Technical Note

To:	Marine Directorate Licensing Operations Team	Ref:	R/5630/TN03/egm
From:	E Mungo, ABPmer	Date:	09 October 2025

Subject: Loch Ryan Sediment Quality Review

1 Introduction

1.1 Background

Stena Line Ports Ltd is applying for a Marine Licence under the Marine (Scotland) Act 2010 to carry out maintenance dredging at Loch Ryan and sea deposit at sea deposit site MA010 (North Channel, Scotland). The new licence would replace the current Marine Licence (Licence Number: MS-00009930) which expires on 14 December 2025.

As part of the licensing process, surface samples to determine the sediment quality have been obtained and analysed for contaminants; see Figure 1 for sample locations. This note provides a summary of the sediment quality results and a comparison with Action Levels (AL).

1.2 Sample strategy and analysis

The sampling stations, physical and chemical analyses required for the Marine Licence application were agreed in July 2025 with Marine Directorate Licensing Operations Team (MD-LOT) (C.Pollard, 14 July 2025, pers. comm.). The sampling and analysis plan recommended obtaining surface samples from ten locations spread across the harbour area to cover the berthing pockets, turning circle and approach channel. The sampling locations are shown in Figure 1.

Samples were collected by ABPmer on 15 August 2025 using a stainless steel Vanveen grab. Sediment analysis of the samples was undertaken by Socotec UK Ltd. In 2025, it was noted that the nature of the seabed at stations in previously dredged areas was predominantly hard substrate with very little surficial sediment. At station 9 this meant that insufficient material was obtained for analysis, despite several attempts at sampling. This resulted in the laboratory not being able to complete all tests for this one site. Sufficient material was obtained for analysis at all other sites.

The samples were analysed for metals, organotins, particle size, Total Hydrocarbons (THC) and Polycyclic Aromatic Hydrocarbon (PAH), Polychlorinated Biphenyls (PCB) and asbestos. The full certified sediment sample results obtained are presented in Appendix A[1]..

[1] Note that the sample results use the prefix 'LR' for station numbers.

