

PHASE 2

CONTAMINATED LAND ASSESSMENT

N.P.T. FULL PLANNING REF. P2021/0956

DETACHED INDUSTRIAL BUILDING

LAND AT MARDON PARK

BAGLAN

PORT TALBOT

SA12 7AX

29/03/2022

This document, including any enclosures and attachments has been prepared for the exclusive use and benefit of the Client and solely for the purpose for which it is provided, namely as a contaminated land risk assessment. Every skill and care has been taken in completing this work within the terms of the contract commissioning our services and taking into account the resources to the commission in agreement with the client. Rhondda Geotechnical Services do not accept any duty, liability or responsibility to any person other than the client in relation to this document and then only for matters within the stated scope.

EXECUTIVE SUMMARY

An application to Neath Port Talbot L.P.A. was made for the construction of an industrial unit at Mardon Park, Baglan. During pre-application consultations the applicants were informed that the site was located in an area of potential contamination. As such, any application should be supported by a minimum of a Desk Top Assessment (Phase 1). The advice then went onto say that in the view of the Contaminated Land Officer, the Phase 1 report would recommend a Phase 2 (intrusive) investigation. It was advised that to save time and to avoid pre-commencement conditions, the site investigation results should accompany the full planning application.

Rhondda Geotechnical Services were commissioned to carry out the work. A Phase 1 Report on the land had already been carried out by Ian Farmer Associates. This was reviewed by R.G.S. and used to inform the design of the Phase 2. The Phase 2 consisted of the excavation of eight trial pits. Both soil and groundwater was sampled and sent for laboratory testing. The testing showed the site was uncontaminated and required no remedial treatment. Therefore there will be no reason for N.P.T. not to discharge the contamination conditions.

INTRODUCTION PURPOSES AND AIMS

G.B.V. Properties Ltd have been granted planning permission ref P2021/0956 for a detached industrial building at Mardon Park, Baglan. Neath Port Talbot L.P.A. have granted the permission with multiple conditions. Amongst these are two contaminated land conditions. The exact wording is as follows:-

12. Notwithstanding the submitted information, No Development shall commence until a scheme which shall include the following components to deal with the risks associated with contamination of the site is undertaken by competent persons in accordance with the following document:-Development of Land Affected by Contamination: A Guide for Developers (WLGA & EAW, 2012) and shall each be submitted to and approved, in writing, by the Local Planning Authority:

1. A preliminary risk assessment of the application site
 - a) all previous uses
 - b) potential contaminants associated with those uses
 - c) a conceptual model of the site indicating sources, pathways and receptors
 - d) potentially unacceptable risks arising from contamination at the site.
2. A site investigation scheme, based on (1) to provide information for a detailed assessment of the risk to all receptors that may be affected, including those off site.
3. The site investigation results and the detailed risk assessment (2) and, based on these, an options appraisal and remediation strategy giving full details of the remediation measures required and how they are to be undertaken.
4. A verification plan providing details of the data that will be collected in order to demonstrate that the works set out in (3) are complete and identifying any requirements for longer-term monitoring of pollutant linkages, maintenance and arrangements for contingency action
5. Any changes to these components require the express consent of the Local Planning Authority. The scheme shall be implemented as approved.

13 Notwithstanding the submitted information, no development shall commence until a verification report demonstrating completion of the works set out in the approved remediation strategy and the effectiveness of the remediation is submitted to and approved, in writing, by the Local Planning Authority. The report shall include results of sampling and monitoring carried out in accordance with the approved verification plan to demonstrate that the site remediation criteria have been met. It shall also include any plan (a "long-term monitoring and maintenance plan") for longer-term monitoring of pollutant linkages, maintenance and arrangements for contingency action, as identified in the verification plan, and for the reporting of this to the Local Planning Authority.

Rhondda Geotechnical Services have been commissioned by the applicant to discharge these conditions. It should be noted that Conditions 12.3, 12.4 and 13 are entirely dependent on the site investigation at 12.2 revealing contamination at the site. This is by no means certain.

1. AUTHOR CREDENTIALS

The author of this report is Richard Davies. He graduated with a Bachelor of Science honours degree in Geology from Liverpool University in 1979. After starting his career as an engineer in the coal industry, he moved into site investigation in the 1980's and has many years experience working on contaminated land. He is a Fellow of The Geological Society and holds a Master's Degree in Applied Environmental Geology from Cardiff University. He is also a Supporter Member of CL: AIRE (Contaminated Land: Applications in Real Environments)

2. THE SITE

The site is situated on Baglan Energy Park, Port Talbot. The site is rectangular, measuring approximately 82m x 70m (0.57 Ha). Centred on grid reference 273950,192650 the site is a featureless expanse of flat land bounded on three sides by industrial/office units. To the southwest is more vacant flat land forming part of what used to be the sprawling B.P. Chemical plant. There are no surface watercourses. The site location is shown in Figure 1, with an aerial photo from Google Earth Pro showing the site boundary in Figure 2.

3. PHASE 1 SUMMARY

A letter report dated 1/03/2021 was produced by R.G.S. during the original P.A.C. (attached as Appendix A). This reviewed all the available information on the site. The letter report concluded that the Phase 1 Desk Study by Ian Farmer Associates was suitable for inclusion in the P.A.C. However, due to an administrative error outside the author's control, the original I.F.A. desk study was not attached to the letter report with the other material relating to the site. Both Phase 1 and Phase 2 reports from I.F.A. had the same reference number, and only the Phase 2 was submitted in the P.A.C. As statutory consultees N.R.W. then advised N.P.T. that a new Phase 1 would be required. Whilst this position is understandable given the circumstances (inability to view the original desk study) it is the opinion of R.G.S. that this is now not necessary. The original report gives a comprehensive review of historical land use at the site and is done within the template framework recommended in "Land Contamination: A guide for Developers (WLGA, 2017). The desk study also addresses the risk to controlled waters. These were the three main concerns of N.R.W. and it is the author's opinion these are now addressed by the I.F.A. Phase 1. It is the author's opinion that the I.F.A. Report is sufficient to discharge Condition 12.1 a-d above. The site boundary for the I.F.A. Phase 1 report is shown in Figure 2 and quite clearly includes the site that is subject to the current planning application. The I.F.A.

will not be attached to this report due to file size. Instead both the I.F.A. Phase 1 (with an R.G.S. cover page to avoid confusion) and the R.G.S. Phase 2 will be submitted together as two separate complementary reports.

The R.G.S. letter report recommended a site specific intrusive site investigation. On page 18 of the I.F.A. Phase 1 Report points 7.1.1 and 7.1.2 also recommended an intrusive investigation. The R.G.S. letter report pointed out that whilst the previous intrusive works by I.F.A. had found no contamination above accepted levels, the sampling was from an adjacent site. Thus the results had no direct bearing on the site in question. Instead R.G.S. carried out a new, robust site investigation using trial pitting. Soil and water samples were taken for laboratory analysis. The results of this analysis, and the implications of these results form the basis of this Phase 2 report. The Conceptual Site Model from the I.F.A. report is summarised in Table 1 on page 9. The preliminary risk from Ground Gas is summarised in Table 2 on page 10.

