

Planning Office
Wrexham County Borough Council,
The Guildhall
Wrexham
LL11 1AY

Our Ref: CRM.427.008.GE.LT/RP01

21th June 2018

Sent via email: Sharon.Holman@wrexham.gov.uk

Dear Sharon,

Marston's Lodge, Plas Coch Road, Wrexham LL11 2BW - P/2018/0357

General

Please find attached the results from the additional gas monitoring and chemical analysis undertaken at the above site on 11th June 2018 and from hand pit/borehole WS/HP05A.

The hand pit/borehole was located in the area of the backfilled pond and as agreed on site with yourselves. The position is shown on the location plan given in the appendices.

The hand pit/Window sampler borehole was excavated using hand tools to 1.20mbgl and then a driven gas installation driven to depth of 2.00mbg, to allow gas monitoring to be undertaken.

The installation comprised a plain pipe to 1.00mbgl and slotted from 1.00mbgl and 2.00mbgl and was sealed using bentonite from 1.00mbgl to 0.80mbgl and a gas valve installed on the top. Gas monitoring was undertaken after 1.5hours to allow the gas to build up within the installation.

Gas monitoring

Ground gas was monitored during the return visits and as part of the original investigation. In additional gas monitoring was undertaken from the new installation (HP/WS05A) located within the backfilled pond. The results are summarised on the table below:

Exploratory Hole	Atmos pressure (Mb)	Flow (l/hr)	CH4		CO2		O2
			Concentration (%)	GSV (l/hr)	Concentration (%)	GSV (l/hr)	Concentration (%)
13-02-18							
WS5	987	<0.1	<0.1	<0.0001	<0.1	<0.0001	21.5
22-02-18							
WS5	1014	<0.1	<0.1	<0.0001	<0.1	<0.0001	21.4
28-02-18							
WS5	1008	<0.1	<0.1	<0.0001	4.8	<0.0048	16.6
11-06-18							
WS5	1006	<0.1	<0.1	<0.0001	4.0	<0.0040	17.2
WS5A	1006	<0.1	<0.2	<0.0002	1.4	<0.0014	18.0

Following the guidance provided in CIRIA C665 an initial assessment is undertaken to determine if there are any significant sources of potential ground gas. Such sources include landfills, organic clays and made ground incorporating putrescible materials such as rags, paper and wood. Where no significant source is identified no further assessment is necessary.

Where significant potential risk from ground gas has been identified from the Initial Conceptual Model and the intrusive ground investigation works ground gas monitoring is undertaken and the results of the monitoring are compared against the Gas Screening Values given in CIRIA Report 665. From this the Characteristic Situation is identified and remedial measures proposed.

When assessing the risk and type of remedial measures appropriate consideration is given to the likely construction of the development, the nature of the gas posing a risk and the nature of the likely source. The use of engineering judgement when determining risk from ground gas is consistent with the recommendations given in CIRIA C665. No significant sources of ground gas were noted from the desk study. A quarry was noted as part of the desk study to the north of the site in 1895. This had been infilled by 1914. Given the date of infilling and the distance from the site the risk associated with the gravel pit has been dismissed. Made Ground was encountered on site but this did not include significant putrescible materials. A backfilled pond was encountered on the site and an additional gas installation (WS/HP05A) was installed into the area backfilled. Gas monitoring has been undertaken as a precaution and to check the gas levels across the site.

Gas monitoring was undertaken during return visits to monitor groundwater levels. Ground gas has not recorded significant elevated concentrations of Methane or Carbon Dioxide and no detectable gas flow rates have been measured.

Based on the gas monitoring undertaken it is considered that Characteristic Situation 1 applies and no gas protective measures are required.

Chemical analysis from the backfilled pond

Chemical sampling was undertaken from the Made Ground which comprised light brown silty clayey sand with subangular fine to coarse gravel and occasional cobbles of limestone and brick. These materials were proved in in excess of 1.20mbgl and are thought to represent the backfilled pond materials.

Assessment of the risks to human health has been undertaken by comparing the soil quality data with reference values obtained from the Contaminated Land Exposure Assessment (CLEA), Soil Guideline Values (SGV) and General Acceptance Criteria (GAC) published by LQM/CIEH. The LQM/CIEH S4ULs values are used and summary tables of the reference values are included in Appendices.

Where an exceedance is identified the risk is assessed by considering the sensitivity of the proposed development and the potential pathway. The proposed development is for lodges with proposed landscaping areas surrounding roadways and car parking and as such the GAC values for Residential with public open space is considered suitable.

The soil quality analysis shows no exceedances of the GAC values for commercial or residential public open space.

