



GeoEnviro Solutions Ltd,
Unit 7, Springvale Works,
Brookfoot Lane,
Brighouse,
West Yorkshire,
HD6 2RA

Mr. Mark Brett
The National Trust,
Finance Service Centre,
Epsom Court,
White Horse,
Business Park,
Trowbridge,
BA14 0XF

10th January 2023

Dear Mr. Mark Brett,

GES Project Reference 3031-21

**RE: Commemorative Woodland, Errdig, Hafod Road, Wrexham,
Report on water samples taken for potential contamination**

As part of Phase 1 report for the Commemorative Woodland at Hafod Road, Wrexham, two water samples were taken from an ephemeral pond in the south of the site.

The location of the samples is shown on Drawing No. 3031-22/02, included within Appendix 1 if this letter report.

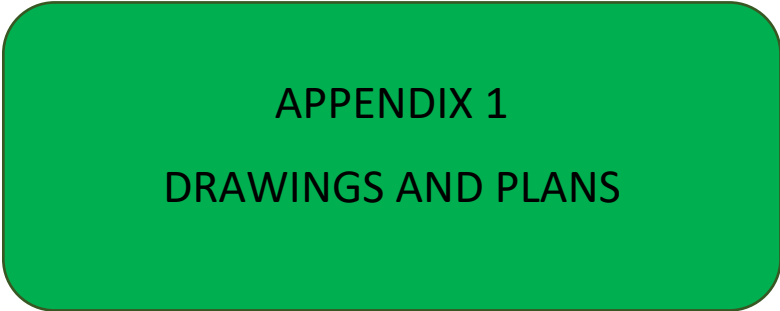
Both waters were taken and sent to Eurofins Chemtests Limited, for ICE SUITE F-Water sample testing, of heavy metals, total TPH, total phenols, and a range of organic compounds. The results of the chemical testing are presented within Appendix 2 of this letter report.

The results of the chemical testing were compared against the Generic Assessment Criteria (GAC), presented within Appendix 3 of this letter report. No exceedances were recorded.

If you have any questions on this letter, please contact the undersigned.