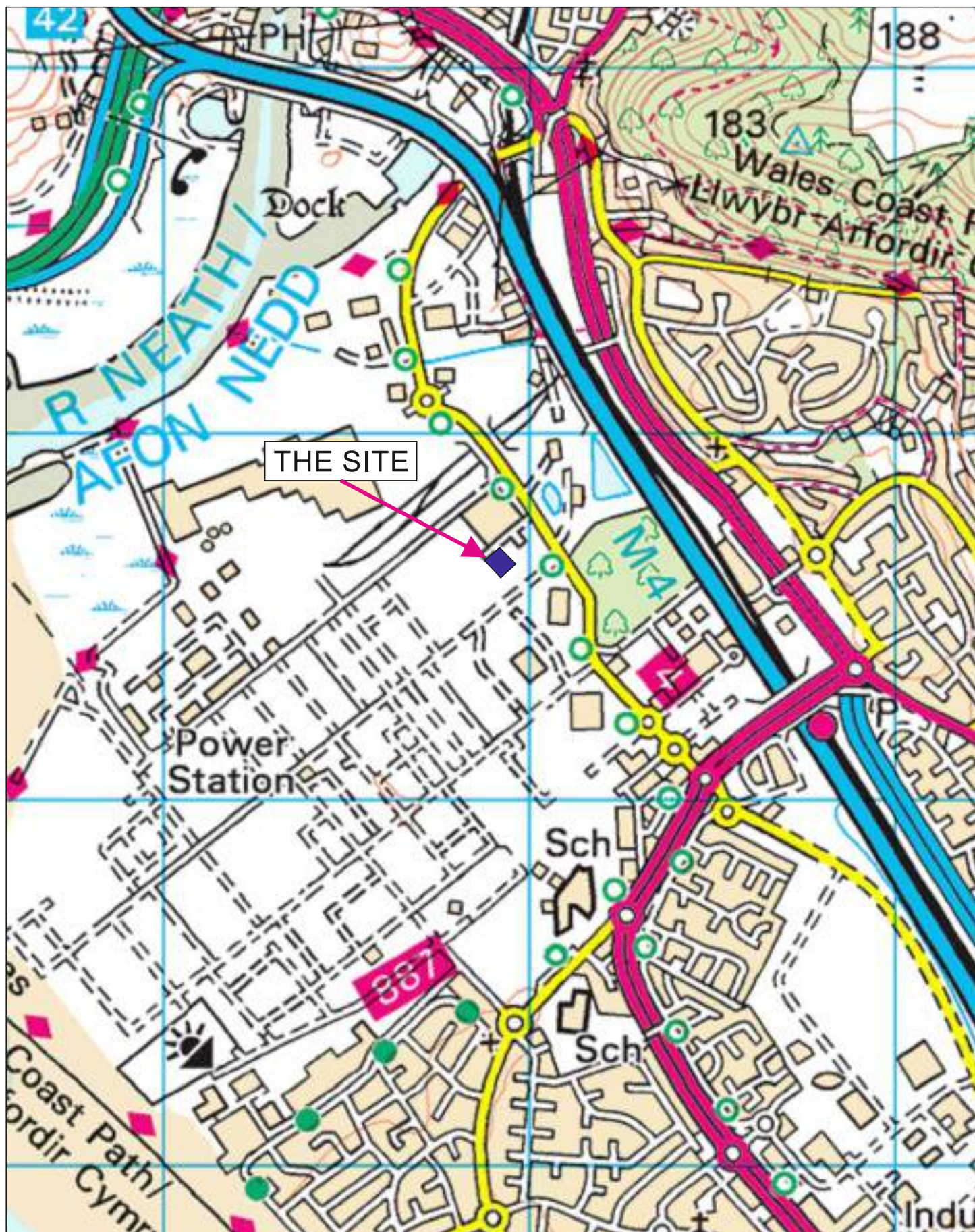


FIGURE 1
SITE LOCATION

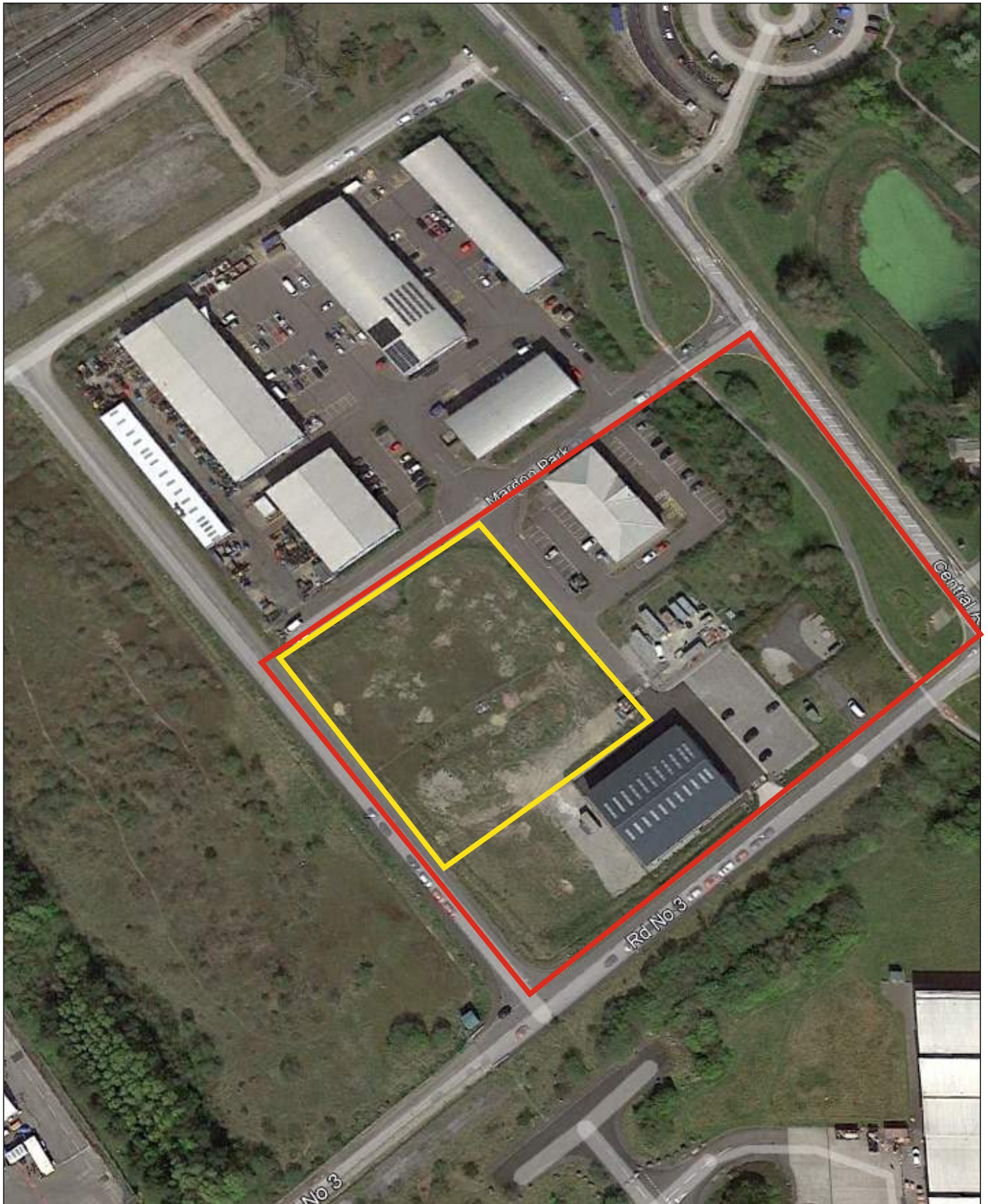


FIGURE 2

AERIAL VIEW FROM GOOGLE EARTH PRO. THE RED BOUNDARY DELINEATES THE AREA COVERED BY THE IAN FARMER ASSOC. DESK STUDY (PHASE 1). THE YELLOW BOUNDARY DELINEATES THE AREA COVERED BY THE RHONDDA GEOTECHNICAL SERVICES INTRUSIVE INVESTIGATION (PHASE 2).

TABLE 1						
QUALITATIVE HUMAN HEALTH RISK ASSESSMENT AND ENVIRONMENTAL RISK ASSESSMENT AT MARDON PARK, BAGLAN.						
CONTAMINANT SOURCE	PATHWAYS	RECEPTORS	POTENTIAL SEVERITY	PROBABILITY OF RISK	LEVEL OF RISK	FURTHER ACTION REQUIRED
ON SITE: POTENTIAL CONTAMINATION IN SOILS/MADE GROUND. POSSIBLY ELEVATED LEVELS OF METALS HYDROCARBONS AND PAH	INGESTION, DERMAL CONTACT, INHALATION	FUTURE END USERS, VISITORS	MEDIUM	MEDIUM	MEDIUM	SLIGHT POSSIBILITY OF MADE GROUND BEING A SOURCE OF CONTAMINATION ON SITE. FURTHER QUANTIFICATION REQUIRED VIA AN INTRUSIVE INVESTIGATION
	CONTACT WITH CONTAMINATED GROUNDWATER	FUTURE END USERS, VISITORS AND CONSTRUCTION WORKERS	MEDIUM			
	PERMEATION OF WATER PIPES	FUTURE END USERS AND SITE VISITORS	MEDIUM			
	INGESTION OF HOME GROWN PRODUCE	FUTURE END USERS	N/A			
ON SITE: ASBESTOS AT OR NEAR GROUND SURFACE IN SOILS/MADE GROUND	INHALATION OF FIBRES IN AIRBORNE DUST	FUTURE END USERS AND SITE VISITORS	HIGH	MEDIUM	MEDIUM	POSSIBLE SOURCE OF ASBESTOS ON SITE. FURTHER QUANTIFICATION REQUIRED. INTRUSIVE INVESTIGATION WILL INCLUDE AN ASBESTOS SCREEN
		CONSTRUCTION WORKERS	HIGH	MEDIUM	MEDIUM	
ON SITE: POTENTIAL CONTAMINATION IN SOILS/MADE GROUND. POSSIBLY ELEVATED LEVELS OF CONTAMINANTS	RUN OFF	SURFACE DRAINAGE	MEDIUM	MEDIUM	MEDIUM	SLIGHT POSIBILITY OF CONTAMINATION IN MADE GROUND ON SITE MEANS FURTHER QUANTIFICATION OF THE THREAT TO CONTROLLED WATERS/ ENVIRONMENTAL RECEPTORS MAY BE NECESSARY
	MIGRATION THROUGH SOIL VIA LEACHING	SHALLOW GROUNDWATER				
	ONWARD MIGRATION OF GROUNDWATER	BEDROCK AQUIFER				

TABLE 2 INITIAL GROUND GAS RISK ASSESSMENT MARDON PARK, BAGLAN					
SOURCE	PATHWAY	RECEPTOR	CONSEQUENCE CLASSIFICATION	RISK	FURTHER ACTION
HAZARDOUS GROUND GAS FROM OFF SITE SOURCE	INHALATION, INJURY FROM EXPLOSION	SITE USERS, VISITORS, CONSTRUCTION WORKERS	SEVERE	MEDIUM. SLIGHT POSSIBILITY OF OFF SITE GENERATION OF MINE GASES MIGRATING ONTO SITE.	THE RISK REQUIRES FURTHER QUANTIFICATION FROM THE NEW C.M.R.A.
HAZARDOUS GROUND GAS FROM OFF SITE SOURCE	DAMAGE FROM EXPLOSION	BUILDINGS	SEVERE		
HAZARDOUS GROUND GAS FROM ON SITE SOURCE	INHALATION, INJURY FROM EXPLOSION	SITE USERS, VISITORS, CONSTRUCTION WORKERS	SEVERE	MEDIUM. SLIGHT POSSIBILITY OF ON SITE GENERATION FROM MADE GROUND.	THE RISK REQUIRES QUANTIFICATION DURING THE INTRUSIVE INVESTIGATION
HAZARDOUS GROUND GAS FROM ON SITE SOURCE	DAMAGE FROM EXPLOSION	BUILDINGS	SEVERE		
RADON GAS	LONG TERM HAZARD FROM INHALATION	SITE USERS	SEVERE	MEDIUM. 3%-5% LOCAL PROPERTIES ABOVE RADON ACTION LEVEL	BASIC RADON PROTECTION MEASURES REQUIRED

4. SITE INVESTIGATION AND SAMPLING METHODOLOGY

Intrusive site investigations were carried out on 16/03/2021 under the supervision of Richard Davies. Works consisted of the digging of eight trial pits with a tracked excavator. The trial pit locations are shown in Figure 3 together with the depth of any samples taken. The site was flat and featureless. As the previous desk studies had suggested no specific areas of contamination a general spread of locations was adopted. Eight soil samples were taken. This was considered reasonable and proportionate for an initial investigation of a site of this size. Trial pits were excavated through any Made Ground into the underlying natural ground, which was sand. There was no sensory field evidence of contamination detected anywhere on site. Groundwater was encountered in all the deeper pits and two groundwater samples taken. Since the groundwater was clearly in hydraulic connectivity, two samples was considered suitably representative.