Asbestos has been encountered and comprised Chrysotile -loose fibres. This confirms the chemical analysis undertaken as part of the previous investigation.

Recommendations

Based on the chemical analysis undertaken. The recommendations given in the ground investigation remain the same.

The additional gas monitoring undertaken confirms no additional risk and therefore Characteristic Situation 1 applies and no gas protective measures are required.

We hope that we have correctly interpreted your requirements.

Yours sincerely,

For and on behalf of Enzygo

Richard Hamilton

Associate Director

Cc Gareth Crowther – Simpson Associates



Key

- Site Boundary
- Window Sampler Boreholes (WS)
(WS1-WS5 and WS5A)
- Cable Percussion Borehole (BH)
(BH01)
- Hand Pit (HP)
(HP1)
- Soakaway Position (SA)
(SA1)



Samuel House, 5 Fox Valley Way, Stocksbridge, Sheffield, S36 2AA

Carter Lauren Ltd

SCALE:	PROJECT REF:
NTS	CRM.427.008

DRAWN:	CHECKED:	DATE:
NP	RH	June 2018

PROJECT:
Plas Coch, Wrexham

TITLE:
Location Plan

FIGURE NO:
CRM.427.008.GE.D.001.A



Richard Hamilton

Enzygo Geoenvironmental Ltd
The Byre
Woodend Lane
Cromhall
Gloucestershire
GL12 8AA

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

e: Richard.hamilton@enzygo.com

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 18-88756

Project / Site name:	Plas Coch	Samples received on:	13/06/2018
Your job number:	CRM.427.008	Samples instructed on:	13/06/2018
Your order number:	CRM.427.008	Analysis completed by:	19/06/2018
Report Issue Number:	1	Report issued on:	19/06/2018
Samples Analysed:	1 soil sample		

Signed:

Jordan Hill
Reporting Manager
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

Analytical Report Number: 18-88756

Project / Site name: Plas Coch

Your Order No: CRM.427.008

Lab Sample Number				980273				
Sample Reference				HP05A				
Sample Number				None Supplied				
Depth (m)				0.50				
Date Sampled				Deviating				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	6.4				
Total mass of sample received	kg	0.001	NONE	1.2				

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile- Loose Fibres				
Asbestos in Soil	Type	N/A	ISO 17025	Detected				

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.0				
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05				
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05				
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05				
Fluorene	mg/kg	0.05	MCERTS	< 0.05				
Phenanthrene	mg/kg	0.05	MCERTS	0.27				
Anthracene	mg/kg	0.05	MCERTS	< 0.05				
Fluoranthene	mg/kg	0.05	MCERTS	0.52				
Pyrene	mg/kg	0.05	MCERTS	0.49				
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.27				
Chrysene	mg/kg	0.05	MCERTS	0.33				
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.39				
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.21				
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.31				
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05				
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05				
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05				

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	2.79				
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.8				
Boron (water soluble)	mg/kg	0.2	MCERTS	0.8				
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.6				
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0				
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	19				
Copper (aqua regia extractable)	mg/kg	1	MCERTS	27				
Lead (aqua regia extractable)	mg/kg	1	MCERTS	110				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.6				
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	19				
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0				
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	120				

Analytical Report Number: 18-88756

Project / Site name: Plas Coch

Your Order No: CRM.427.008

Lab Sample Number				980273				
Sample Reference				HP05A				
Sample Number				None Supplied				
Depth (m)				0.50				
Date Sampled				Deviating				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0				
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0				
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0				
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0				
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4				
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10				
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	< 10				

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0				
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0				
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10				
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10				
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4				
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10				
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	< 10				

TPH (>C5 - C7)	mg/kg	1	MCERTS	< 1.0				
TPH (>C7 - C8)	mg/kg	1	MCERTS	< 1.0				
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1				
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0				
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0				
TPH (C16 - C21)	mg/kg	1	MCERTS	< 1.0				
TPH (C21 - C35)	mg/kg	1	MCERTS	< 1.0				
TPH (C35 - C44)	mg/kg	10	NONE	< 10				
TPH Total C5 - C44	mg/kg	10	NONE	< 10				



Analytical Report Number : 18-88756

Project / Site name: Plas Coch

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
980273	HP05A	None Supplied	0.50	Light brown sandy loam with gravel and rubble.

Analytical Report Number : 18-88756

Project / Site name: Plas Coch

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding.	L076-PL	D	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L088/76-PL	W	MCERTS

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

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

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

Sample Deviation Report



Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
HP05A		S	18-88756	980273	a			