

TECHNICAL NOTE

JBA Project Code	2023s1251
Contract	Cardiff Construction Support
Client	Cardiff Council
Date	27/02/2024
Author	Rowan Barker
Reviewer / Sign-off	Michael McDonald
Subject	Marine Management Organisation Sampling Results

1 Context/Background

Marine Management Organisation (MMO) licenses are required for disposing of dredged materials at sea and use guidelines produced by OSPAR Commission to regulate this activity. A marine licence to dispose of dredged materials to sea requires the sediments to be characterised to allow the potential adverse environmental effects of disposing of the material to be considered.

The OSPAR guidelines recommend a tiered approach to assess the sediments if sufficient information is not already available from existing sources. The assessments required will depend upon the specific details of the proposed activities, although characterisation of a standard set of physical and chemical determinants within the sediments is often a necessary element of the assessment process. The standards applying in the United Kingdom are set by the Centre for Environment Fisheries and Aquaculture Science (CEFAS).

Cardiff Council have implemented a sediment sampling strategy to comply with Planning Conditions associated with the proposed coastal defence works.

Planning Condition 9 – Sediment Management Plan, states "No development or phase of development, including site clearance, shall commence until a detailed sediment sampling plan based on the "Proposed Sediment Sample Plan 1.0 28.01.2022" has been submitted to and approved in writing by the Local Planning Authority. Sampling shall be undertaken in accordance with the sampling plan and analysed at an NRW approved laboratory. Written results of the sediment sampling shall be submitted for approval by the Local Planning Authority prior to construction of the coastal defences along the coastline and along the riverbank of the River Rhymney and shall include an outline of an assessment of alternative uses for the sediment that is to be disposed."

This note provides the results of the sampling which has been undertaken and a review of analysis results.

2 Sampling Plan

A sediment sampling plan (Appendix A) was implemented at the locations outlined in Figure 2-1 below. Samples were taken from the ground surface at each individual location and analysed for the list of determinants to inform marine licence application. An average of each determinant was calculated for each section with planned coastal defence works as shown below.

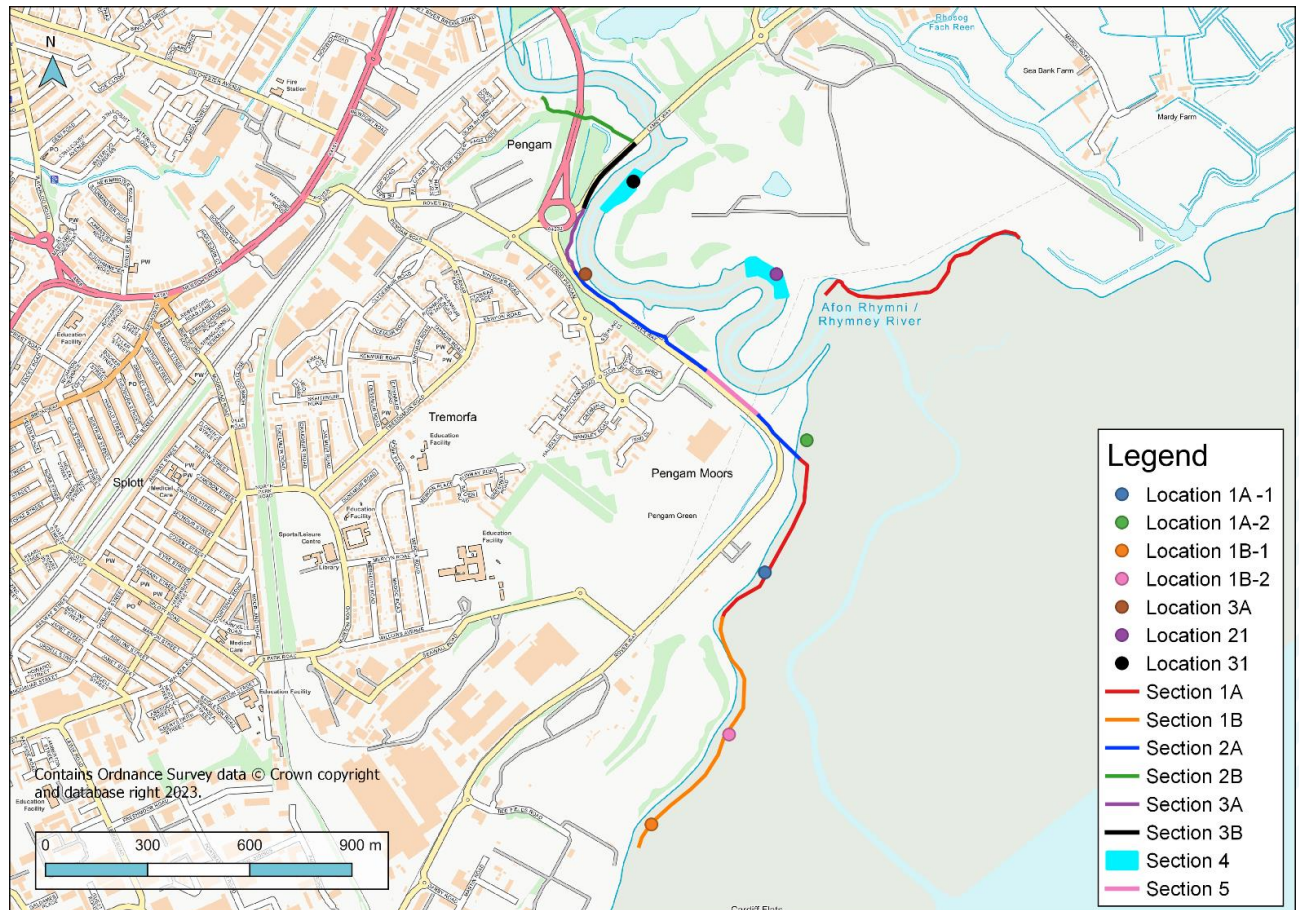


Figure 2-1: Sample Location Map

3 Assessment

Samples were submitted to SOCOTEC for analysis. SOCOTEC is accredited by the MMO to undertake all test except particle size analysis. Particle size analysis was sub-contracted to Ocean Ecology Limited, an accredited laboratory. The results are therefore deemed suitable for establishing whether materials arising from section sampled are suitable for disposal at a marine disposal site. A copy of the Certificate of Analysis is provided in Appendix B.

