Intégral Géotechnique

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14050/LW/Rev A

24 January 2024

Mid & West Wales Fire Service
Lime Grove Avenue
Carmarthen
SA31 1SP

For the attention of Robert Thomas

Dear Sirs,

Earlswood Burn House, Jersey Marine, Neath – Controlled Waters Risk Assessment

We have now completed our controlled waters risk assessment for the above site and report as follows.

Introduction

The site was initially investigated by Intégral Géotechnique (Wales) Limited in July 2022 and reported in 'Earlswood Burn House, Jersey Marine, Neath, Site Investigation Report, Report No. 14050/LS/22/SI/RevB, dated October 2022'.

Following the submission of the Site Investigation Report, Natural Resources Wales (NRW) requested that the potential risk to controlled waters is further investigated and assessed.

To achieve this, it was necessary to install replacement shallow groundwater monitoring wells at the site.

The programme of groundwater sampling and laboratory testing has now been completed at the site and an assessment of the findings is provided below.

This supplementary report should be read in conjunction with the above Site Investigation Report.

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Site Works

A supplementary investigation comprising the drilling of two windowless sample boreholes, was carried out on the 12th September 2023. The windowless sample boreholes were drilled to a depth of 5.0m below existing ground level.

Groundwater monitoring wells were installed within both boreholes to enable representative groundwater samples to be obtained for laboratory testing.

The site works were supervised by a qualified geotechnical engineer from Intégral Géotechnique (Wales) Limited, who also logged the boreholes and prepared the detailed boreholes logs.

Copies of the windowless sample boreholes are presented in Appendix A and their approximate locations are shown in Figure 1.

Groundwater Monitoring

Following installation of the standpipes, groundwater was sampled for laboratory chemical testing. The samples were dispatched to the laboratories of i2 Analytical and tested for a range of contamination including petroleum hydrocarbons and Perfluorooctane sulfonic acid (PFOS).

Three rounds of groundwater sampling and testing has been undertaken to establish baseline conditions.

During each monitoring round, the groundwater levels were checked and recorded. The boreholes were then purged of approximately three times the well volume using a bailer. Representative samples of groundwater were then collected and stored in appropriate and correct sample bottles provided by i2 Analytical for the proposed testing, including PFOS.

The sampling equipment was changed between boreholes to prevent cross contamination between boreholes. Care was also taken to ensure the sampling equipment did not become contaminated at the ground surface.

A copy of the groundwater monitoring results are presented in Appendix B.

Ground Conditions

The ground conditions encountered during the drilling of the windowless sample boreholes to install the groundwater monitoring wells were similar to the ground conditions previously encountered during the site works in July 2022.

The ground conditions consisted of a layer of made ground comprising of loose dark grey to slightly grey and black sandy silty gravel and/or very soft to soft dark grey and black gravelly slightly sandy silty clay. The made ground was encountered to depths of between 1.0m and 2.0m below existing ground level.

The made ground was underlain by superficial deposits that predominantly consisted of very loose to loose yellow beige, lightly brown and dark brown to grey fine to coarse sand, locally gravelly with bands of very soft to soft sandy silty clay.

Groundwater was encountered at depths of between 1.8m and 2.2m below existing ground level.

Groundwater Contamination – Excluding PFOS

As stated above, groundwater samples were taken from the monitoring wells installed within the windowless sample boreholes across the site and analysed at the laboratories of i2 Analytical for a range of contamination. Copies of the three rounds of groundwater test results have been included in Appendix B.

It should be noted that the results of the laboratory testing for PFOS will be discussed separately within the next section.

As part of a 'Tier 1' screening exercise, the results of the groundwater analysis have been compared against the Annual Average Environmental Quality Standards (AA EQS) for freshwater in the first instance. Where no AA EQS values are available, the results have been compared against the Maximum Allowable Concentration Environmental Quality Standards (MAC EQS) for freshwaters. Where no EQS values are available, the results have been compared against UK and WHO drinking water standards, in hierarchical order.

A summary of the groundwater test results and comparison with the screening criteria values is presented in Appendix C.

In Round 1 of the testing the following exceedances were detected:

- A single elevated concentration of copper was detected in WS102 at a concentration of 20ug/l, elevated above the AA EQS threshold of 7.5ug/l.
- A single elevated concentration of lead was detected in WS102 at a concentration of 9.6ug/l, elevated above the AA EQS threshold of 1.2ug/l.
- A single elevated concentration of nickel was detected in WS102 at a concentration of 4.2ug/l, marginally elevated above the AA-EQS threshold of 4ug/l.
- A single elevated concentration of zinc was detected in WS102 at a concentration of 13ug/l, slightly elevated above the AA EQS threshold of 10ug/l.

In Round 2 of the testing the following exceedances were detected:

- A single elevated concentration of copper was detected in WS102 at a concentration of 16ug/l, elevated above the AA EQS threshold of 7.5ug/l.
- Elevated concentrations of lead was detected in both boreholes at concentrations of 22ug/g and 26ug/l, elevated above the AA EQS threshold of 1.2ug/l.
- A single elevated concentration of zinc was detected in WS102 at a concentration of 15ug/l, elevated above the AA EQS threshold of 10ug/l.
- A single elevated concentration of the petroleum hydrocarbon band aromatic C21-C35 was detected in WS101 at a concentration of 20ug/l, elevated above the AA-EQS threshold of 10ug/l.
- Elevated concentrations of the PAH compound fluoranthrene was detected in both boreholes at concentrations of 0.61ug/l and 0.24ug/l, elevated above the AA EQS threshold of 0.01ug/l.
- Elevated concentrations of the PAH compound benzo(a)pyrene was detected in both boreholes at concentrations of 0.14ug/l and 0.11ug/l, elevated above the AA EQS threshold of 0.00017ug/l.

In Round 3 of the testing the following exceedances were detected:

- A single elevated concentration of copper was detected in WS102 at a concentration of 16ug/l, elevated above the AA EQS threshold of 7.5ug/l.

- Elevated concentrations of lead was detected in both boreholes at concentrations of 22ug/l and 26ug/l, elevated above the AA EQS threshold of 1.2ug/l.
- A single elevated concentration of zinc was detected in WS102 at a concentration of 20ug/l, elevated above the AA EQS threshold of 10ug/l.
- A single elevated concentration of the PAH compound fluoranthene was detected at a concentration of 0.27ug/l, elevated above the AA-EQS threshold of 0.01ug/l.

Based on the results of the three rounds of groundwater sampling and testing, site specific PNECs (Predicted No-Effect Concentrations) have been calculated for copper, zinc, nickel and lead with the Water Framework Directive M-BAT (Metal Bioavailability) Tool using a function of dissolved organic carbon (DOC), calcium and pH.

Site specific PNECs of between 2.44ug/l and 16.64ug/l were calculated for copper and therefore the elevated concentrations of copper remain elevated above their calculated PNEC.

Site specific PNECs of between 18.29ug/l and 23.73ug/l were calculated for zinc and therefore the elevated concentrations of zinc are below their calculated PNEC.

A site specific PNEC of 17.9ug/l was calculated for nickel and therefore the elevated concentration of nickel is below the calculated PNEC.

Site specific PNECs of between 1.20ug/l and 4.57ug/l were calculated for lead and therefore the elevated concentrations of lead remain elevated above their calculated PNEC.

Groundwater Contamination – Perfluorooctane sulfonic acid (PFOS)

Background Information

PFOS belongs to a large, diverse group of man-made substances known as perfluoroalkyl and polyfluororalkyl substances (PFAS). Multiple studies have been undertaken which demonstrates PFOS is prevalent in the environment and there is ongoing debate regarding what criterion should be used when undertaking controlled waters risk assessments where PFOS is present.

The Environment Agency (EA) have undertaken multiple studies since mid-2000s, where sampling for PFOS in surface water, groundwater and other PFOS indicators and the available results were reported in '*Environment Agency, Perfluorooctance sulfonate (PFOS) and related substances: sources, pathways and environmental data, dated October 2019'.*

The EA reported that PFOS was frequently detected in surface waters across England. The concentrations of PFOS in the water varied and were typically reported at levels above the freshwater annual average (AA) EQS, a value calculated from biota EQS. The EA have sampled approximately 470 freshwater sites in England for PFOS as part of their surveillance monitoring programme since 2016. The EA reported concentrations of PFOS in surface waters ranging from 0.000053ug/l to 0.084ug/l, with only 8% of the surface water sites measuring PFOS concentrations below the AA EQS of 0.00065ug/l. Within estuarine and coastal environments only 3% of the sites (approximately 55 sites monitored) recorded concentrations of PFOS below the 0.00013ug/l AA EQS threshold.

Concentration of PFOS in groundwater was also measured as part of the monitoring programme. The EA stated that PFOS was detected at approximately 30% of groundwater sites, with a limit of detection of 0.01ug/l.

Monitoring was also undertaken under the Chemical Investigation Programme (CIP2), which is a collaboration between the EA, NRW and water companies to assess the potential influx of PFOS released from waste water treatment works (WwTW). The EA reported that between 2017 and 2019 the mean concentration of PFOS in effluent across all WwTW samples was 0.01ug/l, with a standard deviation of 0.024ug/l. The mean PFOS concentrations upstream and downstream of WwTW were 0.0043ug/l and 0.0059mg/l respectively.

There is currently no available data of PFOS concentrations in the River Neath, however background levels within the River Severn have been recorded at 0.238ug/l and a similar background level could be assumed for the River Neath.

Review of Water Quality Standards

As stated above, there is an ongoing debate regarding what criterion should be used when undertaking controlled waters risk assessments. The current water quality standards which could potentially be used to assess the risk presented by the concentrations of PFOS in the shallow groundwater is presented in Table 1, below.

