^{\#}$	-	-	<250^{U}	-	<250	<10^{U}		µg/kg	10	A-T-006s
cis 1,3-Dichloropropene$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s
Toluene$_{A}^{\#}$	-	-	<25^{U}	-	<25	63^{U}		µg/kg	1	A-T-006s
trans 1,3-Dichloropropene$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s
1,1,2-Trichloroethane$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s
1,3-Dichloropropane$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s
Tetrachloroethene$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s
Dibromochloromethane$_{A}^{\#}$	-	-	<75^{U}	-	<75	<3^{U}		µg/kg	3	A-T-006s
1,2-Dibromoethane$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s

Envirolab Job Number: 24/11442 **Client Project Name: Wrexham**

Client Project Ref: 4495

Lab Sample ID	24/11442/1	24/11442/2	24/11442/3	24/11442/4	24/11442/5	24/11442/6		Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS2	WS3	WS4	WS5	WS7	WS9				
Depth to Top	1.00	0.50	4.00	0.50	1.00	4.00				
Depth To Bottom										
Date Sampled	21-Nov-24	21-Nov-24	21-Nov-24	21-Nov-24	21-Nov-24	21-Nov-24				
Sample Type	SOIL	SOIL	SOLID	SOIL	SOIL	SOLID				
Sample Matrix Code	4ABE	4ABE	7	4A	4A	7				
Chlorobenzene$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s
1,1,1,2-Tetrachloroethane$_{A}$	-	-	<25	-	<25	<1		µg/kg	1	A-T-006s
Ethylbenzene$_{A}^{\#}$	-	-	<25^{U}	-	<25	694^{U}		µg/kg	1	A-T-006s
m & p Xylene$_{A}^{\#}$	-	-	<25^{U}	-	<25	912^{U}		µg/kg	1	A-T-006s
o-Xylene$_{A}^{\#}$	-	-	<25^{U}	-	<25	539^{U}		µg/kg	1	A-T-006s
Styrene$_{A}^{\#}$	-	-	<25^{U}	-	<25	<4^{U}		µg/kg	1	A-T-006s
Bromoform$_{A}^{\#}$	-	-	<75^{U}	-	<75	<3^{U}		µg/kg	3	A-T-006s
Isopropylbenzene$_{A}^{\#}$	-	-	<25^{U}	-	<25	326^{U}		µg/kg	1	A-T-006s
1,1,2,2-Tetrachloroethane$_{A}$	-	-	<25	-	<25	<1		µg/kg	1	A-T-006s
1,2,3-Trichloropropane$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s
Bromobenzene$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s
n-Propylbenzene$_{A}^{\#}$	-	-	<25^{U}	-	<25	142^{U}		µg/kg	1	A-T-006s
2-Chlorotoluene$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s
1,3,5-Trimethylbenzene$_{A}^{\#}$	-	-	<25^{U}	-	<25	557^{U}		µg/kg	1	A-T-006s
4-Chlorotoluene$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s
tert-Butylbenzene$_{A}^{\#}$	-	-	<50^{U}	-	<50	<2^{U}		µg/kg	2	A-T-006s
1,2,4-Trimethylbenzene$_{A}^{\#}$	-	-	<25^{U}	-	<25	1310^{U}		µg/kg	1	A-T-006s
sec-Butylbenzene$_{A}^{\#}$	-	-	<25^{U}	-	<25	<12^{U}		µg/kg	1	A-T-006s
4-Isopropyltoluene$_{A}^{\#}$	-	-	<25^{U}	-	<25	178^{U}		µg/kg	1	A-T-006s
1,3-Dichlorobenzene$_{A}$	-	-	<25	-	<25	<1		µg/kg	1	A-T-006s
1,4-Dichlorobenzene$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s
n-Butylbenzene$_{A}^{\#}$	-	-	<25^{U}	-	<25	<117^{U}		µg/kg	1	A-T-006s
1,2-Dichlorobenzene$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s
1,2-Dibromo-3-chloropropane (DCBP)$_{A}$	-	-	<50	-	<50	<2		µg/kg	2	A-T-006s
1,2,4-Trichlorobenzene$_{A}$	-	-	<75	-	<75	<3		µg/kg	3	A-T-006s
Hexachlorobutadiene$_{A}^{\#}$	-	-	<25^{U}	-	<25	<1^{U}		µg/kg	1	A-T-006s
1,2,3-Trichlorobenzene$_{A}$	-	-	<75	-	<75	<3		µg/kg	3	A-T-006s

Envirolab Job Number: 24/11442

Client Project Name: Wrexham

Client Project Ref: 4495

Lab Sample ID	24/11442/1	24/11442/2	24/11442/3	24/11442/4	24/11442/5	24/11442/6		Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS2	WS3	WS4	WS5	WS7	WS9				
Depth to Top	1.00	0.50	4.00	0.50	1.00	4.00				
Depth To Bottom										
Date Sampled	21-Nov-24	21-Nov-24	21-Nov-24	21-Nov-24	21-Nov-24	21-Nov-24				
Sample Type	SOIL	SOIL	SOLID	SOIL	SOIL	SOLID				
Sample Matrix Code	4ABE	4ABE	7	4A	4A	7				
TPH CWG with Clean Up										
Ali >C5-C6$_A$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	A-T-022s
Ali >C6-C8$_A$	<0.01	<0.01	<0.01	<0.01	<0.01	0.11		mg/kg	0.01	A-T-022s
Ali >C8-C10$_A$	<1	<1	<1	<1	<1	<50		mg/kg	1	A-T-055s
Ali >C10-C12$_A^{M\#}$	<1	<1	<1^U	<1	<1	196^U		mg/kg	1	A-T-055s
Ali >C12-C16$_A^{M\#}$	2	<1	<1^U	<1	1	318^U		mg/kg	1	A-T-055s
Ali >C16-C21$_A^{M\#}$	<1	<1	<1^U	<1	1	83^U		mg/kg	1	A-T-055s
Ali >C21-C35$_A^{M\#}$	35	5	1^U	<1	48	<50^U		mg/kg	1	A-T-055s
Total Aliphatics$_A$	37	5	1	<1	50	598		mg/kg	1	Calc-As Recd
Aro >C5-C7$_A^{\#}$	<0.01	<0.01	<0.01^U	<0.01	<0.01	<0.01^U		mg/kg	0.01	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01	<0.01^U	<0.01	<0.01	0.29^U		mg/kg	0.01	A-T-022s
Aro >C8-C10$_A$	<1	<1	<1	<1	3	427		mg/kg	1	A-T-055s
Aro >C10-C12$_A$	<1	<1	<1	<1	3	2810		mg/kg	1	A-T-055s
Aro >C12-C16$_A$	7	2	<1	<1	5	5380		mg/kg	1	A-T-055s
Aro >C16-C21$_A^{M\#}$	14	7	<1^U	<1	8	2340^U		mg/kg	1	A-T-055s
Aro >C21-C35$_A^{M\#}$	49	13	<1^U	<1	28	1030^U		mg/kg	1	A-T-055s
Total Aromatics$_A$	69	23	<1	<1	45	12000		mg/kg	1	Calc-As Recd
TPH (Ali & Aro >C5-C35)$_A$	106	27	1	<1	95	12600		mg/kg	1	Calc-As Recd
BTEX - Benzene$_A^{\#}$	<0.01	<0.01	<0.01^U	<0.01	<0.01	<0.01^U		mg/kg	0.01	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01	<0.01^U	<0.01	<0.01	0.29^U		mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01	<0.01^U	<0.01	<0.01	3.67^U		mg/kg	0.01	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01	<0.01^U	<0.01	<0.01	4.81^U		mg/kg	0.01	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01	<0.01^U	<0.01	<0.01	3.26^U		mg/kg	0.01	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01	<0.01^U	<0.01	<0.01	<0.01^U		mg/kg	0.01	A-T-022s

Report Notes

General

•This report shall not be reproduced, except in full, without written approval from Envirolab.
•The client Sample No, Client Sample ID, Depth to top, Depth to Bottom and Date Sampled are all provided by the client and can affect the validity of results.
•The results reported herein relate only to the material supplied to the laboratory.
•The residue of any samples contained within this report, and any received within the same delivery, will be disposed of **four weeks** after the initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of **six months** after the initial Asbestos testing is completed.
•Analytical results reflect the quality of the sample at the time of analysis only.
•Opinions and Interpretations expressed are outside our scope of accreditation.
•A deviating sample report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.
•If a sample is outside of the calibration range or affected by interferences then it may need diluting. This will result in the limit of detection (LOD) being raised.
•Subcontracted Analysis: Please see the appended report for any deviations, current LODs and accreditation status of the test.

