Dales Voe and Lerwick Harbour North
Best Practicable Environmental Option

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CONTROL SHEET

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EnviroCentre Limited Office Locations:

Glasgow **Edinburgh** **Inverness** **Banchory**

Registered Office: Craighall Business Park 8 Eagle Street Glasgow G4 9XA
Tel 0141 341 5040 info@envirocentre.co.uk www.envirocentre.co.uk

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VAT no. GB 348 6770 57.

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1 INTRODUCTION

1.1 Scope of Report

This Best Practicable Environmental Option report (BPEO) has been prepared by EnviroCentre Ltd in relation to capital dredging works for two sites in the Shetland Isles. One dredge site is located at Dales Voe and the other within Lerwick Harbour. Site works were undertaken at the locations detailed as per the sampling plan EnviroCentre Report 14173, May 2024.

The proposed dredging works are driven entirely by an urgent need to improve navigational safety through the harbour due to ever increasing vessel size and number being experienced in the port.

The purpose of this report is to review each of the available potential disposal options for the dredged materials. The options which are not considered to be practicable are rejected and the reasons for doing so are explained.

Those options which are practicable are examined in detail and assessed against the following considerations:

- Environmental;
- Strategic; and
- Cost.

The report then compares the practicable disposal options and draws a conclusion on the BPEO.

1.2 Action Levels – AL1 vs AL2

Two action levels are currently used to assess the suitability of sea-based disposal of dredged sediment material: Revised Action Level 1 (RAL1) and Revised Action Level 2 (RAL2).

Sediment with contaminant concentrations below RAL1 is generally considered to be below background levels for contamination and is suitable for disposal at sea.

For samples recording contaminant concentrations between RAL1 and RAL2, additional risk assessment may be required including further sampling and testing to fully identify pockets of contamination or implementation of bioassays to assess the materials suitability for sea disposal.

Material recording contaminant concentrations above RAL2 is generally considered to be unsuitable for disposal to sea. If the sea disposal route is to be pursued, further testing along the lines of bioassay accompanied by a robust justification for selecting sea disposal as the BPEO may be required. This would need to be supported further with additional information regarding any mitigation measures which could be put in place as part of these works. This would require further discussion and agreement with Marine Directorate.

1.3 Site Background Information

Both of the sites are located on the east coast of Shetland with one site located within Lerwick Harbour and the site at Dales Voe. Both sites are operational harbour area under Lerwick Port Authority jurisdiction.

1.3.1 Ground Conditions

Review of available published bathymetric information at the two dredge sites[1] indicates the material summarised in the following sections is present at both sites. Whilst the data is fairly low-resolution data, it provides confirmation of ground conditions encountered as well as high level information on the wider area.

Lerwick Harbour

Large areas of rock, stone, sand and shells are present. The scour hole from the ferry terminal is clear on the chart and there is a notable absence of areas denoted as mud.

Anecdotal evidence from the skipper of the work boat indicated that the area in Lerwick Harbour was hard and that there were many rocky outcrops.

Dales Voe

Rock is noted to be present close to shore with sand/mud highlighted as being further out from the shoreline.

Review of the shoreline from Google Earth at both the Dales Voe site and Lerwick Harbour site indicates both rocky outcrops and prevalence of rocky foreshores indicative of the strata beneath.

Historic Site Investigation Information

Historic site investigation undertaken in 2013/14[2] associated with other developments concluded the following from bedrock drilling works to inform pile design:

Holmsgarth North (Lerwick Harbour) - …*variable thickness of Recent Deposits comprising medium dense and dense shelly sands and gravels resting on a discontinuous layer of possibly weathered sandstone (very dense sands and gravels), which in turn rests on sandstone bedrock*.

Dales Voe - .. *variable thickness of Recent Deposits comprising possibly medium dense, locally shelly, sands and gravels resting on phyllite bedrock. A 1.10m thick layer of Glacigenic Deposits was encountered in Borehole BH3.104 at a depth of 1.00m bsl. A thin band of possibly weathered phyllite was noted by the driller in Borehole BH3.103 at a depth of 1.00m bsl.*

1.3.2 Contamination Sources

Both sites are located within areas of either no or very limited industry, and as such significant sources of contamination are not considered to be present.

[1] https://fishing-app.gpsnauticalcharts.com/i-boating-fishing-web-app/fishing-marine-charts-navigation.html?title=Shetland+Islands+-+Lerwick+Harbour+and+Approaches+boating+app#14.64/60.1633/-1.1569

[2] LPA, Final Interpretative Report on Ground Investigation, N142004U, July 2014

Both sites are coastal, and not subject to significant sediment influx from riverine systems which can transport contaminants from all areas of the catchment including from industry, agriculture and urban run.

The potential sources at Dales Voe are limited due to the remote nature of the site with only the existing pier and quay present for vessel berthing.

Sources at Lerwick Harbour are considered largely to be associated with the various boats and ships which utilise the harbour area.

1.3.3 Historic Sampling

Historic sampling has been undertaken at each of the sites in 2017 by EnviroCentre with available data summarised below.

Lerwick Harbour

2017 – 13 Grab Samples

- Sampling encountered extensive kelp beds, rock and large cobbles within the sample areas in the wider Harbour area.
- Areas where samples were recovered were classified as being fine to coarse sand.
- Samples recorded exceedance of Revised Action Level 1 for metals, TBT and PAH species.
- No exceedances of Revised Action Level 2 were recorded.

2013 – 6 Samples Holmsgarth North

- 5 surface samples (0-0.5m) and one deep sample (3-3.5m) were tested.
- Of the 6 samples tested 2 samples recorded exceedances of Revised Action Level 1 for various metals with all other analytes recorded below Revised Action Level 1.
- No exceedances of Revised Action Level 2 were recorded.

Dales Voe

2017 – 3 Grabs Samples

- No material could be recovered in grab samples due to scour next to jetty.
- Areas where samples were recovered were classified as being fine to coarse sand.
- 1 sample recorded metals over Revised Action Level 1.
- No exceedances of Revised Action Level 2 were recorded.

2013 – 6 Samples Dales Voe

- 6 surface samples (0-0.5m) were collected from the Dales Voe site.
- 5 of 6 samples exceeded Revised Action Level 1 for various metals.
- No other contaminants of concern were recorded for contaminants of concern above Revised Action Level 1
- No exceedances of Revised Action Level 2 were recorded

Review of historic sample information indicates that low levels of contaminants are present and not wide spread within the areas of interest.

Considering the location of the sites, the lack of continuous input of sediments on a catchment scale, limited industry and prevailing sediment type (sand, gravel cobbles and rock), the sites are considered to be low risk for potential contamination.

The site at Lerwick Harbour is also considered to have limited potential for significant sediment accumulation because of marine traffic scouring the area as evidenced in available maps and the most recent bathymetric charts.

1.4 Report Usage

The information and recommendations contained within this report have been prepared in the specific context stated above and should not be utilised in any other context without prior written permission from EnviroCentre Limited.

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2 SAMPLING LOCATIONS AND METHODOLOGY

Sediment sampling was undertaken in May 2024. The following section details the sampling methodology used to retrieve sediment samples. Works were undertaken in line with the Sampling Plan agreed with Marine Directorate Licencing Operations Team (EnviroCentre Document No. 14173, dated 08/05/2024),

The dredge areas and proposed volumes are detailed in the tables below and locations detailed in drawings Drawings 679749-GIS003 and Drawings 679749-GIS004.

Table 2-1: Summary of Dredge Volumes and Depths - Dales Voe

Dredge Area	Dredge Volume (m^3)	Target Dredge Depth (m below Chart Datum)
Dales Voe	88,755	Part -16, part -14.5 & part -12.5

Table 2-2 Summary of Dredge Volumes and Depths – Lerwick Harbour

Dredge Area	Dredge Volume (m^3)	Target Dredge Depth (m below Chart Datum)
Holmsgarth -7m CD	11,450	-7.0
Holmsgarth -10m CD	225,050	-10.0
Holmsgarth -10.5m CD		-10.5
Mair's Pier South	200	-8.0
Heogan Tuning Circle	34,100	-9.0
North Ness Channel	30,350	-10.0
Lerwick Harbour Total Volume	**301,150**	

In addition to the samples collected at the dredge sites, 3 samples were collected at the closest sea deposit site Lerwick FI080 to establish baseline conditions at the candidate deposit site.

2.1 Sample Locations

Sediment samples were collected from a total of 19 locations across the two dredge areas. Sample locations and dredge areas are detailed in Drawings 679749-GIS003 and Drawings 679749-GIS004 in Appendix A.

2.2 Sample Collection

Grab samples were collected using a 0.045m^2 stainless steel van veen grab which was emptied into a plastic bucket for logging and sub sampling following best practice.

Core Samples were collected using a vibrocorer unit with interchangeable aluminium core barrels.

Sample logs are provided in Appendix B.

2.3 Field Information

The following field data was recorded for each sample obtained:

- A unique sample ID;
- Sample location;
- Sample coordinate in latitude and longitude in degrees, minutes and decimals of minutes;
- Date, time and depth of collection;
- Sampler's ID;
- Sediment description;
- Sample photographs; and,
- Details of any deviation from sampling protocol.

2.4 Analysis Requirements

The laboratory analysis undertaken as part of this assessment was as follows:

- Metals - Arsenic, Chromium, Cadmium, Copper, Mercury, Nickel, Lead, Zinc;
- Organotins - Tributyl Tin (TBT) & Dibutyl Tin (DBT);
- Polycyclic Aromatic Hydrocarbons (PAH USEPA 16);
- Polychlorinated Biphenyls (PCB ICES 7);
- Total Hydrocarbons (THC);
- Moisture Content;
- Particle Size Analysis (PSA);
- Total Organic Carbon (TOC); and
- Asbestos (presence/absence).