Table 1: Review of Water Quality Standards

Water Quality Standard	Source	Applicability
0.00065ug/l (Annual Average) 36ug/l (Maximum Allowable)	Priority Substances Directive (2013/39/EU). PFOS is classed as a Water Framework Directive priority hazardous substance and as a ubiquitous persistent, bioaccumulative and toxic substance.	Annual average has been calculated from the biota EQS, which was derived primarily by secondary poisoning of humans through consumption of fish. Significant safety factors incorporated. The Environment Agency (2019)[1] used the annual average as an 'initial assessment of risk' as 'the thresholds are based on toxicological data but as subject some uncertainty'.
0.003ug/l (Annual Average)	Environment Agency (2019)[1] Proposed alternative to the 0.00065ug/l annual average threshold	The comparison of water column and fish residue data, (derived from sampling of surface water and groundwater since the mid 2000s,) collected in the same river reaches, suggested the 0.00065ug/l annual average threshold may over predict the likely failure of biota standard observed in fish living in the same stretch of river. The EA proposed an empirical derived threshold in water of 0.003ug/l.
Concentration >0.01ug/l – Tier 1 requires monitoring Concentrations >0.1ug/l Tier 2 require a plan to reduce Concentrations >1.0ug/l Tier 3 required rapid action	Drinking Water Inspectorate (2022)	The DWI have taken a precautionary approach and produced tiered guideline values. It should be noted that the site is not located within a Source Protection Zone.
1ug/l (Annual mean in groundwater)	UK Technical Advisory Group	The concentration in groundwater below which the danger of deterioration in the quality of the receiving groundwater is avoided.

[1]*Environment Agency, Perfluorooctance sulfonate (PFOS) and related substances: sources, pathways and environmental data, dated October 2019.*

Groundwater Monitoring Results

During the three monitoring rounds, the PFOS concentrations recorded within WS101 ranged from 0.014ug/l to 0.009ug/l and within WS102 the concentrations of PFOS ranged from 0.043ug/l to 0.02ug/l.

The groundwater monitoring programme of the shallow groundwater underlying the site recorded an average PFOS concentration of 0.019ug/l.

The PFOS concentrations detected during the groundwater monitoring programme exceed the AA-EQS of 0.00065ug/l, however the PFOS concentrations are below the MAC-EQS of 36ug/l.

The PFOS concentrations exceed the alterative annual average of 0.003ug/l proposed by the Environment Agency.

When compared to the Drinking Water Inspectorate, the PFOS concentrations exceed the Tier 1 criteria which requires continuing monitoring but does not exceed Tiers 2 and 3. As previously stated the site does not lie within a Source Protection Zone.

The PFOS concentrations do not exceed the groundwater annual mean threshold of 1ug/l proposed by the UK Technical Advisory Group.

Controlled Waters Risk Assessment

The results of the groundwater sampling and testing indicates that the majority of the determinants were below the respective screening criteria values and/or below the laboratory limit of detection. However, exceedances of copper and lead together with occasional exceedances of petroleum hydrocarbon band aromatic C21-C35, fluoranthene, and benzo(a)pyrene have been identified. In addition, PFOS was detected within the groundwater samples.

The concentrations of copper and lead have been fairly consistent during the three monitoring rounds, albeit that the down hydraulic gradient concentrations are typically greater than the up gradient concentrations. This may be indicative of a slightly increasing trend across the site. The concentrations are not significantly elevated and the potential risk to controlled waters is considered to be low given the distance to the River Neath.

A slightly elevated concentration of the petroleum hydrocarbon band aromatic C21-C35 was detected during the second round of monitoring only. No elevated concentrations were detected within the first and third monitoring round with the recorded concentrations below the laboratory limit of detection. It is therefore considered that the potential risk to controlled waters from petroleum hydrocarbons is low.

Elevated concentrations of the PAH compounds fluoranthene and benzo(a)pyrene were detected during the second round of monitoring, however during the third round of monitoring the concentrations of benzo(a)pyrene were below the laboratory limit of detection and the concentration of fluoranthene had significantly decreased. It should be noted that the down hydraulic gradient concentrations are lower than the up gradient concentrations indicating a potentially reducing trend across the site. It is therefore considered that the potential risk to controlled waters from PAH compounds is considered to be low.

The concentrations of PFOS indicate an overall reducing trend over the three monitoring rounds. Although the concentrations of PFOS recorded during the monitoring rounds were elevated above the Annual Average EQS threshold and the EA alternative Annual Average threshold, the recorded concentrations were significantly below the Maximum Acceptable Concentration EQS and the groundwater annual average threshold. The recorded PFOS concentrations were also significantly below the background levels in the River Severn.

However, in the developed state, the site is covered by either the building footprint or areas of hardstanding with formal drainage. It is considered that the potential for rainfall infiltration into the ground, leachate generation from the made ground and the potential for vertical migration to impact on the underlying groundwater is considered to be low.

Further to be above, it should be noted that there is no further source of PFOS within the site, given that the use of PFOS (>0.001wt%) within firefighting foam is prohibited since June 2017 and as stated above the made ground located beneath the site will be encapsulated below the proposed building and areas of hardstanding.

Given the distance to the River Neath (approximately 160m), it is considered that the potential risk to the surface water receptor is low.

It is therefore considered that the overall risk to controlled waters from copper, lead and PFOS is considered to be low.

We trust the above and enclosed are to your satisfaction. However, if you have any queries or require any further information, please do not hesitate to contact us.

Yours faithfully,

L. Williams

Lowri Williams Feighoney
For
Intégral Géotechnique (Wales) Limited

Enc.

APPENDIX A

WINDOWLESS SAMPLE BOREHOLE LOGS

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Project Name: **Earlswood Burn House**		Project No.: **14050**	Borehole No.: **WS101** Sheet 1 of 1
Location: Jersey Marine, Neath	Client: Mid & West Wales Fire Service	Coordinates:	Hole Type: WLS
Equipment: DART 540	Diameter of Casing:	Level:	Scale 1:25
Diameter of Boring: 101+97+86+75mm	Depth of Casing:	Dates 12/09/2023 -	Logged By: LS

Well	Water Strikes	Samples & In situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description	
								Concrete.	
					0.25			[Made Ground] Loose dark grey GRAVEL. Gravel is fine to coarse sub angular and angular limestone	
					0.40			[Made Ground] Loose dark grey and black very clayey slightly sandy silty GRAVEL. Gravel is fine to coarse sub angular and angular limestone, occasional brick fragments, ash, slag and clinker.	
		1.00	C	N=3 (1,0/1,0,1,1)	1.00			[Made Ground] Very loose dark grey slightly sandy slightly silty GRAVEL. Gravel is fine to coarse limestone and occasional ash and clinker.	1
					1.20			[Made Ground] Very soft to soft dark grey and black gravelly slightly sandy silty CLAY. Gravel is fine to coarse sub angular and angular limestone, ash, slag, clinker and occasional brick fragments.	
		2.00	C	N=7 (2,1/1,1,1,4)	2.00			Loose dark grey and black very clayey sandy GRAVEL. Gravel is fine to coarse sub angular and angular sandstone.	2
	2.20								
					2.60			Loose dark brown sandy silty CLAY.	
		3.00	C	N=1 (0,0/0,0,0,1)	3.00			Loose dark grey slightly gravelly silty SAND. Gravel is fine to coarse sub angular and angular sandstone.	3
					3.80			Soft grey silty CLAY.	
		4.00	C	N=0 (0,0/0,0,0,0)	4.00			No recovery.	4
		5.00	C	N=0 (0,0/0,0,0,0)	5.00			End of Borehole at 5.00 m	5

Remarks:

1. Borehole terminated at 5.0mbgl.

Key:

D - Small disturbed sample
B - Bulk disturbed sample
ES - Environmental soil sample
SPT - Standard Penetration Test (split spoon)
CPT - Standard Penetration Test (solid cone)
W - Water sample
U - Undisturbed sample
TCR - Total Core Recovery
SCR - Solid Core Recovery
RQD - Rock Quality Designation

AGS

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Project Name: **Earlswood Burn House**	Project No.: **14050**	Borehole No.: **WS102** Sheet 1 of 1	
Location: Jersey Marine, Neath	Client: Mid & West Wales Fire Service	Coordinates:	Hole Type: WLS
Equipment: DART 540	Diameter of Casing:	Level:	Scale 1:25
Diameter of Boring: 101+97+86+75mm	Depth of Casing:	Dates 12/09/2023 -	Logged By: LS

Well	Water Strikes	Samples & In situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
					0.10			[Made Ground] Grass over black silty SAND with frequent rootlets.
								[Made Ground] Loose light grey and light brown gravelly slightly silty SAND. Gravel is fine to coarse sub angular and angular sandstone., limestone and ash.
		1.00	C	N=9 (1,2/1,3,3,2)	1.00			Loose dark brown clayey sandy GRAVEL. Gravel is fine to coarse sub angular and angular sandstone.
	1.80							
		2.00	C	N=2 (0,0/0,1,0,1)	2.00			Very loose dark grey brown coarse SAND.
					2.50			Very loose light brown coarse SAND with shell fragments.
		3.00	C	N=2 (0,0/0,1,0,1)				
					3.50			Very soft dark grey silty SAND.
		4.00	C	N=2 (0,0/0,1,0,1)	4.00			No recovery.
		5.00	C	N=2 (0,0/0,1,1,0)	5.00			End of Borehole at 5.00 m

Remarks:

1. Borehole terminated at 5.0mbgl.

Key:

D - Small disturbed sample
B - Bulk disturbed sample
ES - Environmental soil sample
SPT - Standard Penetration Test (split spoon)
CPT - Standard Penetration Test (solid cone)
W - Water sample
U - Undisturbed sample
TCR - Total Core Recovery
SCR - Solid Core Recovery
RQD - Rock Quality Designation

AGS

APPENDIX B

LABORATORY CHEMICAL TEST RESULTS - GROUNDWATER

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Analytical Report Number : 23-59015

Replaces Analytical Report Number: 23-59015, issue no. 1
Report format change.
Deviations removed by Laboratory

Project / Site name:	Earlswood Burn House Jersey Marine Neath	**Samples received on:**	28/09/2023
Your job number:	14050	**Samples instructed on/ Analysis started on:**	28/09/2023
Your order number:		**Analysis completed by:**	23/10/2023
Report Issue Number:	2	**Report issued on:**	02/11/2023
Samples Analysed:	2 water samples		

Signed:

Dominika Warjan
Reporting Specialist
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

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

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The results included within the report relate only to the sample(s) submitted for testing.