Samples of soils and groundwater were collected, placed in British Standard sealed containers and immediately labelled with depth, location and sample number. Each soil sampling location had four samples taken. These comprised two one litre plastic tubs, one 60ml. amber glass jar and one 120ml. amber glass jar. This is the recommended quantity required for a broad general suite of testing. In the case of the groundwater samples a litre amber glass bottle and a litre plastic bottle were collected. The soil samples were taken with a stainless steel trowel, cleaned between samples to avoid cross contamination. The samples were stored in cool boxes and dispatched by courier to the laboratory the following morning. This meant that the lab was in receipt of the samples within 48 hours of them being taken, and they were kept under correct conditions throughout. This is important to ensure the samples are “non-deviating” particularly in the case of testing for organic contaminants.

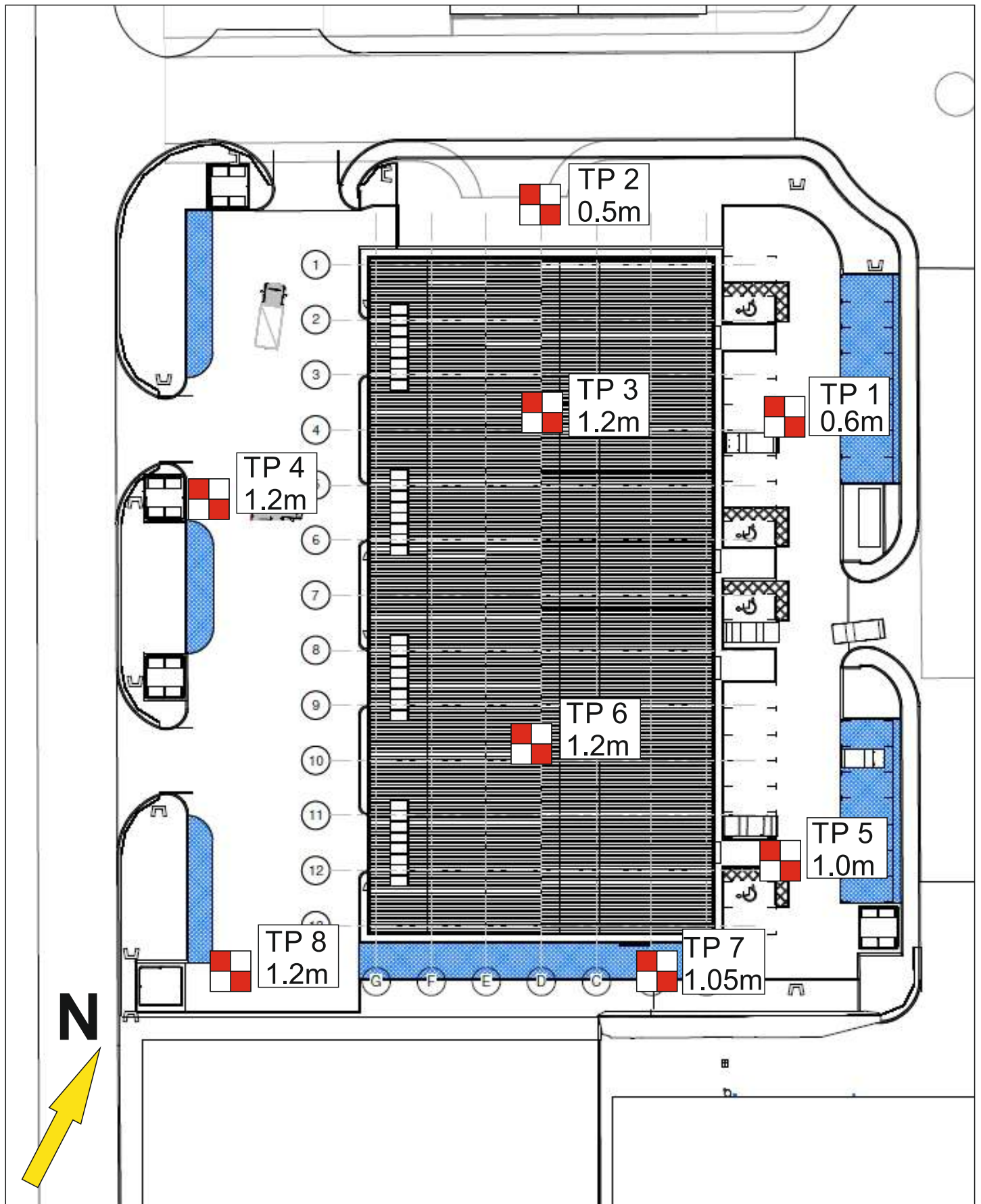


FIGURE 3

TRIAL PIT POSITIONS AND SAMPLING DEPTHS AT MARDON PARK.

5. TESTING STRATEGY

All the samples were tested by The Environmental Laboratory Ltd (reg. 3882193) at their laboratory in East Sussex. They hold both MCERTS and UKAS accreditation (UKAS lab no.2683). Their full details can be seen on the laboratory report 21-32708-01a. The complete report is included as Appendix B.

The Phase 1 report and Conceptual Site Model did not identify any specific range of potential contaminants of concern. Testing of soil samples from an adjacent site showed no contamination. Because of this a wide range of contaminants was tested for. This is the CLEA 2.1 Suite plus asbestos screen. The substances tested for could be described as a broad general suite in common use in British contaminated land studies. The substances can be split into two main categories. Organic and Inorganic compounds.

The inorganic contaminants tested for were metals:-

Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium and Zinc.

In addition, Free Cyanide was measured, and all samples were screened for Asbestos.

Total Organic Carbon and moisture were both measured. From this a calculation is used to derive Soil Organic Matter. This is needed to risk assess levels of P.A.H.'s, TPH's and Phenols which differ with varying S.O.M. values. A wide range of organic contaminants were tested for.

All samples were tested for P.A.H.s (Polycyclic Aromatic Hydrocarbons). Sixteen different compounds were measured. These are the USEPA16. Originating from the U.S.A. they are an internationally recognised, representative indicative group amongst the huge number of these compounds.

T.P.H. (total petroleum hydrocarbons) analysis was split up by Carbon Banding, along conventionally normal lines (Texas Banding). An aromatic/aliphatic split analysis was also carried out to allow further speciation of any hydrocarbon contamination detected.

The analysis for Organic contaminants also included a Phenol Suite. This contained a range of six Monohydric Phenols commonly found on contaminated sites.

6. CHOICE OF SUITABLE FOR USE VALUES (S4ULs) USED IN PHASE 2

Much work has been done in recent years on human health risk assessment for exposure to contaminated land. Originally the E.A. produced figures known as Soil Guidance Values (SGVs). These were later withdrawn, and this has resulted in the production of Generic Assessment Criteria (GACs). These are figures produced for individual substances. If the concentration of a contaminant is above its GAC, there is a potential for harm to human health (or controlled waters). Each contaminant has different levels for different exposure scenarios. For example, for any given contaminant, its GAC is far higher for a commercial development than it would be for Residential Use with consumption of homegrown produce. Many GACs have been published by Contaminated Land: Applications in real environments (CL:AIRE), Land Quality Management Ltd. (LQM) and the Environmental Industries Commission (EIC).

Due to different bodies producing GACS over the years since they were introduced, LQM have produced a complete revision of their figures and renamed them Suitable for Use Levels (S4ULs). The values used in this report are S4ULs with the exception of Lead which has a Category 4 Screening Levels (C4SL). Cyanide is not assessed in this way, instead it has an acute GAC, rather than one modelled on long term exposure. Asbestos also has its own safety levels governing land use.

The LQM S4ULs have been derived in accordance with the changes in exposure modelling presented within the C4SL framework, whilst still using a set of toxicological criteria that are set within the “minimal risk” range. The LQM/CIEH S4ULs were published to offer a set of collated information on the toxicity and transport properties for a number of common contaminants. They are widely considered to be suitable for use in planning assessments such as this. The most recent update was published in 2017 and reflects changes in UK human health risk assessment since the previous figures were published in 2009. All the data inputs used in the derivation of the S4ULs are presented in full in the publication LQM/CIEH Suitable 4 Use Levels and there is no intention to provide them here. These values are intended for use by professionals who have purchased them. To authenticate this the purchaser is supplied with an individual number to validate the report writer’s entitlement to use the LQM/CIEH S4ULs. This number can be seen on the result summary sheet. The author has the right to

reproduce these values here, but they remain copyright of LQM, a specialist environmental consultancy based in Nottingham.