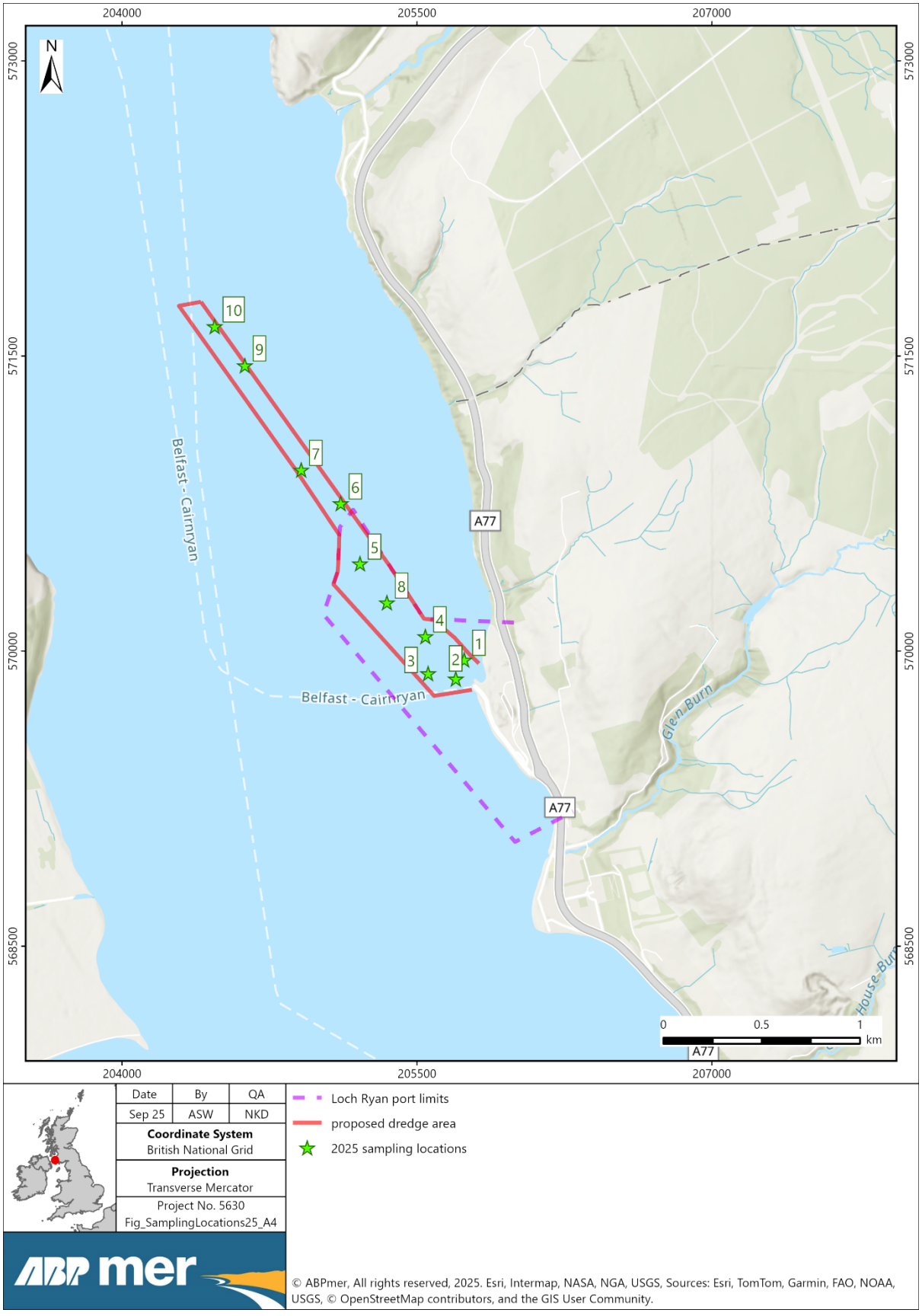

Figure 1. **Location of proposed dredge area and sediment sample locations**

2 Sediment Quality Results

2.1 Action levels

The AL used to assess for the exceedances of contaminant concentrations are those set out in the Pre-disposal Sampling Guidance (Marine Scotland, 2017) and are provided in Appendix B. The MD-LOT applies ALs as part of a 'weight of evidence' approach to assessing dredged material and its suitability for disposal to sea. In general, contaminant levels in dredged material below Action Level 1 (AL1) are of no concern and are unlikely to influence the licensing decision. However, dredged material with contamination exceedance levels above Action Level 2 (AL2) is generally considered unsuitable for sea disposal. Contaminant levels between the two ALs may require further investigation, sampling or analysis before a licensing decision is made. Previous and current sediment analysis results for Loch Ryan are discussed in the following sections in relation to the relevant AL.

2.2 Previous sampling

Sediment sampling has previously been completed within the proposed dredge area; in 2008, 2018 and 2022. In all campaigns there were some exceedances above AL1 recorded. However, these exceedances were not considered significant, and a licence was granted for the disposal of this material at sea. Details on the sediment sample analysis results from previous sampling are provided in the following sections.

2.2.1 Sampling results from 2008

Sediment sampling and analysis was completed in 2008 for 19 samples across the harbour area as part of the Environmental Impact Assessment (EIA) in association with the Port construction. The samples were collected from the surface using a Hamon grab and from boreholes up to a maximum depth of 5 m, to assess for contaminants at various depths. Analytes exceeding thresholds for a number of different national guidelines were presented in Annex F 'Sediment Report' of the EIA submission (ERM, 2008). The results were not assessed in relation to the current MD-LOT ALs but were assessed against the Centre for Environment, Fisheries and Aquaculture Science (Cefas) ALs and the Canadian Council of Ministers of the Environment (CCME) interim sediment quality guidelines (ISQG) threshold and probable effect levels (CCME, 2001).

Based on the applied guideline thresholds, there were exceedances of metals including arsenic, chromium, copper above the Canadian ISQG Threshold Effect Level (TEL) and Cefas AL1, but none exceeded the Canadian Probable Effect Level (PEL) or Cefas AL2. There were a number of exceedances for PAH analytes above the Canadian ISQG TEL and Cefas AL1, with more occurring in relation to the individual Canadian threshold, however none exceeded the higher threshold of both guidelines. In relation to the Canadian ISQG TEL and Cefas AL guidelines for PAHs, there were exceedances of Phenanthrene and Naphthalene. There were additional exceedances of Acenaphthylene, Fluorene and Acenaphthene based on only the Canadian ISQG TEL guidelines and only TPH above the Cefas AL guidelines.

The Cefas AL1 exceedances were identified in samples taken from the surface using a Hamon grab and at depth from the boreholes. The contaminant exceedances in the surface samples were spread at regular intervals covering the whole of the proposed capital dredge area for the construction of the Port. The contaminant exceedances were not considered a significant issue and the material was considered acceptable by the regulatory licensing authority at the time (Marine Scotland Licensing Operations Team (MS-LOT), now MD-LOT) for disposal at sea.

2.2.2 Sampling results from 2018

Eight surface sediment samples were collected in 2018 using a stainless steel Vanveen grab across the proposed dredge area. This was undertaken as part of the previous Marine Licence application submitted to MS-LOT to maintenance dredge within the Loch Ryan Port approach channel, berth pocket and turning circle. The results were assessed in relation to the Marine Scotland ALs (Marine Scotland, 2017).

Data from the 2018 sampling campaign indicated that for metals, only chromium and nickel had exceedances above MD-LOT AL1. Chromium occurred above AL1 at four of the eight sampled stations, while exceedances above AL1 for nickel was identified in all of sediment samples. Chromium above AL1 was identified at sampling stations located within the berth pockets and within the turning circle. The majority of metal exceedances were marginally above AL1 and all exceedances were well below AL2.

There were also occurrences of Diben(ah)anthracene, Fluoranthene, Phenanthrene and Pyrene above AL1, but these only occurred at one sample station located within the berth area. There are currently no relevant published AL2 for PAH analytes.

Asbestos was identified at one station located within the approach channel. No ALs are currently available for asbestos.

All other analytes were below AL1. The contaminant exceedances were not considered an issue and a licence to dispose the dredged material at sea was granted.

2.2.3 Sampling results from 2022

Eight samples were collected on 22 March 2022 and analysed for metals, organotins, particle size, THC, PAHs, PCBs and asbestos. The full sediment sample results are provided in a report on Loch Ryan Port: Sediment Quality Results Sediment quality review[2].

In summary the results in 2022 showed chromium and nickel were present at levels above MD-LOT AL1 in the seabed sediment across all areas of the proposed dredge which were considered indicative of historic presence occurring in the area. PAH concentrations and all other analytes were below AL1 across all of the sampling stations in 2022.

The contaminant exceedances were not considered an issue and a licence to dispose the dredged material at sea was granted.