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Analytical Report Number: 23-59015
Project / Site name: Earlswood Burn House Jersey Marine Neath

Lab Sample Number				2826275	2826276
Sample Reference				WS 101	WS 102
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				26/09/2023	26/09/2023
Time Taken				None Supplied	None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
General Inorganics					
pH (L099)	pH Units	N/A	ISO 17025	7.1	7.2
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10
Sulphate as SO4	µg/l	45	ISO 17025	10400	44000
Total Sulphur	µg/l	15	NONE	3500	15000
Sulphide	µg/l	5	NONE	< 5.0	< 5.0
Dissolved Organic Carbon (DOC)	mg/l	0.1	ISO 17025	4.67	3.81
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	4.8	3.87
Hardness - Total	mgCaCO3/l	1	ISO 17025	352	366
Total Phenols					
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	< 10
Speciated PAHs					
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Total PAH					
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	< 0.16	< 0.16

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The results included within the report relate only to the sample(s) submitted for testing.

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Analytical Report Number: 23-59015
Project / Site name: Earlswood Burn House Jersey Marine Neath

Lab Sample Number				2826275	2826276
Sample Reference				WS 101	WS 102
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				26/09/2023	26/09/2023
Time Taken				None Supplied	None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Heavy Metals / Metalloids					
Boron (dissolved)	µg/l	10	ISO 17025	130	86
Calcium (dissolved)	mg/l	0.012	ISO 17025	120	130
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0
Magnesium (dissolved)	mg/l	0.005	ISO 17025	11	9.4
Arsenic (dissolved)	µg/l	0.15	ISO 17025	11.2	6.91
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1	< 0.1
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	0.12
Chromium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2
Copper (dissolved)	µg/l	0.5	ISO 17025	0.6	20
Lead (dissolved)	µg/l	0.2	ISO 17025	1.2	9.6
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	ISO 17025	0.8	4.2
Selenium (dissolved)	µg/l	0.6	ISO 17025	< 0.6	20
Vanadium (dissolved)	µg/l	0.2	ISO 17025	0.3	1.1
Zinc (dissolved)	µg/l	0.5	ISO 17025	2.5	13
Monoaromatics & Oxygenates					
Benzene	µg/l	3	ISO 17025	< 3.0	< 3.0
Toluene	µg/l	3	ISO 17025	< 3.0	< 3.0
Ethylbenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
p & m-xylene	µg/l	3	ISO 17025	< 3.0	< 3.0
o-xylene	µg/l	3	ISO 17025	< 3.0	< 3.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	3	ISO 17025	< 3.0	< 3.0
Petroleum Hydrocarbons					
TPH-CWG - Aliphatic >C5 - C6 $_{HS\_1D\_AL}$	µg/l	1	NONE	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8 $_{HS\_1D\_AL}$	µg/l	1	NONE	< 1.0	< 1.0
TPH-CWG - Aliphatic >C8 - C10 $_{HS\_1D\_AL}$	µg/l	1	NONE	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C35 - C44 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35) $_{HS+EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic (C5 - C44) $_{HS+EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C5 - C7 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C12 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C12 - C16 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C16 - C21 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C21 - C35 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C35 - C44 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic (C5 - C35) $_{HS+EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic (C5 - C44) $_{HS+EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG Total C5 - C44 $_{EH+HS\_1D\_TOTAL\_MS}$	µg/l	10	NONE	< 10	< 10

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The results included within the report relate only to the sample(s) submitted for testing.

4041

Analytical Report Number: 23-59015
Project / Site name: Earlswood Burn House Jersey Marine Neath

Lab Sample Number				2826275	2826276
Sample Reference				WS 101	WS 102
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				26/09/2023	26/09/2023
Time Taken				None Supplied	None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Environmental Forensics					
PFOS (low level) Subcontracted	ng/l	0.13	NONE	See Attached	See Attached
PFOA (low level) Subcontracted	ng/l	0.13	NONE	See Attached	See Attached

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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The results included within the report relate only to the sample(s) submitted for testing.

4041

Analytical Report Number : 23-59015
Project / Site name: Earlswood Burn House Jersey Marine Neath

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW.(Al, Cu,Fe,Zn).	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Total Hardness of water	Determination of hardness in waters by calculation from calcium and magnesium. Accredited Matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L045-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Sulphide in water	Determination of sulphide in water by ion selective electrode.	In-house method	L029-PL	W	NONE
Sulphate in water	Determination of sulphate in water after filtration by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Total Sulphur in water	Determination of total sulphur in water by acidification followed by ICP-OES.	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	NONE
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	ISO 17025
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Total organic carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR analyser. Accredited matrices: SW PW GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
Dissolved Organic Carbon in water	Determination of dissolved inorganic carbon in water by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260. Refer to CoA for analyte specific accreditation	L073B-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025
TPH in (Water)	Determination of TPH bands by HS-GC-MS/GC-MS	In-house method, TPH with carbon banding.	L070-PL	W	NONE

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Analytical Report Number : 23-59015
Project / Site name: Earlswood Burn House Jersey Marine Neath

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TO - PFOS in water (low level)	Subcontracted Analysis	Subcontracted Analysis		W	NONE

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' 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.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

ALS Laboratories (UK) Limited
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CV4 9GU

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www.alsenvironmental.co.uk

F.A.O Reception
i2 Analytical UK Ltd
7 Woodshoots Meadow
Croxley Green Business Park
Watford WD18 8YS

23 October 2023

Test Report: COV/2548659/2023

Dear F.A.O Reception

Analysis of your sample(s) submitted on 02 October 2023 is now complete and we have pleasure in enclosing the appropriate test report(s).

An invoice for the analysis carried out will be sent under separate cover.

Should you have any queries regarding this report(s) or any part of our service, please contact Customer Services on +44 (0)24 7642 1213 who will be happy to discuss your requirements.

If you would like to arrange any further analysis, please contact Customer Services. To arrange container delivery or sample collection, please call the Couriers Department directly on 024 7685 6562.

Thank you for using ALS Laboratories (UK) Limited and we look forward to receiving your next samples.

Yours Sincerely,

Signed:

Name: A. Zunzunegui

Title: Organics Chemistry Manager

UKAS TESTING 1314

bsi ISO 14001 Environmental Management CERTIFIED EMS675527 ISO 45001 Occupational Health and Safety Management CERTIFIED OHS 542058

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

This communication has been sent to you by ALS Laboratories (UK) Limited. Registered in England and Wales. Registration No.02391955.
Registered Office: ALS Laboratories (UK) Limited, Torrington Avenue, Coventry, CV4 9GU.

Report Summary

ANALYSED BY

F.A.O . Reception
i2 Analytical UK Ltd
7 Woodshoots Meadow
Croxley Green Business Park
Watford
WD18 8YS

Date of Issue **23 October 2023**

Report Number: **COV/2548659/2023** Issue **2** This issue replaces all previous issues

Number of Samples		Site Name:	**23-59015**
included in this report	**2**	Sample Date:	**26 September 2023**
Number of Test Results		Job Received:	**02 October 2023**
included in this report	**4**	Analysis Commenced:	**05 October 2023**

Signed: Name: **A. Zunzunegui** Date: **23 October 2023**

Title: **Organics Chemistry Manager**

ALS Laboratories (UK) Limited was not responsible for sampling unless otherwise stated.

Information on the methods of analysis and performance characteristics are available on request.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. The results relate only to the items tested and where relevant sampled.
Tests marked 'Not UKAS Accredited' in this Report/Certificate are not included in the UKAS Accreditation Schedule for our laboratory.
This test report is not a statement of conformity to any specification or standard.

This communication has been sent to you by ALS Laboratories (UK) Limited. Registered in England and Wales. Registration No. 02391955. Registered Office: ALS Laboratories (UK) Limited, Torrington Avenue, Coventry, CV4 9GU. (c) ALS Laboratories (UK) Limited 2023. All rights reserved. We, ALS Laboratories (UK) Limited, are the owner of all copyright in this report. You must not copy, reproduce, amend or adapt this report, its contents or any format in which it is delivered without our prior written agreement. If you copy, reproduce, amend, or adapt this report in any way without our agreement you will be liable for any damage or loss to us. In the event of a dispute the copy of the report held by us shall be the reference copy.

