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Project	GROUNDHOG PHASE 2 – REMEDIATION STRATEGY
Client	Groundhog

Spectrum Geo Services
Foxglove Cottage,
Cwm Risca Lane,
Tondu,
BRIDGEND
CF32 0EH

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GROUNDHOG PHASE 2 – REMEDIATION STRATEGY

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1.0 INTRODUCTION

1.1 Introduction

Spectrum Geo Services (SGS) were requested by Groundhog to undertake a Phase 2 Investigation Study, of a site at Groundhog, Aberdulais.

The site is situated on the northern side of the B4242 Ynysgerwn Avenue, south east of the A4109, north east of Aberdulais and may be located by approximate Grid Reference SS 781 999. The existing site comprised a tarmac area, adjacent to existing structures.

The area of the proposed extension was generally level and occupied by the southern end of the industrial unit and an access road around the site.

SGS had completed a Phase 1 review of previous data (25070_R1) dated December 2025, which noted the requirement to physical ground investigation at the site to confirm the ground conditions.

This report provides a Remediation Strategy related to elevated the presence of asbestos at 0.30m in WS02.

1.2 Limitations

Subsoils are inherently variable and by their very nature are hidden from view such that no investigation can be exhaustive to the extent that all soil conditions are revealed. Conditions may therefore be present beneath the site that were not apparent from the data available for review.

Unless specifically noted to the contrary, it should be assumed that this report has not been submitted to any regulatory authorities for approval. Redevelopment sites may have planning conditions attached in respect of contaminated land assessment. Where we are made aware of such conditions in advance of scoping the works, we can tailor the report to the regulatory authority requirements. Where we are not made aware of any such requirements there can be no certainty that our investigation will meet any or all the regulatory authority requirements.

2.0 EXISTING SITE INFORMATION

2.1 Site Location

The site is situated on the northern side of the B4242 Ynysgerwn Avenue, south east of the A4109, north east of Aberdulais and may be located by approximate Grid Reference SS 781 999. The existing site comprised a tarmac area, adjacent to existing structures.

The area of the proposed extension was generally level and occupied by the southern end of the industrial unit and an access road around the site.