2.3 Sampling and analysis in 2025

Sediment sampling was carried out in support of the current Marine Licence application on 15 August 2025. Samples were obtained from ten locations throughout the proposed dredge area as shown in Figure 1. Eight of these locations were also sampled in 2022 in support of the previous Marine Licence application at that time.

In the 2025 survey it was noted that the nature of the seabed at stations in previously dredged areas was predominantly hard substrate with very little surficial sediment. As noted in Section 1.2, at station 9 there was insufficient quantity of material to be able to undertake the full suite of analysis, despite

[2] ABPmer, (2022). Loch Ryan Port: Sediment Quality Results, Sediment quality review, ABPmer Report No. R.3933. A report produced by ABPmer for Stena Line Ports Ltd, June 2022.

several attempts at sampling. Sufficient material was obtained for analysis at all other sites. Table 1 details the percentage of each material type for the different samples obtained.

The samples collected in 2025 predominantly comprised sand and gravel, with only sampling stations at the berth pockets (stations 1 and 2) having a higher pro[portion of silt material. Stations 6, 7 and 10 in the approach channel comprised a higher proportion of sand and gravel. A detailed breakdown of the contamination analyses results and analyte exceedances above AL are presented in tables set out in Appendix A.

Table 1. Sample material physical characteristics

Sampling Station	Date and Time Sampled	Locations of Proposed Sampling Stations (WGS84, Decimal Degrees)		Gravel (>2 mm) (%)	Sand (63-2000 µm) (%)	Silt (<63 µm) (%)
		Latitude	Longitude			
1	15/08/25 09:15	54.98621	-5.03766	0.2	65.4	34.5
2	15/08/25 08:47	54.98533	-5.03827	50.5	26.4	23.1
3	15/08/25 13:17	54.98552	-5.04048	87.8	12.2	0.0
4	15/08/25 13:01	54.9872	-5.04083	91.3	8.7	0.0
5	15/08/25 12:11	54.99039	-5.04627	24.4	72.4	3.3
6	15/08/25 12:01	54.9931	-5.048	70.0	28.5	1.5
7	15/08/25 10:40	54.99455	-5.05125	58.8	38.2	3.0
8	15/08/25 12:20	54.98867	-5.04399	75.2	23.9	0.8
9	15/08/25 10:03	54.9992	-5.05609	Insufficient	Insufficient	Insufficient
10	15/08/25 09:49	55.00092	-5.05862	14.7	83.7	1.6

2.3.1 Metals

Data from the 2025 sampling campaign indicate only chromium and nickel have consistent exceedances above AL1, with both of these metals exceeding AL1 in all samples with two exceptions (chromium at stations 5 and 10). The majority of the analyte exceedances are marginally above AL1 and well below AL2.

The highest level of chromium in a sample was 77.5 ppm at station 3 which is only slightly above AL1 (50 ppm). The highest nickel concentration recorded was 86.0 ppm at station 3 is above AL1 (30 ppm), but well below AL2 (150 ppm).

One other instance of an exceedances of AL1 was recorded for copper at sample station 4 (82.4 ppm) which was above AL1 (30 ppm), but well below AL2 (300 ppm).

2.3.2 Organotins

The results of the organotin analysis, relevant to all samples, was accompanied by a note from the laboratory as follows:

> *"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."*

The Limit of Detection (LoD) is the lowest concentration or amount of a substance that an analytical method can reliably detect with a stated level of confidence. The LoD that the laboratory managed to achieve with the samples was 1 ppm at stations 3-8 and station 10, and 5 ppm at stations 1 and 2. The results are preceded by the notation '<' which indicates that the sample concentration was below the LoD, but that it cannot be ascertained by how much.

The ALs for Tributyltin (TBT) and Dibutyltin (DBT) are 0.1 ppm (AL1) and 0.5 ppm (AL2). The LoD that the laboratory managed to achieve with the samples was therefore above AL2 which means that the results cannot be confidently compared with the respective ALs in 2025.

2.3.3 Polycyclic Aromatic Hydrocarbons (PAHs) and Total Hydrocarbons (THC)

There were no occurrences of PAHs or THC above AL1 at any sample stations.

2.3.4 Polychlorinated Biphenyl (PCB)

A comparison of PCBs was made with respect to the sum of ICES 7 and sum of 25 congeners[3]. There were no occurrences of PCBs above AL1.

2.3.5 Asbestos

There were no occurrences of asbestos in any samples taken across the harbour area.

3 Conclusions

Chromium and nickel are present at levels above AL1 in the seabed sediment across all areas of the proposed dredge. These findings correlate with data from sampling campaigns in 2018 and 2022 which recorded elevated levels above AL1 but well below AL2. The vessels that use Loch Ryan Port (Ro-Ro ferries) are not associated with increased levels of chromium or nickel in sediment adjacent to their operation. The presence of AL1 exceedances in the 2008 sediment samples both from surface and from depth could potentially indicate that elevated concentrations of these metals are historic and naturally occurring in the area.

There were no exceedances above AL1 for PAH, THC, PCBs or asbestos. The results for organotins are inconclusive due to interference with sample matrix during laboratory analysis. However it is noted that previous sampling results from 2018 and 2022 showed TBT and DBT to be below AL1 in all sampling stations.

The assessment of the 2025 exceedances in relation to previous surveys within Loch Ryan and more widely across the UK indicate that the sediment contaminant concentrations are broadly within the range of values previously recorded in Loch Ryan and from surveys across Scotland (ERM, 2008). The contaminant levels are not significantly different to those that were previously deemed acceptable and licensed for disposal at sea.