ALS Laboratories (UK) Limited
Torrington Avenue, Coventry, CV4 9GU Tel:+44 (0)24 7642 1213 Fax:+44 (0)24 7685 6575

Certificate of Analysis

ANALYSED BY

Site Name: **23-59015**
Sample Source: **i2 Analytical UK Ltd**
Order No: **PO_S_C6534**

Report Number: **COV/2548659/2023** Issue **2**
Samples Received: **02 October 2023**
Analysis Complete: **23 October 2023**

Sample	Sample Date	Sample Description	Test Description	Unit	Result	Accred.		Method
23266376	26 September 2023	2826275	PFOS	ug/l	0.0145	N	Cov	GEO82
	26 September 2023		PFOA	ug/l	<0.00650	N	Cov	GEO82

Sample Matrix for 23266376: Not Specified

Analyst Comments for 23266376: {/*}Raised reporting limit for PFOA due to the nature of the sample matrix. {*/}

23266377	26 September 2023	2826276	PFOS	ug/l	0.0437	N	Cov	GEO82
	26 September 2023		PFOA	ug/l	0.0135	N	Cov	GEO82

Sample Matrix for 23266377: Not Specified

Analyst Comments for 23266377: No Analyst Comment

Signed:

Name: **A. Zunzunegui** Date: **23 October 2023**

Title: **Organics Chemistry Manager**

This issue replaces all previous issues
Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.
Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG).
For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. The LOD for the Legionella analysis will increase where the volume analysed is <1000g (1g is approximately equivalent to 1ml for sample volume analysed). I/S=Insufficient sample. For soil/sludge samples: AR=As received, DW=Dry weight.

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4041

Roger Hawkins
Integral Geotechnique
Integral House
7 Beddau Way
Castlegate Business Park
CF83 2AX

t: 02920807991
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e: roger@integralgeotec.com

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

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

Analytical Report Number : 23-67259

Project / Site name:	Earlswood Burn House, Jersey Marine, Neath	**Samples received on:**	08/11/2023
Your job number:	14050	**Samples instructed on/ Analysis started on:**	08/11/2023
Your order number:		**Analysis completed by:**	27/11/2023
Report Issue Number:	1	**Report issued on:**	27/11/2023
Samples Analysed:	2 water samples		

Izabela Wójcik

Signed:

Izabela Wójcik
Senior Reporting Specialist
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.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

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The results included within the report relate only to the sample(s) submitted for testing.

4041

Analytical Report Number: 23-67259
Project / Site name: Earlswood Burn House, Jersey Marine, Neath

Lab Sample Number				2870215	2870216
Sample Reference				WS 101	WS 102
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				07/11/2023	07/11/2023
Time Taken				None Supplied	None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
General Inorganics					
pH (L099)	pH Units	N/A	ISO 17025	7.2	7.3
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10
Sulphate as SO4	µg/l	45	ISO 17025	3720	38200
Total Sulphur	µg/l	15	NONE	1200	13000
Sulphide	µg/l	5	NONE	< 5.0	< 5.0
Dissolved Organic Carbon (DOC)	mg/l	0.1	ISO 17025	3.13	0.64
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	4.92	2.62
Hardness - Total	mgCaCO3/l	1	ISO 17025	452	440
Total Phenols					
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	< 10
Speciated PAHs					
Naphthalene	µg/l	0.01	ISO 17025	0.67	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	0.77	0.17
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	0.61	0.24
Pyrene	µg/l	0.01	ISO 17025	0.43	0.16
Benzo(a)anthracene	µg/l	0.01	ISO 17025	0.2	0.13
Chrysene	µg/l	0.01	ISO 17025	0.24	0.16
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	0.26	0.19
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	0.11	0.09
Benzo(a)pyrene	µg/l	0.01	ISO 17025	0.14	0.11
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Total PAH					
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	3.43	1.25
Heavy Metals / Metalloids					
Boron (dissolved)	µg/l	10	ISO 17025	140	99
Calcium (dissolved)	mg/l	0.012	ISO 17025	160	160
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0
Magnesium (dissolved)	mg/l	0.005	ISO 17025	11	9.5

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4041

Analytical Report Number: 23-67259
Project / Site name: Earlswood Burn House, Jersey Marine, Neath

Lab Sample Number				2870215	2870216
Sample Reference				WS 101	WS 102
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				07/11/2023	07/11/2023
Time Taken				None Supplied	None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Arsenic (dissolved)	µg/l	0.15	ISO 17025	30.8	5.93
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1	< 0.1
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	0.15
Chromium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2
Copper (dissolved)	µg/l	0.5	ISO 17025	1.6	16
Lead (dissolved)	µg/l	0.2	ISO 17025	22	26
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	ISO 17025	0.9	3.4
Selenium (dissolved)	µg/l	0.6	ISO 17025	0.7	8.9
Vanadium (dissolved)	µg/l	0.2	ISO 17025	0.6	1
Zinc (dissolved)	µg/l	0.5	ISO 17025	4.8	15

Monoaromatics & Oxygenates

Benzene	µg/l	3	ISO 17025	< 3.0	< 3.0
Toluene	µg/l	3	ISO 17025	< 3.0	< 3.0
Ethylbenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
p & m-xylene	µg/l	3	ISO 17025	< 3.0	< 3.0
o-xylene	µg/l	3	ISO 17025	< 3.0	< 3.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	3	ISO 17025	< 3.0	< 3.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C8 - C10 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C35 - C44 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35) $_{HS+EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic (C5 - C44) $_{HS+EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10

TPH-CWG - Aromatic >C5 - C7 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C12 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C12 - C16 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	10	< 10
TPH-CWG - Aromatic >C16 - C21 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	10	< 10
TPH-CWG - Aromatic >C21 - C35 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	20	< 10
TPH-CWG - Aromatic >C35 - C44 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic (C5 - C35) $_{HS+EH\_1D\_AR\_MS}$	µg/l	10	NONE	40	< 10
TPH-CWG - Aromatic (C5 - C44) $_{HS+EH\_1D\_AR\_MS}$	µg/l	10	NONE	40	< 10

TPH-CWG Total C5 - C44 $_{EH+HS\_1D\_TOTAL\_MS}$	µg/l	10	NONE	40	< 10

Environmental Forensics

PFOS (low level) Subcontracted	ng/l	0.13	NONE	See Attached	See Attached
PFOA (low level) Subcontracted	ng/l	0.13	NONE	See Attached	See Attached

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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4041

Analytical Report Number : 23-67259
Project / Site name: Earlswood Burn House, Jersey Marine, Neath

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW.(Al, Cu,Fe,Zn).	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Total Hardness of water	Determination of hardness in waters by calculation from calcium and magnesium. Accredited Matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L045-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Sulphide in water	Determination of sulphide in water by ion selective electrode.	In-house method	L029-PL	W	NONE
Sulphate in water	Determination of sulphate in water after filtration by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Total Sulphur in water	Determination of total sulphur in water by acidification followed by ICP-OES.	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	NONE
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	ISO 17025
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Total organic carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR analyser. Accredited matrices: SW PW GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
Dissolved Organic Carbon in water	Determination of dissolved inorganic carbon in water by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260. Refer to CoA for analyte specific accreditation	L073B-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025

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Analytical Report Number : 23-67259
Project / Site name: Earlswood Burn House, Jersey Marine, Neath

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPH in (Water)	Determination of TPH bands by HS-GC-MS/GC-MS	In-house method, TPH with carbon banding.	L070-PL	W	NONE
TO - PFOS in water (low level)	Subcontracted Analysis	Subcontracted Analysis		W	NONE

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' 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.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

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www.alsenvironmental.co.uk

F.A.O Reception
i2 Analytical UK Ltd
7 Woodshoots Meadow
Croxley Green Business Park
Watford WD18 8YS

27 November 2023

Test Report: WAK/2569659/2023

Dear F.A.O Reception

Analysis of your sample(s) submitted on 10 November 2023 is now complete and we have pleasure in enclosing the appropriate test report(s).

An invoice for the analysis carried out will be sent under separate cover.

Should you have any queries regarding this report(s) or any part of our service, please contact Customer Services on +44 (0)1924 818100 who will be happy to discuss your requirements.

If you would like to arrange any further analysis, please contact Customer Services. To arrange container delivery or sample collection, please call the Couriers Department directly on 024 7685 6562.

Thank you for using ALS Laboratories (UK) Limited and we look forward to receiving your next samples.

Yours Sincerely,

Signed:

Name: J. Thompson

Title: Inorganic Chemistry Manager

UKAS TESTING 1314

bsi ISO 14001 Environmental Management CERTIFIED EMS675527
ISO 45001 Occupational Health and Safety Management CERTIFIED OHS 542058

mCERTS

This communication has been sent to you by ALS Laboratories (UK) Limited. Registered in England and Wales. Registration No.02391955.
Registered Office: ALS Laboratories (UK) Limited, Torrington Avenue, Coventry, CV4 9GU.

Report Summary

ANALYSED BY

UKAS TESTING 1314

F.A.O . Reception
i2 Analytical UK Ltd
7 Woodshoots Meadow
Croxley Green Business Park
Watford
WD18 8YS

Date of Issue **27 November 2023**

Report Number: **WAK/2569659/2023** Issue **1** This issue replaces all previous issues

Number of Samples		Site Name:	**23-67259**
included in this report	**2**	Sample Date:	**07 November 2023**
Number of Test Results		Job Received:	**10 November 2023**
included in this report	**4**	Analysis Commenced:	**14 November 2023**

Signed: Name: **J. Thompson** Date: **27 November 2023**

Title: **Inorganic Chemistry Manager**

ALS Laboratories (UK) Limited was not responsible for sampling unless otherwise stated.

Information on the methods of analysis and performance characteristics are available on request.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. The results relate only to the items tested and where relevant sampled.
Tests marked 'Not UKAS Accredited' in this Report/Certificate are not included in the UKAS Accreditation Schedule for our laboratory.
This test report is not a statement of conformity to any specification or standard.

This communication has been sent to you by ALS Laboratories (UK) Limited. Registered in England and Wales. Registration No. 02391955. Registered Office: ALS Laboratories (UK) Limited, Torrington Avenue, Coventry, CV4 9GU. (c) ALS Laboratories (UK) Limited 2023. All rights reserved. We, ALS Laboratories (UK) Limited, are the owner of all copyright in this report. You must not copy, reproduce, amend or adapt this report, its contents or any format in which it is delivered without our prior written agreement. If you copy, reproduce, amend, or adapt this report in any way without our agreement you will be liable for any damage or loss to us. In the event of a dispute the copy of the report held by us shall be the reference copy.