The table below shows a comparison of CEFAS Action Levels (AL) with the analytical results, with the key findings as follows:

- Metals - Exceedances in ALs 1 for, Chromium, Nickel, Lead, and Zinc were recorded across all sections (1A,1B,3A,21 and 31). Exceedances in ALs 1 Cadmium and Copper were also recorded at Section 1B). Zinc Levels at section 1B exceeded AL 2, with an average maximum concentration of 916.5mg/kg.
- Organotins - No exceedances of ALs 1 and ALs 2 recorded across all samples.
- PAH & TPH - Exceedances of ALs1 recorded across all samples.
- PCB's Sum of 7 Congeners and PCB's Sum of 25 Congeners – Exceedances of ALs 1 recorded across all sections.
- DDT- No exceedances of ALs 1 or ALs 2 recorded.
- Dieldrin - No exceedances of ALs 1 or ALs 2 recorded.

In Table 3-1, AL1 exceedances are in bold and exceedances of AL2 are underlined.

Table 3-1: Comparison of Analytical Results with CEFAS Action Levels (ppm DW)

Contaminant /Compound	Action Level 1	Action Level 2	Section 1A	Section 1B	Section 3A	Section 21	Section 31
Arsenic	20	100	8	16.45	15.5	14.0	15.7
Mercury	0.3	3	0.14	0.28	0.23	0.21	0.23
Cadmium	0.4	5	0.69	2.32	0.37	0.30	0.34
Chromium	40	400	42.55	112.9	45.6	42.7	46.6
Copper	40	400	32.25	111.9	29.6	27.0	28.5
Nickel	20	200	25.1	68.2	38.0	35.1	37.7
Lead	50	500	74.7	249	73.2	65.9	74.9
Zinc	130	800	305	<u>917</u>	259	234	255
Organotins; TBT DBT MBT	0.1	1	<0.005	<0.005	<0.005	<0.005	<0.005
PAHs	0.1	None	12.6	15.8	6.79	6.02	6.63
PCBs, sum of 7 congeners	0.01	None	0.049	0.065	0.032	0.029	0.031
PCBs, sum of 25 congeners	0.02	0.2	0.108	0.140	0.074	0.067	0.073
DDT	0.001	None	0.0002	0.0004	0.0001	0.0002	0.0001
Dieldrin	0.005	None	0.0004	0.0006	0.0003	0.0002	0.0007

4 Conclusion

Testing of beach sediment samples using the CEFAS MMO Suite identified multiple exceedances of Metals, PAHs and PCBs above Action Level 1 in all sections but below Action Level 2. There was one exceedance of Action Level 2 at section 1B for Zinc recorded with an average value at 916.5 mg/kg.

Natural Resources Wales (NRW) reviewed the dataset and provided their opinion in a letter dated 2 February 2024 (Appendix C) on the suitability of the works. NRW indicated "... given the works will mainly be carried out in the dry, we consider there will be minimal disturbance. Therefore, we have no objection to the discharge of condition 9 of 21/02138/MJR."

Given the results of the sampling and limited number of samples characterising the areas, i.e. only 2 samples taken per sections, it is advised that further testing is carried out within Section 1B to confirm current observed metals, PAHs and PCBs concentrations and allow a refinement of reuse potential at the construction stage.

Appendices

A Sampling Plan

Cardiff Coastal Defences

Document: Proposed Sediment Sample Plan 1.0

Dated: 28 January 2022

We confirm that we will undertake contamination sampling as requested by NRW Advisory and set out below. To confirm the presence (or not) and levels of any contamination we propose the following sampling will be undertaken where works are taking place below MHWS.

Sediment samples would be undertaken as set out in Table 1 below. Samples would be undertaken at the surface within the sections of the scheme as shown (locations as per Figure 1)

The samples would be compared to CEFAS action levels and presented to NRW.

Section	No of samples
1a	2
1b	2
2a	No excavation below MHWS – no sampling proposed
2b	No excavation below MHWS – no sampling proposed
3a	1
3b	No excavation below MHWS – no sampling proposed
4	1 per section – for location 21 and 31
5	No excavation below MHWS – no sampling proposed