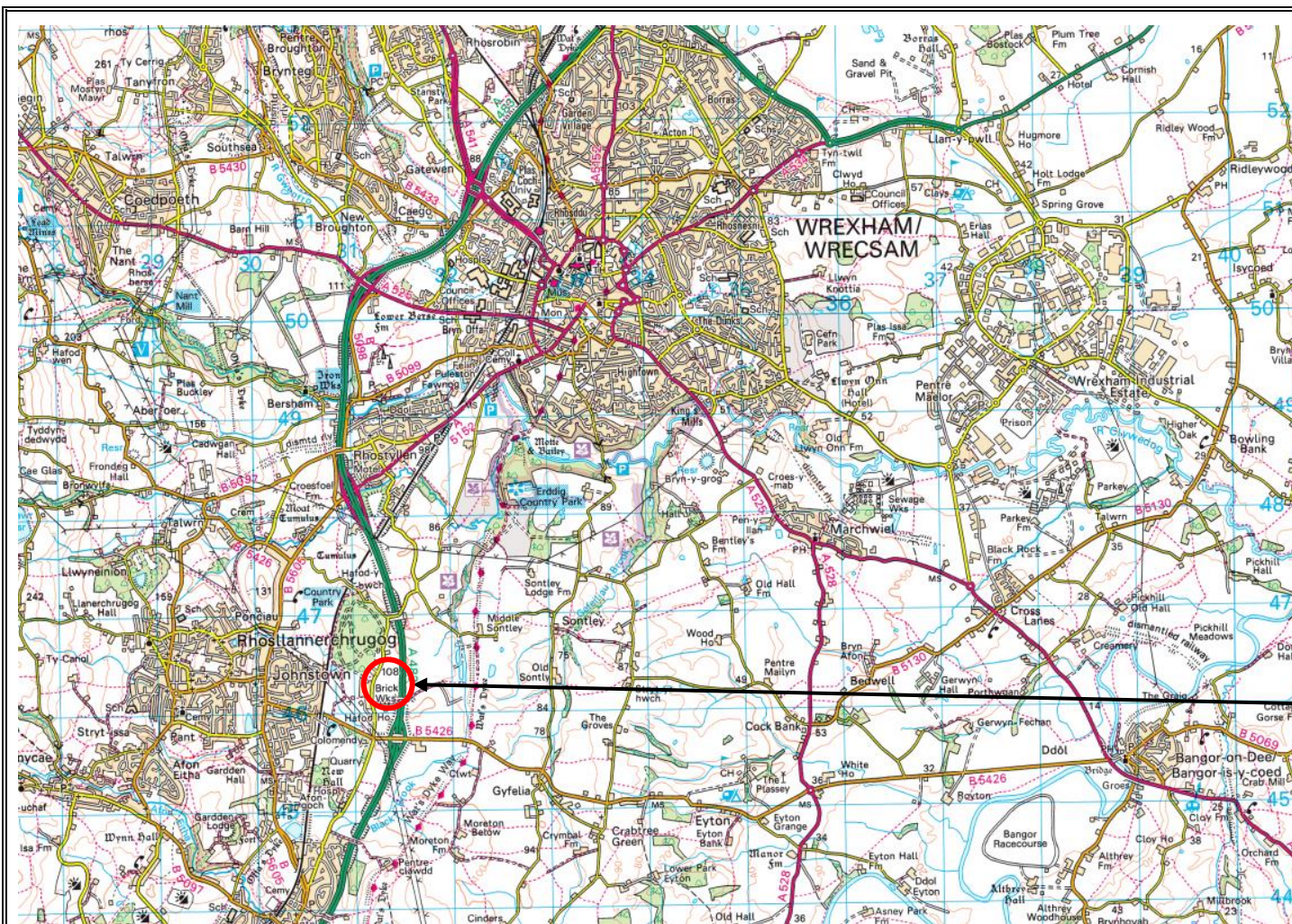
Yours sincerely

Lewis Waller
Geotechnical Engineer
GeoEnviro Solutions Ltd

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APPENDIX 1

DRAWINGS AND PLANS



General
Site
Location



GeoEnviro Solutions Ltd
Unit 7 Springvale Works
Brighouse
West Yorkshire
HD6 2RA
Tel: 01484 986010
Email: info@geoenvirosolutions.com
Web: www.geoenvirosolutions.com



PROJECT NAME	Commemorative Woodland, Errdig, Hafod Road, Wrexham
PROJECT NUMBER	3031-22
TITLE	Site Location Plan

DRAWING NO.
3031-22/01

SCALE
N.T.S

DATE
December 2022

DRAWN BY
RC



**DRAWN
BY
LW**

	GeoEnviro Solutions Ltd Unit 7 Springvale Works Brighouse West Yorkshire HD6 2RA Tel: 01484 986010 info@geoenvirosolutions.com www.geoenvirosolutions.com	PROJECT NAME Hafod Road, Wrexham	DRAWING NO. 3031-22/02	SCALE N.T.S
		PROJECT NUMBER 3031-22	DATE Dec 2022	DRAWN BY LW
		TITLE Test Point Location Plan		

APPENDIX 2
CHEMICAL TEST RESULTS



2183

Final Report

Report No.:	22-47449-1		
Initial Date of Issue:	19-Dec-2022		
Client	Geoenviro Solutions Ltd		
Client Address:	Unit 7 Springvale Works Brookfoot Lane Brighthouse HD6 2RA		
Contact(s):	Joe Frost Lewis Waller Sue Ellis		
Project	3031-22 Wrexham, National Trust		
Quotation No.:		Date Received:	12-Dec-2022
Order No.:		Date Instructed:	12-Dec-2022
No. of Samples:	2		
Turnaround (Wkdays):	5	Results Due:	16-Dec-2022
Date Approved:	19-Dec-2022		
Approved By:			
Details:	Stuart Henderson, Technical Manager		