ALS Laboratories (UK) Limited
Unit 11, Silkwood Park, Janes Hill, Off Albert Drive, Wakefield, WF5 9TG Tel:+44 (0)1924 818100 Fax:+44 (0)1924 818101

Certificate of Analysis

ANALYSED BY

UKAS TESTING 1314

ALS

Site Name: **23-67259**
Sample Source: **i2 Analytical UK Ltd**
Order No: **PO_S_C6596**

Report Number: **WAK/2569659/2023** Issue **1**
Samples Received: **10 November 2023**
Analysis Complete: **24 November 2023**

Sample	Sample Date	Sample Description	Test Description	Unit	Result	Accred.		Method
23410800	07 November 2023	2870215 WS 101	PFOS	ug/l	0.0117	Y	Cov	GEO82
	07 November 2023		PFOA	ug/l	0.00184	Y	Cov	GEO82

Sample Matrix for 23410800: Surface Water

Analyst Comments for 23410800: No Analyst Comment

23410801	07 November 2023	2870216 WS 102	PFOS	ug/l	0.0172	Y	Cov	GEO82
	07 November 2023		PFOA	ug/l	0.00706	Y	Cov	GEO82

Sample Matrix for 23410801: Surface Water

Analyst Comments for 23410801: No Analyst Comment

Signed:

Name: **J. Thompson** Date: **27 November 2023**

Title: **Inorganic Chemistry Manager**

This issue replaces all previous issues
Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.
Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG).
For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. The LOD for the Legionella analysis will increase where the volume analysed is <1000g (1g is approximately equivalent to 1ml for sample volume analysed). I/S=Insufficient sample. For soil/sludge samples: AR=As received, DW=Dry weight.

ALS Laboratories (UK) Limited
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4041

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

Analytical Report Number : 23-70303-2

Replaces Analytical Report Number: 23-70303, issue no. 1
Additional analysis undertaken.
Subcontracted PFOS & PFOA Low Level added at clients request

Project / Site name:	Earlswood Burn House, Jersey Marine, Neath	**Samples received on:**	22/11/2023
Your job number:	14050	**Samples instructed on/ Analysis started on:**	22/11/2023
Your order number:		**Analysis completed by:**	22/12/2023
Report Issue Number:	2	**Report issued on:**	22/12/2023
Samples Analysed:	2 water samples		

Signed:

Joanna Wawrzeczko
Senior Reporting Specialist
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.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

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The results included within the report relate only to the sample(s) submitted for testing.

4041

Analytical Report Number: 23-70303
Project / Site name: Earlswood Burn House, Jersey Marine, Neath

Lab Sample Number				2886315	2886316
Sample Reference				WS 101	WS 102
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				20/11/2023	20/11/2023
Time Taken				None Supplied	None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
General Inorganics					
pH (L099)	pH Units	N/A	ISO 17025	7.2	7.2
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10
Sulphate as SO4	µg/l	45	ISO 17025	7620	39700
Total Sulphur	µg/l	15	NONE	2500	13000
Sulphide	µg/l	5	NONE	< 5.0	< 5.0
Dissolved Organic Carbon (DOC)	mg/l	0.1	ISO 17025	3.59	3.43
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	12.2	12
Hardness - Total	mgCaCO3/l	1	ISO 17025	330	369
Total Phenols					
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	< 10
Speciated PAHs					
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	0.27	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	0.27	< 0.01
Pyrene	µg/l	0.01	ISO 17025	0.18	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Total PAH					
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	0.72	< 0.16

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4041

Analytical Report Number: 23-70303
Project / Site name: Earlswood Burn House, Jersey Marine, Neath

Lab Sample Number				2886315	2886316
Sample Reference				WS 101	WS 102
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				20/11/2023	20/11/2023
Time Taken				None Supplied	None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Heavy Metals / Metalloids					
Boron (dissolved)	µg/l	10	ISO 17025	150	96
Calcium (dissolved)	mg/l	0.012	ISO 17025	110	130
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0
Magnesium (dissolved)	mg/l	0.005	ISO 17025	12	12
Arsenic (dissolved)	µg/l	0.15	ISO 17025	16.3	4.22
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1	< 0.1
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	0.18
Chromium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	0.3
Copper (dissolved)	µg/l	0.5	ISO 17025	1.8	16
Lead (dissolved)	µg/l	0.2	ISO 17025	15	8
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	ISO 17025	0.8	3.8
Selenium (dissolved)	µg/l	0.6	ISO 17025	0.6	23
Vanadium (dissolved)	µg/l	0.2	ISO 17025	0.4	1
Zinc (dissolved)	µg/l	0.5	ISO 17025	1.9	20
Monoaromatics & Oxygenates					
Benzene	µg/l	3	ISO 17025	< 3.0	< 3.0
Toluene	µg/l	3	ISO 17025	< 3.0	< 3.0
Ethylbenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
p & m-xylene	µg/l	3	ISO 17025	< 3.0	< 3.0
o-xylene	µg/l	3	ISO 17025	< 3.0	< 3.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	3	ISO 17025	< 3.0	< 3.0
Petroleum Hydrocarbons					
TPH-CWG - Aliphatic >C5 - C6 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C8 - C10 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C35 - C44 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35) $_{HS+EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic (C5 - C44) $_{HS+EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C5 - C7 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C12 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C12 - C16 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C16 - C21 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C21 - C35 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C35 - C44 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic (C5 - C35) $_{HS+EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic (C5 - C44) $_{HS+EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG Total C5 - C44 $_{EH+HS\_1D\_TOTAL\_MS}$	µg/l	10	NONE	< 10	< 10

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4041

Analytical Report Number: 23-70303
Project / Site name: Earlswood Burn House, Jersey Marine, Neath

Lab Sample Number				2886315	2886316
Sample Reference				WS 101	WS 102
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				20/11/2023	20/11/2023
Time Taken				None Supplied	None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Environmental Forensics					
PFOS	µg/l	0.05	NONE	< 0.05	< 0.05
PFOA	µg/l	0.05	NONE	< 0.05	< 0.05
PFOS (low level) Subcontracted	ng/l	0.13	NONE	See Attached	See Attached
PFOA (low level) Subcontracted	ng/l	0.13	NONE	See Attached	See Attached

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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4041

Analytical Report Number : 23-70303
Project / Site name: Earlswood Burn House, Jersey Marine, Neath

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW.(Al, Cu,Fe,Zn).	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Total Hardness of water	Determination of hardness in waters by calculation from calcium and magnesium. Accredited Matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L045-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Sulphide in water	Determination of sulphide in water by ion selective electrode.	In-house method	L029-PL	W	NONE
Sulphate in water	Determination of sulphate in water after filtration by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Total Sulphur in water	Determination of total sulphur in water by acidification followed by ICP-OES.	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	NONE
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	ISO 17025
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Total organic carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR analyser. Accredited matrices: SW PW GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
Dissolved Organic Carbon in water	Determination of dissolved inorganic carbon in water by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260. Refer to CoA for analyte specific accreditation	L073B-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025

4041

Analytical Report Number : 23-70303
Project / Site name: Earlswood Burn House, Jersey Marine, Neath

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPH in (Water)	Determination of TPH bands by HS-GC-MS/GC-MS	In-house method, TPH with carbon banding.	L070-PL	W	NONE
TO - PFOS in water	Analysed by LC-MS in SIM with ISTD correction	In-house method		W	NONE
TO - PFOS in water (low level)	Subcontracted Analysis	Subcontracted Analysis		W	NONE

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' 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.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

ALS Laboratories (UK) Limited
Torrington Avenue
Coventry
CV4 9GU

T: +44 (0)24 7642 1213
F: +44 (0)24 7685 6575
www.alsenvironmental.co.uk

F.A.O Reception
i2 Analytical UK Ltd
7 Woodshoots Meadow
Croxley Green Business Park
Watford WD18 8YS

22 December 2023

Test Report: COV/2587729/2023

Dear F.A.O Reception

Analysis of your sample(s) submitted on 14 December 2023 is now complete and we have pleasure in enclosing the appropriate test report(s).

An invoice for the analysis carried out will be sent under separate cover.

Should you have any queries regarding this report(s) or any part of our service, please contact Customer Services on +44 (0)24 7642 1213 who will be happy to discuss your requirements.

If you would like to arrange any further analysis, please contact Customer Services. To arrange container delivery or sample collection, please call the Couriers Department directly on 024 7685 6562.

Thank you for using ALS Laboratories (UK) Limited and we look forward to receiving your next samples.

Yours Sincerely,

Signed:

Name: D. Lewis

Title: Technical Inorganic Manager

UKAS TESTING 1314

bsi ISO 14001 Environmental Management CERTIFIED EMS675527 ISO 45001 Occupational Health and Safety Management CERTIFIED OHS 542058

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

This communication has been sent to you by ALS Laboratories (UK) Limited. Registered in England and Wales. Registration No.02391955.
Registered Office: ALS Laboratories (UK) Limited, Torrington Avenue, Coventry, CV4 9GU.

Report Summary

ANALYSED BY

F.A.O . Reception
i2 Analytical UK Ltd
7 Woodshoots Meadow
Croxley Green Business Park
Watford
WD18 8YS

Date of Issue **22 December 2023**

Report Number: **COV/2587729/2023** Issue **1** This issue replaces all previous issues

Number of Samples		Site Name:	**23-70303**
included in this report	**2**	Sample Date:	**20 November 2023**
Number of Test Results		Job Received:	**14 December 2023**
included in this report	**2**	Analysis Commenced:	**21 December 2023**

Signed: D. Lewis

Name: **D. Lewis** Date: **22 December 2023**

Title: **Technical Inorganic Manager**

ALS Laboratories (UK) Limited was not responsible for sampling unless otherwise stated.