The proposed development is a commercial unit. Given the nature of the proposed development, the Commercial Land Use S4ULs are appropriate, and these have been used when analysing the results for the risk assessment of the site.

7. SUMMARY OF GROUND CONDITIONS AND TEST RESULTS

The full trial pit logs to BS5930:2015 together with photographs of the pits can be found in Appendix A. In summary, all trial pits encountered a thin (0.25m-0.7m) layer of poor Topsoil/Made Ground or fused slag. The thin Made Ground lay directly on top of sand. The sand contained some large fragments of slag at deeper levels indicating some degree of disturbance. It is likely this occurred during the reclamation of Baglan Moors approximately 70 years ago.

A summary of the laboratory report in Appendix B has been produced overleaf in Tables 3-7. These compare the test results for each substance with its relevant Commercial Land Use S4UL value.

With the organic contaminants, the samples are normally subdivided based on their Soil Organic Matter (S.O.M.) as the S4UL value for each organic contaminant is controlled by the S.O.M. value. All of the samples tested fell in the S.O.M. band >1% <2.5%. Because of this there are no different S4UL values for all the organic contaminants in Tables 3-5.

There were minute quantities of the 16 P.A.H. range of substances in one of the samples tested. In the remaining seven samples P.A.H. levels were below the L.O.D.

In Table 4, every one of the T.P.H. range tested for was either below the level of detection, or only present in minute trace quantities.

Because all the six speciated Phenols were below the level of detection in all samples, only the Phenol Index is shown, without speciation.

With the inorganic substances in Table 6, there are no exceedances of any of the S4UL/C4SL levels any of the metals tested for.

Cyanide was below the Limit of Detection (L.O.D.) in all the samples. There was no Asbestos detected in any of the samples.

To summarise, levels of all contaminants present in the soils at the site are very low. None remotely approach the S4UL/C4SL values appropriate for the Commercial Land use scenario. In fact, contaminant levels are so low there are no exceedances of the S4UL/C4SL values for residential use with homegrown produce. This is the most conservative of all and is set at approximately 10% of the commercial threshold values.

Two groundwater samples were also tested. These are in the report in Appendix B but are not tabulated here. The reason for this is that there are many different standards for water depending on the situation. The Environmental Quality Standard (E.Q.S.) for freshwater could be considered an appropriate yardstick for the groundwater below the site. These values are from an E.U. directive and are primarily aimed at river basins and lakes. The reason for picking freshwater values is because of the coastal position and the large (>20m) thickness of permeable superficial deposits. In these circumstances a freshwater wedge will form and float on top of more saline water at depth.

The groundwater analyses are on page 7 of the ELAB report. Arsenic appears slightly elevated at 29 µg/l and 30 µg/l. This is a normal phenomenon in the South Wales Coalfield because of naturally occurring Arsenic in the bedrock. The E.Q.S. is 50 µg/l. Traces of P.A.H. were also found in both samples. There are no E.Q.S. values for ten of the USEPA16 substances. Some authorities suggest using Benzo[a]Pyrene as a marker. This was formerly the approach for P.A.H. in soils before speciation was widely available. The levels of BaP are 0.42 µg/l and 0.33 µg/l respectively. Whilst these concentrations are minute, they are much larger than the E.Q.S. of 0.00017 µg/l. the implications of this will be discussed in the risk assessment in Section 9.

**ALL S4ULs COPYRIGHT LAND QUALITY MANAGEMENT LIMITED. REPRODUCED WITH
PERMISSION.PUBLICATION NUMBER S4UL3694. ALL RIGHTS RESERVED**

ALL VALUES ARE IN mg/kg

ALL S4ULs REFER TO COMMERCIAL LAND USE SCENARIO

SOIL ORGANIC MATTER(S.O.M.)									>1%
CONTAMINANT	TP1 0.3m	TP2 0.4m	TP3 1.2m	TP4 0.3m	TP5 0.4m	TP6 1.2m	TP7 0.7m	TP8 1.2	S4UL
NAPHTHALENE	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	190
ACENAPHTHYLENE	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	83000
ACENAPHTHENE	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	84000
FLOURENE	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	63000
PHENANTHRENE	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.4	<0.1	22000
ANTHRACENE	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	<0.1	520000
FLOURANTHENE	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.8	0.1	23000
PYRENE	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.5	0.1	54000
BENZO[a]ANTHRACENE	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	0.2	170
CHRYSENE	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.3	0.2	350
BENZO[b]FLOURANTHENE	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.9	0.2	44
BENZO[k]FLOURANTHENE	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.1	0.2	1200
BENZO[a]PYRENE	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.9	0.2	35
INDENO[1,2,3-cd]PYRENE	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.7	0.2	500
DIBENZO[a,h]ANTHRACENE	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	3.5
BENZO[g,h,i]PERYLINE	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.6	0.2	3900
TOTAL(USEPA 16) PAHs	0.5	<0.4	<0.4	<0.4	<0.4	<0.4	11.9	1.6	N/A
TABLE 3 POLYCYCLIC AROMATIC HYDROCARBONS (USEPA16)									

SUMMARY OF TEST RESULTS MARDON PARK, BAGLAN

ALL S4ULs COPYRIGHT LAND QUALITY MANAGEMENT LIMITED. REPRODUCED WITH PERMISSION. PUBLICATION NUMBER S4UL3694. ALL RIGHTS RESERVED

ALL VALUES ARE IN mg/kg

ALL S4ULs REFER TO COMMERCIAL LAND USE SCENARIO

SOIL ORGANIC MATTER (S.O.M)		>1%								
CARBON BANDING		TP1 0.3m	TP2 0.4m	TP3 1.2m	TP4 0.3m	TP5 0.4m	TP6 1.2m	TP7 0.7m	TP8 1.2	S4UL
>C5-C6	ALI	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	3200
>C6-C8	ALI	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	7800
>C8-C10	ALI	<1	<1	<1	<1	<1	<1	<1	<1	2000
>C10-C12	ALI	<1	<1	<1	<1	<1	<1	<1	<1	9700
>C12-C16	ALI	<1	<1	<1	<1	<1	<1	<1	<1	59000
>C16-C21	ALI	<1	<1	<1	<1	<1	<1	<1	<1	1600000
>C21-C35	ALI	<1	<1	<1	<1	<1	<1	<1	<1	
>C35-C40	ALI	<1	<1	<1	<1	<1	<1	<1	<1	1600000
>C5-C40	TOTAL ALI	<1	<1	<1	<1	2.2	<1	<1	<1	N/A
>C5-C7	ARO	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	26000
>C7-C8	ARO	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	56000
>C8-C10	ARO	<1	<1	<1	<1	<1	<1	<1	<1	3500
>C10-C12	ARO	<1	<1	<1	<1	<1	<1	<1	<1	16000
>C12-C16	ARO	<1	<1	<1	<1	<1	<1	<1	<1	36000
>C16-C21	ARO	<1	<1	<1	<1	<1	<1	<1	<1	28000
>C21-C35	ARO	<1	1.4	<1	<1	1.6	<1	1.4	1.7	28000
>C35-C40	ARO	<1	<1	<1	<1	<1	<1	<1	<1	28000
>C5-C40	TOTAL ARO	<1	1.5	<1	1.1	2.3	<1	1.7	2.1	N/A
TPH >C5-C40		<1	1.7	<1	1.5	4.5	<1	2.5	2.5	N/A
TABLE 4 TOTAL PETROLEUM HYDROCARBONS WITH CARBON BANDING AND ALIPHATIC/AROMATIC SPLIT										

TABLE 4 TOTAL PETROLEUM HYDROCARBONS WITH CARBON BANDING AND ALIPHATIC/AROMATIC SPLIT

SUMMARY OF TEST RESULTS MARDON PARK, BAGLAN

ALL S4ULs COPYRIGHT LAND QUALITY MANAGEMENT LIMITED. REPRODUCED WITH PERMISSION. PUBLICATION NUMBER S4UL3694. ALL RIGHTS RESERVED

ALL VALUES ARE IN mg/kg

ALL S4ULs REFER TO COMMERCIAL LAND USE SCENARIO

SOIL ORGANIC MATTER(S.O.M.)									>1%
	TP1 0.3m	TP2 0.4m	TP3 1.2m	TP4 0.3m	TP5 0.4m	TP6 1.2m	TP7 0.7m	TP8 1.2	S4UL
TOTAL PHENOL INDEX	<5	<5	<5	<5	<5	<5	<5	<5	760

TABLE 5 PHENOL INDEX

CONTAMINANT	TP1 0.3m	TP2 0.4m	TP3 1.2m	TP4 0.3m	TP5 0.4m	TP6 1.2m	TP7 0.7m	TP8 1.2	S4UL	
ARSENIC	14.9	16.2	26.9	15.8	16	16	16.7	19.9	640	
CADMIUM	<0.5	<0.5	0.7	<0.5	0.6	<0.5	0.6	0.9	190	
CHROMIUM	62.9	24.6	30.8	33.5	60.9	16.3	58	49.8	8600	
COPPER	16.3	7.3	38.3	10.6	23.6	19.4	20.5	72.1	68000	
LEAD	13.3	17.1	49.3	20.1	67.2	73.2	52.1	154	2300	(C4SL)
MERCURY	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	58	
NICKEL	9.5	8	15	9.3	13.5	15.9	13.3	12.6	980	
SELENIUM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	12000	
ZINC	88.2	54.7	128	66.5	240	257	201	575	730000	
CYANIDE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	22	GACacute

TABLE 6 TOXIC/HEAVY METALS AND CYANIDE

	TP3 0.45m	TP 4 1.0m	TP5 0.6m	TP7 0.5m	TP8 1.0m	TP9 0.4m	TP10 0.3m	TP11 1.1m
WEIGHT (g)	0	0	0	0	0	0	0	0
% DRY WEIGHT OF SAMPLE	0	0	0	0	0	0	0	0

TABLE 7 ASBESTOS ANALYSIS

SUMMARY OF TEST RESULTS MARDON PARK, BAGLAN

8. REVISED RISK ASSESSMENT FOR GROUND GAS

The review of the earlier desk studies established there was minimal risk from ground gas migration from off-site sources. There are no landfill records within 500m of the site. The C.M.R.A. produced by R.G.S. to validate this application established the fact that the closest underground mining is 270m away. These workings are at depth and undoubtedly flooded. There are no viable pathways to the site and the risk can be completely discounted.