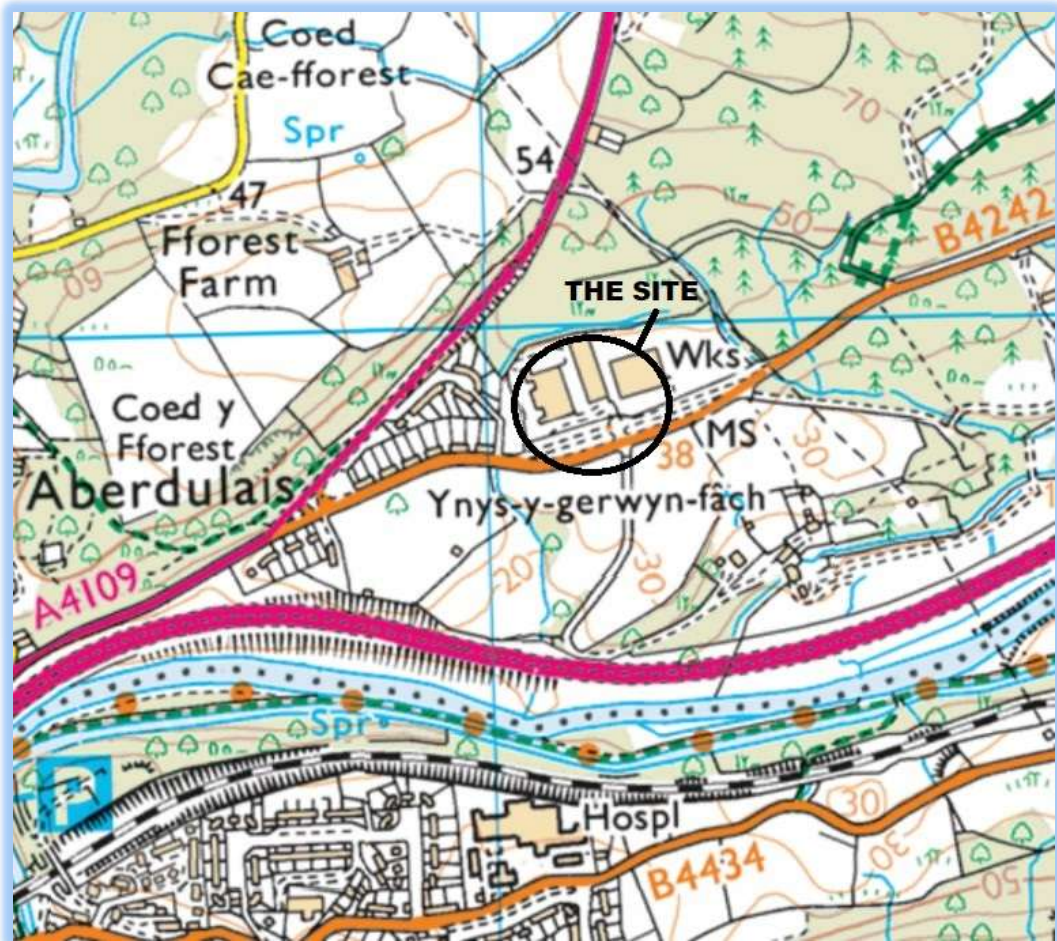


Figure SGS-01: Site Location Plan

2.2 Previous Investigations

SGS had previously investigated the site within:

- *Phase 1 Desk Study, Report 25070_R1, December 2025*
- *Phase 2 Ground Investigation Report, 25070_R2, December 2025*

2.3 Published Geology

The 1:50000 British Geological Map Sheet 247 indicates the site to be underlain by Glacial Sand and Gravel overlying Lower Pennant Coal Measures. Graig and Brithdir Coal Seams are indicated to the west of the site parallel with the Roman Road. The Lower Pennant Coal Measures generally consist of sandstone and mudstone.

The Coal Authority Report included in the Phase 1, indicated that the site is not within a surface area that could be affected by past underground mining and no mine entries were located within or within 20m of the site.

2.4 Hydrology

The OS Map shows the site to be north of the River Neath. Thus, groundwater flow is likely to be towards the south.

3.0 CONTAMINATION TESTING

Contamination testing was undertaken on four samples, as shown in the Appendices.

Client Sample ID		TP01	TP01	WS01	WS01	WS02	
Depth to Top		0.20	1.20	0.17	0.70	0.30	
Depth to Bottom		0.30	1.50	0.20	0.90	0.50	Commercial SGV/C4SL
% Stones >10mm	% w/w	<0.1	18.5	<0.1	16.8	<0.1	
pH	pH	8.97	6.97	10.45	7.99	8.78	
Sulphate (water sol 2:1)	g/l	0.01	0.02	0.19	<0.01	<0.01	
Organic Matter	% w/w	7.15	2.62	3.38	1.93	2.76	
Arsenic	mg/kg	5	6	11	13	10	640
Boron (water soluble)	mg/kg	<1.0	<1.0	1.6	<1.0	<1.0	240000
Cadmium	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	190
Copper	mg/kg	10	30	99	27	23	68000
Chromium	mg/kg	8	11	18	16	13	8600
Chromium (hexavalent)	mg/kg	<1	<1	<1	<1	<1	33
Lead	mg/kg	26	17	73	22	27	2700 P
Mercury	mg/kg	<0.17	<0.17	<0.17	<0.17	<0.17	1100
Nickel	mg/kg	6	25	18	26	30	980
Selenium	mg/kg	<1	<1	<1	2	<1	12000
Zinc	mg/kg	25	72	235	75	127	730000
TPH total (>C6-C40)	mg/kg	11	11	2890	11	178	>250000
Asbestos in Soil (inc. matrix)							
Asbestos in soil		NAD	NAD	NAD	NAD	Chrysotile	
Asbestos Matrix (microscope)		-	-	-	-	Loose Fibres	
Asbestos ACM - Suitable for Water Absorption Test?		N/A	N/A	N/A	N/A	N/A	
Asbestos in Soil Quantification % (Hand Picking & Weighing)							
Asbestos in soil % composition (hand picking and weighing)	% w/w					<0.001	
PAH-16MS							
Acenaphthene	mg/kg	<0.01	<0.01	0.17	<0.01	<0.01	5% SOM
Acenaphthylene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	100000
Anthracene	mg/kg	<0.02	<0.02	0.27	<0.02	<0.02	100000
Benzo(a)anthracene	mg/kg	<0.04	<0.04	0.98	<0.04	<0.04	540000
Benzo(a)pyrene	mg/kg	<0.04	<0.04	1.18	<0.04	<0.04	98
Benzo(b)fluoranthene	mg/kg	<0.05	<0.05	1.57	<0.05	<0.05	15
Benzo(ghi)perylene	mg/kg	<0.05	<0.05	0.71	<0.05	<0.05	100
Benzo(k)fluoranthene	mg/kg	<0.07	<0.07	<0.07	<0.07	<0.07	660
Chrysene	mg/kg	<0.06	<0.06	1.61	<0.06	<0.06	140
Dibenzo(ah)anthracene	mg/kg	<0.04	<0.04	<0.04	<0.04	<0.04	140
Fluoranthene	mg/kg	<0.08	<0.08	2.03	<0.08	<0.08	13
Fluorene	mg/kg	<0.01	<0.01	0.2	<0.01	<0.01	23000
Indeno(123-cd)pyrene	mg/kg	<0.03	<0.03	0.71	<0.03	<0.03	70000
Naphthalene	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	62
Phenanthrene	mg/kg	<0.03	<0.03	1.04	<0.03	0.05	540
Pyrene	mg/kg	<0.07	<0.07	1.81	<0.07	<0.07	23000
Total PAH-16MS	mg/kg	<0.08	<0.08	12.3	<0.08	<0.08	55000
							912768