Information on the methods of analysis and performance characteristics are available on request.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. The results relate only to the items tested and where relevant sampled.
Tests marked 'Not UKAS Accredited' in this Report/Certificate are not included in the UKAS Accreditation Schedule for our laboratory.
This test report is not a statement of conformity to any specification or standard.

This communication has been sent to you by ALS Laboratories (UK) Limited. Registered in England and Wales. Registration No. 02391955. Registered Office: ALS Laboratories (UK) Limited, Torrington Avenue, Coventry, CV4 9GU. (c) ALS Laboratories (UK) Limited 2023. All rights reserved. We, ALS Laboratories (UK) Limited, are the owner of all copyright in this report. You must not copy, reproduce, amend or adapt this report, its contents or any format in which it is delivered without our prior written agreement. If you copy, reproduce, amend, or adapt this report in any way without our agreement you will be liable for any damage or loss to us. In the event of a dispute the copy of the report held by us shall be the reference copy.

ALS Laboratories (UK) Limited
Torrington Avenue, Coventry, CV4 9GU Tel:+44 (0)24 7642 1213 Fax:+44 (0)24 7685 6575

Certificate of Analysis

ANALYSED BY

Site Name: **23-70303**
Sample Source: **i2 Analytical UK Ltd**
Order No: **PO_S_C6650**

Report Number: **COV/2587729/2023**
Samples Received: **14 December 2023**
Analysis Complete: **22 December 2023**

Issue **1**

Sample	Sample Date	Sample Description	Test Description	Unit	Result	Accred.		Method
23531206	20 November 2023	2886315 WS101	PFOS	ug/l	0.00987	N	Cov	GEO82

Sample Matrix for 23531206: Not Specified

No Analyst Comment

23531207	20 November 2023	2886316 WS102	PFOS	ug/l	0.0208	N	Cov	GEO82

Sample Matrix for 23531207: Not Specified

No Analyst Comment

Signed: D. Lewis

Name: **D. Lewis**
Title: **Technical Inorganic Manager**
Date: **22 December 2023**

This issue replaces all previous issues
Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.
Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG).
For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. The LOD for the Legionella analysis will increase where the volume analysed is <1000g (1g is approximately equivalent to 1ml for sample volume analysed). I/S=Insufficient sample. For soil/sludge samples: AR=As received, DW=Dry weight.

ALS Laboratories (UK) Limited
Torrington Avenue, Coventry, CV4 9GU Tel:+44 (0)24 7642 1213 Fax:+44 (0)24 7685 6575

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APPENDIX C

SUMMARY OF GROUNDWATER TEST RESULTS

Groundwater Results (Round 1)

Determinand	Unit	Borehole		Generic Assessment Criteria		
		WS101	WS102	MAC-EQS (Inland Surface Waters >200mg/l CaCo3)	AA-EQS (Freshwater >250mg/l CaCO3)	UK DWS (or best equivalent)
Inorganic Determinands						
pH	pH Units	7.1	7.2	-	6.0 - 8.5	-
Total Cyanide	µg/l	< 10	< 10	5.00	1.00	50.00
Sulphate as SO4	µg/l	10400	44000	-	400000.00	250000.00
Total Sulphur	µg/l	3500	15000	-	-	-
Sulphide	µg/l	< 5.0	< 5.0	-	-	-
Dissolved Organic Carbon (DOC)	mg/l	4.67	3.81			
Total Organic Carbon (TOC)	mg/l	4.8	3.87			
Hardness	mgCaCO3/l	352	366	-	-	-
Total Phenols						
Total Phenols	µg/l	< 10	< 10	46.00	7.70	0.50
Metals / Metalloids						
Boron (dissolved)	µg/l	130	86.00	-	2000.00	1000.00
Calcium (dissolved)	mg/l	120	130.00	-	-	-
Arsenic (dissolved)	µg/l	11.2	6.91	-	50.00	10.00
Beryllium (dissolved)	µg/l	< 0.1	< 0.1	-	-	-
Cadmium (dissolved)	µg/l	< 0.02	0.12	1.50	0.25	5.00
Chromium (dissolved)	µg/l	< 0.2	< 0.2	-	-	50.00
Copper (dissolved)	µg/l	0.6	**20.00**	-	7.5*	2000.00
Lead (dissolved)	µg/l	1.2	**9.60**	14.00	1.20	10.00
Mercury (dissolved)	µg/l	< 0.05	< 0.05	0.07	-	1.00
Nickel (dissolved)	µg/l	0.8	**4.20**	34.00	4.00	20.00
Selenium (dissolved)	µg/l	< 0.6	20.00	-	-	10.00
Vanadium (dissolved)	µg/l	0.3	1.10	-	60.00	-
Zinc (dissolved)	µg/l	2.5	**13.00**	-	10.00	5000.00
Polyaromatic Hydrocarbons						
Naphthalene	µg/l	< 0.01	< 0.01	130.00	2.00	-
Acenaphthylene	µg/l	< 0.01	< 0.01	-	10.00	-
Acenaphthene	µg/l	< 0.01	< 0.01	-	10.00	-
Fluorene	µg/l	< 0.01	< 0.01	-	-	-
Phenanthrene	µg/l	< 0.01	< 0.01	-	-	-
Anthracene	µg/l	< 0.01	< 0.01	0.10	0.10	-
Fluoranthene	µg/l	< 0.01	< 0.01	0.12	0.01	-
Pyrene	µg/l	< 0.01	< 0.01	-	-	-
Benzo(a)anthracene	µg/l	< 0.01	< 0.01	-	-	-
Chrysene	µg/l	< 0.01	< 0.01	-	-	-
Benzo(b)fluoranthene	µg/l	< 0.01	< 0.01	0.02	-	-
Benzo(k)fluoranthene	µg/l	< 0.01	< 0.01	0.02	-	-
Benzo(a)pyrene	µg/l	< 0.01	< 0.01	0.27	0.00	0.01
Indeno(1,2,3-cd)pyrene	µg/l	< 0.01	< 0.01	-	-	-
Dibenzo(ah)anthracene	µg/l	< 0.01	< 0.01	-	-	-
Benzo(ghi)perylene	µg/l	< 0.01	< 0.01	0.01	-	-
Total PAH	µg/l	< 0.16	< 0.16	-	0.00	0.10
Petroleum Hydrocarbons						
Aliphatic VPH >C5 - C6	µg/l	< 1.0	< 1.0	10.00	10.00	10.00
Aliphatic VPH >C6 - C8	µg/l	< 1.0	< 1.0	10.00	10.00	10.00
Aliphatic VPH >C8 - 10	µg/l	< 1.0	< 1.0	10.00	10.00	10.00
Aliphatic EPH >C10 - C12	µg/l	< 10	< 10	10.00	10.00	10.00
Aliphatic EPH >C12 - C16	µg/l	< 10	< 10	10.00	10.00	10.00
Aliphatic EPH >C16 - C21	µg/l	< 10	< 10	10.00	10.00	10.00
Aliphatic EPH >C21 - C35	µg/l	< 10	< 10	10.00	10.00	10.00
Aliphatic EPH >C35 - C44	µg/l	< 10	< 10	-	-	-
Aliphatic EPH (C5 - C35)	µg/l	< 10	< 10	-	-	-
Aliphatic EPH (C5 - C44)	µg/l	< 10	< 10	-	-	-
Aromatic VPH >C5 - C7	µg/l	< 1.0	< 1.0	10.00	10.00	10.00
Aromatic VPH >C7 - C8	µg/l	< 1.0	< 1.0	10.00	10.00	10.00
Aromatic VPH >C8 - C10	µg/l	< 1.0	< 1.0	10.00	10.00	10.00
Aromatic EPH >C10 - C12	µg/l	< 10	< 10	10.00	10.00	10.00
Aromatic EPH >C12 - C16	µg/l	< 10	< 10	10.00	10.00	10.00
Aromatic EPH >C16 - C21	µg/l	< 10	< 10	10.00	10.00	10.00
Aromatic EPH >C21 - C35	µg/l	< 10	< 10	10.00	10.00	10.00
Aromatic EPH >C35 - C44	µg/l	< 10	< 10	-	-	-
Aromatic EPH (C5 - C35)	µg/l	< 10	< 10	-	-	-
Aromatic EPH (C5 - C44)	µg/l	< 10	< 10	-	-	-
TPH C5 - C44	µg/l	< 10	< 10	10.00	10.00	10.00
PFOS						
PFOS	ug/l	**0.0145**	**0.0437**	36.00	0.00065	

*where Dissolved Organic Carbon (DOC) > 1 mg/l: AA EQS = 3.76 + (2.677 x ((DOC value/2) –0.5)) µg/l

0.0008

Results exceeding the AA-EQS value, or the most conservative EQS/UKDWS guideline value where AA-EQS values are unavailable are highlighted in red bold type

Results exceeding the EQS threshold but below site specific PNEC highlighted blue bold type

Sources:
MAC-EQS and AA-EQS values sourced from the Environment Agency/Water Framework Directive
Drinking Water Standards sourced from The Water Supply (Water Quality) Regulations 2018 Water, England and Wales: 2018 No.647 (W.121)

Groundwater Results (Round 2)