Samples were dispatched to Socotec's Marine Laboratory for analysis, which holds UKAS accreditation for analysis of marine sediment samples.

2.5 Deviations from the Sampling Plan

Core sampling across both sites had limited success due to the prevailing ground conditions with limited core recovery at each proposed core location. Due to this, grab samples were collected at each location for analysis to ensure sufficient material for analysis. The longest cores from each location have been retained and frozen.

Following dialogue with the Marine Directorate following the initial BPEO submission, frozen core samples were defrosted, sub-sampled and submitted for analysis in September 2024. Due to the limited volumes of material recovered and submitted for analysis, chemical parameters were prioritised for analysis (i.e. particle size and asbestos were not analysed) with the focus on analytes with a corresponding action level(s).

The challenging ground conditions for sampling were also reflected in many locations with multiple grab recoveries required to collect sufficient material for testing.

No laboratory analysis was possible in the material recovered from the grab sampler at sample station 24-11 at Lerwick North Harbour. Sediment recovered comprised cobbles and a small quantity of coarse gravel and shell fragments. Given that material greater than 2mm in size is excluded from the

sample preparation process makes this sample unsuitable for analysis, and therefore there is no corresponding sample data.

Anecdotal evidence from the skipper of the work boat indicated that the area in Lerwick Harbour was hard and that there were many rocky outcrops. The areas sampled have also been subject to historic dredging activity which has deepened the area to accommodate vessels removing the upper layers and further exposing the natural deposits below.

Review of the shoreline from Google Earth at both the Dales Voe site and Lerwick Harbour site indicates both rocky outcrops and prevalence of rocky foreshores indicative of the strata beneath.

The other consideration for the site, especially at Lerwick Harbour is the presence of regular vessels transiting in and out of the harbour and the effects of ship-propeller wash leading to scouring.

We have encountered similar ground conditions at other ferry terminals including Ullapool and Ardrossan, where there is very limited fine material present with either bedrock, boulders, cobbles or hard consolidated residual sea bed material which is resistant to the effects of scour from ship-propeller wash. The net effect of this means that limited deposition can occur within these areas, and that disturbed material will deposit within areas of lower energy.

2.6 Ground Conditions

Sample Logs are provided in Appendix B

2.6.1 Dales Voe

Samples from across the Dales Voe site were fairly consistent with a mixture of gravelly sand and shell fragments recovered from each location. Multiple grab samples were needed at several locations due to the presence of dense sands yielding very limited volumes at each deployment.

Core penetration was limited due to the presence very dense layers with core recovery ranging from 0.20m to 0.37m. The majority of cores returned very dense dry sand at the end of the core on recovery.

2.6.2 Lerwick North Harbour

Samples collected at Lerwick North Harbour site returned a mixture of silty sand, gravelly sand and cobbles.

Core penetration was limited due to the presence very dense layers with core recovery ranging from 0.28m to 0.7m. The majority of cores returned very dense dry sand at the end of the core on recovery.

3 RESULTS

All chemical analytical results were assessed against Revised Action Levels (RAL) criteria as adopted by Marine Directorate. The results are summarised in sections below with the Summary Tables provided in Appendix C. Completed data sheets in the MDLOT format accompany the wider application.

Please note that there is a formatting issue in the sheet which incorrectly highlights samples with results in exceedance of RAL2. This is noted where samples have a "<" denoting less than the limit of detection. So while the sheet indicates there is a breach of RAL2, there are no RAL2 exceedances with samples being below detectable limits where a "<" is denoted unless otherwise specified.

Where contaminants have RALs as adopted by Marine Directorate, recorded exceedances above these criteria are summarised in Table 3-1 and Table 3-2.

All chemical data is reported and assessed on a dry weight basis.

Further consideration of these exceedances undertaken in Section 4.

3.1 Dales Voe

Table 3-1: Exceedances of Revised Action Levels - Dales Voe

Contaminant	No. of Exceedances (of 11 samples)	
	RAL 1	RAL 2
Lead	1	-
PAH (All Species Maximum)	1	-
PCBs	1	-

Two samples recorded exceedances of RAL1 criteria for at least one parameter at the Dales Voe Site, however no exceedances were recorded for RAL2. Both exceeding samples were collected from location 24-DV-04. The RAL1 exceedance for PCBs is considered to be marginal (recorded concentration of 0.02171 mg/kg vs. RAL1 of 0.02 mg/kg).

3.2 Lerwick North Harbour

Table 3-2: Exceedances of Revised Action Levels - Lerwick Harbour

Contaminant	No. of Exceedances (of 20 samples)	
	RAL 1	RAL 2
Cadmium	1	0
Copper	3	0
Lead	4	0
Mercury	1	0
Nickel	1	0
Zinc	2	0
PAH (All Species)	14	-

Contaminant	No. of Exceedances (of 20 samples)	
	RAL 1	RAL 2
TBT	1	0
THC	8	-

17 samples recorded exceedances of various RAL1 criteria for the Lerwick Harbour Site, however no exceedances were recorded for RAL2.

3.3 Asbestos

Asbestos was not detected in any of the samples analysed for either of the sites.

3.4 Particle Size Distribution and Organic Carbon

Sample logs are present in Appendix B

3.4.1 Dales Voe

Samples from Dales Voe were noted to be largely either sand (23% to 92%) or gravel sized (2% to 37%) fractions with limited silt fractions recorded. Silt sized particles ranged from 2% to 12 % in samples submitted for analysis.

Total organic carbon content of samples is also generally very low within the samples ranging from 0.35% to 0.75%

3.4.2 Lerwick North Harbour

Samples from Lerwick North Harbour were noted to be largely either sand (25% to 79%) or silt (6% to 42%). Gravel sized material ranged from 1% to 69% in samples submitted for analysis.

Total organic carbon content of samples is also generally very low within the samples ranging from 0.28% to 11%

4 DISCUSSION OF AVAILABLE DISPOSAL OPTIONS

The BPEO process is geared towards identifying a preferred overall strategy from the perspective of the environment as a whole, as opposed to detailed optimisation of any one selected scheme. It is a structured and systematic process to identify and compare strategic options in a transparent manner. Alternatives are evaluated in terms of their projected implications for the environment together with consideration of practicability, social and economic issues as well as within a wider strategic context.

The key stages of a BPEO are:

- Identification of options;
- Screening of options;
- Selection of assessment criteria;
- Analysis and evaluation of criteria; and
- Evaluation of BPEO.

Further details on methodology are provided within each section.

4.1 Identification and Screening of Available Disposal Options

A number of options are available for disposal of dredged sediments. The options considered are provided in Table 4-1 along with justification for screening out those options which have not been taken forward for further consideration.

Table 4-1: Initial Best Practicable Available Options

Location	Options	Screening Assessment	Carry forward?
Harbour/ Coast	Leave in situ	Not an option due to the project specific requirements to deepen the approaches to accommodate larger vessels at both sites.	No
	Infilling of an existing dry dock/harbour facility/development site (beneficial re-use)	The proposed dredging works are driven entirely by an urgent need to improve navigational safety through the harbour due to ever increasing vessel size and number being experienced in the port. As a result, there is no land based development which may be able to accommodate the reuse of material either within reasonable sailing distance of the dredge sites or within the timeframes available to deliver this element of the project.	No
	Beach Nourishment	The material sampled is of variable composition including silt, sand, and rock of variable sizes. This type of material is not typically used for beach nourishment projects.	No

Location	Options	Screening Assessment	Carry forward?
Land	Landfill Disposal	This is possible but it is unlikely that this option will offer long term solution due to lack of space at landfills. Landfill space is currently at a premium and does not offer a sustainable solution either financially or environmentally for the disposal of dredged arisings. Dredged material is likely to require treatment first in a dewatering facility. Significant cost associated with set up of dewatering facility at the quayside plus transportation and additional costs associated with gaining the necessary planning and regulatory consents. The closest landfill, Gremista Landfill, is operated by Shetland Islands Council. This site is used for the disposal of material which cannot be either recycled or burned in the energy recovery plant. The site currently takes in c. 14,500 tonnes of waste a year[3] and is due to have an extension created to extend its life. The proposed volume of dredged material would account for several years capacity and as space is at a premium, it is considered unlikely that this would be accepted by the landfill operator. The only other alternative for the local landfill is to ship waste to the Scottish mainland which would incur significant additional costs.	No
	Land Incineration	The dredged material consists of non-combustible material (sands, gravels, shells) with a low combustible component and very high-water content. This makes it unsuitable for treatment/disposal by this route.	No
	Application to Agricultural Land	The dredged material would need to be treated to reduce salt concentrations to acceptable levels. Would require detailed chemical analysis and assessment as well as a Waste Management License Exemption. Would require special precautions during spreading in relation to the risk of odour and watercourses / aquifers. The availability of land for this option will be limited within a reasonable haulage distance of the dredge arisings. Large volumes are unlikely to be viable to dispose of in this manner and would potentially have a detrimental effect on existing terrestrial habitats.	No

[3] https://www.shetnews.co.uk/2023/09/18/extension-planned-to-give-shetland-landfill-another-15-years/

Location	Options	Screening Assessment	Carry forward?
	Recycling	Recycling of dredged material is theoretically possible, however, due to the varied lithology there would need to be either segregation during dredging works to minimise the entrainment of fine-grained material into the sands, or energy and water rich processing on land. This is not currently understood to be an established disposal and reuse route locally at present and is not likely to be something which could be established in the project timeframes due to the requirement for various permitting requirements including waste management licencing, discharge consents for process water as well as increased road transportation for delivery of waste material and collection of processed material.	No
Sea	Aquatic disposal direct to seabed.	Relatively low cost, minimal transportation requirements compared to all other options and potential for low environmental risk. The closest open disposal site Lerwick (FI080) is located approximately 4 km from the proposed dredge sites.	Yes

4.2 Summary of Identified BPEO Options

Following review of the available options and due to the remote location of the dredge site, the only viable option identified is considered to be sea disposal.