Key

Superscript "#"	Accredited to ISO 17025
Superscript "M"	Accredited to MCertS
Superscript "U"	Individual result not accredited
None of the above symbols	Analysis unaccredited
Subscript "A"	Analysis performed on as-received Sample
Subscript "D"	Analysis performed on the dried sample, crushed to pass 2mm sieve.
Subscript "D" on Asbestos	Analysis performed on a dried aliquot of sample provided.
Subscript "^"	Analysis has dependant options against results. Details appear in the comments of your Sample receipt
IS	Insufficient Sample for analysis
US	Unsuitable Sample for analysis
NDP	No Determination Possible
NAD	No Asbestos Detected
Trace	Asbestos found not suitable for Gravimetric Quantification – not enough to accurately weigh.
N/A	Not applicable

Asbestos

Identification: Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis
"Trace Asbestos Identified" will be reported if there is not enough present to verify the type.
Quantification: Generally a 2 stage process including visual identification, hand picking and weighing, and fibre counting. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres). "TRACE" will be reported as a quantification result.
PLEASE INFORM THE LABORATORY IF YOU WOULD LIKE THE STAGE 3 SEDIMENTATION PROCESS CARRIED OUT. Note this will be subcontracted.

Assigned Matrix Codes

1	SAND	6	CLAY/LOAM	A	Contains Stones
2	LOAM	7	OTHER	B	Contains Construction Rubble
3	CLAY	8	Asbestos Bulk (Only Asbestos ID accredited)	C	Contains visible hydrocarbons
4	LOAM/SAND	9	Incinerator Ash (some Metals accredited)	D	Contains glass / metal
5	SAND/CLAY			E	Contains roots / twigs
Note: 7,8,9 matrices are not covered by our ISO 17025 or MCertS accreditation, unless stated above.					

Soil Chemical Analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH by method A-T-007:
For waters, free and visible oils are excluded from the sample used for analysis, so the reported result represents the dissolved phase only.
Results "with Clean up" indicates samples cleaned up with Silica during extraction.

EPH CWG (method A-T-055) from TPH CWG:
EPH CWG results have humics mathematically subtracted through instrument calculation.
Where these humic substances have been identified in any IDs from "TPH CWG with clean up" please note that the concentration is **NOT** included in the quantified results but present in the ID for information.

Electrical Conductivity of water by method A-T-037:
Results greater than 12900µS/cm @ 25^0C / 11550µS/cm @ 20^0C fall outside the calibration range and as such are unaccredited.

Please contact your client manager if you require any further information.

Envirolab Deviating Samples Report

Hattersley Science & Technology Park, Stockport Road, Hattersley, SK14 3QU
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: Geo2 Remediation Ltd, Coniston House,, Louisa Street, Bradford, BD10 8NE

Project No: 24/11442

Date Received: 25/11/2024 (am)

Project: Wrexham

Cool Box Temperatures (°C): 6.3 & 6.4

Clients Project No: 4495

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Envirolab Analysis Dates

Lab Sample ID	24/11442/1	24/11442/2	24/11442/3	24/11442/4	24/11442/5	24/11442/6
Client Sample No						
Client Sample ID/Depth	WS2 1.00m	WS3 0.50m	WS4 4.00m	WS5 0.50m	WS7 1.00m	WS9 4.00m
Date Sampled	21/11/24	21/11/24	21/11/24	21/11/24	21/11/24	21/11/24
A-T-006s			02/12/2024		02/12/2024	27/11/2024
A-T-022s	27/11/2024	27/11/2024	27/11/2024	27/11/2024	27/11/2024	27/11/2024
A-T-024s	28/11/2024	28/11/2024		28/11/2024	28/11/2024	
A-T-027s	27/11/2024	27/11/2024		27/11/2024	27/11/2024	
A-T-032s	27/11/2024		27/11/2024	27/11/2024		
A-T-040s	27/11/2024	27/11/2024		28/11/2024	27/11/2024	
A-T-044	27/11/2024	27/11/2024	27/11/2024	27/11/2024	27/11/2024	27/11/2024
A-T-045		26/11/2024		26/11/2024	26/11/2024	
A-T-050s			29/11/2024		29/11/2024	29/11/2024
A-T-052s			27/11/2024		27/11/2024	02/12/2024
A-T-055s	27/11/2024	27/11/2024	27/11/2024	27/11/2024	27/11/2024	28/11/2024
A-T-056			27/11/2024		27/11/2024	27/11/2024
Calc	28/11/2024	28/11/2024		28/11/2024	28/11/2024	
Calc-As Recd	27/11/2024	27/11/2024	27/11/2024	27/11/2024	27/11/2024	28/11/2024

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

End of Report

Envirolab Job Number: 24/11441 & 24/11176
Client: Geo2 Remediation Ltd
Client Project Name: Wrexham
Client Project Ref: 4495