[3] Cefas Action Levels from https://www.gov.uk/guidance/marine-licensing-sediment-analysis-and-sample-plans

4 References

ABPmer, (2022). Loch Ryan Port: Sediment Quality Results, Sediment quality review, ABPmer Report No. R.3933, for Stena Line Ports Ltd, June 2022.

Canadian Council of Ministers of the Environment (CCME) (2001). The Canadian Sediment quality guidelines. Updated in 2001.

Cefas Action Levels from https://www.gov.uk/guidance/marine-licensing-sediment-analysis-and-sample-plans

ERM (2008). Annex F: Sediment Report Stena Port (Old House Point). June 2008. Environmental Resources Management Ltd, Reference 0074835.

Marine Scotland (2017). Pre-disposal Sampling Guidance. Version 2 – November 2017.

A Sediment Results

Results to be added prior to issue.

Certificate of Analysis

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

SOCOTEC

Test Report ID MAR02766

Issue Version: 1

Customer: ABPmer, Quayside Suite, Medina Chambers, Town Quay, Southampton, SO14 2AQ

Customer Reference: Loch Ryan - Marine Scotland Sediment Analysis

Date Sampled: 15-Aug-25

Date Samples Received: 21-Aug-25

Test Report Date: 25-Sep-25

Condition of samples: Ambient Satisfactory

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

[Redacted]

Authorised by: Jane Colbourne

Position: Customer Service Specialist

UKAS TESTING
1252

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	MAR02766
Issue Version	1
Customer Reference	Loch Ryan - Marine Scotland Sediment Analysis

		Units	%	%	%	%	%	Mg/m3
		Method No	ASC/SOP/303	ASC/SOP/303	SUB_01*	SUB_01*	SUB_01*	SUB_02*
		Limit of Detection	0.2	0.2	N/A	N/A	N/A	N/A
		Accreditation	UKAS	UKAS	N	N	N	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Total Moisture @ 120°C**	**Total Solids**	**Gravel (>2mm)**	**Sand (63-2000 µm)**	**Silt (<63 µm)**	**Particle Density**
LR01	MAR02766.001	Sediment	31.0	69.0	0.16	65.39	34.45	2.68
LR02	MAR02766.002	Sediment	28.1	71.9	50.50	26.41	23.09	2.68
LR03	MAR02766.003	Sediment	13.9	86.1	87.77	12.23	0.00	2.72
LR04	MAR02766.004	Sediment	14.0	86.0	91.32	8.68	0.00	2.68
LR05	MAR02766.005	Sediment	16.2	83.8	24.38	72.36	3.26	2.68
LR06	MAR02766.006	Sediment	14.7	85.3	70.03	28.46	1.52	2.70
LR07	MAR02766.007	Sediment	19.0	81.0	58.75	38.23	3.03	2.71
LR08	MAR02766.008	Sediment	14.3	85.7	75.23	23.93	0.84	2.74
LR09	MAR02766.009	Sediment	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient
LR10	MAR02766.010	Sediment	25.0	75.0	14.67	83.71	1.62	2.70
		Reference Material (% Recovery)	N/A	N/A	N/A	N/A	N/A	N/A
		QC Blank	N/A	N/A	N/A	N/A	N/A	N/A

* See Report Notes

NAD - No Asbestos Detected

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Test Report ID	MAR02766
Issue Version	1
Customer Reference	Loch Ryan - Marine Scotland Sediment Analysis

		Units	N/A	% M/M
		Method No	SUB_02*	WSLM59*
		Limit of Detection	N/A	0.02
		Accreditation	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Asbestos**	**TOC**
LR01	MAR02766.001	Sediment	NAD	1.29
LR02	MAR02766.002	Sediment	NAD	0.29
LR03	MAR02766.003	Sediment	NAD	0.06
LR04	MAR02766.004	Sediment	NAD	0.05
LR05	MAR02766.005	Sediment	NAD	0.10
LR06	MAR02766.006	Sediment	NAD	0.09
LR07	MAR02766.007	Sediment	NAD	0.14
LR08	MAR02766.008	Sediment	NAD	0.05
LR09	MAR02766.009	Sediment	Insufficient	0.20
LR10	MAR02766.010	Sediment	NAD	0.13
		Reference Material (% Recovery)	N/A	111
		QC Blank	N/A	<0.02

* See Report Notes

NAD - No Asbestos Detected

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 MAR02766
Issue Version 1
Customer Reference Loch Ryan - Marine Scotland Sediment Analysis

		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	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Arsenic**	**Cadmium**	**Chromium**	**Copper**	**Mercury**	**Nickel**	**Lead**	**Zinc**
LR01	MAR02766.001	Sediment	12.6	0.15	67.1	19.9	0.04	83.6	24.1	98.3
LR02	MAR02766.002	Sediment	6.8	0.10	54.8	10.8	<0.01	65.3	6.8	47.8
LR03	MAR02766.003	Sediment	14.8	0.08	77.5	26.3	<0.01	86.0	6.6	74.6
LR04	MAR02766.004	Sediment	6.2	0.10	76.1	82.4	<0.01	74.3	4.9	71.0
LR05	MAR02766.005	Sediment	6.1	0.06	40.0	9.9	<0.01	44.4	5.5	37.8
LR06	MAR02766.006	Sediment	9.0	0.11	67.9	19.2	<0.01	71.4	5.4	54.7
LR07	MAR02766.007	Sediment	6.7	0.11	63.3	18.1	<0.01	70.0	7.6	65.8
LR08	MAR02766.008	Sediment	7.4	0.10	69.2	25.5	<0.01	79.6	5.0	69.6
LR09	MAR02766.009	Sediment	11.4	0.09	58.4	15.8	<0.01	69.2	8.6	54.6
LR10	MAR02766.010	Sediment	10.6	0.06	40.6	6.4	<0.01	42.4	6.2	39.7
Certified Reference Material SETOC 768 (% Recovery)			99	99	94	90	91	96	96	95
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	MAR02766
Issue Version	1
Customer Reference	Loch Ryan - Marine Scotland Sediment Analysis