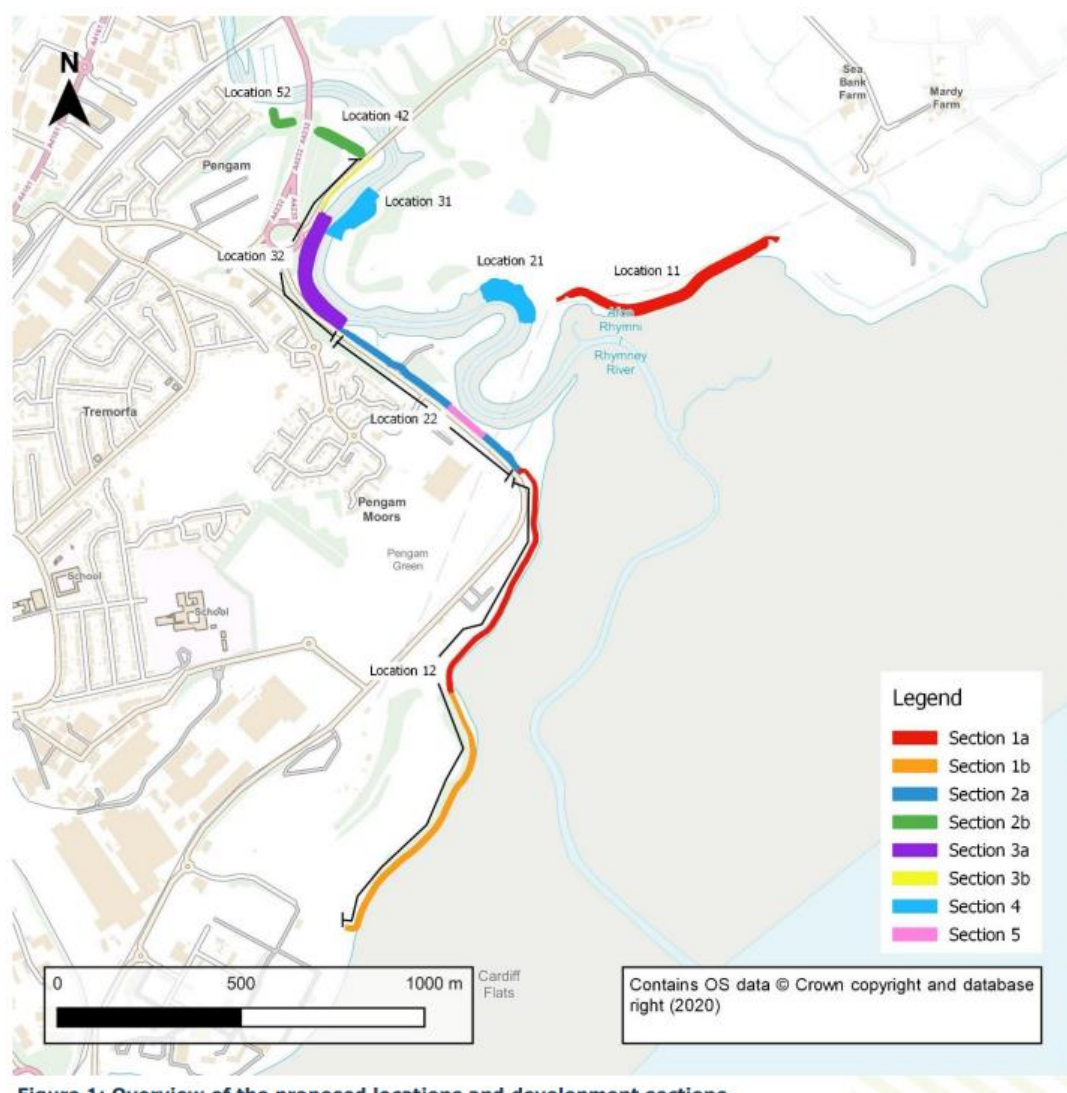


Figure 1: Overview of the proposed locations and development sections.

B Laboratory Analytical Data

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ



Test Report ID MAR02118

Issue Version: 1

Customer: Cardiff Council, County Hall, Cardiff, CF10 4UW

Customer Reference: NRW Analysis - Cardiff Coastal Defences

Date Sampled: 13-Nov-23

Date Samples Received: 15-Nov-23

Test Report Date: 13-Dec-23

Condition of samples: Ambient Unsatisfactory

Samples jars were damaged in transit

Opinions and Interpretations expressed herein are outside the scope of our UKAS accreditation

The results reported relate only to the sample tested

The results apply to the sample as received

JM Colbourne

Authorised by: Jane Colbourne

Position: Customer Service Specialist



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Test Report ID MAR02118
 Issue Version 1
 Customer Reference NRW Analysis - Cardiff Coastal Defences

		Units	% M/M	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)
		Method No	WSLM59*	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01
		Accreditation	UKAS/MMO	MMO	MMO	MMO	MMO	MMO	MMO
			Total Organic Carbon	45mm	31.5mm	22.4mm	16mm	11.2mm	8mm
Client Reference:	SOCOTEC Ref:	Matrix	-	-5.5	-5.0	-4.5	-4.0	-3.5	-3.0
Location 1A-1	MAR02118.001	Sediment	2.33	0.00	0.00	0.00	0.00	0.00	0.00
Location 1A-2	MAR02118.002	Sediment	2.11	0.00	0.00	0.00	0.00	0.00	0.00
Location 1B-1	MAR02118.003	Sediment	2.38	0.00	0.00	0.00	0.00	0.00	0.00
Location 1B-2	MAR02118.004	Sediment	1.91	0.00	0.00	0.00	0.00	0.00	0.00
Location 3A	MAR02118.005	Sediment	2.38	0.00	0.00	0.00	0.00	0.00	0.01
Location 21	MAR02118.006	Sediment	2.29	0.00	0.00	0.00	0.00	0.00	0.02
Location 31	MAR02118.007	Sediment	2.21	0.00	0.00	0.00	0.00	0.00	0.00