Surface Water GAC comparison

Lab Sample ID				24/11176/1	24/11176/2	24/11176/3	24/11176/4	24/11441/1	24/11441/2	24/11441/3		
Client Sample No												
Client Sample ID				Upstream	Downstream	Well	EX1	WS2	WS3	WS9		
Depth to Top												
Depth to Bottom												
Date Sampled				11-Nov-24	11-Nov-24	11-Nov-24	11-Nov-24	21-Nov-24	21-Nov-24	21-Nov-24		
Sample Type				Water - SW	Water - SW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	Units	Limit of Detection	Method	N/A	N/A	N/A	N/A	N/A	N/A	N/A	GAC	Count >GAC
pH (w)	pH	0.01	A-T-031w	7.8	7.87	7.14	6.96	7.5	7.82	8.72		
Arsenic (dissolved)	µg/l	1	A-T-025w	<1	<1	8	11	42	10	5	50	0
Boron (dissolved)	µg/l	10	A-T-025w	61	63	27	<100	156	126	49		
Barium (dissolved)	µg/l	1	A-T-025w	59	59	43	515	985	564	58		
Beryllium (dissolved)	µg/l	1	A-T-025w	<1	<1	<1	<10	<5	<1	<1		
Cadmium (dissolved)	µg/l	0.2	A-T-025w	<0.2	<0.2	<0.2	<2.0	2.4	0.7	<0.2	0.08	2
Copper (dissolved)	µg/l	4	A-T-025w	<4	<4	<4	<40	55	20	<4	1	2
Chromium (dissolved)	µg/l	1	A-T-025w	2	6	4	<10	18	3	8	4.7	3
Chromium (hexavalent) (w)	mg/l	0.01	A-T-040w	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	3.4	0
Chromium (trivalent) (w)	mg/l	0.01	Calc	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	4.7	0
Lead (dissolved)	µg/l	1	A-T-025w	<1	<1	1	41	420	188	7	1.2	4
Mercury (dissolved)	µg/l	0.1	A-T-025w	<0.1	<0.1	<0.1	<1.0	<0.5	<0.1	<0.1	0.07	0
Nickel (dissolved)	µg/l	2	A-T-025w	<2	<2	<2	<20	29	7	<2	4	2
Selenium (dissolved)	µg/l	1	A-T-025w	<1	<1	<1	<10	6	2	2		
Vanadium (dissolved)	µg/l	1	A-T-025w	<1	<1	<1	30	29	8	9	20	2
Zinc (dissolved)	µg/l	2	A-T-025w	<2	<2	40	290	257	24	3	12.1	4
SVOC (w)												
1,2,4-Trichlorobenzene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
1,2-Dichlorobenzene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
1,3-Dichlorobenzene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
1,4-Dichlorobenzene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
2,4,5-Trichlorophenol	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1	0.75	0
2,4,6-Trichlorophenol	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1	0.75	0
2,4-Dichlorophenol	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1	4.2	0
2,4-Dimethylphenol	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
2,4-Dinitrotoluene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
2,6-Dinitrotoluene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
2-Chloronaphthalene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1	1.6	0
2-Chlorophenol	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1	50	0
2-Methylnaphthalene	µg/l	1	A-T-052w	<1	<1	<1	<1	>997	61	645		
2-Methylphenol	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
2-Nitrophenol	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
4-Bromophenyl phenyl ether	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
4-Chloro-3-methylphenol	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1	40	0
Bis(2-chloroisopropyl)ether	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
3+4-Methylphenol	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
4-Nitrophenol	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
Acenaphthene	µg/l	1	A-T-052w	<1	<1	<1	16	>431	15	126		
Acenaphthylene	µg/l	1	A-T-052w	<1	<1	<1	1	93	<10	<1		
Anthracene	µg/l	1	A-T-052w	<1	<1	<1	<1	172	<10	<1	0.1	1
Bis(2-chloroethyl)ether	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
Bis(2-chloroethoxy)methane	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
Bis(2-ethylhexyl)phthalate	µg/l	10	A-T-052w	<10	<10	<10	<10	<100	<100	<10	1.3	0
Benzo(a)anthracene	µg/l	1	A-T-052w	<1	<1	<1	<1	56	<10	<1		
Butylbenzyl phthalate	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1	7.5	0
Benzo(b)fluoranthene	µg/l	1	A-T-052w	<1	<1	<1	<1	23	<10	<1		
Benzo(k)fluoranthene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
Benzo(a)pyrene	µg/l	1	A-T-052w	<1	<1	<1	<1	29	<10	<1	0.27	1
Benzo(ghi)perylene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
Carbazole	µg/l	1	A-T-052w	<1	<1	<1	<1	11	<10	<1		
Chrysene	µg/l	1	A-T-052w	<1	<1	<1	<1	48	<10	<1		
Dibenzofuran	µg/l	1	A-T-052w	<1	<1	<1	<1	70	<10	10		
n-Dibutylphthalate	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1	8	0
n-Dioctylphthalate	µg/l	10	A-T-052w	<10	<10	<10	<10	<100	<100	<10	20	0
n-Nitroso-n-dipropylamine	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
Diethyl phthalate	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1	200	0
Dimethyl phthalate	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1	800	0
Dibenzo(ah)anthracene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
Fluorene	µg/l	1	A-T-052w	<1	<1	<1	3	>430	<10	50		
Fluoranthene	µg/l	1	A-T-052w	<1	<1	<1	<1	108	<10	<1	0.12	1
Hexachlorobutadiene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
Hexachlorobenzene SVOC	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1	0.05	0
Pentachlorophenol SVOC	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1	0.4	0
Phenol	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1	7.7	0
Hexachloroethane	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1	0.44	0
Nitrobenzene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
Naphthalene	µg/l	1	A-T-052w	<1	<1	<1	<1	151	52	591	2	3
Isophorone	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
Phenanthrene	µg/l	1	A-T-052w	<1	<1	<1	1	>362	<10	38		
Pyrene	µg/l	1	A-T-052w	<1	<1	<1	<1	157	<10	<1		
Indeno(1,2,3-cd)pyrene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
Perylene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
VOC (w)												
Dichlorodifluoromethane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
Chloromethane	µg/l	10	A-T-006w	<10	<10	<10	<10	<10	<10	<10		
Vinyl Chloride	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
Bromomethane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
Chloroethane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
Trichlorofluoromethane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
trans 1,2-Dichloroethene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
Dichloromethane	µg/l	5	A-T-006w	<5	<5	<5	<5	<5	<5	<5	20	0
Carbon Disulphide	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
1,1-Dichloroethane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	7	0
cis 1,2-Dichloroethene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
Bromochloromethane	µg/l	5	A-T-006w	<5	<5	<5	<5	<5	<5	<5		
Chloroform	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	2.5	0
2,2-Dichloropropane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
1,2-Dichloroethane	µg/l	2	A-T-006w	<2	<2	<2	<2	<2	<2	<2	10	0
1,1,1-Trichloroethane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	100	0
1,1-Dichloropropene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
Benzene	µg/l	1	A-T-006w	<1	<1	<1	<1	1	<1	<1	10	0
Carbon Tetrachloride	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	12	0
Dibromomethane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
1,2-Dichloropropane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
Bromodichloromethane	µg/l	10	A-T-006w	<10	<10	<10	<10	<10	<10	<10		
Trichloroethene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	10	0
cis 1,3-Dichloropropene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
trans 1,3-Dichloropropene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
1,1,2-Trichloroethane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	400	0
Toluene	µg/l	1	A-T-006w	<1	<1	<1	<1	108	7	9	74	1
1,3-Dichloropropane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
Dibromochloromethane	µg/l	3	A-T-006w	<3	<3	<3	<3	<3	<3	<3		
1,2-Dibromoethane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
Tetrachloroethene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	10	0
1,1,1,2-Tetrachloroethane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	140	0
Chlorobenzene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	32	0
Ethylbenzene	µg/l	1	A-T-006w	<1	<1	<1	11	372	20	82	20	2
m & p Xylene	µg/l	1	A-T-006w	<1	<1	<1	1	660	9	124	30	2
Bromoform	µg/l	3	A-T-006w	<3	<3	<3	<3	<3	<3	<3		
Styrene	µg/l	1	A-T-006w	<1	<1	<1	<1	<8	<1	<1		
1,1,2,2-Tetrachloroethane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	140	0
o-Xylene	µg/l	1	A-T-006w	<1	<1	<1	7	329	23	70	30	2
1,2,3-Trichloropropane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
Isopropylbenzene	µg/l	1	A-T-006w	<1	<1	<1	3	84	10	27		
Bromobenzene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
2-Chlorotoluene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	360	0
n-propylbenzene	µg/l	1	A-T-006w	<1	<1	<1	1	34	3	14		
4-Chlorotoluene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	360	0
1,2,4-Trimethylbenzene	µg/l	1	A-T-006w	<1	<1	<1	<1	503	37	229	36	3
4-Isopropyltoluene	µg/l	1	A-T-006w	<1	<1	<1	<1	17	<1	6		
1,3,5-Trimethylbenzene	µg/l	1	A-T-006w	<1	<1	<1	<1	171	3	68		
1,2-Dichlorobenzene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	20	0
1,4-Dichlorobenzene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	20	0
sec-Butylbenzene	µg/l	1	A-T-006w	<1	<1	<1	<1	<2	<1	<1		
tert-Butylbenzene	µg/l	2	A-T-006w	<2	<2	<2	<2	<2	<2	<2		
1,3-Dichlorobenzene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	20	0
n-butylbenzene	µg/l	1	A-T-006w	<1	<1	<1	<1	<7	<1	<2		
1,2-Dibromo-3-chloropropane	µg/l	2	A-T-006w	<2	<2	<2	<2	<2	<2	<2		
1,2,4-Trichlorobenzene	µg/l	3	A-T-006w	<3	<3	<3	<3	<3	<3	<3	0.4	0
1,2,3-Trichlorobenzene	µg/l	3	A-T-006w	<3	<3	<3	<3	<3	<3	<3	0.4	0
Hexachlorobutadiene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	0.6	0
TPH CWG (w) with Clean Up												
Ali >C5-C6 (w)	µg/l	1	A-T-022w	<1	<1	<1	<1	<1	<1	<1	1900	0
Ali >C6-C8 (w)	µg/l	1	A-T-022w	<1	<1	<1	<1	<1	<1	<1	1500	0
Ali >C8-C10 (w)	µg/l	5	A-T-055w	<5	<5	<5	8	246	<50	<50	57	1
Ali >C10-C12 (w)	µg/l	5	A-T-055w	<5	<5	<5	10	866	<50	152	37	2
Ali >C12-C16 (w)	µg/l	5	A-T-055w	<5	<5	<5	<5	747	<50	79		
Ali >C16-C21 (w)	µg/l	5	A-T-055w	<5	<5	<5	<5	<25	<50	<50		
Ali >C21-C35 (w)	µg/l	5	A-T-055w	<5	<5	<5	16	1700	<50	468		
Total Aliphatics (w)	µg/l	5	Calc-As Recd	<5	<5	<5	34	3560	<50	699	2500	1
Aro >C5-C7 (w)	µg/l	1	A-T-022w	<1	<1	<1	<1	<1	<1	<1	10	0
Aro >C7-C8 (w)	µg/l	1	A-T-022w	<1	<1	<1	<1	104	6	7	74	1
Aro >C8-C10 (w)	µg/l	5	A-T-055w	<5	<5	<5	98	13800	381	3490	20	4
Aro >C10-C12 (w)	µg/l	5	A-T-055w	<5	<5	<5	326	57800	1430	16100	100	4
Aro >C12-C16 (w)	µg/l	5	A-T-055w	<5	<5	<5	308	27100	424	8310	100	4
Aro >C16-C21 (w)	µg/l	5	A-T-055w	<5	<5	<5	33	3980	96	434	90	3
Aro >C21-C35 (w)	µg/l	10	A-T-055w	<10	<10	<10	<10	1080	<100	137	90	2
Total Aromatics (w)	µg/l	10	Calc-As Recd	<10	<10	<10	765	104000	2340	28500	2500	2
TPH (Ali & Aro >C5-C35) (w)	µg/l	10	Calc-As Recd	<10	<10	<10	799	107000	2340	29200		
BTEX - Benzene (w)	µg/l	1	A-T-022w	<1	<1	<1	<1	<1	<1	<1	10	0
BTEX - Toluene (w)	µg/l	1	A-T-022w	<1	<1	<1	<1	104	6	7	74	1
BTEX - Ethyl Benzene (w)	µg/l	1	A-T-022w	<1	<1	<1	11	444	20	82	20	2
BTEX - m & p Xylene (w)	µg/l	1	A-T-022w	<1	<1	<1	1	803	11	126	30	2
BTEX - o Xylene (w)	µg/l	1	A-T-022w	<1	<1	<1	9	437	29	85	30	2
MTBE (w)	µg/l	1	A-T-022w	<1	<1	<1	<1	<1	<1	<1		