		Units	µg/Kg (Dry Weight)	
		Method No	ASC/SOP/301	
		Limit of Detection	1	1
		Accreditation	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Dibutyltin (DBT)**	**Tributyltin (TBT)**
LR01	MAR02766.001	Sediment	<5	<5
LR02	MAR02766.002	Sediment	<5	<5
LR03	MAR02766.003	Sediment	<1	<1
LR04	MAR02766.004	Sediment	<1	<1
LR05	MAR02766.005	Sediment	<1	<1
LR06	MAR02766.006	Sediment	<1	<1
LR07	MAR02766.007	Sediment	<1	<1
LR08	MAR02766.008	Sediment	<1	<1
LR10	MAR02766.010	Sediment	<1	<1
Certified Reference Material BCR-646 (% Recovery)			84	85
QC Blank			<1	<1

* See Report Notes

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Test Report ID	MAR02766
Issue Version	1
Customer Reference	Loch Ryan - Marine Scotland Sediment Analysis

		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)
		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
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**ACENAPTH**	**ACENAPHY**	**ANTHRACN**	**BAA**	**BAP**	**BBF**
LR01	MAR02766.001	Sediment	2.86	2.50	4.28	21.1	28.5	28.9
LR02	MAR02766.002	Sediment	<1	<1	<1	1.73	2.36	3.81
LR03	MAR02766.003	Sediment	<1	<1	<1	<1	<1	<1
LR04	MAR02766.004	Sediment	2.36	<1	<1	<1	<1	<1
LR05	MAR02766.005	Sediment	<1	1.59	<1	1.28	8.75	6.52
LR06	MAR02766.006	Sediment	<1	<1	<1	<1	<1	<1
LR07	MAR02766.007	Sediment	<1	<1	<1	2.37	3.00	4.57
LR08	MAR02766.008	Sediment	<1	<1	<1	<1	<1	<1
LR10	MAR02766.010	Sediment	<1	<1	<1	2.62	4.40	4.27
Certified Reference Material Quasimeme SED42 (% Recovery)			34	129	83	91	97	95
QC Blank			<1	<1	<1	<1	<1	<1

For full analyte name see method summaries

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

As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

*See report notes

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 MAR02766
Issue Version 1
Customer Reference Loch Ryan - Marine Scotland Sediment Analysis

		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)
		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
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	N	N	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**BEP**	**BENZGHIP**	**BKF***	**C1N**	**C1PHEN**	**C2N**
LR01	MAR02766.001	Sediment	25.3	29.2	27.4	19.1	34.5	26.2
LR02	MAR02766.002	Sediment	5.17	6.25	2.04	8.73	8.97	9.75
LR03	MAR02766.003	Sediment	<1	<1	<1	<1	<1	<1
LR04	MAR02766.004	Sediment	<1	<1	<1	<1	<1	<1
LR05	MAR02766.005	Sediment	5.72	7.28	5.54	3.24	2.36	3.30
LR06	MAR02766.006	Sediment	<1	<1	<1	2.83	2.06	2.06
LR07	MAR02766.007	Sediment	3.88	3.88	3.78	9.64	5.22	7.79
LR08	MAR02766.008	Sediment	<1	<1	<1	1.27	<1	<1
LR10	MAR02766.010	Sediment	3.21	3.20	3.25	1.75	<1	<1
Certified Reference Material Quasimeme SED42 (% Recovery)			107	112	90	100	78	82
QC Blank			<1	<1	<1	<1	<1	<1

For full analyte name see method summaries
~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.
As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.
*See report notes

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

Test Report ID MAR02766
Issue Version 1
Customer Reference Loch Ryan - Marine Scotland Sediment Analysis

		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)
		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
		Limit of Detection	1	1	1	1	1	1
		Accreditation	N	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**C3N**	**CHRYSENE***	**DBENZAH**	**FLUORANT**	**FLUORENE**	**INDPYR**
LR01	MAR02766.001	Sediment	20.4	24.0	5.77	32.0	4.01	28.7
LR02	MAR02766.002	Sediment	8.04	3.71	<1	2.08	<1	1.80
LR03	MAR02766.003	Sediment	<1	<1	<1	<1	<1	<1
LR04	MAR02766.004	Sediment	<1	<1	<1	<1	<1	<1
LR05	MAR02766.005	Sediment	2.71	1.71	1.57	1.25	<1	7.91
LR06	MAR02766.006	Sediment	1.88	<1	<1	<1	<1	<1
LR07	MAR02766.007	Sediment	6.81	2.90	<1	3.36	<1	3.78
LR08	MAR02766.008	Sediment	<1	<1	<1	<1	<1	<1
LR10	MAR02766.010	Sediment	<1	2.89	<1	2.64	<1	3.16
Certified Reference Material Quasimeme SED42 (% Recovery)			43	101	108	83	64	118
QC Blank			<1	<1	<1	<1	<1	<1