* See Report Notes

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		Units	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)
		Method No	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01
		Accreditation	MMO	MMO	MMO	MMO	MMO	MMO	MMO
			5.6mm	4mm	2.8mm	2mm	1.4mm	1mm	707µm
Client Reference:	SOCOTEC Ref:	Matrix	-2.5	-2.0	-1.5	-1.0	-0.5	0.0	0.5
Location 1A-1	MAR02118.001	Sediment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Location 1A-2	MAR02118.002	Sediment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Location 1B-1	MAR02118.003	Sediment	0.00	0.14	0.19	0.28	0.48	0.64	4.54
Location 1B-2	MAR02118.004	Sediment	0.00	0.00	0.07	0.00	0.02	0.07	0.01
Location 3A	MAR02118.005	Sediment	0.01	0.01	0.05	0.05	0.02	0.02	0.00
Location 21	MAR02118.006	Sediment	0.00	0.00	0.09	0.15	0.07	0.22	0.00
Location 31	MAR02118.007	Sediment	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* See Report Notes

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		Units	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)
		Method No	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01
		Accreditation	MMO	MMO	MMO	MMO	MMO	MMO	MMO
			500µm	353.6µm	250µm	176.8µm	125µm	88.39µm	63µm
Client Reference:	SOCOTEC Ref:	Matrix	1.0	1.5	2.0	2.5	3.0	3.5	4.0
Location 1A-1	MAR02118.001	Sediment	0.00	0.00	0.00	0.00	0.00	0.09	0.16
Location 1A-2	MAR02118.002	Sediment	0.00	0.00	0.00	0.00	1.11	5.34	0.94
Location 1B-1	MAR02118.003	Sediment	3.58	6.17	12.33	7.82	5.67	2.93	0.20
Location 1B-2	MAR02118.004	Sediment	0.78	1.37	4.79	5.00	3.48	1.69	0.02
Location 3A	MAR02118.005	Sediment	0.00	0.00	0.00	0.24	2.67	1.93	0.22
Location 21	MAR02118.006	Sediment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Location 31	MAR02118.007	Sediment	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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		Units	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)
		Method No	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01
		Accreditation	MMO	MMO	MMO	MMO	MMO	MMO	MMO
			44.2µm	31.3µm	22.1µm	15.6µm	11µm	7.8µm	5.5µm
Client Reference:	SOCOTEC Ref:	Matrix	4.5	5.0	5.5	6.0	6.5	7.0	7.5
Location 1A-1	MAR02118.001	Sediment	0.84	5.40	5.94	6.85	7.77	10.56	12.96
Location 1A-2	MAR02118.002	Sediment	1.04	4.66	5.08	6.18	7.31	9.73	12.00
Location 1B-1	MAR02118.003	Sediment	1.30	2.86	3.19	4.03	4.39	5.34	6.47
Location 1B-2	MAR02118.004	Sediment	0.77	3.76	4.02	5.58	7.20	9.69	12.12
Location 3A	MAR02118.005	Sediment	1.96	4.54	4.71	6.87	7.98	9.43	12.18
Location 21	MAR02118.006	Sediment	0.33	4.38	5.04	5.68	7.86	11.02	13.38
Location 31	MAR02118.007	Sediment	0.21	4.33	6.31	5.73	8.08	11.77	13.94

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		Units	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)
		Method No	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01
		Accreditation	MMO	MMO	MMO	MMO	MMO	MMO	MMO
			3.9µm	2.75µm	1.95µm	1.38µm	0.98µm	0.69µm	0.49µm
Client Reference:	SOCOTEC Ref:	Matrix	8.0	8.5	9.0	9.5	10.0	10.5	11.0
Location 1A-1	MAR02118.001	Sediment	12.10	8.68	5.39	3.87	3.40	3.23	3.13
Location 1A-2	MAR02118.002	Sediment	11.33	8.13	5.06	3.70	3.26	3.06	2.96
Location 1B-1	MAR02118.003	Sediment	6.17	4.49	2.98	2.40	2.11	1.89	1.79
Location 1B-2	MAR02118.004	Sediment	11.31	7.77	4.25	2.60	2.22	2.24	2.27
Location 3A	MAR02118.005	Sediment	11.88	8.32	4.99	3.68	3.22	2.97	2.90
Location 21	MAR02118.006	Sediment	12.44	9.02	5.77	4.20	3.59	3.34	3.24
Location 31	MAR02118.007	Sediment	12.71	9.14	5.75	4.02	3.31	3.01	2.89

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		Units	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)
		Method No	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01
		Accreditation	MMO	MMO	MMO	MMO	MMO	MMO	MMO
			0.34µm	0.24µm	0.17µm	0.12µm	0.09µm	0.06µm	0.04µm
Client Reference:	SOCOTEC Ref:	Matrix	11.5	12.0	12.5	13.0	13.5	14.0	14.5
Location 1A-1	MAR02118.001	Sediment	2.93	2.50	1.84	1.28	0.75	0.28	0.03
Location 1A-2	MAR02118.002	Sediment	2.79	2.40	1.75	1.20	0.69	0.26	0.03
Location 1B-1	MAR02118.003	Sediment	1.71	1.49	1.09	0.74	0.42	0.15	0.02
Location 1B-2	MAR02118.004	Sediment	2.14	1.81	1.31	0.90	0.52	0.20	0.02
Location 3A	MAR02118.005	Sediment	2.82	2.46	1.78	1.18	0.66	0.23	0.03
Location 21	MAR02118.006	Sediment	3.08	2.66	1.96	1.35	0.78	0.29	0.03
Location 31	MAR02118.007	Sediment	2.71	2.32	1.69	1.15	0.66	0.25	0.03