Envirolab Job Number: 24/11441 & 24/11176
Client: Geo2 Remediation Ltd
Client Project Name: Wrexham
Client Project Ref: 4495

Groundwater GAC comparison

Lab Sample ID				24/11176/1	24/11176/2	24/11176/3	24/11176/4	24/11441/1	24/11441/2	24/11441/3		
Client Sample No												
Client Sample ID				Upstream	Downstream	Well	EX1	WS2	WS3	WS9		
Depth to Top												
Depth to Bottom												
Date Sampled				11-Nov-24	11-Nov-24	11-Nov-24	11-Nov-24	21-Nov-24	21-Nov-24	21-Nov-24		
Sample Type				Water - SW	Water - SW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	**Units**	**Limit of Detection**	**Method**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	GAC	Count >GAC
pH (w)	pH	0.01	A-T-031w	7.8	7.87	7.14	6.96	7.5	7.82	8.72		
Arsenic (dissolved)	µg/l	1	A-T-025w	<1	<1	8	11	42	10	5	10	2
Boron (dissolved)	µg/l	10	A-T-025w	61	63	27	<100	156	126	49		
Barium (dissolved)	µg/l	1	A-T-025w	59	59	43	515	985	564	58		
Beryllium (dissolved)	µg/l	1	A-T-025w	<1	<1	<1	<10	<5	<1	<1		
Cadmium (dissolved)	µg/l	0.2	A-T-025w	<0.2	<0.2	<0.2	<2.0	2.4	0.7	<0.2	5	0
Copper (dissolved)	µg/l	4	A-T-025w	<4	<4	<4	<40	55	20	<4	2000	0
Chromium (dissolved)	µg/l	1	A-T-025w	2	6	4	<10	18	3	8	50	0
Chromium (hexavalent) (w)	mg/l	0.01	A-T-040w	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Chromium (trivalent) (w)	mg/l	0.01	Calc	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01		
Lead (dissolved)	µg/l	1	A-T-025w	<1	<1	1	41	420	188	7	10	3
Mercury (dissolved)	µg/l	0.1	A-T-025w	<0.1	<0.1	<0.1	<1.0	<0.5	<0.1	<0.1	1	0
Nickel (dissolved)	µg/l	2	A-T-025w	<2	<2	<2	<20	29	7	<2	20	1
Selenium (dissolved)	µg/l	1	A-T-025w	<1	<1	<1	<10	6	2	2	10	0
Vanadium (dissolved)	µg/l	1	A-T-025w	<1	<1	<1	30	29	8	9		0
Zinc (dissolved)	µg/l	2	A-T-025w	<2	<2	40	290	257	24	3	3000	0
SVOC (w)												
1,2,4-Trichlorobenzene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
1,2-Dichlorobenzene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
1,3-Dichlorobenzene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
1,4-Dichlorobenzene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
2,4,5-Trichlorophenol	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
2,4,6-Trichlorophenol	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
2,4-Dichlorophenol	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
2,4-Dimethylphenol	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
2,4-Dinitrotoluene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
2,6-Dinitrotoluene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
2-Chloronaphthalene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
2-Chlorophenol	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
2-Methylnaphthalene	µg/l	1	A-T-052w	<1	<1	<1	<1	>997	61	645		
2-Methylphenol	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
2-Nitrophenol	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
4-Bromophenyl phenyl ether	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
4-Chloro-3-methylphenol	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1	350	0
Bis(2-chloroisopropyl)ether	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
3+4-Methylphenol	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
4-Nitrophenol	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
Acenaphthene	µg/l	1	A-T-052w	<1	<1	<1	16	>431	15	126		
Acenaphthylene	µg/l	1	A-T-052w	<1	<1	<1	1	93	<10	<1		
Anthracene	µg/l	1	A-T-052w	<1	<1	<1	<1	172	<10	<1		
Bis(2-chloroethyl)ether	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
Bis(2-chloroethoxy)methane	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
Bis(2-ethylhexyl)phthalate	µg/l	10	A-T-052w	<10	<10	<10	<10	<100	<100	<10	8	0
Benzo(a)anthracene	µg/l	1	A-T-052w	<1	<1	<1	<1	56	<10	<1		
Butylbenzyl phthalate	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
Benzo(b)fluoranthene	µg/l	1	A-T-052w	<1	<1	<1	<1	23	<10	<1	0.1	1
Benzo(k)fluoranthene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1	0.1	0
Benzo(a)pyrene	µg/l	1	A-T-052w	<1	<1	<1	<1	29	<10	<1	0.01	1
Benzo(ghi)perylene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1	0.1	0
Carbazole	µg/l	1	A-T-052w	<1	<1	<1	<1	11	<10	<1		
Chrysene	µg/l	1	A-T-052w	<1	<1	<1	<1	48	<10	<1		
Dibenzofuran	µg/l	1	A-T-052w	<1	<1	<1	<1	70	<10	10		
n-Dibutylphthalate	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
n-Dioctylphthalate	µg/l	10	A-T-052w	<10	<10	<10	<10	<100	<100	<10		
n-Nitroso-n-dipropylamine	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
Diethyl phthalate	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
Dimethyl phthalate	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
Dibenzo(ah)anthracene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
Fluorene	µg/l	1	A-T-052w	<1	<1	<1	3	>430	<10	50		
Fluoranthene	µg/l	1	A-T-052w	<1	<1	<1	<1	108	<10	<1		
Hexachlorobutadiene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
Hexachlorobenzene SVOC	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
Pentachlorophenol SVOC	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1	9	0
Phenol	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
Hexachloroethane	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
Nitrobenzene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
Naphthalene	µg/l	1	A-T-052w	<1	<1	<1	<1	151	52	591		
Isophorone	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
Phenanthrene	µg/l	1	A-T-052w	<1	<1	<1	1	>362	<10	38		
Pyrene	µg/l	1	A-T-052w	<1	<1	<1	<1	157	<10	<1		
Indeno(1,2,3-cd)pyrene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1	0.1	0
Perylene	µg/l	1	A-T-052w	<1	<1	<1	<1	<10	<10	<1		