For full analyte name see method summaries
~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.
As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.
*See report notes

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	MAR02766
Issue Version	1
Customer Reference	Loch Ryan - Marine Scotland Sediment Analysis

		Units	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/303/306
		Limit of Detection	1	1	1	1	100
		Accreditation	UKAS	N	UKAS	N*	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**NAPTH**	**PERYLENE**	**PHENANT**	**PYRENE**	**THC**
LR01	MAR02766.001	Sediment	7.00	11.4	15.5	27.3	28100
LR02	MAR02766.002	Sediment	2.40	7.00	7.03	2.79	3620
LR03	MAR02766.003	Sediment	1.23	<1	<1	<1	1970
LR04	MAR02766.004	Sediment	<1	<1	<1	<1	863
LR05	MAR02766.005	Sediment	1.85	3.04	2.19	1.49	4410
LR06	MAR02766.006	Sediment	1.56	<1	1.51	<1	2650
LR07	MAR02766.007	Sediment	3.74	2.62	3.89	3.76	7890
LR08	MAR02766.008	Sediment	1.68	<1	<1	<1	2640
LR10	MAR02766.010	Sediment	<1	1.66	<1	3.23	1790
Certified Reference Material Quasimeme SED42 (% Recovery)			97	95	74	81	92~
QC Blank			<1	<1	<1	<1	<100

For full analyte name see method summaries

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As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

*See report notes

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

Test Report ID	MAR02766
Issue Version	1
Customer Reference	Loch Ryan - Marine Scotland Sediment Analysis

		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)
		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	0.08	0.08	0.08	0.08	0.08	0.08	0.08
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB138**	**PCB153**	**PCB18**
LR01	MAR02766.001	Sediment	<0.08	0.08	0.18	0.17	0.23	0.20	<0.08
LR02	MAR02766.002	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
LR03	MAR02766.003	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
LR04	MAR02766.004	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Certified Reference Material Quasimeme SED28 (% Recovery)			72	107	96	97	79	98	63
QC Blank			<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

For full analyte name see method summaries

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Test Report ID MAR02766
Issue Version 1
Customer Reference Loch Ryan - Marine Scotland Sediment Analysis

		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)
		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	0.08	0.08	0.08	0.08	0.08	0.08	0.08
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB105**	**PCB110**	**PCB128**	**PCB141**	**PCB149**	**PCB151**	**PCB156**
LR01	MAR02766.001	Sediment	<0.08	0.11	0.08	<0.08	0.12	<0.08	<0.08
LR02	MAR02766.002	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
LR03	MAR02766.003	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
LR04	MAR02766.004	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Certified Reference Material Quasimeme SED28 (% Recovery)			99	90	83	88	90	95	63
QC Blank			<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

For full analyte name see method summaries
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Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR02766
Issue Version	1
Customer Reference	Loch Ryan - Marine Scotland Sediment Analysis

		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)
		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	0.08	0.08	0.08	0.08	0.08	0.08	0.08
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB158**	**PCB170**	**PCB180**	**PCB183**	**PCB187**	**PCB194**	**PCB31**
LR01	MAR02766.001	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
LR02	MAR02766.002	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
LR03	MAR02766.003	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
LR04	MAR02766.004	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Certified Reference Material Quasimeme SED28 (% Recovery)			141	80	79	75	79	69	86
QC Blank			<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

For full analyte name see method summaries

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Certificate of Analysis

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Test Report ID	MAR02766
Issue Version	1
Customer Reference	Loch Ryan - Marine Scotland Sediment Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.08	0.08	0.08	0.08	0.56
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB44**	**PCB47**	**PCB49**	**PCB66**	**ICES7**
LR01	MAR02766.001	Sediment	<0.08	<0.08	<0.08	<0.08	0.95
LR02	MAR02766.002	Sediment	<0.08	<0.08	<0.08	<0.08	<0.56
LR03	MAR02766.003	Sediment	<0.08	<0.08	<0.08	<0.08	<0.56
LR04	MAR02766.004	Sediment	<0.08	<0.08	<0.08	<0.08	<0.56
Certified Reference Material Quasimeme SED28 (% Recovery)			82	94	75	92	86~
QC Blank			<0.08	<0.08	<0.08	<0.08	<0.56

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Test Report ID MAR02766
Issue Version 1
Customer Reference Loch Ryan - Marine Scotland Sediment Analysis

		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)
		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	0.08	0.08	0.08	0.08	0.08	0.08	0.08
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB138**	**PCB153**	**PCB18**
LR05	MAR02766.005	Sediment	<0.08	0.09	<0.08	<0.08	<0.08	<0.08	0.14
LR06	MAR02766.006	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
LR07	MAR02766.007	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
LR08	MAR02766.008	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
LR09	MAR02766.009	Sediment	<0.08	<0.08	0.11	<0.08	<0.08	<0.08	<0.08
LR10	MAR02766.010	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Certified Reference Material Quasimeme SED28 (% Recovery)			66	100	92	88	114	80	62
QC Blank			<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

For full analyte name see method summaries
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Test Report ID MAR02766
Issue Version 1
Customer Reference Loch Ryan - Marine Scotland Sediment Analysis