The risk from on-site gas generation was considered unlikely but required quantification. The trial pitting established that the site has a thin (<0.5m) veneer of Made Ground with no visible biodegradable material. This means there is no potential for gas generation. The Made Ground is underlain at very shallow depth by sand. The nearest available borehole records established that there was gravel at greater (17m-20m) depth. Both strata contain very low levels of organic material and have no potential for gas generation. This is reflected in the revised gas risk assessment in Table 8 overleaf. The author has very extensive experience of drilling boreholes in the Baglan Energy Park, both before and after the removal of the former B.P. plant. There are laterally discontinuous layers of Peat in the area, and it is possible the site is underlain at depth by Peat. The peat dates from the immediate post-glacial period after the last (Devensian) glaciation. Rising sea levels then buried the Peat, and it is highly compact. Some finite gas remains and piling for the building will produce a preferential pathway for gas. This should completely discharge during the construction phase and will pose no further risk.

Lastly the risk from Radon needs to be considered. Earlier desk studies stated that 3%-5% of local properties are above the Radon Action Threshold. This figure cannot be directly applied to the proposed building. The research comes from residential properties of which there are none nearby. Because of the size of the building P.H.E. reports are deemed inadequate. Instead, a report from the B.G.S. is the requirement for a desk study. Instead of this it is proposed to design the substructure of the building as Gas Characteristic 2. This means gas Protection Measures will need to be incorporated into the new development and will negate the threat from Radon.

9. REVISED RISK ASSESSMENT FOR SOILS

There were no contaminants present in the soils at the site above acceptable levels. The contaminants tested for in the soil samples, were at very low levels,

well below the appropriate S4UL/C4SL levels. There was no Asbestos present. Organic contaminants were either below L.O.D. or present in minute traces. All contaminant levels were so low that they were below residential S4UL/C4SL levels. Without a source there can be no pathway to above ground receptors. For this reason, the potential risks from soils at the site can be removed from Table 9 at this stage.

10. RISK ASSESSMENT FOR CONTROLLED WATERS

The contaminants tested for in the soil samples, were at very low levels well below the appropriate S4UL/C4SL levels. The natural ground has a high permeability, and the water table was encountered at shallow depth. Testing of the groundwater showed Arsenic levels were slightly elevated, but not above recommended levels (E.Q.S.) for freshwater. As explained in Section 6 this is a natural phenomenon in the South Wales Coalfield. Traces of P.A.H. were also present in the groundwater but not in the soils. This means the soil cannot be the source of the contamination in the groundwater. It could be speculated that the source of these contaminants would be the former B.P. Plant.

- The plant was in very close proximity to the site and produced plastics using Hydrocarbon compounds from refined crude oil.
- The groundwater below the plant was previously heavily contaminated (Author's personal experience). Whilst extensive remediation was carried out this would have been unlikely to lower contaminant levels to E.Q.S. levels.
- The groundwater beneath the site will be in lateral hydraulic connectivity with the groundwater directly beneath the process areas of the former plant.

The soil at the site does not form a threat to controlled waters or onward transport to the wider environment. The potential source has been removed from the revised risk assessment in Table 9 overleaf. The groundwater beneath the site may be classed as slightly contaminated but the comparison values are idealised standards and have no Generic Assessment Criteria with regard to human health. Besides which, there is no pathway to above ground receptors. The site investigation and results detailed above are sufficient for N.P.T. to discharge Conditions 12.2 and 12.3

10. SUMMARY OF REMEDIATION OBJECTIVES, CRITERIA AND OPTIONS

The objective of any remediation strategy is to make the land suitable for its intended use. In this case a commercial property. The levels of contamination are so low that the site would be suitable for residential use with no remediation necessary. The soil beneath the site poses no risk to human, animal or environmental receptors. Because of this no remediation strategy needs to be presented in accordance with the requirements of Condition 12.3. Because remediation will not be required, no verification report for soils in accordance with the requirement of Condition 12.4 will be required. It is the conclusion of this report that both Condition 13 can also be removed after the L.P.A. consults with their E.H. Officer.

The slight contamination of the groundwater beneath the site does not originate on the site and neither is it the responsibility of the site owners. Tens of millions of pounds have already been spent on groundwater remediation and it is unrealistic to imagine the situation can be improved further.

A gas proof membrane will need to be installed in line with current guidance (BS8485 and CIRIA C665). The suitability of the materials used and the integrity of the installation will require verification by an independent third party in line with the recommendations of CIRIA C735. Whether this is a matter for Building Control or Environmental Health is a matter for the L.P.A. to decide

Richard Davies BSc.(Hons.), MSc., F.G.S.

29/03/2022

TABLE 9						
QUANTITATIVE HUMAN HEALTH RISK ASSESSMENT AND ENVIRONMENTAL RISK ASSESSMENT AT MARDON PARK, BAGLAN.						
CONTAMINANT SOURCE	PATHWAYS	RECEPTORS	POTENTIAL SEVERITY	PROBABILITY OF RISK	LEVEL OF RISK	FURTHER ACTION REQUIRED
ON SITE: POTENTIAL CONTAMINATION IN SOILS/MADE GROUND. POSSIBLY ELEVATED LEVELS OF METALS HYDROCARBONS AND PAH	INGESTION, DERMAL CONTACT, INHALATION	FUTURE END USERS, VISITORS	MEDIUM	LOW	LOW	CONTAMINANT LEVELS AT SHALLOW DEPTH WERE WELL BELOW ACCEPTABLE LEVELS FOR A COMMERCIAL PROPERTY. THERE IS NO RISK TO END USERS. THE PROPOSED DEVELOPMENT WILL CUT ALL PATHWAYS AND REMOVE ALL RISKS. NO FURTHER ACTION REQUIRED.
	CONTACT WITH CONTAMINATED GROUNDWATER	FUTURE END USERS, VISITORS AND CONSTRUCTION WORKERS	MEDIUM			
	PERMEATION OF WATER PIPES	FUTURE END USERS AND SITE VISITORS	MEDIUM			
	INGESTION OF HOME GROWN PRODUCE	FUTURE END USERS	MEDIUM			
ON SITE: ASBESTOS AT OR NEAR GROUND SURFACE IN SOILS/MADE GROUND	INHALATION OF FIBRES IN AIRBORNE DUST	FUTURE END USERS AND SITE VISITORS	HIGH	LOW	LOW	NO ASBESTOS WAS FOUND DURING THE LABORATORY TESTING. NO FURTHER ACTION REQUIRED.
		CONSTRUCTION WORKERS	HIGH	LOW	LOW	
ON SITE: POTENTIAL CONTAMINATION IN SOILS/MADE GROUND. POSSIBLY ELEVATED LEVELS OF CONTAMINANTS	RUN OFF	SURFACE DRAINAGE	MEDIUM	LOW	LOW	TRACE LEVELS OF PAH WERE DETECTED IN THE GROUNDWATER. ARSENIC LEVELS WERE ALSO SLIGHTLY ELEVATED, BUT BELOW THE EQS FOR FRESHWATER. NO FURTHER ACTION REQUIRED.
	MIGRATION THROUGH SOIL VIA LEACHING	SHALLOW GROUNDWATER				
	ONWARD MIGRATION OF GROUNDWATER	BEDROCK AQUIFER				

TABLE 8 FINAL GROUND GAS RISK ASSESSMENT MARDON PARK, BAGLAN					
SOURCE	PATHWAY	RECEPTOR	CONSEQUENCE CLASSIFICATION	RISK	FURTHER ACTION
HAZARDOUS GROUND GAS FROM OFF SITE SOURCE	INHALATION, INJURY FROM EXPLOSION	SITE USERS, VISITORS, CONSTRUCTION WORKERS	SEVERE	LOW. C.M.R.A. ESTABLISHED THERE WAS NO RISK FROM MINE GASES.	NO FURTHER ACTION REQUIRED
HAZARDOUS GROUND GAS FROM OFF SITE SOURCE	DAMAGE FROM EXPLOSION	BUILDINGS	SEVERE		
HAZARDOUS GROUND GAS FROM ON SITE SOURCE	INHALATION, INJURY FROM EXPLOSION	SITE USERS, VISITORS, CONSTRUCTION WORKERS	SEVERE	LOW. NO POSSIBILITY OF ON SITE GENERATION FROM MADE GROUND. SLIGHT POSSIBILITY OF FINITE GAS FROM ORGANIC SOILS.	NO FURTHER ACTION REQUIRED
HAZARDOUS GROUND GAS FROM ON SITE SOURCE	DAMAGE FROM EXPLOSION	BUILDINGS	SEVERE		
RADON GAS	LONG TERM HAZARD FROM INHALATION	SITE USERS	SEVERE	MEDIUM . RISK REMAINS UNCHANGED FROM INITIAL R.A.	BASIC RADON PROTECTION MEASURES REQUIRED