VOC (w)												
Dichlorodifluoromethane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
Chloromethane	µg/l	10	A-T-006w	<10	<10	<10	<10	<10	<10	<10		
Vinyl Chloride	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	0.5	0
Bromomethane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
Chloroethane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
Trichlorofluoromethane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
trans 1,2-Dichloroethene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	50	0
Dichloromethane	µg/l	5	A-T-006w	<5	<5	<5	<5	<5	<5	<5	20	0
Carbon Disulphide	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
1,1-Dichloroethene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	7	0
cis 1,2-Dichloroethene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	50	0
Bromochloromethane	µg/l	5	A-T-006w	<5	<5	<5	<5	<5	<5	<5		
Chloroform	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	100	0
2,2-Dichloropropane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
1,2-Dichloroethane	µg/l	2	A-T-006w	<2	<2	<2	<2	<2	<2	<2	3	0
1,1,1-Trichloroethane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	51.6	0
1,1-Dichloropropene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
Benzene	µg/l	1	A-T-006w	<1	<1	<1	<1	1	<1	<1	1	0
Carbon Tetrachloride	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	4	0
Dibromomethane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
1,2-Dichloropropane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
Bromodichloromethane	µg/l	10	A-T-006w	<10	<10	<10	<10	<10	<10	<10	100	0
Trichloroethene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	10	0
cis 1,3-Dichloropropene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
trans 1,3-Dichloropropene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
1,1,2-Trichloroethane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	206	0
Toluene	µg/l	1	A-T-006w	<1	<1	<1	<1	108	7	9	700	0
1,3-Dichloropropane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
Dibromochloromethane	µg/l	3	A-T-006w	<3	<3	<3	<3	<3	<3	<3	100	0
1,2-Dibromoethane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
Tetrachloroethene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	10	0
1,1,1,2-Tetrachloroethane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
Chlorobenzene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
Ethylbenzene	µg/l	1	A-T-006w	<1	<1	<1	11	372	20	82	300	1
m & p Xylene	µg/l	1	A-T-006w	<1	<1	<1	1	660	9	124	15.5	2
Bromoform	µg/l	3	A-T-006w	<3	<3	<3	<3	<3	<3	<3	100	0
Styrene	µg/l	1	A-T-006w	<1	<1	<1	<1	<8	<1	<1		
1,1,2,2-Tetrachloroethane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
o-Xylene	µg/l	1	A-T-006w	<1	<1	<1	7	329	23	70	500	0
1,2,3-Trichloropropane	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
Isopropylbenzene	µg/l	1	A-T-006w	<1	<1	<1	3	84	10	27		
Bromobenzene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
2-Chlorotoluene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
n-propylbenzene	µg/l	1	A-T-006w	<1	<1	<1	1	34	3	14		
4-Chlorotoluene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
1,2,4-Trimethylbenzene	µg/l	1	A-T-006w	<1	<1	<1	<1	503	37	229		
4-Isopropyltoluene	µg/l	1	A-T-006w	<1	<1	<1	<1	17	<1	6		
1,3,5-Trimethylbenzene	µg/l	1	A-T-006w	<1	<1	<1	<1	171	3	68		
1,2-Dichlorobenzene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	1000	0
1,4-Dichlorobenzene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	300	0
sec-Butylbenzene	µg/l	1	A-T-006w	<1	<1	<1	<1	<2	<1	<1		
tert-Butylbenzene	µg/l	2	A-T-006w	<2	<2	<2	<2	<2	<2	<2		
1,3-Dichlorobenzene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1		
n-butylbenzene	µg/l	1	A-T-006w	<1	<1	<1	<1	<7	<1	<2		
1,2-Dibromo-3-chloropropane	µg/l	2	A-T-006w	<2	<2	<2	<2	<2	<2	<2		
1,2,4-Trichlorobenzene	µg/l	3	A-T-006w	<3	<3	<3	<3	<3	<3	<3		
1,2,3-Trichlorobenzene	µg/l	3	A-T-006w	<3	<3	<3	<3	<3	<3	<3		
Hexachlorobutadiene	µg/l	1	A-T-006w	<1	<1	<1	<1	<1	<1	<1	0.6	0
TPH CWG (w) with Clean Up												
Ali >C5-C6 (w)	µg/l	1	A-T-022w	<1	<1	<1	<1	<1	<1	<1		
Ali >C6-C8 (w)	µg/l	1	A-T-022w	<1	<1	<1	<1	<1	<1	<1		
Ali >C8-C10 (w)	µg/l	5	A-T-055w	<5	<5	<5	8	246	<50	<50	300	0
Ali >C10-C12 (w)	µg/l	5	A-T-055w	<5	<5	<5	10	866	<50	152	300	1
Ali >C12-C16 (w)	µg/l	5	A-T-055w	<5	<5	<5	<5	747	<50	79	300	1
Ali >C16-C21 (w)	µg/l	5	A-T-055w	<5	<5	<5	<5	<25	<50	<50		
Ali >C21-C35 (w)	µg/l	5	A-T-055w	<5	<5	<5	16	1700	<50	468		
Total Aliphatics (w)	µg/l	5	Calc-As Recd	<5	<5	<5	34	3560	<50	699		
Aro >C5-C7 (w)	µg/l	1	A-T-022w	<1	<1	<1	<1	<1	<1	<1	1	0
Aro >C7-C8 (w)	µg/l	1	A-T-022w	<1	<1	<1	<1	104	6	7	700	0
Aro >C8-C10 (w)	µg/l	5	A-T-055w	<5	<5	<5	98	13800	381	3490	300	3
Aro >C10-C12 (w)	µg/l	5	A-T-055w	<5	<5	<5	326	57800	1430	16100	90	4
Aro >C12-C16 (w)	µg/l	5	A-T-055w	<5	<5	<5	308	27100	424	8310	90	4
Aro >C16-C21 (w)	µg/l	5	A-T-055w	<5	<5	<5	33	3980	96	434	90	3
Aro >C21-C35 (w)	µg/l	10	A-T-055w	<10	<10	<10	<10	1080	<100	137	90	2
Total Aromatics (w)	µg/l	10	Calc-As Recd	<10	<10	<10	765	104000	2340	28500		
TPH (Ali & Aro >C5-C35) (w)	µg/l	10	Calc-As Recd	<10	<10	<10	799	107000	2340	29200		
BTEX - Benzene (w)	µg/l	1	A-T-022w	<1	<1	<1	<1	<1	<1	<1	1	0
BTEX - Toluene (w)	µg/l	1	A-T-022w	<1	<1	<1	<1	104	6	7	700	0
BTEX - Ethyl Benzene (w)	µg/l	1	A-T-022w	<1	<1	<1	11	444	20	82	300	1
BTEX - m & p Xylene (w)	µg/l	1	A-T-022w	<1	<1	<1	1	803	11	126	15.5	2
BTEX - o Xylene (w)	µg/l	1	A-T-022w	<1	<1	<1	9	437	29	85	500	0
MTBE (w)	µg/l	1	A-T-022w	<1	<1	<1	<1	<1	<1	<1		

Envirolab Job Number: 24/11442
Client: Geo2 Remediation Ltd
Client Project Name: Wrexham
Client Project Ref: 4495