4.2.1 Sea Disposal

This option handles material in a single stage namely transport to the disposal site. The existing closest licensed disposal Lerwick (FI080) site is c. 4km from each of the dredge sites approximately 360m north of Bressay It is located in naturally deep water with ease of access, has a large capacity with a footprint of 145,000m^2 in 30m of water and is anticipated to be active for the foreseeable future.

As no other viable disposal or reuse options have been identified for the dredged material, no further screening or assessment of options will be undertaken.

5 FURTHER ASSESSMENT

As detailed in Section 1, on the basis of the exceedances of Action Level 1, further assessment to determine the suitability of the material for sea disposal is deemed a requirement.

The approach for this further assessment is outlined as follows:

- Provide an overview of the proposed dredge works and the identified disposal site including existing chemical monitoring data for the site where available; and
- Compare existing chemical data with other recognised sediment assessment criteria including those listed below. Summary tables are provided in Appendix C.

Background Assessment Concentration (BAC) - BACs were developed by the OSPAR Commission (OSPAR) for testing whether concentrations are near background levels. Mean concentrations significantly below the BAC are said to be near background. However, it should be noted that river catchments have their own unique geochemical finger prints and are also governed by the geology within the catchment, so in theory one set of background level values is not applicable to all situations;

Effects Range Low (ERL) - ERLs were developed by the United States Environmental Protection Agency (USEPA) for assessing the ecological significance of sediment concentrations. Concentrations below the ERL rarely cause adverse effects in marine organisms. Concentrations above the ERL will often cause adverse effects in some marine organisms;

Probable Effects Level (PEL) – PELs (Marine) have been adopted from the Canadian Environmental Quality Guidelines http://www.ccme.ca/en/resources/canadian_environmental_quality_guidelines/) If a concentration is recorded above the PEL this is the probable effect range within which adverse effects frequently occur. The Threshold Effect levels (TELs) have been included in the summary tables in Appendix C but have not been used as part of the further assessment as they typically fall below the RAL1.

Review of potential risks to the list of receptors identified in “Water Framework Directive Assessment: estuarine and coastal waters (https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters) to draw conclusions from available information and provide recommendation for proposed disposal routes.

5.1 Background Data – Dredge and Disposal Site

As part of the sediment sampling works, 3 grab samples were also collected from the disposal site to provide some current sediment quality data. The results are provided in Appendix C.

In summary, the material at the disposal site can be described as being variable with a mixture of silty sand and gravel at sample location 1 and 2, and predominately gravel at sample site 3.

Chemical analysis of the samples did not record any elevated levels of contamination (all below RAL1 for comparative purposes) with one sample recording an elevated level of Hydrocarbons which exceeded RAL1 (Sample 3).

5.2 Analytical Data Review

Existing analytical data for the proposed dredge site is provided in Summary Tables A and B in Appendix C. This data has been summarised against RAL 1 & 2, the BAC, ERL and PEL. As detailed previously, the data has not been reviewed against the Canadian TEL as these numbers are typically lower than RAL1.

The exceedances for both sites are summarised below:

Table 5-1: Exceedances of Revised Action Levels

Contaminant	No. of Exceedances (of 11 samples)	
	RAL 1	RAL 2
Lead	1	-
PAH (All Species Maximum)	1	-
PCBs	1	-

Two samples recorded exceedances of RAL1 criteria for at least one parameter at the Dales Voe Site, however no exceedances were recorded for RAL2. Both exceeding samples were collected from location 24-DV-04. The RAL1 exceedance for PCBs is considered to be marginal (recorded concentration of 0.02171 mg/kg vs. RAL1 of 0.02 mg/kg).

Table 5-2: Exceedances of Revised Action Levels - Lerwick Harbour

Contaminant	No. of Exceedances (of 20 samples)	
	RAL 1	RAL 2
Cadmium	1	0
Copper	3	0
Lead	4	0
Mercury	1	0
Nickel	1	0
Zinc	2	0
PAH (All Species)	14	-
TBT	1	0
THC	8	-

17 samples recorded exceedances of various RAL1 criteria for the Lerwick Harbour Site, however no exceedances were recorded for RAL2.

5.2.1 ERL & PEL Review

Exceedances of the ERL and PEL (where one is available) is summarised in Table 5-3 Full summary tables are provided in Table A & B in Appendix C : Note any contaminant of concern with N/A indicates no corresponding ERL or PEL value currently available.

Table 5-3: Exceedances of ERL and PEL – Dales Voe

Contaminant	No. of Exceedances (of 11 samples)	
	ERL	PEL
Lead	1	0
PAH (Phenanthrene)	1	0

Table 5-4: Exceedances of ERL and PEL – Lerwick North Harbour

Contaminant	No. of Exceedances (of 20 samples)	
	ERL	PEL
Copper	2	0
Lead	4	0
Mercury	4	0
Zinc	1	1
PAH (All Species Maximum)	10	1

5.3 Averages

Review of the averaged data for all the data has been undertaken i.e. considering the material as a single volume for disposal. The concentrations of the various contaminants of concern are quite variable, the review of average data against the available adopted assessment criteria are as follows:

- Dales Voe – No average concentrations exceed RAL1, ERL or PEL for the samples from the Dales Voe site.

Table 5-5: Exceedances (Averages) of ERL and PEL – Lerwick North Harbour

Contaminant	Do Average Concentrations exceed?		
	RAL1	ERL	PEL
Copper	No	No	No
Lead	No	No	No
Mercury	No	No	No
Zinc	No	No	No
PAH	Yes	Yes*	No

*Note –ERL is lower than RAL1 for this species of PAH.

- All samples recorded averaged concentrations below RAL2 where they exist.

5.4 Chemical Assessment Conclusions

Two individual samples, both located at 24-DV-04, recorded exceedances of RAL1 in samples from Dales Voe. Up to 17 individual samples recorded RAL1 exceedances at the Lerwick North Harbour Site.

However, when the averaged data is considered, which is representative of all contaminants of concern in all of the material proposed to be disposed of, there are no exceedances of the ERL or PEL recorded for both sites with the exception of 1 PAH species. It should be noted that the ERL for benzo(ghi)perylene is lower than RAL1.

No exceedances of RAL2 at either of the sites were recorded.

The generally low levels of contaminants present reflect both the sediment types at the sample sites as well as the relatively low source potential in the surrounding areas and lack of sediment input from fluvial sources and are consistent with historic sampling campaigns with no samples recorded above RAL2.

5.5 Water Framework Directive Assessment

As outlined in the Water Framework Directive Assessment: estuarine and coastal waters, there are several key receptors which can be impacted upon including the following:

- Hydromorphology
- Biology – habitats
- Biology – fish
- Water quality
- Protected areas

Each of these points are considered in Table 5-6 below:

Table 5-6: Receptor Risk Assessment

Key Receptor[4]	Brief Summary of Potential Effects on Receptor	Further Consideration Required?	Comment
Hydromorphology (Source Area and Disposal Site)	Morphological conditions, for example depth variation, the seabed and intertidal zone structure tidal patterns, for example dominant currents, freshwater flow and wave exposure	No	The areas proposed to be dredged are for the purpose of deepening the existing approaches. The dredge site within Lerwick Harbour is located within the Bressay Sound waterbody which has an overall status of good for hydromorphology. The dredge site at Dales Voe is located within the Dales Voe (South Mainland) waterbody which has an overall status of High for hydromorphology. The disposal site is located within the Keen to Isle of waterbody which has an overall status of High for hydromorphology. The scale of proposed works, current activities undertaken in these locations are not considered to have the potential to change the current hydromorphological status of these waterbodies.
Biology - habitats	Included to assess potential impacts to sensitive/high value habitats.	No	No Habitats Directive Annex I habitats have been identified for the dredge or disposal sites.
Biology – fish	Consideration of fish both within the estuary and also potential effects on migratory fish in transit through the estuary	No	All three sites are located out with estuary waters.

[4] https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters

Key Receptor[4]	Brief Summary of Potential Effects on Receptor	Further Consideration Required?	Comment
Water Quality	Consideration must be given to water quality when contaminants are present in exceedance of CEFAS RAL1.	Yes	Exceedances of RAL1 were recorded at both sites albeit the Dales Voe site recorded one minor exceedance for 1 species of PAH. Water quality is noted as good at both sites for records for 2022 on the Marine Directorate NMPI Interactive viewer[5]. Further consideration of the implications of these are detailed in section 5.6 Potential Risk to Water Quality .