Determinand	Unit	Borehole		Generic Assessment Criteria		
		WS101	WS102	MAC-EQS (Inland Surface Waters >200mg/l CaCo3)	AA-EQS (Freshwater >250mg/l CaCO3)	UK DWS (or best equivalent)
Inorganic Determinands						
pH	pH Units	7.2	7.3	-	6.0 - 8.5	-
Total Cyanide	µg/l	< 10	< 10	5.00	1.00	50.00
Sulphate as SO4	µg/l	3720	38200	-	400000.00	250000.00
Total Sulphur	µg/l	1200	13000	-	-	-
Sulphide	µg/l	< 5.0	< 5.0	-	-	-
Dissolved Organic Carbon (DOC)	mg/l	3.13	0.64			
Total Organic Carbon (TOC)	mg/l	4.92	2.62			
Hardness	mgCaCO3/l	452	440	-	-	-
Total Phenols						
Total Phenols	µg/l	< 10	< 10	46.00	7.70	0.50
Metals / Metalloids						
Boron (dissolved)	µg/l	140	99.00	-	2000.00	1000.00
Calcium (dissolved)	mg/l	160	160.00	-	-	-
Arsenic (dissolved)	µg/l	30.8	5.93	-	50.00	10.00
Beryllium (dissolved)	µg/l	< 0.1	< 0.1	-	-	-
Cadmium (dissolved)	µg/l	< 0.02	0.15	1.50	0.25	5.00
Chromium (dissolved)	µg/l	< 0.2	< 0.2	-	-	50.00
Copper (dissolved)	µg/l	1.6	**16.00**	-	7.5*	2000.00
Lead (dissolved)	µg/l	**22**	**26.00**	14.00	1.20	10.00
Mercury (dissolved)	µg/l	< 0.05	< 0.05	0.07	-	1.00
Nickel (dissolved)	µg/l	0.9	3.40	34.00	4.00	20.00
Selenium (dissolved)	µg/l	0.7	8.90	-	-	10.00
Vanadium (dissolved)	µg/l	0.6	1.00	-	60.00	-
Zinc (dissolved)	µg/l	4.8	**15.00**	-	10.00	5000.00
Polyaromatic Hydrocarbons						
Naphthalene	µg/l	0.67	< 0.01	130.00	2.00	-
Acenaphthylene	µg/l	< 0.01	< 0.01	-	10.00	-
Acenaphthene	µg/l	< 0.01	< 0.01	-	10.00	-
Fluorene	µg/l	< 0.01	< 0.01	-	-	-
Phenanthrene	µg/l	0.77	0.17	-	-	-
Anthracene	µg/l	< 0.01	< 0.01	0.10	0.10	-
Fluoranthene	µg/l	**0.61**	**0.24**	0.12	0.01	-
Pyrene	µg/l	0.43	0.16	-	-	-
Benzo(a)anthracene	µg/l	0.2	0.13	-	-	-
Chrysene	µg/l	0.24	0.16	-	-	-
Benzo(b)fluoranthene	µg/l	0.26	0.19	0.017	-	-
Benzo(k)fluoranthene	µg/l	0.11	0.09	0.017	-	-
Benzo(a)pyrene	µg/l	**0.14**	**0.11**	0.27	0.00017	0.01000
Indeno(1,2,3-cd)pyrene	µg/l	< 0.01	< 0.01	-	0.0008	-
Dibenzo(ah)anthracene	µg/l	< 0.01	< 0.01	-	-	-
Benzo(ghi)perylene	µg/l	< 0.01	< 0.01	0.01	-	-
Total PAH	µg/l	**3.43**	**1.25**	-	0.00017	0.10
Petroleum Hydrocarbons						
Aliphatic VPH >C5 - C6	µg/l	< 1.0	< 1.0	10.00	10.00	10.00
Aliphatic VPH >C6 - C8	µg/l	< 1.0	< 1.0	10.00	10.00	10.00
Aliphatic VPH >C8 - 10	µg/l	< 1.0	< 1.0	10.00	10.00	10.00
Aliphatic EPH >C10 - C12	µg/l	< 10	< 10	10.00	10.00	10.00
Aliphatic EPH >C12 - C16	µg/l	< 10	< 10	10.00	10.00	10.00
Aliphatic EPH >C16 - C21	µg/l	< 10	< 10	10.00	10.00	10.00
Aliphatic EPH >C21 - C35	µg/l	< 10	< 10	10.00	10.00	10.00
Aliphatic EPH >C35 - C44	µg/l	< 10	< 10	-	-	-
Aliphatic EPH (C5 - C35)	µg/l	< 10	< 10	-	-	-
Aliphatic EPH (C5 - C44)	µg/l	< 10	< 10	-	-	-
Aromatic VPH >C5 - C7	µg/l	< 1.0	< 1.0	10.00	10.00	10.00
Aromatic VPH >C7 - C8	µg/l	< 1.0	< 1.0	10.00	10.00	10.00
Aromatic VPH >C8 - C10	µg/l	< 1.0	< 1.0	10.00	10.00	10.00
Aromatic EPH >C10 - C12	µg/l	< 10	< 10	10.00	10.00	10.00
Aromatic EPH >C12 - C16	µg/l	10	< 10	10.00	10.00	10.00
Aromatic EPH >C16 - C21	µg/l	10	< 10	10.00	10.00	10.00
Aromatic EPH >C21 - C35	µg/l	**20**	< 10	10.00	10.00	10.00
Aromatic EPH >C35 - C44	µg/l	< 10	< 10	-	-	-
Aromatic EPH (C5 - C35)	µg/l	40	< 10	-	-	-
Aromatic EPH (C5 - C44)	µg/l	40	< 10	-	-	-
TPH C5 - C44	µg/l	**40**	< 10	10.00	10.00	10.00
PFOS						
PFOS	ug/l	**0.0117**	**0.0172**	36.00	0.00065	
*where Dissolved Organic Carbon (DOC) > 1 mg/l: AA EQS = 3.76 + (2.677 x ((DOC value/2) –0.5)) µg/l						

Results exceeding the AA-EQS value, or the most conservative EQS/UKDWS guideline value where AA-EQS values are unavailable are highlighted in red bold type

Results exceeding the EQS threshold but below site specific PNEC highlighted blue bold type

Sources:
MAC-EQS and AA-EQS values sourced from the Environment Agency/Water Framework Directive
Drinking Water Standards sourced from The Water Supply (Water Quality) Regulations 2018 Water, England and Wales: 2018 No.647 (W.121)

Groundwater Results (Round 3)

Determinand	Unit	Borehole		Generic Assessment Criteria		
		WS101	WS102	MAC-EQS (Inland Surface Waters >200mg/l CaCo3)	AA-EQS (Freshwater >250mg/l CaCO3)	UK DWS (or best equivalent)
Inorganic Determinands						
pH	pH Units	7.2	7.2	-	6.0 - 8.5	-
Total Cyanide	µg/l	< 10	< 10	5.00	1.00	50.00
Sulphate as SO4	µg/l	7620	39700	-	400000.00	250000.00
Total Sulphur	µg/l	2500	13000	-	-	-
Sulphide	µg/l	< 5.0	< 5.0	-	-	-
Dissolved Organic Carbon (DOC)	mg/l	3.59	3.43			
Total Organic Carbon (TOC)	mg/l	12.2	12			
Hardness	mgCaCO3/l	330	369	-	-	-
Total Phenols						
Total Phenols	µg/l	< 10	< 10	46.00	7.70	0.50
Metals / Metalloids						
Boron (dissolved)	µg/l	150	96.00	-	2000.00	1000.00
Calcium (dissolved)	mg/l	110	130.00	-	-	-
Arsenic (dissolved)	µg/l	16.3	4.22	-	50.00	10.00
Beryllium (dissolved)	µg/l	< 0.1	< 0.1	-	-	-
Cadmium (dissolved)	µg/l	< 0.02	0.18	1.50	0.25	5.00
Chromium (dissolved)	µg/l	< 0.2	0.30	-	-	50.00
Copper (dissolved)	µg/l	1.8	**16.00**	-	7.5*	2000.00
Lead (dissolved)	µg/l	**15**	**8.00**	14.00	1.20	10.00
Mercury (dissolved)	µg/l	< 0.05	< 0.05	0.07	-	1.00
Nickel (dissolved)	µg/l	0.8	3.80	34.00	4.00	20.00
Selenium (dissolved)	µg/l	0.6	23.00	-	-	10.00
Vanadium (dissolved)	µg/l	0.4	1.00	-	60.00	-
Zinc (dissolved)	µg/l	1.9	**20.00**	-	10.00	5000.00
Polyaromatic Hydrocarbons						
Naphthalene	µg/l	< 0.01	< 0.01	130.00	2.00	-
Acenaphthylene	µg/l	< 0.01	< 0.01	-	10.00	-
Acenaphthene	µg/l	< 0.01	< 0.01	-	10.00	-
Fluorene	µg/l	< 0.01	< 0.01	-	-	-
Phenanthrene	µg/l	0.27	< 0.01	-	-	-
Anthracene	µg/l	< 0.01	< 0.01	0.10	0.10	-
Fluoranthene	µg/l	**0.27**	< 0.01	0.12	0.01	-
Pyrene	µg/l	0.18	< 0.01	-	-	-
Benzo(a)anthracene	µg/l	< 0.01	< 0.01	-	-	-
Chrysene	µg/l	< 0.01	< 0.01	-	-	-
Benzo(b)fluoranthene	µg/l	< 0.01	< 0.01	0.017	-	-
Benzo(k)fluoranthene	µg/l	< 0.01	< 0.01	0.017	-	-
Benzo(a)pyrene	µg/l	< 0.01	< 0.01	0.27	0.00017	0.01
Indeno(1,2,3-cd)pyrene	µg/l	< 0.01	< 0.01	0.0008	-	-
Dibenzo(ah)anthracene	µg/l	< 0.01	< 0.01	-	-	-
Benzo(ghi)perylene	µg/l	< 0.01	< 0.01	0.01	-	-
Total PAH	µg/l	**0.72**	< 0.16	-	0.00017	0.10
Petroleum Hydrocarbons						
Aliphatic VPH >C5 - C6	µg/l	< 1.0	< 1.0	10.00	10.00	10.00
Aliphatic VPH >C6 - C8	µg/l	< 1.0	< 1.0	10.00	10.00	10.00
Aliphatic VPH >C8 - 10	µg/l	< 1.0	< 1.0	10.00	10.00	10.00
Aliphatic EPH >C10 - C12	µg/l	< 10	< 10	10.00	10.00	10.00
Aliphatic EPH >C12 - C16	µg/l	< 10	< 10	10.00	10.00	10.00
Aliphatic EPH >C16 - C21	µg/l	< 10	< 10	10.00	10.00	10.00
Aliphatic EPH >C21 - C35	µg/l	< 10	< 10	10.00	10.00	10.00
Aliphatic EPH >C35 - C44	µg/l	< 10	< 10	-	-	-
Aliphatic EPH (C5 - C35)	µg/l	< 10	< 10	-	-	-
Aliphatic EPH (C5 - C44)	µg/l	< 10	< 10	-	-	-
Aromatic VPH >C5 - C7	µg/l	< 1.0	< 1.0	10.00	10.00	10.00
Aromatic VPH >C7 - C8	µg/l	< 1.0	< 1.0	10.00	10.00	10.00
Aromatic VPH >C8 - C10	µg/l	< 1.0	< 1.0	10.00	10.00	10.00
Aromatic EPH >C10 - C12	µg/l	< 10	< 10	10.00	10.00	10.00
Aromatic EPH >C12 - C16	µg/l	< 10	< 10	10.00	10.00	10.00
Aromatic EPH >C16 - C21	µg/l	< 10	< 10	10.00	10.00	10.00
Aromatic EPH >C21 - C35	µg/l	< 10	< 10	10.00	10.00	10.00
Aromatic EPH >C35 - C44	µg/l	< 10	< 10	-	-	-
Aromatic EPH (C5 - C35)	µg/l	< 10	< 10	-	-	-
Aromatic EPH (C5 - C44)	µg/l	< 10	< 10	-	-	-
TPH C5 - C44	µg/l	< 10	< 10	10.00	10.00	10.00
PFOS						
PFOS	ug/l	**0.00987**	**0.0208**	36.00	0.00065	
*where Dissolved Organic Carbon (DOC) > 1 mg/l: AA EQS = 3.76 + (2.677 x ((DOC value/2) –0.5)) µg/l						