		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)
		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	0.08	0.08	0.08	0.08	0.08	0.08	0.08
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB105**	**PCB110**	**PCB128**	**PCB141**	**PCB149**	**PCB151**	**PCB156**
LR05	MAR02766.005	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
LR06	MAR02766.006	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
LR07	MAR02766.007	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
LR08	MAR02766.008	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
LR09	MAR02766.009	Sediment	<0.08	0.09	<0.08	<0.08	0.13	<0.08	<0.08
LR10	MAR02766.010	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Certified Reference Material Quasimeme SED28 (% Recovery)			91	79	89	83	90	77	68
QC Blank			<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

For full analyte name see method summaries
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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 MAR02766
Issue Version 1
Customer Reference Loch Ryan - Marine Scotland Sediment Analysis

		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)
		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	0.08	0.08	0.08	0.08	0.08	0.08	0.08
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB158**	**PCB170**	**PCB180**	**PCB183**	**PCB187**	**PCB194**	**PCB31**
LR05	MAR02766.005	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
LR06	MAR02766.006	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
LR07	MAR02766.007	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
LR08	MAR02766.008	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
LR09	MAR02766.009	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
LR10	MAR02766.010	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Certified Reference Material Quasimeme SED28 (% Recovery)			111	72	73	70	88	54	73
QC Blank			<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

For full analyte name see method summaries
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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	MAR02766
Issue Version	1
Customer Reference	Loch Ryan - Marine Scotland Sediment Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.08	0.08	0.08	0.08	0.56
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB44**	**PCB47**	**PCB49**	**PCB66**	**ICES7**
LR05	MAR02766.005	Sediment	<0.08	<0.08	<0.08	<0.08	<0.56
LR06	MAR02766.006	Sediment	<0.08	<0.08	<0.08	<0.08	<0.56
LR07	MAR02766.007	Sediment	<0.08	<0.08	<0.08	<0.08	<0.56
LR08	MAR02766.008	Sediment	<0.08	<0.08	<0.08	<0.08	<0.56
LR09	MAR02766.009	Sediment	<0.08	<0.08	<0.08	<0.08	<0.56
LR10	MAR02766.010	Sediment	<0.08	<0.08	<0.08	<0.08	<0.56
Certified Reference Material Quasimeme SED28 (% Recovery)			97	92	79	78	88
QC Blank			<0.08	<0.08	<0.08	<0.08	<0.56

For full analyte name see method summaries

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Certificate of Analysis

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Test Report ID MAR02766
Issue Version 1
Customer Reference Loch Ryan - Marine Scotland Sediment Analysis

		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/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	N*	N*
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**AHCH**	**BHCH**	**GHCH**	**DIELDRIN**	**HCB**	**DDE**	**DDT**	**DDD**
LR01	MAR02766.001	Sediment	<0.1	<0.1	<0.1	0.10	<0.1	<0.1	<0.1	0.20
LR02	MAR02766.002	Sediment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
LR03	MAR02766.003	Sediment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
LR04	MAR02766.004	Sediment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Certified Reference Material Quasimeme SED28 (% Recovery)			101~	102~	94~	77	78	57	50	87
QC Blank			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

For full analyte name see method summaries

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Certificate of Analysis

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Customer Reference Loch Ryan - Marine Scotland Sediment Analysis

		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/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**AHCH**	**BHCH**	**GHCH**	**DIELDRIN**	**HCB**	**DDE**	**DDT**	**DDD**
LR05	MAR02766.005	Sediment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
LR06	MAR02766.006	Sediment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
LR07	MAR02766.007	Sediment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
LR08	MAR02766.008	Sediment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
LR09	MAR02766.009	Sediment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
LR10	MAR02766.010	Sediment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Certified Reference Material Quasimeme SED28 (% Recovery)			98~	84~	98~	63	76	82	45	76
QC Blank			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

For full analyte name see method summaries
~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

Certificate of Analysis

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

Test Report ID MAR02766
Issue Version 1
Customer Reference Loch Ryan - Marine Scotland Sediment Analysis

		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)
		Method No	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308
		Limit of Detection	0.05	0.05	0.05	0.05	0.05	0.05
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PBDE 17**	**PBDE 28**	**PBDE 47**	**PBDE 66**	**PBDE 100**	**PBDE 99**
LR01	MAR02766.001	Sediment	<0.05	<0.05	0.05	<0.05	<0.05	<0.05
LR02	MAR02766.002	Sediment	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
LR03	MAR02766.003	Sediment	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
LR04	MAR02766.004	Sediment	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
LR05	MAR02766.005	Sediment	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
LR06	MAR02766.006	Sediment	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
LR07	MAR02766.007	Sediment	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
LR08	MAR02766.008	Sediment	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
LR09	MAR02766.009	Sediment	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
LR10	MAR02766.010	Sediment	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Certified Reference Material Quasimeme SED56 (% Recovery)			98~	109	111	94~	123	133
QC Blank			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

For full analyte name see method summaries

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

*See report notes

Certificate of Analysis

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

Test Report ID	MAR02766
Issue Version	1
Customer Reference	Loch Ryan - Marine Scotland Sediment Analysis