[5] https://marinescotland.atkinsgeospatial.com/nmpi/

Key Receptor[4]	Brief Summary of Potential Effects on Receptor	Further Consideration Required?	Comment
Protected Areas	If your activity is within 2km of any WFD protected area, include each identified area in your impact assessment. • special areas of conservation (SAC) • special protection areas (SPA) • shellfish waters • bathing waters • nutrient sensitive areas	Yes	The Dales Voe site and Lerwick Disposal site are located within the East Mainland Coast, Shetland SPA. There are no bathing waters within 2Km of the dredge or disposal sites. Dales Voe site is within 2km of shellfish protected waters. Lerwick harbour Dredge Site and the disposal site are over 2km from shellfish protected waters. There is a Blue Mussel farm located in Dales Voe south west of the dredge site. The East Mainland Coast, Shetland SPA qualifying interests[6] include Annex 1 species: great northern diver *Gavia immer* (a mean peak annual non-breeding population of 182 individuals (7.3% of the Great Britain (GB) population) for the years 2007/08 to 2009/10) and Slavonian grebe *Podiceps auritus* (a mean peak annual non-breeding population of 54 individuals (4.9% of the GB population) for the years 2006/07 to 2010/11). The site also qualifies under Article 4.1 by regularly supporting a population of European importance of the Annex 1 species red-throated diver *Gavia stellata* during the breeding season. The foraging area is available to 205 pairs of birds breeding on the nearby islands (15.8% of the GB population in 2006). It is considered that the proposed activities are unlikely to have a significant effect on the status of the SPA as vessel movements are common occurrence at both the dredge sites. A habitat regulations assessment (HRA) has been undertaken for each site and have both concluded no likely significant effect from the proposed works.

5.6 Potential Risk to Water Quality

The potential risks to water quality at the dredge sites and disposal site are further considered as all other receptors have been screened out of the assessment.

SEPA classified the coastal water at the dredge sites and the area of the disposal ground as "good" 2022[7].

Although there are contaminants of concern above the RAL1 within the sediment for disposal, it is considered that these levels will not contribute to an overall degradation of water quality in proximity to the disposal site. While any effects are considered to be both localised and temporary, the potential for dilution is considerable when comparing the size of disposal site in relation to the marine environment.

When the sediment results are reviewed as an average to assess the sediment mass as a single unit for disposal there are exceedances for RAL1 for various PAH species at the Lerwick North Harbour site only. One exceedance of the ERL was recorded in the averaged concentrations for benzo(ghi)perylene only. It should however be noted that the adopted ERL for this parameter is noted to be lower than RAL1. All averaged concentrations were recorded below both the PEL and RAL2. On this basis the risks from the sediment are considered to be low.

The key contaminants for impacting water quality are considered to be metals as these have the potential to dissolve/desorb from sorption sites, whereas the organic contaminants (e.g. PAHs and PCBs) have a greater affinity for the organic materials which they are bound to, and are more likely to remain strongly bound to the sediment, or if become dissolved, quickly adsorbed onto organic matter within the water column or sediments.

The key overall risk is considered to be an increase in turbidity/suspended solids during the disposal activity, although this is likely to cause localised degradation in water quality, it is considered that this will be a local and temporary event and has been factored into the selection and location of the agreed disposal ground. Finally, the material sampled in the most recent campaign is similar in chemical nature to material previously deposited under licence.

Average particle sizes are presented in Table 5-7 for each dredge area.

Table 5-7: Average particle size by dredge area

Dredge Area	Estimated Dredge Volume (m^3)	Average % Gravel	Average % Sand	Average % Silt
Dales Voe	88,755	23.8	69.6	6.6
Lerwick Harbour North	301,150	13.5	61.9	24.6

The disposal site is a sacrificial disposal ground with a large footprint and as such there is an allowance for some lateral dispersal of materials within the area of disposal over time due to sites typically being dispersive, rather than retentive.

[7] https://map.environment.gov.scot/sewebmap/

The dominant sediment type across the majority of the dredge areas is sand, with a higher proportion of gravel at Dales Voe and higher overall proportion of silt at Lerwick Harbour which reflect the different types of energy environment which these sites represent. Lerwick is more sheltered, so naturally has a higher silt fraction in areas.

Given that the majority of material at both dredge sites comprises sand and gravel, it is considered that the majority of the deposited sediment will fall out of suspension quickly at the disposal site with limited lateral spread. Material from Lerwick Harbour will naturally have a longer suspension potential due to higher silt/fines content.

It is noted that the Lerwick disposal grounds have been utilised for historic dredge spoil disposal and water quality classification for chemical status of the waterbody which accommodates the disposal grounds is currently noted as “good”.

On this basis, the associated risk with degradation of water quality directly associated with the proposed disposal is considered to be Low i.e. unlikely to cause a change in status of the waterbodies in question at both the dredge and disposal sites.

5.7 Discussion and Conclusions

Assessment of recent sampling data including sediment logs and analytical results has concluded that although several contaminants of concern exceed RAL1 in sediment samples at the Lerwick Harbour Dales Voe sites, assessment of key receptors identified from the Water Framework Directive assessment for estuarine and coastal waters concluded that there is a low risk of the sediments impacting upon the overall ecological or chemical status classifications.

Additionally, the contaminants of concern levels recorded in the sediment are not considered likely to have a significant adverse impact once placed within the disposal site.

Sampling at the two sites had limited success recovering samples at depth due to the presence of hard substrate, cobbles, boulders as well as rocky outcrops in the area at surface. It should be noted that that the two sites are relatively high energy environments as a result of their natural location in Dales Voe’s instance and/ or the presence of significant marine traffic in Lerwick Harbour’s case. This results in scour in the areas of interest which limits significant deposition and accrual of sediments and potential contaminants. The dominant grain sizes at both sites were sand and gravel, with cobbles and shells found during sampling at surface at several locations.

Core sampling to target depth at all sites was hindered by the presence of hard layers at shallow depths with the range of depths recorded as follows:

- Dales Voe – 0.22m-0.37m
- Lerwick Harbour North –0.28m to 0.7m

The depth of refusal is considered to be the interface between the unconsolidated more mobile layer of sediment, and rock (shallow outcrops, boulders cobbles) or consolidated natural undisturbed deposits including historic dredge level. The unconsolidated layer thicknesses encountered are considered to be an indicator of sediment accumulation within the dredge areas i.e. low accumulation rates.

The upper unconsolidated layer is considered to be more mobile and has the highest risk of becoming contaminated through human activity and is considered to represent the worst case scenario in terms of contamination risk.

The consolidated layers at depth are considered to represent the natural deposits with any potential contamination present being a result of elevated natural contaminations in the geological source of the material.

Very limited evidence of anthropogenic contamination (TBT and PCBs) has been recorded across both sites with one marginal exceedance of RAL1 recorded for TBT at Lerwick Harbour and for PCBs at Dales Voe.

PAHs, which are both naturally occurring and can be a result of human activity i.e. poor combustion of hydrocarbons etc, were recorded more frequently within Lerwick Harbour (14 samples) than at the Dales Voe site (1 Sample), but generally present at levels which are typically approved for sea disposal. The reason for their presence in Lerwick Harbour is most likely due to a higher proportion of fine grained (clay and silt sized particles) and higher organic carbon content within the samples collected in Lerwick Harbour which tends to adsorb contaminants to a much higher degree than sand.

Metals can be both naturally occurring (i.e. within natural mineral bearing strata) and be released as a result of human activity (i.e. paint pigments, batteries, metal plating etc). The higher levels recorded in Lerwick Harbour are considered likely to be associated with the presence of higher silt fraction and organic carbon in some of the more sheltered areas. The coarser grained sand and gravel samples recovered at both sites are noted to largely be free from metal concentrations with respect to exceedance of RAL1.

This would indicate that the natural deposits of sand that were sampled and analysed at interface of the unconsolidated and consolidated layers are considered to be representative of the natural deposits of material that will extend beneath this sampling depth (i.e. the investigation has not identified evidence of naturally occurring contamination and the potential for anthropogenic contamination being present at depth is considered negligible).

Overall, based on the multiple lines of evidence approach adopted to further assess the exceedances identified in the sediment assessment and lack of alternative suitable disposal or reuse options, the recommendation for sea disposal is considered to be the BPEO for the proposed dredge works at Lerwick North Harbour and Dales Voe.

REFERENCES

Marine Scotland (2017). *Pre-Dredge Sampling Guidance Version 2*: Scottish Government.

Marine Scotland (2015). *Guidance for Marine Licence Applicants Version 2*: Scottish Government.