Results exceeding the AA-EQS value, or the most conservative EQS/UKDWS guideline value where AA-EQS values are unavailable are highlighted in red bold type

Results exceeding the EQS threshold but below site specific PNEC highlighted blue bold type

Sources:
MAC-EQS and AA-EQS values sourced from the Environment Agency/Water Framework Directive
Drinking Water Standards sourced from The Water Supply (Water Quality) Regulations 2018 Water, England and Wales: 2018 No.647 (W.121)

Metal Bioavailability Assessment Tool (M-BAT)

Back

Calculate

Clear Data

INPUT DATA											RESULTS (Copper)				RESULTS (Zinc)				RESULTS (Mn)				RESULTS (Ni)			
ID	Location	Waterbody	Date	Measured Cu Concentration (dissolved) (µg l^{-1})	Measured Zn Concentration (dissolved) (µg l^{-1})	Measured Mn Concentration (dissolved) (µg l^{-1})	Measured Ni Concentration (dissolved) (µg l^{-1})	pH	DOC	Ca	Site-specific PNEC Dissolved Copper (µg l^{-1})	BioF	Bioavailable Copper Concentration (µg l^{-1})	Risk Characterisation Ratio	Site-specific PNEC Dissolved Zinc (µg l^{-1})	BioF	Bioavailable Zinc Concentration (µg l^{-1})	Risk Characterisation Ratio	Site-specific PNEC Dissolved Manganese (µg l^{-1})	BioF	Bioavailable Manganese Concentration (µg l^{-1})	Risk Characterisation Ratio	Site-specific PNEC Dissolved Nickel (µg l^{-1})	BioF	Bioavailable Nickel Concentration (µg l^{-1})	Risk Characterisation Ratio
1	WS102 R1	Shallow GW		20	13		4.2	7.2	3.81	130	16.64	0.06	1.20	1.20	23.73	0.46	5.97	0.55	1033.09	0.12			17.19	0.23	0.98	0.24
2	WS102 R2	Shallow GW		16	15			7.3	0.64	160	2.74	0.41	6.57	6.57	18.29	0.60	8.94	0.82	851.26	0.14			11.38	0.35		
3	WS102 R3	Shallow GW		16	20			7.2	3.43	130	14.51	1.07	17.1	17.1	23.01	0.47	9.47	0.87	1033.09	0.12			16.62	0.24		

Pb Screening Tool 1.0

Back

Calculate

Clear Data

INPUT DATA						RESULTS (Pb)			
ID	Location	Waterbody	Date	Measured Pb Concentration (dissolved) (µg l^{-1})	DOC	Site Specific PNEC Dissolved Pb (µg l^{-1})	BioF	Available Pb (µg l^{-1})	Risk Characterisation Ratio
1	WS102 R1	Shallow GW		9.50	3.81	4.57	0.26	2.49	2.08
2	WS102 R2	Shallow GW		26.00	**0.64**	1.20	1.00	26.00	21.67
3	WS102 R3	Shallow GW		8.00	3.43	4.12	0.29	2.33	1.94
4	WS101 R2	Shallow GW		22.00	3.13	3.76	0.32	7.03	5.86
5	WS101 R3	Shallow GW		15.00	3.59	4.31	0.28	4.18	3.48

FIGURES

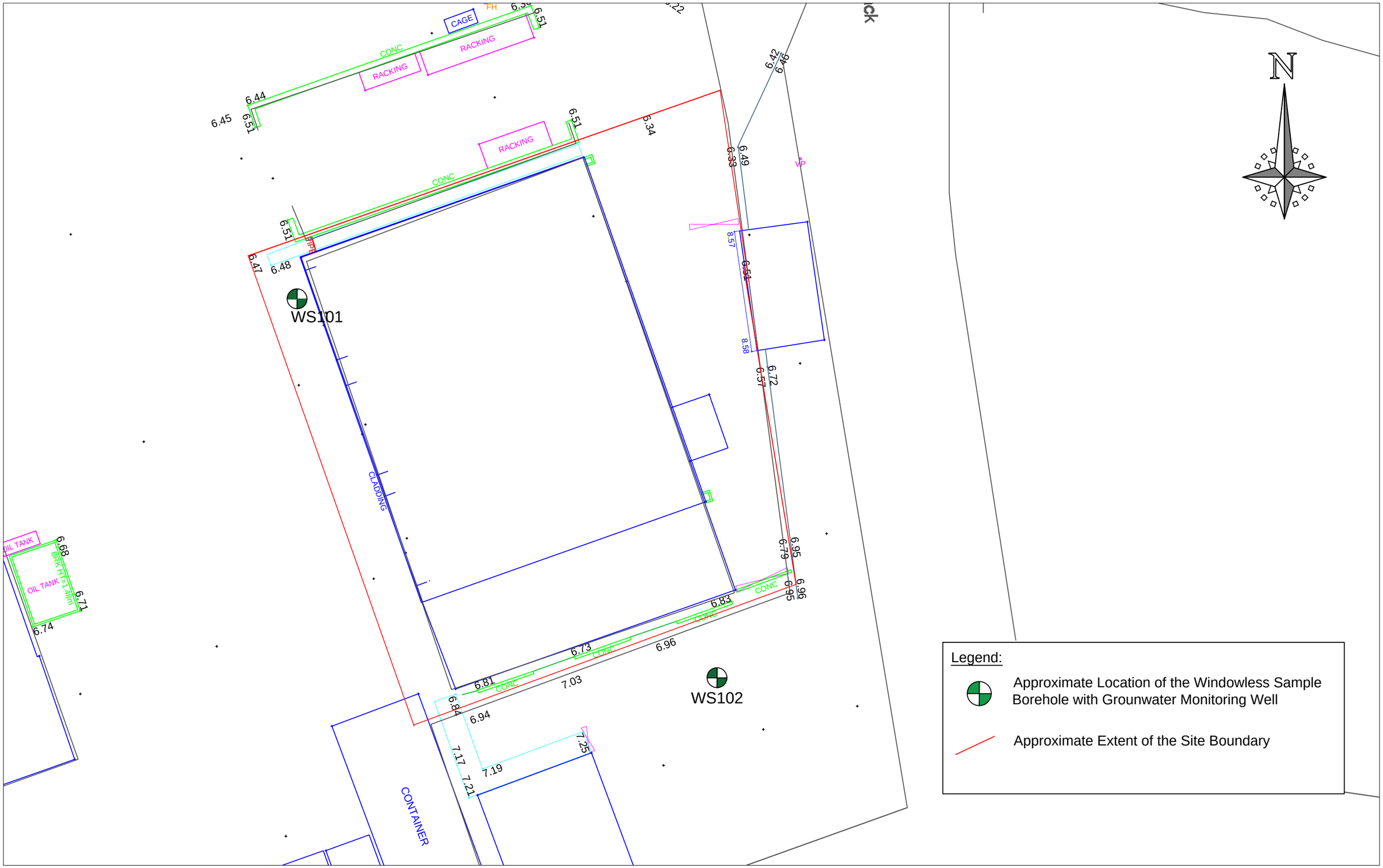

Figure 1: Site Plan

Project: Earlswood Burn House, Jersey Marine, Neath	Job No.: 14050	Intégral Géotechnique
Client: Mid & West Wales Fire Service	Scale: 1:20 at A3	

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