Results - Water

Project: 3031-22 Wrexham, National Trust

Client: Geoenviro Solutions Ltd	Chemtest Job No.:				22-47449	22-47449
Quotation No.:	Chemtest Sample ID.:				1562345	1562346
	Sample Location:				WST01	WST02
	Sample Type:				WATER	WATER
	Top Depth (m):				0.1	0.1
	Bottom Depth (m):				0.1	0.1
	Date Sampled:				09-Dec-2022	09-Dec-2022
Determinand	Accred.	SOP	Units	LOD		
pH	U	1010		N/A	7.4	7.2
Sulphate	U	1220	mg/l	1.0	280	440
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050	< 0.050
Arsenic (Dissolved)	U	1455	µg/l	0.20	1.5	1.4
Boron (Dissolved)	U	1455	µg/l	10.0	60	73
Cadmium (Dissolved)	U	1455	µg/l	0.11	< 0.11	< 0.11
Copper (Dissolved)	U	1455	µg/l	0.50	3.4	0.57
Mercury (Dissolved)	U	1455	µg/l	0.05	< 0.05	< 0.05
Nickel (Dissolved)	U	1455	µg/l	0.50	4.0	3.5
Lead (Dissolved)	U	1455	µg/l	0.50	< 0.50	< 0.50
Zinc (Dissolved)	U	1455	µg/l	2.5	17	10
Chromium (Total)	N	1455	µg/l	0.50	3.3	3.3
Total TPH >C6-C40	U	1670	µg/l	10	< 10	< 10
Naphthalene	U	1800	µg/l	0.10	< 0.10	0.26
Acenaphthylene	U	1800	µg/l	0.10	< 0.10	< 0.10
Acenaphthene	U	1800	µg/l	0.10	< 0.10	< 0.10
Fluorene	U	1800	µg/l	0.10	< 0.10	< 0.10
Phenanthrene	U	1800	µg/l	0.10	< 0.10	< 0.10
Anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10
Fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10
Pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10
Chrysene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1800	µg/l	0.10	< 0.10	< 0.10
Total Of 16 PAH's	U	1800	µg/l	2.0	< 2.0	< 2.0
Total Phenols	U	1920	mg/l	0.030	< 0.030	< 0.030

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1670	Total Petroleum Hydrocarbons (TPH) in Waters by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO	Pentane extraction / GC FID detection
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