APPENDIX A
TRIAL PIT LOG TO BS5930:2015
WITH PHOTOGRAPHS
MARDON PARK
BAGLAN

Project: MARDON PARK	Project No: MP15
Described By: R.DAVIES	Trial Pit No. TP1
Date: 16/03/2021	Sheet: 1 of 1
Method / Plant TRACKED EXCAVATOR	Groundwater Observations: DRY
Stability GOOD	Strike of Face A:
Shoring NONE	Loggers Signature

FACE SKETCHES - INCLUDING ANY SIGNIFICANT FINDINGS WITHIN TRIAL PIT

Samples and Tests		Strata	
Depth (m)	Type (B,D,ES)	Depth (m)	Strata Description
		G.L.	Fused grey metallic slag (MADE GROUND)
0.3	ES1	0.3	Medium dense, brown gravelly SAND. Gravel is angular, fine to coarse of slag.
		0.6	

Notes: ES-Environmental Soil
EW - Environmental Water
B - Bulk Disturbed
D - Small Disturbed

TRIAL PIT NUMBER
TP1



FIGURE 4

TP 1

Project: MARDON PARK	Project No: MP15
Described By: R.DAVIES	Trial Pit No. TP2
Date: 16/03/2021	Sheet: 1 of 1
Method / Plant TRACKED EXCAVATOR	Groundwater Observations: DRY
Stability GOOD	Strike of Face A:
Shoring NONE	Loggers Signature

FACE SKETCHES - INCLUDING ANY SIGNIFICANT FINDINGS WITHIN TRIAL PIT

Samples and Tests		Strata	
Depth (m)	Type (B,D,ES)	Depth (m)	Strata Description
		G.L.	Fused grey metallic slag (MADE GROUND)
		0.3	Medium dense, brown gravelly SAND. Gravel is angular, fine to coarse of slag.
0.4	ES1		
		0.5	

Notes: ES-Environmental Soil
 EW - Environmental Water
 B - Bulk Disturbed
 D - Small Disturbed

TRIAL PIT NUMBER
TP2



FIGURE 5

TP2

Project: MARDON PARK	Project No: MP15
Described By: R.DAVIES	Trial Pit No. TP3
Date: 16/03/2021	Sheet: 1 of 1
Method / Plant TRACKED EXCAVATOR	Groundwater Observations: 1.0m
Stability GOOD	Strike of Face A:
Shoring NONE	Loggers Signature

FACE SKETCHES - INCLUDING ANY SIGNIFICANT FINDINGS WITHIN TRIAL PIT

Samples and Tests		Strata	
Depth (m)	Type (B,D,ES)	Depth (m)	Strata Description
		G.L.	Fused grey metallic slag
		0.25	(MADE GROUND)
		0.9	Medium dense brown SAND
		1.2	Soft grey slightly clayey SAND
1.2	ES1	1.2	

Notes: ES-Environmental Soil
 EW - Environmental Water
 B - Bulk Disturbed
 D - Small Disturbed

TRIAL PIT NUMBER
TP3



FIGURE 6 TP 3

Project: MARDON PARK	Project No: MP15
Described By: R.DAVIES	Trial Pit No. TP4
Date: 16/03/2021	Sheet: 1 of 1
Method / Plant TRACKED EXCAVATOR	Groundwater Observations: 1.0m
Stability GOOD	Strike of Face A:
Shoring NONE	Loggers Signature

FACE SKETCHES - INCLUDING ANY SIGNIFICANT FINDINGS WITHIN TRIAL PIT

Samples and Tests		Strata	
Depth (m)	Type (B,D,ES)	Depth (m)	Strata Description
		G.L.	
0.3	ES1	0.3	Fused grey metallic slag (MADE GROUND)
1.0	WS1	1.0	Medium dense brown SAND
		1.2	Soft grey slightly clayey SAND

Notes: ES-Environmental Soil
 EW - Environmental Water
 B - Bulk Disturbed
 D - Small Disturbed

TRIAL PIT NUMBER
TP4



FIGURE 7

TP 4

Project: MARDON PARK	Project No: MP15
Described By: R.DAVIES	Trial Pit No. TP5
Date: 16/03/2021	Sheet: 1 of 1
Method / Plant TRACKED EXCAVATOR	Groundwater Observations: DRY
Stability GOOD	Strike of Face A:
Shoring NONE	Loggers Signature

FACE SKETCHES - INCLUDING ANY SIGNIFICANT FINDINGS WITHIN TRIAL PIT

Samples and Tests		Strata	
Depth (m)	Type (B,D,ES)	Depth (m)	Strata Description
		G.L.	Loose grey slag with silty sand and rootlets (MADE GROUND)
		0.25	
0.4	ES1	1.0	Medium dense brown SAND with occasional angular cobbles of slag

Notes: ES-Environmental Soil
 EW - Environmental Water
 B - Bulk Disturbed
 D - Small Disturbed

TRIAL PIT NUMBER
TP5



FIGURE 8

TP 5

Project: MARDON PARK	Project No: MP15
Described By: R.DAVIES	Trial Pit No. TP6
Date: 16/03/2021	Sheet: 1 of 1
Method / Plant TRACKED EXCAVATOR	Groundwater Observations: 1.0m
Stability GOOD	Strike of Face A:
Shoring NONE	Loggers Signature

FACE SKETCHES - INCLUDING ANY SIGNIFICANT FINDINGS WITHIN TRIAL PIT

Samples and Tests		Strata	
Depth (m)	Type (B,D,ES)	Depth (m)	Strata Description
		G.L.	Loose grey metallic slag and sand (MADE GROUND)
		0.25	
		1.0	Medium dense brown SAND
1.0	WS2	1.2	Soft grey slightly clayey SAND
1.2	ES1	1.2	

Notes: ES-Environmental Soil
 EW - Environmental Water
 B - Bulk Disturbed
 D - Small Disturbed

TRIAL PIT NUMBER
TP6



FIGURE 9

TP 6

Project: MARDON PARK	Project No: MP15
Described By: R.DAVIES	Trial Pit No. TP7
Date: 16/03/2021	Sheet: 1 of 1
Method / Plant TRACKED EXCAVATOR	Groundwater Observations: DRY
Stability GOOD	Strike of Face A:
Shoring NONE	Loggers Signature

FACE SKETCHES - INCLUDING ANY SIGNIFICANT FINDINGS WITHIN TRIAL PIT

Samples and Tests		Strata	
Depth (m)	Type (B,D,ES)	Depth (m)	Strata Description
		G.L.	Loose grey slag with brown silty sand and rootlets. (MADE GROUND)
		0.45	Medium dense brown SAND with occasional angular cobbles of slag
0.7	ES1		
		1.0	

Notes: ES-Environmental Soil
 EW - Environmental Water
 B - Bulk Disturbed
 D - Small Disturbed

TRIAL PIT NUMBER
TP7



FIGURE 10 TP 7

Project: MARDON PARK	Project No: MP15
Described By: R.DAVIES	Trial Pit No. TP8
Date: 16/03/2021	Sheet: 1 of 1
Method / Plant TRACKED EXCAVATOR	Groundwater Observations: 1.2m
Stability GOOD	Strike of Face A:
Shoring NONE	Loggers Signature

FACE SKETCHES - INCLUDING ANY SIGNIFICANT FINDINGS WITHIN TRIAL PIT

Samples and Tests		Strata	
Depth (m)	Type (B,D,ES)	Depth (m)	Strata Description
		G.L.	Loose brown very sandy SILT with high organic content. (TOPSOIL)
		0.8	Loose brown SAND with occasional angular cobbles of slag.
1.2	ES1		
		1.3	

Notes: ES-Environmental Soil
 EW - Environmental Water
 B - Bulk Disturbed
 D - Small Disturbed

TRIAL PIT NUMBER
TP8



FIGURE 11 TP 8

APPENDIX B
ENVIRONMENTAL LABORATORIES
REPORT 21-32708-1a
MARDON PARK
BAGLAN



Unit A2
Windmill Road
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BY
Telephone: (01424) 718618

cs@elab-uk.co.uk
info@elab-uk.co.uk

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 21-32708

Issue: 1a

Date of Issue: 25/03/2021

Contact: Lisa Williams

Customer Details: GBV Properties Ltd
19 Mardon Park
Baglan Energy Park
Port Talbot
SA12 7AX

Quotation No: Q21-02092

Order No: Not Supplied

Customer Reference: MP15

Date Received: 18/03/2021

Date Approved: 25/03/2021

Details: Mardon Park Area 1

Approved by: 