Soil Human Health GAC comparison

Lab Sample ID				24/11442/1	24/11442/2	24/11442/3	24/11442/4	24/11442/5	24/11442/6				
Client Sample No													
Client Sample ID				WS2	WS3	WS4	WS5	WS7	WS9				
Depth to Top				1.00	0.50	4.00	0.50	1.00	4.00				
Depth to Bottom													
Date Sampled				21-Nov-24	21-Nov-24	21-Nov-24	21-Nov-24	21-Nov-24	21-Nov-24				
Sample Type				Soil	Soil	Solid	Soil	Soil	Solid				
Sample Matrix Code	**Units**	**Limit of Detection**	**Method**	4ABE	4ABE	7	4A	4A	7	GAC (µg/kg)	GAC (mgkg)	Count >GAC	
% Stones >10mm	% w/w	0.1	A-T-044	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Phenols - Total by HPLC	mg/kg	0.2	A-T-050s			<0.2		<0.2	<0.2				
Total Organic Carbon	% w/w	0.03	A-T-032s	0.71		2.8	0.28						**Note: No exceedances of SoBRA vapour GACs**
Arsenic	mg/kg	1	A-T-024s	3	10		3	5			640	0	
Barium	mg/kg	1	A-T-024s	101	202		75	643					
Beryllium	mg/kg	0.5	A-T-024s	<0.5	1.4		<0.5	4.1					
Boron (water soluble)	mg/kg	1	A-T-027s	<1.0	1.1		<1.0	<1.0					
Cadmium	mg/kg	0.5	A-T-024s	<0.5	1.5		<0.5	1.9			190	0	
Copper	mg/kg	1	A-T-024s	13	42		14	106			68000	0	
Chromium	mg/kg	1	A-T-024s	15	20		13	34					
Chromium (hexavalent)	mg/kg	1	A-T-040s	<1	<1		<1	<1			33	0	
Chromium (trivalent)	mg/kg	1	Calc	15	20		13	34			8600	0	
Lead	mg/kg	1	A-T-024s	30	301		71	235			2300	0	
Mercury	mg/kg	0.17	A-T-024s	<0.17	0.34		<0.17	<0.17			1100	0	
Nickel	mg/kg	1	A-T-024s	12	23		19	44			980	0	
Selenium	mg/kg	1	A-T-024s	<1	2		<1	<1			12000	0	
Vanadium	mg/kg	1	A-T-024s	15	28		12	57			9000	0	
Zinc	mg/kg	5	A-T-024s	44	283		53	463			730000	0	
alpha-Hexachlorocyclohexane (HCH)	mg/kg	0.01	A-T-056			<0.01		<0.01	<0.01				
beta-Hexachlorocyclohexane (HCH)	mg/kg	0.01	A-T-056			<0.01		<0.01	<0.01				
delta-Hexachlorocyclohexane (HCH)	mg/kg	0.01	A-T-056			<0.01		<0.01	<0.01				
Asbestos in Soil (inc. matrix) ^													
Asbestos in soil			A-T-045	NAD			NAD	NAD					
Asbestos Matrix (visual)			A-T-045	-			-	-					
Asbestos Matrix (microscope)			A-T-045	-			-	-					
Asbestos ACM - Suitable for Water Absorption Test?			A-T-045	N/A			N/A	N/A					
SVOC													
4-Bromophenyl phenyl ether	µg/kg	100	A-T-052s			<100		<100	<1000				
Hexachlorobenzene	µg/kg	100	A-T-052s			<100		<100	<1000	1800	1.8	0	
Diethyl phthalate	µg/kg	100	A-T-052s			<100		<100	<1000	120000	120	0	
Dimethyl phthalate	µg/kg	100	A-T-052s			<100		<100	<1000				
Dibenzofuran	µg/kg	100	A-T-052s			<100		<100	<1000				
Carbazole	µg/kg	100	A-T-052s			<100		<100	<1000				
Butylbenzyl phthalate	µg/kg	100	A-T-052s			<100		<100	<1000	1400000	1400	0	
Bis(2-ethylhexyl)phthalate	µg/kg	500	A-T-052s			<500		1410	<5000	280000	280	1	
Bis(2-chloroethoxy)methane	µg/kg	100	A-T-052s			<100		<100	<1000				
Bis(2-chloroethyl)ether	µg/kg	100	A-T-052s			<100		<100	<1000				
4-Nitrophenol	µg/kg	100	A-T-052s			<100		<100	<1000				
3+4-Methylphenol	µg/kg	100	A-T-052s			<100		<100	<1000				
4-Chloro-3-methylphenol	µg/kg	100	A-T-052s			<100		<100	<1000				
2-Nitrophenol	µg/kg	100	A-T-052s			<100		<100	<1000				
2-Methylphenol	µg/kg	100	A-T-052s			<100		<100	<1000				
1,2,4-Trichlorobenzene	µg/kg	100	A-T-052s			<100		<100	<1000				
2-Chlorophenol	µg/kg	100	A-T-052s			<100		<100	<1000				
2,6-Dinitrotoluene	µg/kg	100	A-T-052s			<100		<100	<1000				
2,4-Dinitrotoluene	µg/kg	100	A-T-052s			<100		<100	<1000				
2,4-Dimethylphenol	µg/kg	100	A-T-052s			<100		<100	<1000				
2,4-Dichlorophenol	µg/kg	100	A-T-052s			<100		<100	<1000				
2,4,6-Trichlorophenol	µg/kg	100	A-T-052s			<100		<100	<1000				
2,4,5-Trichlorophenol	µg/kg	100	A-T-052s			<100		<100	<1000				
1,4-Dichlorobenzene	µg/kg	100	A-T-052s			<100		<100	<1000				
1,3-Dichlorobenzene	µg/kg	100	A-T-052s			<100		<100	<1000				
1,2-Dichlorobenzene	µg/kg	100	A-T-052s			<100		<100	<1000				
2-Chloronaphthalene	µg/kg	100	A-T-052s			<100		<100	<1000	3700	3.7	0	
2-Methylnaphthalene	µg/kg	100	A-T-052s			<100		245	3540	8700	8.7	2	
Acenaphthylene	µg/kg	100	A-T-052s			<100		<100	<1000	83000000	83000	0	
Acenaphthene	µg/kg	100	A-T-052s			<100		<100	1690	84000000	84000	0	
Anthracene	µg/kg	100	A-T-052s			<100		<100	1280	520000000	520000	0	
Benzo(a)anthracene	µg/kg	100	A-T-052s			<100		<100	<1000	170000	170	0	
Benzo(b)fluoranthene	µg/kg	100	A-T-052s			<100		145	<1000	44000	44	1	
Benzo(k)fluoranthene	µg/kg	100	A-T-052s			<100		<100	<1000	1200000	1200	0	
Benzo(a)pyrene	µg/kg	100	A-T-052s			<100		<100	<1000	35000	35	0	
Benzo(ghi)perylene	µg/kg	100	A-T-052s			<100		<100	<1000	3900000	3900	0	
Chrysene	µg/kg	100	A-T-052s			<100		<100	<1000	350000	350	0	
Fluoranthene	µg/kg	100	A-T-052s			<100		<100	1170	23000000	23000	0	
Fluorene	µg/kg	100	A-T-052s			<100		<100	1390	63000000	63000	0	
Indeno(1,2,3-cd)pyrene	µg/kg	100	A-T-052s			<100		<100	<1000	500000	500	0	
Phenanthrene	µg/kg	100	A-T-052s			<100		<100	4800	22000000	22000	0	
Pyrene	µg/kg	100	A-T-052s			<100		<100	1690	54000000	54000	0	
Naphthalene	µg/kg	100	A-T-052s			<100		233	3740	190000	190	2	
Dibenzo(ah)anthracene	µg/kg	100	A-T-052s			<100		<100	<1000	3500	3.5	0	
Bis(2-chloroisopropyl)ether	µg/kg	100	A-T-052s			<100		<100	<1000				
Phenol	µg/kg	100	A-T-052s			<100		<100	<1000				
Pentachlorophenol	µg/kg	100	A-T-052s			<100		<100	<1000				
n-Nitroso-n-dipropylamine	µg/kg	100	A-T-052s			<100		<100	<1000				
n-Dioctylphthalate	µg/kg	500	A-T-052s			<500		<500	<5000	2300000	2300	0	
n-Dibutylphthalate	µg/kg	100	A-T-052s			<100		<100	<1000	13000	13	0	
Nitrobenzene	µg/kg	100	A-T-052s			<100		<100	<1000				
Isophorone	µg/kg	100	A-T-052s			<100		<100	<1000				