APPENDICES

A FIGURES

445500

446000

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1145500

24-DV-07

24-DV-06

24-DV-03

24-DV-04

24-DV-01

24-DV-02A

24-DV-05

Legend

Sample Stations

Dredge Areas

Dales Voe -15.5m CD

Future UDWQ -16m CD

Do not scale this map

Client
Lerwick Port Authority

Project
Dales Voe Sediment Sampling

Title
Sample Station Locations
May 2024

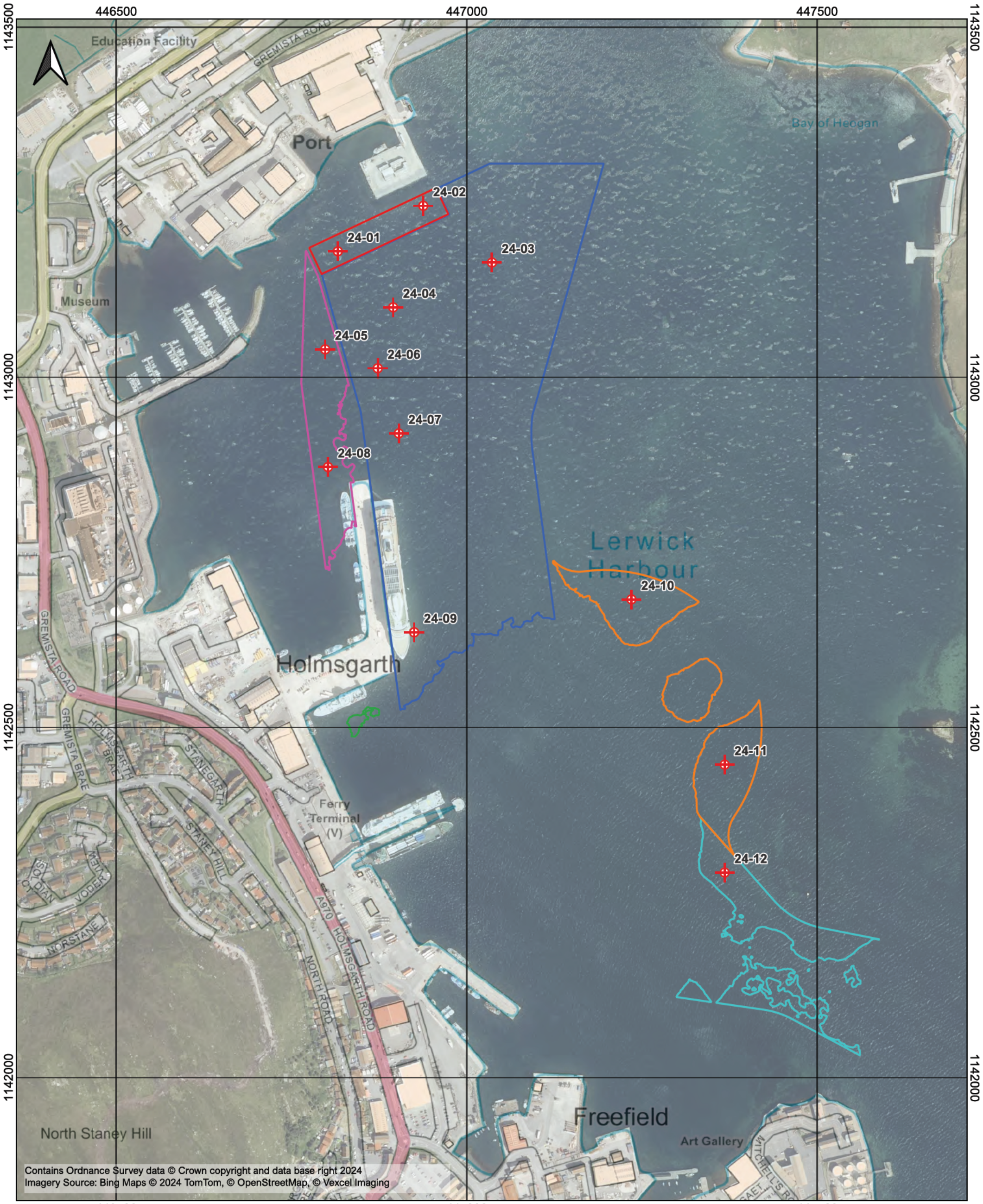
Status
Final

Drawing No.	Revision	Date
679749-GIS004	-	28 May 2024
Drawn	**Checked**	**Approved**
FR	CCAS	CCAS

Scale
1:2,500 @ A3

Rev	Date	Amendment	Initials
-	-	-	-

envirocentre
8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA.
T: 0141 341 5040 E: info@envirocentre.co.uk
W: www.envirocentre.co.uk



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Legend

- Sample Stations

Dredge Areas

- Heogan Turning Circle -9m CD
- Holmsgarth -10.5m CD
- Holmsgarth -10m CD
- Holmsgarth -7m CD
- Mair's Pier South -8m CD
- North Ness Channel -10m CD

Client
Lerwick Port Authority

Project
Lerwick North Harbour
Sediment Sampling

Title
Sediment Sample Station Locations
May 2024

Scale
1:5,000 @ A3

Status
Final

Drawing No.	Revision	Date
679749-GIS003	-	28 May 2024
Drawn	**Checked**	**Approved**
FR	CCAS	CCAS

Rev	Date	Amendment	Initials
-	-	-	-

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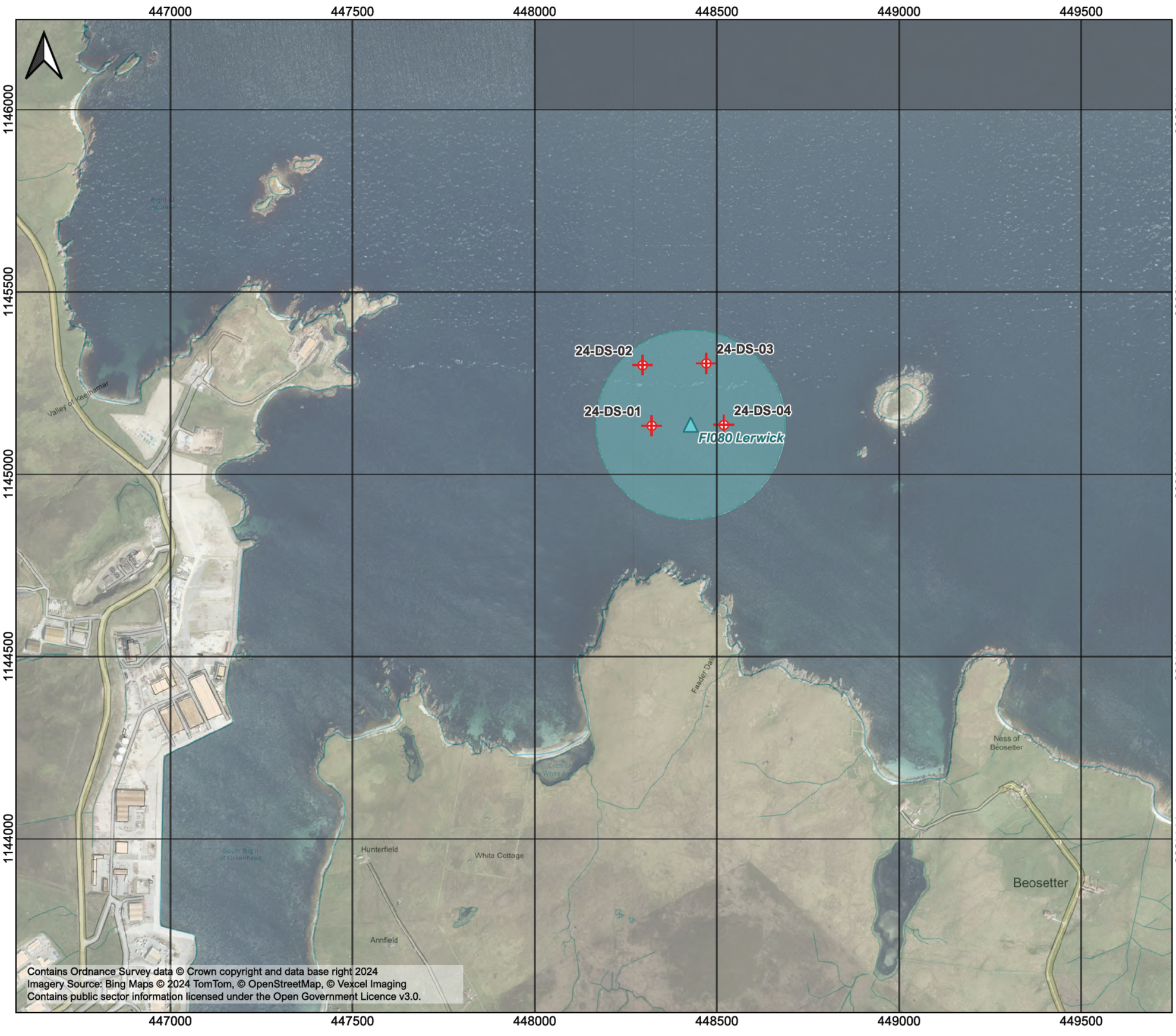

Legend

- Sample Stations
- FI080 Dipsosal Site Centre
- FI080 Disposal Site Extent

Do not scale this map

Client
Lerwick Port Authority

Project
Lerwick North Harbour/Dales Voe
Sediment Sampling

Title
FI080 Lerwick Disposal Site
Sample Station Locations May 2024

Status
Final

Drawing No.	Revision	Date
679749-GIS005	-	28 May 2024
Drawn	**Checked**	**Approved**
FR	CCAS	CCAS

Scale
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Rev	Date	Amendment	Initials
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envirocentre
8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA.
T: 0141 341 5040 E: info@envirocentre.co.uk
W: www.envirocentre.co.uk

B SAMPLE LOGS

envirocentre 8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA	**Project Name**	Lerwick North Harbour & Dales Voe	**Location ID**
	Project No.	679749	**24-DV-01**
	Client	Lerwick Port Authority	

SEDIMENT SAMPLE LOG

Date/Time:	13/05/2024 10:00	**Latitude/Longitude:**	60° 11.593589, -1° 10.888694
Dredge Area:	Dales Voe -14.5m CD	**Sampled/logged by:**	FR/AK
Method:	0.045m^2 Van Veen Grab Sampler	**Core Length (m):**	N/A

Remarks: **Grab:**
0.0 – 0.15m Light silvery grey gravelly medium to coarse sand with occasional shells. Gravel is fine and is shell derived.

Biota: None noted.

Odours: None noted.

Anthropogenic Inputs: None noted.

Notes: Sample complete after 10 deployments of grab sampler.

envirocentre 8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA	**Project Name**	Lerwick North Harbour & Dales Voe	**Location ID**
	Project No.	679749	**24-DV-02A**
	Client	Lerwick Port Authority	

SEDIMENT SAMPLE LOG

Date/Time:	Grab: 13/05/2024 15:50 Core: 15/05/2024 13:30	**Latitude/Longitude:**	60° 11.587374, -1° 10.754675
Dredge Area:	Dales Voe -14.5m CD	**Sampled/logged by:**	FR/AK
Method:	0.045m^2 Van Veen Grab Sampler & 3" Vibrocore	**Core Length (m):**	0.33

Remarks:

Grab:
0.0 – 0.15m Shells and shell fragments, some in a silty sandy matrix. Frequent cobbles and kelp.