The results have been compared with current Environment Agency limits for Commercial Uses. The previous table shows the recorded values, related to current Soil Guideline Values (SGVs)/S4UL/C4SL, or other published values.

The only concern within the laboratory test results was an identification of chrysotile fibres at WS02 (0.30m). The sample was further tested to determine quantification, which noted <0.001 % w/w.

This location will be beneath hardstanding or the buildings themselves and thus it is considered that no linkage will exist. Thus, no remediation design is required for end use. However, this must be considered within the context of the site works and materials management plan.

4.0 REMEDIATION STRATEGY

4.1 General

As there will be a concrete hard surface at this location, the risk of future contact with the minute quantity of asbestos is considered to be negligible.

Thus, no specific remediation scheme is considered necessary.

Ground workers should be made aware of the individual asbestos find, and be aware that there may be other areas where such materials exist. All excavations should be damped down and appropriate site welfare facilities made available.

- Movement of materials on the site should be undertaken in conjunction with a Materials Management Plan in line with the recommendations in the CL:AIRE Code of Practice to confirm any materials utilised on site are geotechnically and chemically suitable for re-use and to ensure all materials leaving site are disposed of at a suitable waste disposal facility;

It remains the responsibility of the contractor as waste producer to classify any waste materials and identify a suitable off-site disposal facility.

Thus, it is considered that the proposed hard surfacing will be sufficient to break any pathway from the low level sources noted during the investigation, in areas other than the capped soft landscaped areas.

4.2 Ground Gas

Ground gas monitoring was undertaken.

The key reference document which has been used to undertake the semi-quantitative land gas assessment presented in this report is CIRIA C665 (CIRIA, 2007). This provides a framework for assessment of land gas risk to buildings/structures with foundations (i.e. houses and/or commercial properties).

The risk assessment process is based on a Source-Pathway-Receptor Conceptual Site Model Methodology, with consideration given to the potential sources likely to be present on the site and the ground gas monitoring regime designed to reflect the scale of the source potential.

The collected data has been used for the purposes of undertaking a semi-quantitative assessment in accordance with the CIRIA 665 methodology. The calculation used to calculate the gas screening value (GSV) for the site, together with the relevant definition of units, is as follows:

$$\text{GSV (litres of gas/hr)} = \text{borehole flow rate (l/hr)} \times \text{gas concentration (volume/100)}$$

The calculated GSV values are used to determine the Characteristic Situation (CS) for the site in terms of methane and carbon dioxide, based on the conditions outlined in Table 4.2 below.

CS classification is applicable to all buildings, with the exception of low-rise housing with a ventilated underfloor void, in these situations, the NHBC Traffic Light System is adopted. As this development is for a childcare unit, the NHCC Traffic Light System is not considered appropriate in this instance and as such has not been included.

Characteristic Situation	Risk Classification	Gas Screening Value Threshold (l/hr)	Additional Considerations
1	Very Low Risk	<0.07	Methane concentration <1% Carbon dioxide <5%
2	Low Risk	<0.7	Borehole flow rate <70 l/hr
3	Moderate Risk	<3.5	-
4	Moderate to High Risk	<15	Quantitative risk assessment required to evaluate scope of protective measures
5	High Risk	<70	-
6	Very High Risk	>70	-

Table 4.2. GSV Classification

In order to assess the significance of ground gases at the site, measured concentrations and flow rates have been used to derive Gas Screening Values (GSVs). GSVs are the product of gas concentration and gas flow measured in a borehole and provide an indication of the flow of the particular gas in question out of the ground.