Hexachloroethane	µg/kg	100	A-T-052s			<100		<100	<1000	22000	22	0	
Hexachlorobutadiene	µg/kg	100	A-T-052s			<100		<100	<1000				
Perylene	µg/kg	100	A-T-052s			<100		<100	<1000				
VOC													
Dichlorodifluoromethane	µg/kg	1	A-T-006s			<25		<25	<1				
Chloromethane	µg/kg	10	A-T-006s			<250		<250	<10	1000	1	0	
Vinyl Chloride (Chloroethene)	µg/kg	1	A-T-006s			<25		<25	<1	1100	1.1	0	
Bromomethane	µg/kg	1	A-T-006s			<25		<25	<1				
Chloroethane	µg/kg	1	A-T-006s			<25		<25	<1	960000	960	0	
Trichlorofluoromethane	µg/kg	1	A-T-006s			<25		<25	<1				
1,1-Dichloroethene	µg/kg	1	A-T-006s			<25		<25	<1	26000	26	0	
Carbon Disulphide	µg/kg	1	A-T-006s			<25		<25	1	140	0.14	1	
Dichloromethane	µg/kg	5	A-T-006s			<125		<125	<5	270000	270	0	
trans 1,2-Dichloroethene	µg/kg	1	A-T-006s			<25		<25	<1	22000	22	0	
1,1-Dichloroethane	µg/kg	1	A-T-006s			<25		<25	<1	280000	280	0	
cis 1,2-Dichloroethene	µg/kg	1	A-T-006s			<25		<25	<1	14000	14	0	
2,2-Dichloropropane	µg/kg	1	A-T-006s			<25		<25	<1				
Bromochloromethane	µg/kg	5	A-T-006s			<125		<125	<5				
Chloroform	µg/kg	1	A-T-006s			<25		<25	<1	99000	99	0	
1,1,1-Trichloroethane	µg/kg	1	A-T-006s			<25		<25	<1	660000	660	0	
1,1-Dichloropropene	µg/kg	1	A-T-006s			<25		<25	<1				
Carbon Tetrachloride	µg/kg	1	A-T-006s			<25		<25	<1	2900	2.9	0	
1,2-Dichloroethane	µg/kg	2	A-T-006s			<50		<50	<2	12000	12	0	
Benzene	µg/kg	1	A-T-006s			<25		<25	1	27000	27	0	
Trichloroethene	µg/kg	1	A-T-006s			<25		<25	<1	9.3	0.0093	0	
1,2-Dichloropropane	µg/kg	1	A-T-006s			<25		<25	<1	24	0.024	0	
Dibromomethane	µg/kg	1	A-T-006s			<25		<25	<1				
Bromodichloromethane	µg/kg	10	A-T-006s			<250		<250	<10	16	0.016	0	
cis 1,3-Dichloropropene	µg/kg	1	A-T-006s			<25		<25	<1				
Toluene	µg/kg	1	A-T-006s			<25		<25	63	56000000	56000	0	
trans 1,3-Dichloropropene	µg/kg	1	A-T-006s			<25		<25	<1				
1,1,2-Trichloroethane	µg/kg	1	A-T-006s			<25		<25	<1	94000	94	0	
1,3-Dichloropropane	µg/kg	1	A-T-006s			<25		<25	<1				
Tetrachloroethene	µg/kg	1	A-T-006s			<25		<25	<1	310	0.31	0	
Dibromochloromethane	µg/kg	3	A-T-006s			<75		<75	<3				
1,2-Dibromoethane	µg/kg	1	A-T-006s			<25		<25	<1				
Chlorobenzene	µg/kg	1	A-T-006s			<25		<25	<1	460	0.46	0	
1,1,1,2-Tetrachloroethane	µg/kg	1	A-T-006s			<25		<25	<1	110000	110	0	
Ethylbenzene	µg/kg	1	A-T-006s			<25		<25	694	5700000	5700	0	
m & p Xylene	µg/kg	1	A-T-006s			<25		<25	912	5900000	5900	0	
o-Xylene	µg/kg	1	A-T-006s			<25		<25	539	6600000	6600	0	
Styrene	µg/kg	1	A-T-006s			<25		<25	<4	8100	8.1	0	
Bromoform	µg/kg	3	A-T-006s			<75		<75	<3	2800	2.8	0	
Isopropylbenzene	µg/kg	1	A-T-006s			<25		<25	326	1400000	1400	0	
1,1,2,2-Tetrachloroethane	µg/kg	1	A-T-006s			<25		<25	<1	270000	270	0	
1,2,3-Trichloropropane	µg/kg	1	A-T-006s			<25		<25	<1				
Bromobenzene	µg/kg	1	A-T-006s			<25		<25	<1	870	0.87	0	
n-Propylbenzene	µg/kg	1	A-T-006s			<25		<25	142	4100000	4100	0	
2-Chlorotoluene	µg/kg	1	A-T-006s			<25		<25	<1				
1,3,5-Trimethylbenzene	µg/kg	1	A-T-006s			<25		<25	557	42000	42	1	
4-Chlorotoluene	µg/kg	1	A-T-006s			<25		<25	<1				
tert-Butylbenzene	µg/kg	2	A-T-006s			<50		<50	<2				
1,2,4-Trimethylbenzene	µg/kg	1	A-T-006s			<25		<25	1310	42000	42	1	
sec-Butylbenzene	µg/kg	1	A-T-006s			<25		<25	<12				
4-Isopropyltoluene	µg/kg	1	A-T-006s			<25		<25	178	179			
1,3-Dichlorobenzene	µg/kg	1	A-T-006s			<25		<25	<1	400	0.4	0	
1,4-Dichlorobenzene	µg/kg	1	A-T-006s			<25		<25	<1	61000	61	0	
n-Butylbenzene	µg/kg	1	A-T-006s			<25		<25	<117				
1,2-Dichlorobenzene	µg/kg	1	A-T-006s			<25		<25	<1	23000	23	0	
1,2-Dibromo-3-chloropropane (DCBP)	µg/kg	2	A-T-006s			<50		<50	<2				
1,2,4-Trichlorobenzene	µg/kg	3	A-T-006s			<75		<75	<3	2600	2.6	0	
Hexachlorobutadiene	µg/kg	1	A-T-006s			<25		<25	<1	290	0.29	0	
1,2,3-Trichlorobenzene	µg/kg	3	A-T-006s			<75		<75	<3	1500	1.5	0	
TPH CWG with Clean Up													
Ali >C5-C6	mg/kg	0.01	A-T-022s	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		3200	0	
Ali >C6-C8	mg/kg	0.01	A-T-022s	<0.01	<0.01	<0.01	<0.01	<0.01	0.11		7800	0	
Ali >C8-C10	mg/kg	1	A-T-055s	<1	<1	<1	<1	<1	<50		2000	0	
Ali >C10-C12	mg/kg	1	A-T-055s	<1	<1	<1	<1	<1	196		9700	0	
Ali >C12-C16	mg/kg	1	A-T-055s	2	<1	<1	<1	1	318		59000	0	
Ali >C16-C21	mg/kg	1	A-T-055s	<1	<1	<1	<1	1	83		1600000	0	
Ali >C21-C35	mg/kg	1	A-T-055s	35	5	1	<1	48	<50		1600000	0	
Total Aliphatics	mg/kg	1	Calc-As Recd	37	5	1	<1	50	598				
Aro >C5-C7	mg/kg	0.01	A-T-022s	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		26000	0	
Aro >C7-C8	mg/kg	0.01	A-T-022s	<0.01	<0.01	<0.01	<0.01	<0.01	0.29		56000	0	
Aro >C8-C10	mg/kg	1	A-T-055s	<1	<1	<1	<1	3	427		3500	0	
Aro >C10-C12	mg/kg	1	A-T-055s	<1	<1	<1	<1	3	2810		16000	0	
Aro >C12-C16	mg/kg	1	A-T-055s	7	2	<1	<1	5	5380		36000	0	
Aro >C16-C21	mg/kg	1	A-T-055s	14	7	<1	<1	8	2340		28000	0	
Aro >C21-C35	mg/kg	1	A-T-055s	49	13	<1	<1	28	1030		28000	0	
Total Aromatics	mg/kg	1	Calc-As Recd	69	23	<1	<1	45	12000				
TPH (Ali & Aro >C5-C35)	mg/kg	1	Calc-As Recd	106	27	1	<1	95	12600				
BTEX - Benzene	mg/kg	0.01	A-T-022s	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		27	0	
BTEX - Toluene	mg/kg	0.01	A-T-022s	<0.01	<0.01	<0.01	<0.01	<0.01	0.29		56000	0	
BTEX - Ethyl Benzene	mg/kg	0.01	A-T-022s	<0.01	<0.01	<0.01	<0.01	<0.01	3.67		5700	0	
BTEX - m & p Xylene	mg/kg	0.01	A-T-022s	<0.01	<0.01	<0.01	<0.01	<0.01	4.81		5900	0	
BTEX - o Xylene	mg/kg	0.01	A-T-022s	<0.01	<0.01	<0.01	<0.01	<0.01	3.26		6600	0	
MTBE	mg/kg	0.01	A-T-022s	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		7900	0	