Core:
0.0 – 0.2m Dense greyish-brown sand with frequent fine shell fragments
0.2 – 0.33m Coarse greyish-brown sand with frequent mixed sized shell fragments and shells.

Biota: None noted.

Odours: None noted.

Anthropogenic Inputs: None noted.

Notes: Location 24-DV-02 repositioned inshore as 24-DV-02A, as only cobbles and kelp returned in grab sampler at 24-DV-02.
Grab sample complete after five deployments of grab sampler.

Two attempts made at retrieving a core sample using the vibrocorer. Maximum core length achieved was 0.33m (progressed to refusal in dense sand). Core was initially frozen upon return from site and sub-sampled on 24/09/2024.

envirocentre 8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA	**Project Name**	Lerwick North Harbour & Dales Voe	**Location ID**
	Project No.	679749	**24-DV-03**
	Client	Lerwick Port Authority	

SEDIMENT SAMPLE LOG

Date/Time:	13/05/2024 10:00	**Latitude/Longitude:**	60° 11.651125, -1° 10.609167
Dredge Area:	Dales Voe -14.5m CD	**Sampled/logged by:**	FR/AK
Method:	0.045m^2 Van Veen Grab Sampler	**Core Length (m):**	N/A

Remarks: **0.0 – 0.15m (Grab)**
Light grey slightly gravelly fine to coarse sand. Gravel is fine and is shell derived. Occasional shells including mussel and razor clam shells. Rare fragments of kelp.

Biota: One mussel in grab.

Odours: None noted.

Anthropogenic Inputs: None noted.

Notes: Sample complete after two deployments of grab sampler.

envirocentre 8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA	**Project Name**	Lerwick North Harbour & Dales Voe	**Location ID**
	Project No.	679749	**24-DV-04**
	Client	Lerwick Port Authority	

SEDIMENT SAMPLE LOG

Date/Time:	Grab: 13/05/2024 15:23 Core: 15/05/2024 14:23	**Latitude/Longitude:**	60° 11.60677, -1° 10.667626
Dredge Area:	Dales Voe -14.5m CD	**Sampled/logged by:**	FR/AK
Method:	0.045m^2 Van Veen Grab Sampler & 3" Vibrocore	**Core Length (m):**	0.29

Remarks:

Grab:
0.0 – 0.15m Light grey/greyish-brown gravelly fine to coarse sand with abundant shells and shell fragments (including mussel and razor clam shells). Gravel is fine to coarse. One cobble.

Core:
0.0 – 0.29m Dense dark greyish-brown sand with fine shell fragments and two clam shells.

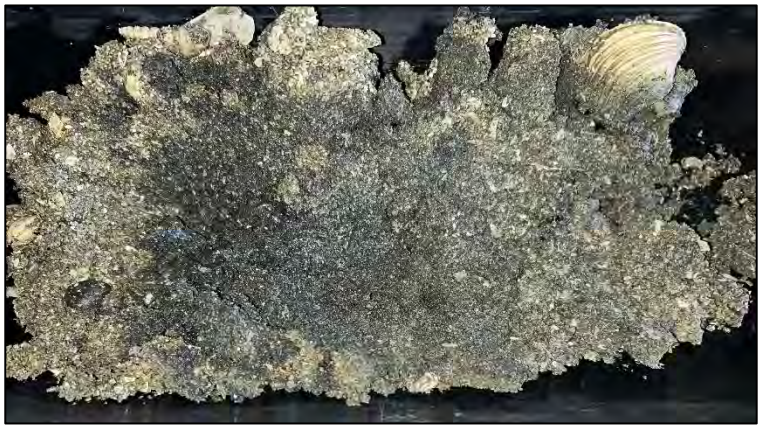
Biota: None noted.

Odours: None noted.

Anthropogenic Inputs: None noted.

Notes: Grab sample complete after four deployments of grab sampler.

Two attempts made at retrieving a core sample using the vibrocorer. Maximum core length achieved was 0.29m (progressed to refusal in dense sand). Core was initially frozen upon return from site and sub-sampled on 24/09/2024.



envirocentre 8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA	**Project Name**	Lerwick North Harbour & Dales Voe	**Location ID**
	Project No.	679749	**24-DV-05**
	Client	Lerwick Port Authority	

SEDIMENT SAMPLE LOG

Date/Time:	Grab: 13/05/2024 15:35 Core: 15/05/2024 13:55	**Latitude/Longitude:**	60° 11.554595, -1° 10.768477
Dredge Area:	Dales Voe -14.5m CD	**Sampled/logged by:**	FR/AK
Method:	0.045m^2 Van Veen Grab Sampler & 3" Vibrocore	**Core Length (m):**	0.37

Remarks:

Grab:
0.0 – 0.15m Light grey gravelly fine to coarse sand. Gravel is fine to coarse and almost entirely shell derived, with frequent larger shell fragments. Rare kelp fragments.

Core:
0.0 – 0.37m Greyish-brown coarse sand with rare fine shell fragments.

Biota: One sea urchin and two large mussels in grab.

Odours: Moderate fish-like rotting odour within core sample.

Anthropogenic Inputs: None noted.

Notes: Grab sample complete after two deployments of grab sampler.

Two attempts made at retrieving a core sample using the vibrocorer. Maximum core length achieved was 0.37m (progressed to refusal in dense sand). Core was initially frozen upon return from site and sub-sampled on 24/09/2024.

envirocentre 8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA	**Project Name**	Lerwick North Harbour & Dales Voe	**Location ID**
	Project No.	679749	**24-DV-06**
	Client	Lerwick Port Authority	

SEDIMENT SAMPLE LOG

Date/Time:	Grab: 13/05/2024 15:05 Core: 15/05/2024 14:50	**Latitude/Longitude:**	60° 11.669509, -1° 10.53296
Dredge Area:	Dales Voe Future UDWQ -16m CD	**Sampled/logged by:**	FR/AK
Method:	0.045m^2 Van Veen Grab Sampler & 3" Vibrocore	**Core Length (m):**	0.22

Remarks:

Grab:
0.0 – 0.15m Light greyish-brown fine to coarse sand with occasional shell fragments.

Core:
0.0 – 0.22m Dense greyish-brown coarse sand. Frequent fine shell fragments.

Biota: A few sandworms in grab.

Odours: Faint fish-like rotting odour within core sample.

Anthropogenic Inputs: Two pieces of plastic within core sample.

Notes: Grab sample complete after two deployments of grab sampler.

Two attempts made at retrieving a core sample using the vibrocorer. Maximum core length achieved was 0.22m (progressed to refusal in dense sand). Core was initially frozen upon return from site and sub-sampled on 24/09/2024.

envirocentre 8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA	**Project Name**	Lerwick North Harbour & Dales Voe	**Location ID**
	Project No.	679749	**24-DV-07**
	Client	Lerwick Port Authority	

SEDIMENT SAMPLE LOG

Date/Time:	13/05/2024 10:46	**Latitude/Longitude:**	60° 11.715512, -1° 10.479865
Dredge Area:	Dales Voe Future UDWQ -16m CD`	**Sampled/logged by:**	FR/AK
Method:	0.045m^2 Van Veen Grab Sampler	**Core Length (m):**	N/A

Remarks: **Grab:**
0.0 – 0.15m Grey/light brown silty very gravelly medium to coarse sand. Gravel is fine to medium and is shell derived. Rare kelp fragments.

Biota: None noted.

Odours: None noted.

Anthropogenic Inputs: None noted.

Notes: Sample complete after four deployments of grab sampler.

envirocentre 8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA	**Project Name**	Lerwick North Harbour & Dales Voe	**Location ID**
	Project No.	679749	**24-01**
	Client	Lerwick Port Authority	

SEDIMENT SAMPLE LOG

Date/Time:	15/05/2024 12:19	**Latitude/Longitude:**	60°10.223907, -1°9.488948
Dredge Area:	Holmsgarth Dredge -10.5m CD	**Sampled/logged by:**	FR/AK
Method:	0.045m^2 Van Veen Grab Sampler & 3" Vibrocore	**Core Length (m):**	0.42

Remarks:

Grab:
0.0 – 0.15m
Soft greyish-brown slightly sandy silt with one scallop shell. Sand is fine.

Core:
0.0 – 0.3m Grey-brown/dark grey silty fine to medium sand with rare small shell fragments.
0.3 – 0.35m Dark grey silty fine sand with frequent vegetation
0.35 – 0.42m Dense dark grey-brown silty fine to medium sand.

Biota: One ragworm noted in grab.

Odours: Rotting fish-like odour throughout core.

Anthropogenic Inputs: None noted.

Notes: Grab sample complete after one deployment of grab sampler.

Two attempts made at retrieving a core sample using the vibrocorer. Maximum core length achieved was 0.42m (progressed to refusal progressed to refusal in dense sand).

Core was initially frozen upon return from site and sub-sampled on 17/09/2024.

envirocentre 8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA	**Project Name**	Lerwick North Harbour & Dales Voe	**Location ID**
	Project No.	679749	**24-02**
	Client	Lerwick Port Authority	

SEDIMENT SAMPLE LOG

Date/Time:	Grab: 14/05/2024 13:15 Core Attempts 1 & 2: 15/05/2024 11:20 Core Attempts 3 to 5: 16/05/2024 11:21	**Latitude/Longitude:**	60°10.258083, -1°9.356153
Dredge Area:	Holmsgarth Dredge -10.5m CD	**Sampled/logged by:**	FR/AK
Method:	0.045m^2 Van Veen Grab Sampler & 3" Vibrocore	**Core Length (m):**	0.55

Remarks:

Grab: 0.0 – 0.15m
Light greyish-brown gravelly sand with abundant shell fragments and occasional clumps of peat (with visible decomposing wood).