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		Units	% (at 0.5phi intervals)
		Method No	*SUB_01
		Accreditation	MMO
			<0.04µm
Client Reference:	SOCOTEC Ref:	Matrix	>14.5
Location 1A-1	MAR02118.001	Sediment	0.00
Location 1A-2	MAR02118.002	Sediment	0.00
Location 1B-1	MAR02118.003	Sediment	0.00
Location 1B-2	MAR02118.004	Sediment	0.00
Location 3A	MAR02118.005	Sediment	0.00
Location 21	MAR02118.006	Sediment	0.00
Location 31	MAR02118.007	Sediment	0.00

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		Units	mg/Kg (Dry Weight)							
		Method No	ICPMSS*							
		Limit of Detection	0.5	0.04	0.5	0.5	0.01	0.5	0.5	2
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	SOCOTEC Ref:	Matrix	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Copper (Cu)	Mercury (Hg)	Nickel (Ni)	Lead (Pb)	Zinc (Zn)
Location 1A-1	MAR02118.001	Sediment	14.2	1.15	74.4	55.3	0.24	43.7	128	530
Location 1A-2	MAR02118.002	Sediment	1.8	0.22	10.7	9.2	0.04	6.4	21.4	80.6
Location 1B-1	MAR02118.003	Sediment	16.7	2.76	121	131	0.34	84.5	318	1075
Location 1B-2	MAR02118.004	Sediment	16.2	1.87	104	92.8	0.22	51.8	180	758
Location 3A	MAR02118.005	Sediment	15.5	0.37	45.6	29.6	0.23	38.0	73.2	259
Location 21	MAR02118.006	Sediment	14.0	0.30	42.7	27.0	0.21	35.1	65.9	234
Location 31	MAR02118.007	Sediment	15.7	0.34	46.6	28.5	0.23	37.7	74.9	255
Certified Reference Material SETOC 768 (% Recovery)			105	104	107	103	117	105	106	108
QC Blank			<0.5	<0.04	<0.5	<0.5	<0.01	<0.5	<0.5	<2

* See Report Notes

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Test Report ID MAR02118
 Issue Version 1
 Customer Reference NRW Analysis - Cardiff Coastal Defences

		Units	mg/Kg (Dry Weight)	
		Method No	ASC/SOP/301	
		Limit of Detection	0.001	0.001
		Accreditation	UKAS/MMO	UKAS/MMO
Client Reference:	SOCOTEC Ref:	Matrix	Dibutyltin (DBT)	Tributyltin (TBT)
Location 1A-1	MAR02118.001	Sediment	<0.005	<0.005
Location 1A-2	MAR02118.002	Sediment	<0.005	<0.005
Location 1B-1	MAR02118.003	Sediment	0.013	<0.005
Location 1B-2	MAR02118.004	Sediment	<0.005	<0.005
Location 3A	MAR02118.005	Sediment	<0.005	<0.005
Location 21	MAR02118.006	Sediment	<0.005	<0.005
Location 31	MAR02118.007	Sediment	<0.005	<0.005
Certified Reference Material BCR-646 (% Recovery)			75	63
QC Blank			<0.001	<0.001

* See Report Notes

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		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1	1	1
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	SOCOTEC Ref:	Matrix	ACENAPTH	ACENAPHY	ANTHRACN	BAA	BAP	BBF	BENZGHIP	BEP
Location 1A-1	MAR02118.001	Sediment	209	435	439	1360	1400	1530	842	980
Location 1A-2	MAR02118.002	Sediment	67.1	59.6	117	346	364	429	250	279
Location 1B-1	MAR02118.003	Sediment	166	260	1860	1760	1720	1850	1170	1150
Location 1B-2	MAR02118.004	Sediment	79.3	62.4	95.8	257	347	433	351	300
Location 3A	MAR02118.005	Sediment	72.8	49.8	108	308	411	520	423	362
Location 21	MAR02118.006	Sediment	66.2	45.4	93.0	266	360	461	374	320
Location 31	MAR02118.007	Sediment	77.1	48.7	101	292	397	504	403	346
Certified Reference Material Nist 1941b (% Recovery)			93	111	65	65	64	81	73	82
QC Blank			<1	<1	<1	<1	<1	<1	<1	<1

- Indicates result is for an In-house Reference Material as no Certified Reference Materials are available.

For full analyte name see method summaries.

*See report notes

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		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1	1	1
		Accreditation	UKAS/MMO	MMO	MMO	MMO	MMO	MMO	UKAS/MMO	UKAS/MMO
Client Reference:	SOCOTEC Ref:	Matrix	BKF*	C1N	C1PHEN	C2N	C3N	CHRYSENE*	DBENZAH	FLUORANT
Location 1A-1	MAR02118.001	Sediment	1180	423	590	457	336	1500	209	2600
Location 1A-2	MAR02118.002	Sediment	331	201	239	166	128	397	67.0	754
Location 1B-1	MAR02118.003	Sediment	1440	475	690	397	346	2430	313	3400
Location 1B-2	MAR02118.004	Sediment	314	356	267	314	233	374	80.9	463
Location 3A	MAR02118.005	Sediment	377	378	351	326	241	445	98.4	575
Location 21	MAR02118.006	Sediment	335	349	299	306	220	395	83.8	501
Location 31	MAR02118.007	Sediment	362	398	339	352	255	431	96.6	541
Certified Reference Material Nist 1941b (% Recovery)			90	77	78	112	123	90	117	82
QC Blank			<1	<1	<1	<1	<1	<1	<1	<1

- Indicates result is for an In-house Reference Material as no Certified Reference Materials are available.

For full analyte name see method summaries.