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

customerservices@chemtest.com

APPENDIX 3
WATER GENERIC ASSESSMENT
CRITERIA

Geo Enviro Solutions

June 2018

GENERIC SCREENING CRITERIA FOR GENERIC QUANTITATIVE RISK ASSESSMENT

Atkins ATRISK SSV's Screening Criteria - WATERS

Compound	WSV's Residential		WSV's Commercial		DWS		EQS	
	mg/l	Ref	mg/l	Ref	µg/l	Ref	µg/l	Ref
Metals								
Antimony					5	F		
Arsenic					10	F	50	G
Barium								
Beryllium								
Boron					1000	F	2000	G
Cadmium (pH 6, 7, 8)					5	F	1.5	G
Chromium III					50	F	4.7	G
Chromium VI							3.4	G
Copper					2000	F	1	G
Lead					10	F	14	G
Mercury (elemental)	0.00463	J	0.428	J				
Mercury (Inorganic)								
Mercury (methyl)	45.5	J	5660	J	1	F	0.07	G
Molybdenum								
Nickel					20	F	34	G
Selenium					10	F		
Vanadium							100	G
Zinc					5000	F	20	G
Non-Metals								
Free-Cyanide (Total)					50	F	1	G
Phenol and Chlorophenols								
Phenol	1690	J	269000	J	0.5	F	7.7	G
Chlorophenols								
Pentachlorophenol							1	G
Poly Aromatic Hydrocarbons (PAH) (1.0% SOM)								
Acenaphthene	375	J	-	-				
Acenaphthylene								
Anthracene							0.1	G
Benzo(a)anthracene	0.0536	J	-	-				
Benzo(a)pyrene	0.0638	J	-	-	0.01	F	0.27	G
Benzo(b)fluoranthene					0.1	F	0.017	G
Benzo(ghi)perylene					0.1	F	0.00082	G
Benzo(k)fluoranthene					0.1	F	0.017	G
Chrysene								
Dibenzo(ah)anthracene	0.0237	J	-	-				
Fluoranthene							0.12	G
Fluorene								
Indeno(123-cd)pyrene					0.1	F		
Napthalene	0.952	J	99.8	J			130	G
Phenanthrene								
Pyrene								
PAH (Total 16)					0.1	F		
Petroleum Hydrocarbons (TPH CWG)								
MTBE	352	J	33800	J				
Benzene	0.0888	J	8.46	J	1	F	50	G
Toluene	96.4	J	9090	J			74	G
Ethylbenzene	13.4	J	1250	J			200	G
o-Xylene	5	J	503	J			30	G
m-Xylene	4.1	J	413	J			30	G
p-Xylene	4.29	J	432	J			30	G
TPH Aliphatic EC5-6	1.9	J	198	J				
TPH Aliphatic EC6-8	1.4	J	144	J				
TPH Aliphatic EC8-10	0.0296	J	2.9	J				
TPH Aliphatic EC10-12	0.0228	J	2.23	J				
TPH Aliphatic EC12-16	0.00547	J	-	-				
TPH Aliphatic EC16-35								
TPH Aliphatic EC35-44								
TPH Aromatic EC5-7	0.0888	J	8.46	J				
TPH Aromatic EC7-8	96.4	J	9090	J				

Geo Enviro Solutions

June 2018

GENERIC SCREENING CRITERIA FOR GENERIC QUANTITATIVE RISK ASSESSMENT

Compound	WSV's Residential		WSV's Commercial		DWS		EQS	
	mg/l	Ref	mg/l	Ref	µg/l	Ref	µg/l	Ref
TPH Aromatic EC8-10	0.985	J	96.5	J				
TPH Aromatic EC10-12	3.87	J	380	J				
TPH Aromatic EC12-16	10.5	J	-	-				
TPH Aromatic EC16 – 21								
TPH Aromatic EC21-35								
VOC and SVOC								
1,1,1-Trichloroethane	13.1	J	1270	J			100	G
1,1,1,2-Tetrachloroethane	1.05	J	96.7	J				
1,1,2,2-Tetrachloroethane	6.89	J	650	J				
1,2-Dichloroethane	0.0373	J	3.54	J	3	F	10	G
1,1,2 Trichloroethane	2.23	J	208	J			400	G
1,1-Dichloroethane	11.4	J	1110	J				
1,1-Dichloroethene	0.683	J	65.6	J				
1,2,4-Trimethylbenzene	0.11	J	9.83	J				
1,2-Dichloropropane	0.0969	J	11.1	J				
2-Chloronaphthalene	0.695	J	62.7	J				
2-Methylphenol	11000	J	-	-				
2,4-Dichloro-o-cresol	1960	J	-	-				
2,4-Dimethylphenol	291	J	30900	J				
2,4-Dinitrotoluene	3250	J	-	-				
2,4,6-Trinitrotoluene								
2,6-Dinitrotoluene	921	J	-	-				
2,6-bis(1,1-dimethyl)-4-(1-methylpropyl)-phenol	13.2	J	-	-				
3-Methylphenol	17900	J	-	-				
4-Methylphenol	12000	J	-	-				
Biphenyl	64.4	J	-	-			25	G
Bis (2-ethylhexyl) phthalate								
Bromobenzene	0.941	J	87.7	J				
Bromodichloromethane	0.0725	J	6.82	J	100	F		
Bromoform	15.9	J	1770	J	100	F		
Butyl benzyl phthalate							51	G
Carbon disulphide								
Carbon tetrachloride	0.0229	J	3.31	J				
Chlorobenzene	13.7	J	1300	J				
Chloroethane	41.5	J	4180	J				
Chloroform / Trichloromethane	3.88	J	369	J	100	F		
Chloromethane	0.0531	J	5.5	J				
Cis 1,2 Dichloroethene	0.548	J	54.6	J				
DDD	7.18	J	-	-			0.025	G
Dibromochloromethane	0.394	J	38.7	J	100	F		
Dichloromethane	13.6	J	1500	J			20	G
Diethyl Phthalate	4340	J	-	-			1000	G
Di-n-butyl phthalate	230	J	-	-			40	G
Di-n-octyl phthalate								
Dinoseb	0.11	J	>52	J				
Formaldehyde	21.6	J	2360	J			50	G
Hexachlorobutadiene							0.6	G
Hexachloroethane	0.0388	J	>50	J				
HMX								
Isopropylbenzene	3.89	J	389	J				
Methyl tert-butyl ether	352	J	33800	J				
Nicotine	573	J	58900	J				
Prochloraz							40	G
Propylbenzene	12.3	J	1100	J				
RDX								
Styrene	38.6	J	3530	J			500	G
Tetrachloroethene	1.66	J	174	J	10	F	140	G
Total Cresols (2-, 3- and 4-methylphenol)								
Trans 1,2 Dichloroethene	0.676	J	65.7	J				
Tributyl tin oxide	0.423	J	54.5	J			0.0015	G
Trichloroethene	0.222	E	20.7	E	10	F		
Trichloromethane	3.88	E	369	E			2.5	G