Core: 0.0 – 0.25m Grey silty fine to coarse sand. Sand mostly shell derived with occasional fine to medium subrounded gravel and shell fragments.
0.25 – 0.55m Dense beige/light brown slightly clayey fine to coarse sand with occasional subrounded coarse gravel.

Biota: A few small crabs noted in grab.

Odours: None noted.

Anthropogenic Inputs: None noted.

Notes: Grab sample complete after three deployments of grab sampler.

Five attempts in total were made at retrieving a core sample using the vibrocorer (over two days). Maximum core length achieved was 0.55m (progressed to refusal in dense sand).

Core was initially frozen upon return from site and sub-sampled on 17/09/2024.

envirocentre 8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA	**Project Name**	Lerwick North Harbour & Dales Voe	**Location ID**
	Project No.	679749	**24-03**
	Client	Lerwick Port Authority	

SEDIMENT SAMPLE LOG

Date/Time:	14/05/2024	**Latitude/Longitude:**	60° 10.213775, -1° 9.251321
Dredge Area:	Holmsgarth Dredge -10.0m CD	**Sampled/logged by:**	FR/AK
Method:	0.045m^2 Van Veen Grab Sampler	**Core Length (m):**	N/A

Remarks: **0.0 – 0.15m (Grab)**
Light greyish-brown fine to coarse sand with rare cobbles.

Biota: One hermit crab.

Odours: None noted.

Anthropogenic Inputs: None noted.

Notes: Sample complete after five deployments of grab sampler.

envirocentre 8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA	**Project Name**	Lerwick North Harbour & Dales Voe	**Location ID**
	Project No.	679749	**24-04**
	Client	Lerwick Port Authority	

SEDIMENT SAMPLE LOG

Date/Time:	Grab: 14/05/2024 Core: 16/05/2024 12:28	**Latitude/Longitude:**	60° 10.18027, -1° 9.404643
Dredge Area:	Holmsgarth Dredge -10.0m CD	**Sampled/logged by:**	FR/AK
Method:	0.045m² Van Veen Grab Sampler & 3" Vibrocore	**Core Length (m):**	0.35

Remarks:

Grab:
0.0 – 0.15m
Light and dark grey very silty sand. Rare small shells.

Core:
0.0 – 0.35m
Dense dark greyish-brown silty fine sand. Frequent shells and shell fragments at 0.35.

Biota: None noted.

Odours: None noted.

Anthropogenic Inputs: None noted.

Notes: Grab sample complete after two deployments of grab sampler.

Two attempts were made at retrieving a core sample using the vibrocorer. Maximum core length achieved was 0.35m (progressed to refusal in dense sand). Core was initially frozen upon return from site and sub-sampled on 2409/2024.

envirocentre 8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA	**Project Name**	Lerwick North Harbour & Dales Voe	**Location ID**
	Project No.	679749	**24-05**
	Client	Lerwick Port Authority	

SEDIMENT SAMPLE LOG

Date/Time:	Grab: 14/05/2024 Core: 15/05/2024 12:30	**Latitude/Longitude:**	60°10.148615, -1°9.510336
Dredge Area:	Holmsgarth Dredge -7.0m CD	**Sampled/logged by:**	FR/AK
Method:	0.045m^2 Van Veen Grab Sampler & 3" Vibrocore	**Core Length (m):**	0.55

Remarks:

Grab: 0.0 – 0.15m
Soft dark grey/black sandy silt with rare rootlets and shells, including razor clam shells. Sand is fine.

Core: 0.0 – 0.5m Dark grey very silty fine sand with rare shells and shell fragments.
0.5 – 0.55m Dark grey-brown slightly silty fine to medium sand. Frequent shells and shell fragments at the base with coarse sand**.**

Biota: Razor clam at the base of core.

Odours: Slight anoxic H_2S odour in grab.

Anthropogenic Inputs: One piece of soft plastic sheeting in grab.

Notes: Razor clam at base may have prevented further progress.

Grab sample complete after two deployments of grab sampler.

Two attempts were made at retrieving a core sample using the vibrocorer. Maximum core length achieved was 0.55m (progressed to refusal).

Core was initially frozen upon return from site and sub-sampled on 17/09/2024.

envirocentre 8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA	**Project Name**	Lerwick North Harbour & Dales Voe	**Location ID**
	Project No.	679749	**24-06**
	Client	Lerwick Port Authority	

SEDIMENT SAMPLE LOG

Date/Time:	Grab: 14/05/2024 Core: 15/05/2024 12:30	**Latitude/Longitude:**	60°10.133556, -1°9.429627
Dredge Area:	Holmsgarth Dredge -10.0m CD	**Sampled/logged by:**	FR/AK
Method:	0.045m^2 Van Veen Grab Sampler & 3" Vibrocore	**Core Length (m):**	0.64

Remarks:

Grab: 0.0 – 0.15m
Greyish-brown silty fine to medium sand with rare shells and shell fragments.

Core: 0.0 – 0.25m Grey-brown fine sand with rare shell fragments.
0.25 – 0.4m Soft greyish-brown clay.
0.4 – 0.64m Dark greyish brown slightly silty fine to medium sized sand with occasional shells and shell fragments. Frequent shells and coarse gravel at 0.64m

Biota: None noted.

Odours: None noted.

Anthropogenic Inputs: None noted.

Notes: Grab sample complete after three deployments of grab sampler.

Two attempts were made at retrieving a core sample using the vibrocorer. Maximum core length achieved was 0.64m (progressed to refusal).

Core was initially frozen upon return from site and sub-sampled on 17/09/2024.

envirocentre 8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA	**Project Name**	Lerwick North Harbour & Dales Voe	**Location ID**
	Project No.	679749	**24-07**
	Client	Lerwick Port Authority	

SEDIMENT SAMPLE LOG

Date/Time:	Grab: 14/05/2024 Core: 15/05/2024 13:28	**Latitude/Longitude:**	60° 10.083252, -1° 9.398478
Dredge Area:	Holmsgarth Dredge -10.0m CD	**Sampled/logged by:**	FR/AK
Method:	0.045m^2 Van Veen Grab Sampler & 3" Vibrocore	**Core Length (m):**	0.36

Remarks:

Grab:
0.0 – 0.15m
Light brown silty gravelly fine to coarse sand with occasional shells and shell fragments. Gravel is coarse and subrounded.

Core:
0.0 – 0.36m
Dense dark greyish-brown silty sand.

Biota: None noted.

Odours: None noted.

Anthropogenic Inputs: None noted.

Notes: Grab sample complete after three deployments of grab sampler.

Four attempts were made at retrieving a core sample using the vibrocorer. Maximum core length achieved was 0.36m (progressed to refusal in dense sand). Core was initially frozen upon return from site and sub-sampled on 2409/2024.

envirocentre 8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA	**Project Name**	Lerwick North Harbour & Dales Voe	**Location ID**
	Project No.	679749	**24-08**
	Client	Lerwick Port Authority	

SEDIMENT SAMPLE LOG

Date/Time:	Grab: 14/05/2024 12:58 Core: 16/05/2024 10:45	**Latitude/Longitude:**	60°10.058089, -1°9.508325
Dredge Area:	Holmsgarth Dredge -7.0m CD	**Sampled/logged by:**	FR/AK
Method:	0.045m^2 Van Veen Grab Sampler & 3" Vibrocore	**Core Length (m):**	0.70

Remarks:

Grab: 0.0 – 0.15m
Dark grey silty fine to medium sand with rare shell fragments.

Core: 0.0 – 0.7m Dark greyish brown slightly silty fine to medium sand. Small and subrounded cobble at 0.6m.

Biota: None noted.

Odours: Slight H_2S odour throughout core.

Anthropogenic Inputs: None noted.

Notes: Grab sample complete after three deployments of grab sampler.

A core sample was not proposed for this location, however a core sample was attempted at this location as silty material was present on the surface and the waters were more sheltered being behind Mair's Pier.

Two attempts were made at retrieving a core sample using the vibrocorer. Both attempts achieved a core length of 0.7m (progressed to refusal in dense sand).

Core was initially frozen upon return from site and sub-sampled on 17/09/2024.

envirocentre 8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA	**Project Name**	Lerwick North Harbour & Dales Voe	**Location ID**
	Project No.	679749	**24-09**
	Client	Lerwick Port Authority	

SEDIMENT SAMPLE LOG

Date/Time:	15/05/2024 09:15	**Latitude/Longitude:**	60° 9.930116, -1° 9.378615
Dredge Area:	Holmsgarth Dredge -10.0m CD	**Sampled/logged by:**	FR/AK
Method:	0.045m^2 Van Veen Grab Sampler	**Core Length (m):**	N/A

Remarks: **0.0 – 0.15m (Grab)**
Shells and shell fragments with occasional coarse gravel and cobbles.

Biota: None noted.

Odours: None noted.

Anthropogenic Inputs: None noted.