Mike Varley, Technical Manager

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

This report may only be reproduced in full



Sample Summary

Report No.: 21-32708, issue number 1a

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
230845	TP1 ES1 0.30	16/03/2021	18/03/2021	Sand	
230846	TP2 ES1 0.40	16/03/2021	18/03/2021	Sand	
230847	TP3 ES1 1.20	16/03/2021	18/03/2021	Sand	
230848	TP4 ES1 0.30	16/03/2021	18/03/2021	Sand	
230849	TP4 WS1 1.00	16/03/2021	18/03/2021		c
230850	TP5 ES1 0.40	16/03/2021	18/03/2021	Sand	
230851	TP6 ES1 1.20	16/03/2021	18/03/2021	Sand	
230852	TP6 WS2 1.00	16/03/2021	18/03/2021		c
230853	TP7 ES1 0.70	16/03/2021	18/03/2021	Sand	
230854	TP8 ES1 1.20	16/03/2021	18/03/2021	Sand	

Results Summary

Report No.: 21-32708, issue number 1a

ELAB Reference	230845	230846	230847	230848	230850
Customer Reference	ES1	ES1	ES1	ES1	ES1
Sample ID					
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	TP1	TP2	TP3	TP4	TP5
Sample Depth (m)	0.30	0.40	1.20	0.30	0.40
Sampling Date	16/03/2021	16/03/2021	16/03/2021	16/03/2021	16/03/2021

Determinand	Codes	Units	LOD					
Soil sample preparation parameters								
Moisture Content	N	%	0.1	8.5	9.7	23.5	10.1	8.5
Material removed	N	%	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Description of Inert material removed	N		0	None	None	None	None	None
Metals								
Arsenic	M	mg/kg	1	14.9	16.2	26.9	15.8	16.0
Cadmium	M	mg/kg	0.5	< 0.5	< 0.5	0.7	< 0.5	0.6
Chromium	M	mg/kg	5	62.9	24.6	30.8	33.5	60.9
Copper	M	mg/kg	5	16.3	7.3	38.3	10.6	23.6
Lead	M	mg/kg	5	31.3	17.1	49.3	20.1	67.2
Mercury	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	M	mg/kg	5	9.5	8.0	15.0	9.3	13.5
Selenium	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc	M	mg/kg	5	88.2	54.7	128	66.5	240
Inorganics								
Total Cyanide	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Miscellaneous								
pH	M	pH units	0.1	9.2	9.4	8.9	9.2	8.8
Soil Organic Matter	U	%	0.1	0.1	0.2	0.1	0.1	0.2
Total Organic Carbon	N	%	0.01	0.14	0.08	0.27	0.09	0.58
Phenols								
Phenol	M	mg/kg	1	< 1	< 1	< 1	< 1	< 1
M,P-Cresol	N	mg/kg	1	< 1	< 1	< 1	< 1	< 1
O-Cresol	N	mg/kg	1	< 1	< 1	< 1	< 1	< 1
3,4-Dimethylphenol	N	mg/kg	1	< 1	< 1	< 1	< 1	< 1
2,3-Dimethylphenol	M	mg/kg	1	< 1	< 1	< 1	< 1	< 1
2,3,5-trimethylphenol	M	mg/kg	1	< 1	< 1	< 1	< 1	< 1
Total Monohydric Phenols	N	mg/kg	5	< 5	< 5	< 5	< 5	< 5
Polyaromatic hydrocarbons								
Naphthalene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	M	mg/kg	0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	M	mg/kg	0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo[g,h,i]perylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total PAH(16)	M	mg/kg	0.4	0.5	< 0.4	< 0.4	< 0.4	< 0.4



Results Summary

2683

Report No.: 21-32708, issue number 1a

ELAB Reference	230845	230846	230847	230848	230850
Customer Reference	ES1	ES1	ES1	ES1	ES1
Sample ID					
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	TP1	TP2	TP3	TP4	TP5
Sample Depth (m)	0.30	0.40	1.20	0.30	0.40
Sampling Date	16/03/2021	16/03/2021	16/03/2021	16/03/2021	16/03/2021

Determinand	Codes	Units	LOD					
TPH CWG								
>C5-C6 Aliphatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
>C6-C8 Aliphatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
>C8-C10 Aliphatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
>C10-C12 Aliphatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
>C12-C16 Aliphatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
>C16-C21 Aliphatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
>C21-C35 Aliphatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
>C35-C40 Aliphatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total aliphatic hydrocarbons (>C5 - C40)	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	2.2
>C5-C7 Aromatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
>C7-C8 Aromatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
>C8-C10 Aromatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
>C10-C12 Aromatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
>C12-C16 Aromatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
>C16-C21 Aromatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
>C21-C35 Aromatic	M	mg/kg	1	< 1.0	1.4	< 1.0	< 1.0	1.6
>C35-C40 Aromatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total aromatic hydrocarbons (>C5 - C40)	N	mg/kg	1	< 1.0	1.5	< 1.0	1.1	2.3
Total petroleum hydrocarbons (>C5 - C40)	N	mg/kg	1	< 1.0	1.7	< 1.0	1.5	4.5

Results Summary

2683

Report No.: 21-32708, issue number 1a

ELAB Reference	230851	230853	230854
Customer Reference	ES1	ES1	ES1
Sample ID			
Sample Type	SOIL	SOIL	SOIL
Sample Location	TP6	TP7	TP8
Sample Depth (m)	1.20	0.70	1.20
Sampling Date	16/03/2021	16/03/2021	16/03/2021

Determinand	Codes	Units	LOD			
Soil sample preparation parameters						
Moisture Content	N	%	0.1	16.6	12.2	12.4
Material removed	N	%	0.1	< 0.1	< 0.1	< 0.1
Description of Inert material removed	N		0	None	None	None
Metals						
Arsenic	M	mg/kg	1	16.0	16.7	19.9
Cadmium	M	mg/kg	0.5	< 0.5	0.6	0.9
Chromium	M	mg/kg	5	16.3	58.0	49.8
Copper	M	mg/kg	5	19.4	20.5	72.1
Lead	M	mg/kg	5	73.2	52.1	154
Mercury	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Nickel	M	mg/kg	5	15.9	13.3	12.6
Selenium	M	mg/kg	1	< 1.0	< 1.0	< 1.0
Zinc	M	mg/kg	5	257	201	575
Inorganics						
Total Cyanide	M	mg/kg	1	< 1.0	< 1.0	< 1.0
Miscellaneous						
pH	M	pH units	0.1	8.9	9.4	8.9
Soil Organic Matter	U	%	0.1	0.1	0.1	0.6
Total Organic Carbon	N	%	0.01	0.22	0.10	0.60
Phenols						
Phenol	M	mg/kg	1	< 1	< 1	< 1
M,P-Cresol	N	mg/kg	1	< 1	< 1	< 1
O-Cresol	N	mg/kg	1	< 1	< 1	< 1
3,4-Dimethylphenol	N	mg/kg	1	< 1	< 1	< 1
2,3-Dimethylphenol	M	mg/kg	1	< 1	< 1	< 1
2,3,5-trimethylphenol	M	mg/kg	1	< 1	< 1	< 1
Total Monohydric Phenols	N	mg/kg	5	< 5	< 5	< 5
Polyaromatic hydrocarbons						
Naphthalene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Fluorene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	M	mg/kg	0.1	< 0.1	1.4	< 0.1
Anthracene	M	mg/kg	0.1	< 0.1	0.3	< 0.1
Fluoranthene	M	mg/kg	0.1	< 0.1	1.8	0.1
Pyrene	M	mg/kg	0.1	< 0.1	1.5	0.1
Benzo(a)anthracene	M	mg/kg	0.1	< 0.1	1.0	0.2
Chrysene	M	mg/kg	0.1	< 0.1	1.3	0.2
Benzo(b)fluoranthene	M	mg/kg	0.1	< 0.1	0.9	0.2
Benzo(k)fluoranthene	M	mg/kg	0.1	< 0.1	1.1	0.2
Benzo(a)pyrene	M	mg/kg	0.1	< 0.1	0.9	0.2
Indeno(1,2,3-cd)pyrene	M	mg/kg	0.1	< 0.1	0.7	0.2
Dibenzo(a,h)anthracene	M	mg/kg	0.1	< 0.1	0.2	< 0.1
Benzo[g,h,i]perylene	M	mg/kg	0.1	< 0.1	0.6	0.2
Total PAH(16)	M	mg/kg	0.4	< 0.4	11.9	1.6



Results Summary

2683

Report No.: 21-32708, issue number 1a

ELAB Reference	230851	230853	230854
Customer Reference	ES1	ES1	ES1
Sample ID			
Sample Type	SOIL	SOIL	SOIL
Sample Location	TP6	TP7	TP8
Sample Depth (m)	1.20	0.70	1.20
Sampling Date	16/03/2021	16/03/2021	16/03/2021

Determinand	Codes	Units	LOD			
TPH CWG						
>C5-C6 Aliphatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01
>C6-C8 Aliphatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01
>C8-C10 Aliphatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0
>C10-C12 Aliphatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0
>C12-C16 Aliphatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0
>C16-C21 Aliphatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0
>C21-C35 Aliphatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0
>C35-C40 Aliphatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0
Total aliphatic hydrocarbons (>C5 - C40)	N	mg/kg	1	< 1.0	< 1.0	< 1.0
>C5-C7 Aromatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01
>C7-C8 Aromatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01
>C8-C10 Aromatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0
>C10-C12 Aromatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0
>C12-C16 Aromatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0
>C16-C21 Aromatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0
>C21-C35 Aromatic	M	mg/kg	1	< 1.0	1.4	1.7
>C35-C40 Aromatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0
Total aromatic hydrocarbons (>C5 - C40)	N	mg/kg	1	< 1.0	1.7	2.1
Total petroleum hydrocarbons (>C5 - C40)	N	mg/kg	1	< 1.0	2.5	2.5