		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)
		Method No	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308
		Limit of Detection	0.05	0.05	0.05	0.05	0.05	0.1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PBDE 85**	**PBDE 154**	**PBDE 153**	**PBDE 138**	**PBDE 183**	**PBDE 209**
LR01	MAR02766.001	Sediment	<0.05	<0.05	<0.05	<0.05	<0.05	<2
LR02	MAR02766.002	Sediment	<0.05	<0.05	<0.05	<0.05	<0.05	<2
LR03	MAR02766.003	Sediment	<0.05	<0.05	<0.05	<0.05	<0.05	<2
LR04	MAR02766.004	Sediment	<0.05	<0.05	<0.05	<0.05	<0.05	<2
LR05	MAR02766.005	Sediment	<0.05	<0.05	<0.05	<0.05	<0.05	<2
LR06	MAR02766.006	Sediment	<0.05	<0.05	<0.05	<0.05	<0.05	<2
LR07	MAR02766.007	Sediment	<0.05	<0.05	<0.05	<0.05	<0.05	<2
LR08	MAR02766.008	Sediment	<0.05	<0.05	<0.05	<0.05	<0.05	<2
LR09	MAR02766.009	Sediment	<0.05	<0.05	<0.05	<0.05	<0.05	<2
LR10	MAR02766.010	Sediment	<0.05	<0.05	<0.05	<0.05	<0.05	<2
Certified Reference Material Quasimeme SED56 (% Recovery)			98~	111~	295	98~	135	85
QC Blank			<0.05	<0.05	<0.05	<0.05	<0.05	<2*

For full analyte name see method summaries

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

*See report notes

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 MAR02766
Issue Version 1
Customer Reference Loch Ryan - Marine Scotland Sediment Analysis

REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
WSLM59*	MAR02766.001-010	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
ICPMSS*	MAR02766.001-010	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
SUB_01*	MAR02766.001-010	Analysis was conducted by an approved subcontracted laboratory.
SUB_02*	MAR02766.001-010	Analysis was conducted by an approved subcontracted laboratory.
ASC/SOP/301	MAR02766.001-002	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	MAR02766.001-004	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 (DDT, DDD) . These circumstances should be taken into consideration when utilising the data.
ASC/SOP/303/304	MAR02766.001-008, .010	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 (PYRENE) . These circumstances should be taken into consideration when utilising the data.
ASC/SOP/303/304	MAR02766.001-008, .010	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	MAR02766.001-008, .010	Chrysene is known to coelute with Triphenylene and these peaks can not be resolved. Triphenylene may be present in these samples therefore it is suggested that the Chrysene results should be taken as a Chrysene (inc. Triphenylene).This should be taken into consideration when utilising the data.
ASC/SOP/308	MAR02766.001-010	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	N/A	N/A
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

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	MAR02766
Issue Version	1
Customer Reference	Loch Ryan - Marine Scotland Sediment Analysis

Method	Sample and Fraction Size	Method Summary
Total Solids	Wet Sediment	Calculation (100%-Moisture Content).Moisture content determined by drying a portion of the sample at 120°C to constant weight.
Particle Size Analysis	Wet Sediment	Wet and dry sieving followed by laser diffraction analysis.
Total Organic Carbon (TOC)	Air dried and ground	Carbonate removal and sulphurous acid/combustion at 1600°C/NDIR.
Metals	Air dried and seived to <63µm	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	Solvent extraction and clean up followed by GC-FID analysis.
Polychlorinated Biphenyls (PCBs)	Air dried and seived to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.
Organochlorine Pesticides (OCPs)	Air dried and seived to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.
Brominated Flame Retardants (PBDEs)	Air dried and seived 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-Hexachlorcyclohexane
ANTHRACN	Anthracene	CHRYSENE	Chrysene	BHCH	beta-Hexachlorcyclohexane
BAA	Benzo[a]anthracene	DBENZAH	Dibenzo[ah]anthracene	GHCH	gamma-Hexachlorcyclohexane
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	DDD	p,p'-Dichlorodiphenyldichloroethane
BENZGHIP	Benzo[ghi]perylene	NAPTH	Naphthalene	DDE	p,p'-Dichlorodiphenyldichloroethylene
BKF	Benzo[k]fluoranthene	PERYLENE	Perylene	DDT	p,p'-Dichlorodiphenyltrichloroethane
C1N	C1-naphthalenes	PHENANT	Phenanthrene		
C1PHEN	C1-phenanthrene	PYRENE	Pyrene		

B Action Levels

Contaminant	Revised AL1 mg/kg Dry Weight (ppm)	Revised AL2 mg/kg Dry Weight (ppm)
Arsenic (As)	20	70
Cadmium (Cd)	0.4	4
Chromium (Cr)	50	370
Copper (Cu)	30	300
Mercury (Hg)	0.25	1.5
Nickel (Ni)	30	150
Lead (Pb)	50	400
Zinc (Zn)	130	600
Tributyltin	0.1	0.5
Polychlorinated Biphenyls	0.02	0.18
Polyaromatic Hydrocarbons		
Acenaphthene	0.1	
Acenaphthylene	0.1	
Anthracene	0.1	
Fluorene	0.1	
Naphthalene	0.1	
Phenanthrene	0.1	
Benzo[a]anthracene	0.1	
Benzo[b]fluoranthene	0.1	
Benzo[k]fluoranthene	0.1	
Benzo[a]pyrene	0.1	
Benzo[g, h, i]perylene	0.1	
Dibenzo[a,h]anthracene	0.01	
Chrysene	0.1	
Fluoranthene	0.1	
Pyrene	0.1	
Indeno(1,2,3cd)pyrene	0.1	
Total hydrocarbons	100	
Booster Biocide and Brominated Flame Retardants *		

* Provisional Action Levels for these compounds are subject to further investigation.

Source: Marine Scotland (2017). Pre-disposal Sampling Guidance. Version 2 – November 2017.