*See report notes

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Test Report ID MAR02118
Issue Version 1
Customer Reference NRW Analysis - Cardiff Coastal Defences

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	mg/Kg
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/305
		Limit of Detection	1	1	1	1	1	1	1
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	SOCOTEC Ref:	Matrix	FLUORENE	INDPYR	NAPTH	PERYLENE	PHENANT	PYRENE	THC
Location 1A-1	MAR02118.001	Sediment	332	921	258	363	1220	1850	91.8
Location 1A-2	MAR02118.002	Sediment	108	313	117	104	396	531	33.3
Location 1B-1	MAR02118.003	Sediment	422	1280	307	443	1460	2450	177
Location 1B-2	MAR02118.004	Sediment	141	365	191	109	312	351	28.6
Location 3A	MAR02118.005	Sediment	140	444	200	140	374	442	18.7
Location 21	MAR02118.006	Sediment	127	393	178	120	333	390	19.1
Location 31	MAR02118.007	Sediment	143	432	210	130	358	416	15.0
Certified Reference Material Nist 1941b (% Recovery)			55	66	57	53	74	71	92~
QC Blank			<1	<1	<1	<1	<1	<1	<1

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		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	MMO*	UKAS/MMO	UKAS/MMO
Client Reference:	SOCOTEC Ref:	Matrix	PCB 101	PCB 105	PCB 110	PCB 118	PCB 128	PCB 138	PCB 141
Location 1A-1	MAR02118.001	Sediment	0.01026	0.00397	0.01092	0.01001	0.00231	0.00997	0.00198
Location 1A-2	MAR02118.002	Sediment	0.00447	0.00171	0.00547	0.00449	0.00123	0.00484	0.00091
Location 1B-1	MAR02118.003	Sediment	0.01498	0.00599	0.01582	0.01561	0.00439	0.01502	0.00263
Location 1B-2	MAR02118.004	Sediment	0.00470	0.00236	0.00543	0.00548	0.00175	0.00611	0.00140
Location 3A	MAR02118.005	Sediment	0.00297	0.00154	0.00428	0.00420	0.00103	0.00355	0.00083
Location 21	MAR02118.006	Sediment	0.00275	0.00136	0.00374	0.00358	0.00090	0.00403	0.00080
Location 31	MAR02118.007	Sediment	0.00289	0.00144	0.00390	0.00389	0.00111	0.00445	0.00095
Certified Reference Material Nist 1941b (% Recovery)			98	96	94	103	85	93	99~
QC Blank			<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008

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		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	MMO*	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	SOCOTEC Ref:	Matrix	PCB 149	PCB 151	PCB 153	PCB 156	PCB 158	PCB 170	PCB 18
Location 1A-1	MAR02118.001	Sediment	0.00646	0.00160	0.01146	0.00148	0.00212	0.00241	0.00469
Location 1A-2	MAR02118.002	Sediment	0.00372	0.00115	0.00631	0.00072	0.00115	0.00176	0.00342
Location 1B-1	MAR02118.003	Sediment	0.00988	0.00240	0.01834	0.00264	0.00358	0.00415	0.00543
Location 1B-2	MAR02118.004	Sediment	0.00398	0.00142	0.00692	0.00138	0.00159	0.00207	0.00237
Location 3A	MAR02118.005	Sediment	0.00340	0.00118	0.00617	0.00057	0.00085	0.00190	0.00305
Location 21	MAR02118.006	Sediment	0.00321	0.00091	0.00526	0.00053	0.00081	0.00182	0.00270
Location 31	MAR02118.007	Sediment	0.00334	0.00099	0.00579	0.00057	0.00070	0.00177	0.00288
Certified Reference Material Nist 1941b (% Recovery)			85	98~	103	99	105	100	80
QC Blank			<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008

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		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	MMO*	MMO*	UKAS/MMO	UKAS/MMO
Client Reference:	SOCOTEC Ref:	Matrix	PCB 180	PCB 183	PCB 187	PCB 194	PCB 28	PCB 31	PCB 44
Location 1A-1	MAR02118.001	Sediment	0.00431	0.00111	0.00263	0.00110	0.00861	0.00728	0.00762
Location 1A-2	MAR02118.002	Sediment	0.00358	0.00075	0.00201	0.00086	0.00585	0.00537	0.00408
Location 1B-1	MAR02118.003	Sediment	0.00732	0.00173	0.00385	0.00162	0.01018	0.00864	0.00863
Location 1B-2	MAR02118.004	Sediment	0.00377	0.00117	0.00223	0.00118	0.00611	0.00500	0.00347
Location 3A	MAR02118.005	Sediment	0.00406	0.00086	0.00225	0.00109	0.00703	0.00617	0.00334
Location 21	MAR02118.006	Sediment	0.00368	0.00071	0.00198	0.00097	0.00650	0.00581	0.00290
Location 31	MAR02118.007	Sediment	0.00388	0.00095	0.00212	0.00108	0.00693	0.00607	0.00336
Certified Reference Material Nist 1941b (% Recovery)			97	73	89	100	88	105	98
QC Blank			<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008

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		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.00008	0.00008	0.00008	0.00008
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	SOCOTEC Ref:	Matrix	PCB 47	PCB 49	PCB 52	PCB 66
Location 1A-1	MAR02118.001	Sediment	0.00222	0.00626	0.00911	0.00800
Location 1A-2	MAR02118.002	Sediment	0.00115	0.00318	0.00415	0.00535
Location 1B-1	MAR02118.003	Sediment	0.00278	0.00811	0.01169	0.00995
Location 1B-2	MAR02118.004	Sediment	0.00165	0.00339	0.00413	0.00538
Location 3A	MAR02118.005	Sediment	0.00129	0.00313	0.00353	0.00565
Location 21	MAR02118.006	Sediment	0.00116	0.00259	0.00293	0.00497
Location 31	MAR02118.007	Sediment	0.00133	0.00308	0.00354	0.00559
Certified Reference Material Nist 1941b (% Recovery)			100~	112	98	100
QC Blank			<0.00008	<0.00008	<0.00008	<0.00008