Appendix F – Planning Correspondence

MEMORANDUM

From:	Angela Guy Contaminated Land Officer	**To:**	Sharon Holman Planning Team
Our Ref:	P/2024/1020	**Your Ref:**	P/2024/1020
Date:	26 June 2024	**No. of Pages:**	2

TOWN AND COUNTRY PLANNING ACT 1990

P/2024/1020 CHANGE OF USE OF LAND TO CREATE CAR WASH AND TYRE FITTING UNIT

1 SALOP ROAD, WREXHAM, LL13 7AF

The following report was submitted in relation to the above planning application.

- Earth Environmental & Geotechnical, Phase 1 GeoEnvironmental Desk Study, Salop Road, Wrexham. December 2021 on behalf of P1 Speedyfit Ltd

Having reviewed the report I note that Appendix 1 is missing, please can this be provided.

I consider the content of the report to otherwise be sufficient, although the recommendations do not suggest an intrusive investigation is required and I am not in agreement with that. Potential sources of contamination have been identified and the proposed end use may have a risk to site users, furthermore risks to controlled waters may also be present. Therefore I recommend the following conditions be applied to the planning permission if granted.

Conditions

EN01 008R PHASED INVESTIGATION - LAND CONTAMINATION
No development shall take place until a phased site investigation of the nature and extent of contamination has been carried out and submitted to and approved in writing by the Local Planning Authority. If any contamination is found during the site investigation, no part of the development shall commence until a scheme specifying the measures that will be taken to remediate the site to render it suitable for the development hereby permitted has been submitted to and approved in writing by the local planning authority. The site shall thereafter be remediated in accordance with the approved scheme. If during the course of development any contamination is found that has not been identified in the site investigation,

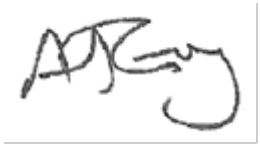
no further development shall take place on those parts of the site where that contamination has been found until an additional scheme of remediation has been submitted to and approved in writing by the local planning authority for those parts of the site. The relevant parts of the site shall thereafter be remediated in accordance with the additional scheme of remediation.

EN03 008R VALIDATION REPORT - CONTAMINATED LAND
Each part of the site subject to the remediation under the scheme(s) approved as part of condition @@ shall not be occupied/used until a Validation Report has been completed in respect of that part of the site and submitted to and approved in writing by the Local Planning Authority.

Informative

INF03 - SITE CONTAMINATION
Further advice on compliance with condition no. @@ may be obtained by contacting the Council's Contaminated Land Officer on 01978 298771 or 297773. Should the investigation identify contamination issues that may affect receptors other than the site users e.g. groundwater, then it is recommended that these works are also addressed in consultation with the Contaminated Land Officer prior to commencement of works on site.

Should you have any queries regarding the above then please contact me on Ext. 8771.



……
Angela Guy
Contaminated Land Officer

Appendix G – Risk Assessment Terminology

Definitions and Classifications of Risk Assessment Terminology.

Probability

Probability can be defined as the chance of a particular event occurring in a given period of time.

Descriptions of each of the four qualitative terms to be use in this report to describe the perceived probability of any identified pollutant linkage becoming realised are shown below in Table W.

Term	Description
High Likelihood	There is pollutant linkage and an event would appear very likely in the short-term and almost inevitable over the long-term, or there is evidence at the receptor of harm or pollution.
Likely	There is pollutant linkage and all the elements are present and in the right place which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short-term and likely over the long-term.
Low Likelihood	There is pollutant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a long period such an event would take place, and is less likely in the shorter term.
Unlikely	There is pollutant linkage but circumstances are such that it is improbable that an event would occur even in the very long-term.

Table W. Description of Probability Classifications

Severity

Severity (consequence) can be defined as the adverse effects (or harm) arising from a defined hazard, which impairs the quality of human health or the environment in the short or longer term.

Descriptions of each of the four qualitative terms to be use in this report to describe the perceived potential severity of any identified pollutant linkage becoming realised are shown below in Table X.

Term	Description
Severe	Highly elevated concentrations **likely** to result in "significant harm" to human health as defined by the EPA 1990, Part 2A, if exposure occurs. Equivalent to **EA Category 1** pollution incident including persistent and/or extensive effects on water quality; leading to closure of a potable abstraction point; major impact on amenity value or major damage to agriculture or commerce. Major damage to aquatic or other ecosystems, which is likely to result in a substantial adverse change in its functioning or harm to a species of special interest that endangers the long-term maintenance of the population. Catastrophic damage to crops, buildings or property.
Medium	Elevated concentrations which could result in "significant harm" to human health as defined by the EPA 1990, Part 2A if exposure occurs. Equivalent to **EA Category 2** pollution incident including significant effect on water quality; notification required to abstractors; reduction in amenity value or significant damage to agriculture or commerce. Significant damage to aquatic or other ecosystems, which may result in a substantial adverse change in its functioning or harm to a species of special interest that may endanger the long-term maintenance of the population. Significant damage to crops, buildings or property.
Mild	Exposure to human health **unlikely** to lead to "significant harm". Equivalent to **EA Category 3** pollution incident including minimal or short-lived effect on water quality; marginal effect on amenity value, agriculture or commerce. Minor or short-lived damage to aquatic or other ecosystems, which is unlikely to result in a substantial adverse change in its functioning or harm to a species of special interest that would endanger the long-term maintenance of the population. Minor damage to crops, buildings or property.
Minor	No measurable effect on humans. Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems. Repairable effects of damage to buildings, structures and services.

Table X. Description of Severity Classifications

Once the severity and probability of a pollutant linkage has been determined the risk can be assessed using the risk matrix shown overleaf on Table Y.

Risk Matrix

By cross referencing the derived severity and probability in Table Y, below the perceived potential risk can be determined.

		Severity			
		Severe	Medium	Mild	Minor
Probability	High Likelihood	Very High Risk	High Risk	Moderate Risk	Moderate / Low Risk
	Likely	High Risk	Moderate Risk	Moderate / Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate / Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate / Low Risk	Low Risk	Very Low Risk	Very Low Risk

Table Y. Risk Assessment Matrix

The risk categories detailed above are defined below in the following Table Z.

Term	Description
Very High Risk	There is a high probability that significant harm could arise to a designated receptor from an identified hazard at the site without appropriate remedial action.
High Risk	Significant harm is likely to arise to a designated receptor from an identified hazard at the site without appropriate remedial action.
Moderate Risk	It is possible that without appropriate remedial action, harm could arise to a designated receptor but it is relatively unlikely that any such harm would be severe and if any harm were to occur, it is likely that such harm would be relatively mild.
Low Risk	It is possible that significant harm could arise to a designated receptor from an identified hazard but it is likely that at worst this harm if realised would normally be mild.
Very Low Risk	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised, it is not likely to be severe.

Table Z. Definition of Risk