Geo Enviro Solutions
 GENERIC SCREENING CRITERIA
 FOR
 GENERIC QUANTITATIVE RISK ASSESSMENT

June 2018

Compound	WSV's Residential		WSV's Commercial		DWS		EQS	
	mg/l	Ref	mg/l	Ref	µg/l	Ref	µg/l	Ref
Trichloromethylbenzene	0.00069	J	0.0609	J				
Vinyl chloride	0.00248	J	0.249	J	0.5	F		
Pesticides								
Aldrin					0.03			
Dieldrin					0.03			
Atrazine							2	G
Dichlorvos								
Alpha-Endosulfans							0.01	G
Beta-Endosulfans								
Alpha-Hexachlorocyclohexane								
Beta-Hexachlorocyclohexane								
Gamma-Hexachlorocyclohexane								
Polychlorinated Biphenols (PCB)								
Sum of PCDDs, PCDFs and dioxin-like PCBs								
Chlorobenzenes								
Chlorobenzene								
1,2-Dichlorobenzene								
1,3-Dichlorobenzene								
1,4-Dichlorobenzene								
Hexachlorobenzene							0.05	G
Pentachlorobenzene								
1,2,3-Trichlorobenzene								
1,2,4-Trichlorobenzene								
1,3,5-Trichlorobenzene								
1,2,3,4-Tetrachlorobenzene								
1,2,3,5-Tetrachlorobenzene								
1,2,4,5-Tetrachlorobenzene								

Geo Enviro Solutions
GENERIC SCREENING CRITERIA
FOR
GENERIC QUANTITATIVE RISK ASSESSMENT

June 2018

Screening Criteria Reference Guide:

Soil GAC Source Reference	
A	UK (CLEA) Soil Guideline Value 2009
B	LQM/CIEH S4ULs for Human Health Risk Assessment Values 2015
C	UK (CLEA) Soil Guideline Value 2002
D	CL:AIRE GAC Values December 2009
E	AtRisk Soil Screening Values and Water Screening Values Produced by Atkins 2011
F	UK Drinking Water Standards (DWS)
G	Environment Agency, Environmental Quality Standards (EQS) 2015
H	Defra C4SL's 2014
I	NHBC Technical Extra 15 - 2014
J	Atkins AtRisk SSV's and WSV's Produced by Atkins 2017
Abbreviations	
SOM	Soil Organic Matter
N/P	No pathway - no risk is posed by this substance under the specific land-use scenario
MTBE	Methyl Tertiary Butyl Ether - a petroleum fuel additive which is a common groundwater contaminant