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 Issue Version 1
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		Units	mg/Kg (Dry Weight)							
		Method No	ASC/SOP/302							
		Limit of Detection	0.0001							
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	SOCOTEC Ref:	Matrix	AHCH	BHCH	GHCH	DIELDRIN	HCB	PPTDE	PPDDE	PPDDT
Location 1A-1	MAR02118.001	Sediment	<0.0001	<0.0001	<0.0001	0.0004	0.0004	0.0013	0.0004	0.0001
Location 1A-2	MAR02118.002	Sediment	<0.0001	<0.0001	<0.0001	0.0004	0.0003	0.0010	0.0004	0.0002
Location 1B-1	MAR02118.003	Sediment	<0.0001	<0.0001	0.0001	0.0005	0.0008	0.0012	0.0006	0.0002
Location 1B-2	MAR02118.004	Sediment	0.0003	0.0004	0.0004	0.0006	0.0005	0.0019	0.0007	0.0006
Location 3A	MAR02118.005	Sediment	<0.0001	<0.0001	<0.0001	0.0003	0.0004	0.0014	0.0005	0.0001
Location 21	MAR02118.006	Sediment	<0.0001	<0.0001	<0.0001	0.0002	0.0003	0.0012	0.0005	0.0002
Location 31	MAR02118.007	Sediment	<0.0001	<0.0001	<0.0001	0.0007	0.0003	0.0015	0.0005	0.0001
Certified Reference Material Nist 1941b (% Recovery)			104~	69~	81~	110~	127	92	78	69
QC Blank			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

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For full analyte name see method summaries.

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		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308
		Limit of Detection	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	SOCOTEC Ref:	Matrix	BDE17	BDE28	BDE47	BDE66	BDE85	BDE99	BDE100	BDE138
Location 1A-1	MAR02118.001	Sediment	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00130	<0.00005	<0.00005
Location 1A-2	MAR02118.002	Sediment	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00170	<0.00005	<0.00005
Location 1B-1	MAR02118.003	Sediment	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00542	<0.00005	0.00006
Location 1B-2	MAR02118.004	Sediment	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00156	<0.00005	<0.00005
Location 3A	MAR02118.005	Sediment	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00015	<0.00005	<0.00005
Location 21	MAR02118.006	Sediment	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00034	<0.00005	<0.00005
Location 31	MAR02118.007	Sediment	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00040	<0.00005	<0.00005
Certified Reference Material Quasimeme SED56 (% Recovery)			92~	100	117	106~	99~	101	117	93~
QC Blank			<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005

* See Report Notes

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		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308
		Limit of Detection	0.00005	0.00005	0.00005	0.0001
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	SOCOTEC Ref:	Matrix	BDE153	BDE154	BDE183	BDE209
Location 1A-1	MAR02118.001	Sediment	<0.00005	0.00013	0.00010	0.0311
Location 1A-2	MAR02118.002	Sediment	<0.00005	0.00010	0.00009	0.0308
Location 1B-1	MAR02118.003	Sediment	<0.00005	0.00029	0.00007	0.0275
Location 1B-2	MAR02118.004	Sediment	<0.00005	0.00012	0.00007	0.0302
Location 3A	MAR02118.005	Sediment	<0.00005	<0.00005	<0.00005	0.0092
Location 21	MAR02118.006	Sediment	<0.00005	0.00008	0.00009	0.0357
Location 31	MAR02118.007	Sediment	<0.00005	0.00007	0.00007	0.0418
Certified Reference Material Quasimeme SED56 (% Recovery)			90	105	114	100
QC Blank			<0.00005	<0.00005	<0.00005	<0.0007*

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REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
*SUB_01	MAR02118.001-007	Analysis was conducted by an approved subcontracted laboratory.
WSLM59*	MAR02118.001-007	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
ICPMSS*	MAR02118.001-007	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
ASC/SOP/301	MAR02118.001-007	The matrix of this sample has been found to interfere with the result for this test. The sample has therefore been diluted, but in doing so, the detection limit for this test has been elevated.
ASC/SOP/302	MAR02118.001-007	The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. The remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected. However in line with our QMS policy we have removed accreditation, where applicable, from the affected analytes (PCB28, 128, 156 & 194) . These circumstances should be taken into consideration when utilising the data.
ASC/SOP/303/304	MAR02118.001-007	Benzo[k]fluoranthene is known to coelute with Benzo[j]fluoranthene and these peaks can not be resolved. It is believed Benzo[j]fluoranthene is present in these samples therefore it is suggested that the Benzo[k]fluoranthene results should be taken as a Benzo[k]fluoranthene (inc. Benzo[j]fluoranthene). Benzo[j]fluoranthene is not UKAS accredited. This should be taken into consideration when utilising the data.
ASC/SOP/303/304	MAR02118.001-007	Chrysene is known to coelute with Triphenylene and these peaks can not be resolved in the PAHSED UKAS accredited method. Chrysene and Triphenylene are resolved for MMO but this is currently not UKAS accredited therefore Chrysene is reported without this accreditation.
ASC/SOP/308	MAR02118.001-007	The Primary process control blank data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with BDE209 falling above acceptable reporting limits. The remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected. However in line with our QMS policy the report limit for this compound has been raised and samples have been blank subtracted.