Worst-case values have been used within the risk assessment.

Based on a maximum flow recorded of 0l/hr and the maximum recorded concentration of carbon dioxide (CO₂) and methane (CH₄) during the three monitoring visits, the GSVs have been calculated as presented in Table 4.3.

Gas	Maximum Concentration (%)	Maximum Flow Rate (l/hr)	GSV (l/hr)	Characteristic Situation (Wilson and Card)
Carbon Dioxide	4.7	0	0	1 Very Low Risk
Methane	0	0	0	1 Very Low Risk

Table 4.3 CSV Calculations

It is concluded that Ground gas monitoring indicates the site is representative of CS1 (Very Low Risk).

5.0 MITIGATION MEASURES DURING SITE WORKS

5.1 Neighboring Site Users and Passers-by

During site works the adequate protection measures should be put in places to ensure that neighbouring site users and passers-by are not put at risk. Dampening down of soils is likely to prove the most effective method of control.

Similarly, appropriate measures should be taken for any materials being transported off site to prevent dust migration.

5.2 Site Workers

Robust health and safety risk assessments and method statements should be drawn up prior to commencement of any site activity. This should address the potential risks.

Emergency contingencies should be defined prior to commencement of site works.

COSHH Assessment will also be required as part of the health and safety assessment.

5.3 Protection of the Environment

During the construction period, there is a risk to the environment/adjacent sites from spills during de-watering, excavations, moving contaminated soil, drainage misconnections, discharges of perched groundwater to local surface waters or the ground, runoff from construction materials and/or exposed ground, wheel washings and oil or chemical spills.

A drainage plan should be devised, identifying manholes to prevent pollutants accidentally reaching surface water sewers. Temporary drainage measures may need to be put in place.

Within the documentation prepared by the contractor(s), the following information should be provided, but not limited to:

- Project Description
- Key participants/contractor(s)
- Technical procedures
- Phasing of works and approximate timescales
- Site plans to scale
- Details of consents or license needed
- Emergency contingencies

In addition, the following precautions should also be taken.

- All potential chemicals and associated risks and emergency procedures for spills/leaks should be considered in a site risk assessment and the details provided to all site employees
- Any potential pollutant materials or chemicals/detergents used on site should be stored in suitable containers, with clear labelling.
- Any oil or hazardous substance containers and associated pipe works should be enclosed within a bund.
- Care taken during delivery of materials, with correct supervision and labelling detailing the substance and its quantities.
- All delivery drivers should be informed of procedures and restrictions
- Any materials on delivery should be covered to ensure no spillage from the vehicle.
- Any detergents, paints, chemicals etc should not be allowed to be discharged into surface drains or water courses
- Washing out and cleaning of concrete/cement plant should be carried out in a contained area with adequate measures to collect all run-off water.
- Security and prevention of vandalism, especially of oil drums/containers.

6.0 REMEDIAL MEASURES FOR THE PROTECTION OF FUTURE SITE USERS

6.1 General

As most of the site will be laid to hard standing, no special measures are considered necessary.

If, during site excavation, materials are encountered that are significantly different to those encountered in the investigation, the occurrence should be reported to the Engineer and appropriate action taken prior to continuing with the works

6.2 Service Routes

All service and utility channels on site should be lined with inert material.

6.3 Potable Water Supply

Any Potable Water Supplier should complete an assessment in accordance with UK Water Industry Research guidance; Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites, UKWIR Report Ref: 10/WM/03/21. The assessment should determine the selection of Water Supply Pipe material. A copy of the assessment, along with evidence of the water supply pipe installation, should be retained for inclusion in the Validation Report.

6.4 Management and Disposal of Excavated Materials

During site works there may be local excavations of the made ground in some locations, including from beneath proposed roads, foundations and from service trenches. All materials excavated should be managed and stored appropriately in a controlled manner to ensure protection of site construction workers and neighbouring site users. Material movement should be performed under an appropriate Permit or Exemption. Material destined for off-site disposal should be classified in accordance with Environment Agency Document WM3 (V.1.1, 2018) to determine the European Waste Code for the material. Waste transfer and disposal must be undertaken by an authorized person. A waste transfer note must accompany each load. Waste transfer notes should be retained for inclusion within any validation report.

APPENDIX A

Drawings

Exploratory Hole Locations with relation to
the development plan