Results Summary

2683

Report No.: 21-32708, issue number 1a

ELAB Reference	230849	230852
Customer Reference	WS1	WS2
Sample ID		
Sample Type	WATER	WATER
Sample Location	TP4	TP6
Sample Depth (m)	1.00	1.00
Sampling Date	16/03/2021	16/03/2021

Determinand	Codes	Units	LOD		
Dissolved Metals					
Arsenic	U	ug/l	5	29	30
Cadmium	U	ug/l	1	< 1	< 1
Chromium	U	ug/l	5	5	5
Copper	U	ug/l	5	8	8
Mercury	U	ug/l	0.1	< 0.1	< 0.1
Nickel	U	ug/l	5	< 5	< 5
Lead	U	ug/l	1	< 1	< 1
Selenium	U	ug/l	5	< 5	< 5
Zinc	U	ug/l	5	< 5	< 5
Inorganics					
Total Cyanide	U	ug/l	5	c < 5	c < 5
Miscellaneous					
pH	U	pH units	0.1	9.0	9.0
Total Organic Carbon	N	mg/l	0.9	6	6
Phenols					
Phenol	N	ug/l	1	< 1	< 1
M,P-Cresol	N	ug/l	1	< 1	< 1
O-Cresol	N	ug/l	1	< 1	< 1
3,4-Dimethylphenol	N	ug/l	1	< 1	< 1
2,3-Dimethylphenol	N	ug/l	1	< 1	< 1
2,3,5-trimethylphenol	N	ug/l	1	< 1	< 1
Total Monohydric Phenols	N	ug/l	1	< 1	< 1
Polyaromatic hydrocarbons					
Naphthalene GCMS	N	ug/l	0.01	0.12	0.10
Acenaphthylene GCMS	N	ug/l	0.01	0.03	0.02
Acenaphthene GCMS	N	ug/l	0.01	0.02	0.02
Fluorene GCMS	N	ug/l	0.01	0.04	0.03
Phenanthrene GCMS	N	ug/l	0.01	0.27	0.21
Anthracene GCMS	N	ug/l	0.01	0.05	0.04
Fluoranthene GCMS	N	ug/l	0.01	0.37	0.28
Pyrene GCMS	N	ug/l	0.01	0.34	0.25
Benzo (a) anthracene GCMS	N	ug/l	0.01	0.28	0.22
Chrysene GCMS	N	ug/l	0.01	0.35	0.27
Benzo (b) fluoranthene GCMS	N	ug/l	0.01	0.38	0.31
Benzo (k) fluoranthene GCMS	N	ug/l	0.01	0.39	0.29
Benzo (a) pyrene GCMS	N	ug/l	0.01	0.42	0.33
Indeno (1,2,3-cd) pyrene GCMS	N	ug/l	0.01	0.25	0.20
Dibenzo(a,h)anthracene GCMS	N	ug/l	0.01	0.12	0.09
Benzo(ghi)perylene GCMS	N	ug/l	0.01	0.29	0.24
Total PAH(16) GCMS	N	ug/l	0.01	3.74	2.89



Results Summary

2683

Report No.: 21-32708, issue number 1a

ELAB Reference	230849	230852
Customer Reference	WS1	WS2
Sample ID		
Sample Type	WATER	WATER
Sample Location	TP4	TP6
Sample Depth (m)	1.00	1.00
Sampling Date	16/03/2021	16/03/2021

Determinand	Codes	Units	LOD		
TPH CWG					
>C5-C6 Aliphatic	N	ug/l	1	< 1.0	< 1.0
>C6-C8 Aliphatic	N	ug/l	1	< 1.0	< 1.0
>C8-C10 Aliphatic	N	ug/l	5	< 5.0	< 5.0
>C10-C12 Aliphatic	N	ug/l	5	< 5.0	< 5.0
>C12-C16 Aliphatic	N	ug/l	5	< 5.0	< 5.0
>C16-C21 Aliphatic	N	ug/l	5	5.3	< 5.0
>C21-C35 Aliphatic	N	ug/l	5	42.8	< 5.0
>C35-C40 Aliphatic	N	ug/l	5	< 5.0	< 5.0
Total (>C5-C40) Aliphatic	N	ug/l	5	48.1	< 5.0
>C5-C7 Aromatic	N	ug/l	1	< 1.0	< 1.0
>C7-C8 Aromatic	N	ug/l	1	< 1.0	< 1.0
>C8-C10 Aromatic	N	ug/l	5	< 5.0	< 5.0
>C10-C12 Aromatic	N	ug/l	5	< 5.0	< 5.0
>C12-C16 Aromatic	N	ug/l	5	< 5.0	< 5.0
>C16-C21 Aromatic	N	ug/l	5	< 5.0	< 5.0
>C21-C35 Aromatic	N	ug/l	5	30.2	10.5
>C35-C40 Aromatic	N	ug/l	5	< 5.0	< 5.0
Total (>C5-C40) Aromatic	N	ug/l	5	30.2	10.5
Total (>C5-C40) Ali/Aro	N	ug/l	5	78.3	10.5



Unit A2, Windmill Road, Ponswood Industrial Estate, St Leonards on Sea, East Sussex, TN38 9BY

Tel: +44 (0)1424 718618, Email: info@elab-uk.co.uk, Web: www.elab-uk.co.uk

Results Summary

Report No.: 21-32708, issue number 1a

Asbestos Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #) in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client.

Elab No	Depth (m)	Clients Reference	Description of Sample Matrix #	Asbestos Identification	Gravimetric Analysis Total (%)	Gravimetric Analysis by ACM Type (%)	Free Fibre Analysis (%)	Total Asbestos (%)
230845	0.30	TP1 ES1	Brown sandy soil with stones	No asbestos detected	n/t	n/t	n/t	n/t
230846	0.40	TP2 ES1	Brown sandy soil with stones	No asbestos detected	n/t	n/t	n/t	n/t
230847	1.20	TP3 ES1	Brown sandy soil	No asbestos detected	n/t	n/t	n/t	n/t
230848	0.30	TP4 ES1	Brown sandy soil with stones	No asbestos detected	n/t	n/t	n/t	n/t
230850	0.40	TP5 ES1	Brown sandy soil with stones	No asbestos detected	n/t	n/t	n/t	n/t
230851	1.20	TP6 ES1	Brown sandy soil with stones	No asbestos detected	n/t	n/t	n/t	n/t
230853	0.70	TP7 ES1	Brown sandy soil with stones	No asbestos detected	n/t	n/t	n/t	n/t
230854	1.20	TP8 ES1	Brown sandy soil with stones	No asbestos detected	n/t	n/t	n/t	n/t

Method Summary

Report No.: 21-32708, issue number 1a

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
pH	M	Air dried sample	23/03/2021	113	Electromeric
Phenols in solids	M	As submitted sample	19/03/2021	121	HPLC
PAH (GC-FID)	M	As submitted sample	19/03/2021	133	GC-FID
Low range Aliphatic hydrocarbons soil	N	As submitted sample	22/03/2021	181	GC-MS
Low range Aromatic hydrocarbons soil	N	As submitted sample	22/03/2021	181	GC-MS
Total cyanide	M	As submitted sample	19/03/2021	204	Colorimetry
Total organic carbon/Total sulphur	N	Air dried sample	22/03/2021	210	IR
TPH CWG soil by gc-gc	M	As submitted sample	18/03/2021	271	
Asbestos identification	U	Air dried sample	22/03/2021	280	Microscopy
Aqua regia extractable metals	M	Air dried sample	19/03/2021	300	ICPMS
Soil organic matter	U	Air dried sample	25/03/2021	BS1377:P3	Titrimetry
Water					
Aliphatic/Aromatic hydrocarbons in water	N		23/03/2021		GC-FID
Aromatic hydrocarbons in water	N		23/03/2021		GC-FID
Phenols in waters	N		19/03/2021		HPLC
Dissolved organic carbon	N		22/03/2021	102	IR
pH of waters	U		22/03/2021	113	Electromeric
PAHs and/or PCBs in waters	N		23/03/2021	135	GC-MS
Low range Aliphatic hydrocarbons water	N		22/03/2021	200	GC-MS
Low range Aromatic hydrocarbons water	N		22/03/2021	200	GC-MS
Cyanide in waters	U		23/03/2021	205	Colorimetry
Aliphatic hydrocarbons in water	N		23/03/2021	215	GC-FID
Aromatic hydrocarbons in water	N		23/03/2021	215	GC-FID
Dissolved metals by ICP in waters	U		19/03/2021	301	ICPMS

Tests marked N are not UKAS accredited

Report Information

Report No.: 21-32708, issue number 1a

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

LOD LOD refers to limit of detection, except in the case of pH soils and pH waters where it means limit of discrimination.
Soil sample results are expressed on an air dried basis (dried at < 30°C), and are uncorrected for inert material removed.
ELAB are unable to provide an interpretation or opinion on the content of this report.
The results relate only to the sample received.
PCB congener results may include any coeluting PCBs
Uncertainty of measurement for the determinands tested are available upon request
Unless otherwise stated, sample information has been provided by the client. This may affect the validity of the results.

Deviation Codes

-
- | | |
|---|--|
| a | No date of sampling supplied |
| b | No time of sampling supplied (Waters Only) |
| c | Sample not received in appropriate containers |
| d | Sample not received in cooled condition |
| e | The container has been incorrectly filled |
| f | Sample age exceeds stability time (sampling to receipt) |
| g | Sample age exceeds stability time (sampling to analysis) |

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month
All water samples will be retained for 7 days following the date of the test report
Charges may apply to extended sample storage