DEVIATING SAMPLE STATEMENT

Deviation Code	Deviation Definition	Sample ID	Deviation Details. The following information should be taken into consideration when using the data contained within this report
D1	Holding Time Exceeded	N/A	N/A
D2	Sample Contaminated through Damaged Packaging	N/A	N/A
D3	Sample Contaminated through Sampling	N/A	N/A
D4	Inappropriate Container/Packaging	N/A	N/A
D5	Damaged in Transit	MAR02118.001, 002, 003, 004, 006, 007	Glass jars damaged in transit and transferred to suitable containers on arrival
D6	Insufficient Quantity of Sample	N/A	N/A
D7	Inappropriate Headspace	N/A	N/A
D8	Retained at Incorrect Temperature	N/A	N/A
D9	Lack of Date & Time of Sampling	N/A	N/A
D10	Insufficient Sample Details	N/A	N/A
D11	Sample integrity compromised or not suitable for analysis	N/A	N/A

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Issue Version 1
Customer Reference NRW Analysis - Cardiff Coastal Defences

Method	Sample and Fraction Size	Method Summary
Particle Size Analysis	Wet Sediment	Wet and dry sieving followed by laser diffraction analysis.
Total Organic Carbon (TOC)	Air dried	Carbonate removal and sulphurous acid/combustion at 1600°C/NDIR.
Metals	Air dried	Aqua-regia extraction followed by ICP analysis.
Organotins	Wet Sediment	Solvent extraction and derivatisation followed by GC-MS analysis.
Polyaromatic Hydrocarbons (PAH)	Wet Sediment	Solvent extraction and clean up followed by GC-MS analysis.
Total Hydrocarbon Content (THC)	Wet Sediment	Ultra-violet fluorescence spectroscopy
Polychlorinated Biphenyls (PCBs)	Air dried and sieved to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.
Organochlorine Pesticides (OCPs)	Air dried and sieved to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.
Brominated Flame Retardants (PBDEs)	Air dried and sieved to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.

Analyte Definitions					
Analyte Abbreviation	Full Analyte name	Analyte Abbreviation	Full Analyte name	Analyte Abbreviation	Full Analyte name
ACENAPTH	Acenaphthene	C2N	C2-naphthalenes	THC	Total Hydrocarbon Content
ACENAPHY	Acenaphthylene	C3N	C3-naphthalenes	AHCH	alpha-Hexachlorocyclohexane
ANTHRACN	Anthracene	CHRYSENE	Chrysene	BHCH	beta-Hexachlorocyclohexane
BAA	Benzo[a]anthracene	DBENZAH	Dibenzo[ah]anthracene	GHCH	gamma-Hexachlorocyclohexane
BAP	Benzo[a]pyrene	FLUORANT	Fluoranthene	DIELDRIN	Dieldrin
BBF	Benzo[b]fluoranthene	FLUORENE	Fluorene	HCB	Hexachlorobenzene
BEP	Benzo[e]pyrene	INDPYR	Indeno[1,2,3-cd]pyrene	PPDDE	p,p'-Dichlorodiphenyldichloroethylene
BENZGHIP	Benzo[ghi]perylene	NAPTH	Naphthalene	PPDDT	p,p'-Dichlorodiphenyltrichloroethane
BKF	Benzo[k]fluoranthene	PERYLENE	Perylene	PPTDE	p,p'-Dichlorodiphenyldichloroethane
C1N	C1-naphthalenes	PHENANT	Phenanthrene		
C1PHEN	C1-phenanthrene	PYRENE	Pyrene		

MAR02118

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c **NRW Letter**



Ein cyf/Our ref: CAS-247438-C8F9
Eich cyf/Your ref: 23/02967/DOC

Cardiff Council
County Hall
Atlantic Wharf
Cardiff
CF10 4UW

Dyddiad/Date: 02 February 2024

Annwyl Syr/Madam/Dear Sir/Madam,

BWRIAD/PROPOSAL: DISCHARGE OF CONDITION 9 (DETAILED SEDIMENT SAMPLING PLAN) OF 21/02138/MJR.

LLEOLIAD/LOCATION: RIVER RUMNEY ESTUARY BANKS AND FORESHORE.

Thank you for consulting Cyfoeth Naturiol Cymru (CNC)/Natural Resources Wales (NRW) about the above, which we received on 22 January 2024.

We have no objection to the application as submitted and provide the following advice.

The sediment quality results show some elevated contaminants (particularly metals and Polycyclic aromatic hydrocarbons (PAHs)), mostly just above CEFAS Action Level (AL) 1, but in one case above AL2. However, given the works will mainly be carried out in the dry, we consider there will be minimal disturbance. Therefore, we have no objection to the discharge of condition 9 of 21/02138/MJR.

Other Matters

Our comments above only relate specifically to matters included on our checklist, *Development Planning Advisory Service: Consultation Topics* (September 2018), which is published on our [website](#). We have not considered potential effects on other matters and do not rule out the potential for the proposed development to affect other interests.

We advise the applicant that, in addition to planning permission, it is their responsibility to ensure they secure all other permits/consents/licences relevant to their development. Please refer to our [website](#) for further details.

If you have any queries on the above, please do not hesitate to contact us.

Yn gywir / Yours faithfully

Sarah Lund

Cynghorydd - Cynllunio Datblygu/Advisor - Development Planning
Cyfoeth Naturiol Cymru/Natural Resources Wales

E-bost/E-mail: southeastplanning@cyfoethnaturiolcymru.gov.uk

Croesewir gohebiaeth yn Gymraeg a byddwn yn ymateb yn Gymraeg, heb i hynny arwain at oedi./Correspondence in Welsh is welcomed, and we will respond in Welsh without it leading to a delay.