Notes: Sample complete after three deployments of grab sampler.

envirocentre 8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA	**Project Name**	Lerwick North Harbour & Dales Voe	**Location ID**
	Project No.	679749	**24-10**
	Client	Lerwick Port Authority	

SEDIMENT SAMPLE LOG

Date/Time:	Grab: 15/05/2024 09:35 Core: 16/05/2024 13:46	**Latitude/Longitude:**	60° 9.953295, -1° 9.042863
Dredge Area:	Heogan Turning Circle Dredge -9.0m CD	**Sampled/logged by:**	FR/AK
Method:	0.045m^2 Van Veen Grab Sampler & 3" Vibrocore	**Core Length (m):**	0.28

Remarks:

Grab:
0.0 – 0.15m
Light greyish-brown silty fine to coarse sand with frequent shells and shell fragments.

Core:
0.0 – 0.28m
Dense grey/greyish-brown silty sand.

Biota: None noted.

Odours: None noted.

Anthropogenic Inputs: None noted.

Notes: Grab sample complete after two deployments of grab sampler.

Two attempts were made at retrieving a core sample using the vibrocorer. Maximum core length achieved was 0.28m (progressed to refusal in dense sand). Core was initially frozen upon return from site and sub-sampled on 2409/2024.

envirocentre 8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA	**Project Name**	Lerwick North Harbour & Dales Voe	**Location ID**
	Project No.	679749	**24-11**
	Client	Lerwick Port Authority	

SEDIMENT SAMPLE LOG

Date/Time:	15/05/2024	**Latitude/Longitude:**	60° 9.825245, -1° 8.902382
Dredge Area:	Heogan Turning Circle Dredge -9.0m CD	**Sampled/logged by:**	FR/AK
Method:	0.045m^2 Van Veen Grab Sampler	**Core Length (m):**	N/A

Remarks: **0.0 – 0.15m (Grab)**
Cobbles with kelp and a small quantity of fine to coarse gravel and shell fragments.

Biota: None noted.

Odours: None noted.

Anthropogenic Inputs: None noted.

Notes: Six attempts were made within the vicinity of the proposed sampling station.

A core sample was proposed for this location but was not progressed as the presence of cobbles and kelp on the surface would prevent penetration of the core barrel into the seabed.

envirocentre 8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA	**Project Name**	Lerwick North Harbour & Dales Voe	**Location ID**
	Project No.	679749	**24-12**
	Client	Lerwick Port Authority	

SEDIMENT SAMPLE LOG

Date/Time:	15/05/2024 10:15	**Latitude/Longitude:**	60° 9.742288, -1° 8.904527
Dredge Area:	North Ness Channel Dredge -10m CD	**Sampled/logged by:**	FR/AK
Method:	0.045m^2 Van Veen Grab Sampler	**Core Length (m):**	0.46

Remarks:

0.0 – 0.15m (Grab)
Greyish-brown fine to coarse sand with frequent shells and shell fragments.

0.0 – 0.46 (Core)
Greyish-brown fine to coarse sand with frequent shells and shell fragments.

Biota: None noted.

Odours: None noted.

Anthropogenic Inputs: None noted.

Notes: Grab sample complete after four deployments of grab sampler.

Two attempts were made at retrieving a core sample using the vibrocorer. Maximum core length achieved was 0.46m, with 0.2m achieved in the other. Both were progressed to refusal in dense sand. The contents of both cores were combined and sub-sampled. The sample was not submitted for analysis but has been retained in frozen storage.

envirocentre 8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA	**Project Name**	Lerwick North Harbour & Dales Voe	**Location ID**
	Project No.	679749	**24-DS-01**
	Client	Lerwick Port Authority	

SEDIMENT SAMPLE LOG

Date/Time:	14/05/2024 10:23	**Latitude/Longitude:**	60° 11.26544, -1° 7.834078
Sampling Area:	Lerwick Disposal Site (FI080)	**Sampled/logged by:**	FR/AK
Method:	0.045m^2 Van Veen Grab Sampler	**Core Length (m):**	N/A

Remarks: **0.0 – 0.15m (Grab)**
Greyish-brown silty fine to medium sand with occasional shells and shell fragments.

Biota: One starfish and a few sandworms.

Odours: None noted.

Anthropogenic Inputs: None noted.

Notes: Sample complete after three deployments of grab sampler.

envirocentre 8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA	**Project Name**	Lerwick North Harbour & Dales Voe	**Location ID**
	Project No.	679749	**24-DS-02**
	Client	Lerwick Port Authority	

SEDIMENT SAMPLE LOG

Date/Time:	14/05/2024 09:46	**Latitude/Longitude:**	60° 11.355036, -1° 7.858758
Sampling Area:	Lerwick Disposal Site (FI080)	**Sampled/logged by:**	FR/AK
Method:	0.045m^2 Van Veen Grab Sampler	**Core Length (m):**	N/A

Remarks: **0.0 – 0.15m (Grab)**
Light greyish-brown silty fine to medium sand with occasional shells and shell fragments.

Biota: One hermit crab.

Odours: None noted.

Anthropogenic Inputs: None noted.

Notes: Sample complete after three deployments of grab sampler.

envirocentre 8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA	**Project Name**	Lerwick North Harbour & Dales Voe	**Location ID**
	Project No.	679749	**24-DS-03**
	Client	Lerwick Port Authority	

SEDIMENT SAMPLE LOG

Date/Time:	14/05/2024	**Latitude/Longitude:**	60° 11.356485, -1° 7.669384
Sampling Area:	Lerwick Disposal Site (FI080)	**Sampled/logged by:**	FR/AK
Method:	0.045m^2 Van Veen Grab Sampler	**Core Length (m):**	N/A

Remarks: **0.0 – 0.15m (Grab)**
Two boulders, three cobbles and one scallop shell obtained in total.

Biota: One brittle star.

Odours: None noted.

Anthropogenic Inputs: None noted.

Notes: Several attempts made at two separate locations within the vicinity of the proposed sampling station.
The material obtained is unsuitable for analysis and therefore not submitted to the laboratory.

envirocentre 8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA	**Project Name**	Lerwick North Harbour & Dales Voe	**Location ID**
	Project No.	679749	**24-DS-04**
	Client	Lerwick Port Authority	

SEDIMENT SAMPLE LOG

Date/Time:	14/05/2024 09:30	**Latitude/Longitude:**	60° 11.265107, -1° 7.619876
Sampling Area:	Lerwick Disposal Site (FI080)	**Sampled/logged by:**	FR/AK
Method:	0.045m^2 Van Veen Grab Sampler	**Core Length (m):**	N/A

Remarks: **0.0 – 0.15m (Grab)**
Soft dark grey sandy gravelly silt with occasional shells and shell fragments. Sand is fine to medium, gravel is coarse.

Biota: Several brittle stars.

Odours: None noted.

Anthropogenic Inputs: None noted.

Notes: Sample complete after three deployments of grab sampler.

C LABORATORY RESULTS AND DATA SUMMARY TABLES

Summary Table A

Sampling Results Incorporated with BPEO Assessment (mg/kg)

						Dales Voe																
	AL1	AL2	BAC	ERL	PEL	24-DV-01	24-DV-02A	24-DV-02A	24-DV-03	24-DV-04	24-DV-04	24-DV-05	24-DV-05	24-DV-06	24-DV-06	24-DV-07	Max	AVERAGE	No. Exceed RAL 1	No. Exceed RAL 2	No.Exceed BAC?	No. Exceed ERL	No. Exceed PEL?
Source			CSEMP	CSEMP	Canada	0.0-0.15m	0.0-0.15m	0.0-0.33m	0.0-0.15m	0.0-0.15m	0.0-0.29m	0.0-0.15m	0.0-0.37m	0.0-0.15m	0.0-0.22m	0.0-0.15m							
Arsenic	20	70	25		41.6	3.0	8.8	6.1	4.1	3.8	4.4	7.1	6.8	4.4	2.5	5	8.80	5.09	0	0	0	-	0
Cadmium	0.4	4	0.31	1.2	4.2	0.05	0.15	0.09	0.08	0.11	0.15	0.08	0.09	0.07	0.07	0.12	0.15	0.10	0	0	0	0	0
Chromium	50	370	81	81	160	11.4	20	14.3	17.8	19.9	33.4	15.8	12.6	22.0	11.9	14.8	33.40	17.63	0	0	0	0	0
Copper	30	300	27	34	108	3.7	9.3	7	7.5	11.3	14.9	5	3.6	7.5	4	8.1	14.90	7.45	0	0	0	0	0
Mercury	0.25	1.5	0.07	0.15	0.7	0.01	0.13	0.02	0.06	0.04	0.04	0.02	0.02	0.02	0.01	0.03	0.13	0.04	0	0	1	0	0
Nickel	30	150	36	-	-	6.5	15.0	7.2	12.5	14.4	11.8	8.9	5.8	14.7	7.7	11.5	15.00	10.55	0	0	0	N/A	N/A
Lead	50	400	38	47	112	4	9.5	8.7	7.8	6.8	72.3	7.4	9.3	8.7	5	9.9	72.30	13.58	1	0	1	1	0
Zinc	130	600	122	150	271	19.2	42.2	34.7	46.5	58	93	39.6	25.4	50.2	21.6	36.3	92.70	42.43	0	0	0	0	0
Napthalene	0.1		0.08	0.16	0.391	0.001	0.002	0.001	0.003	0.069	0.001	0.001	0.001	0.001	0.001	0.003	0.07	0.01	0	-	0	0	0
Acenaphthylene	0.1				0.128	0.001	0.001	0.001	0.001	0.134	0.001	0.001	0.001	0.001	0.001	0.001	0.13	0.01	1	-	N/A	N/A	1
Acenaphthene	0.1				0.0889	0.001	0.001	0.007	0.001	0.003	0.004	0.001	0.003	0.001	0.001	0.001	0.01	0.00	0	-	N/A	N/A	0
Fluorene	0.1				0.144	0.001	0.001	0.004	0.001	0.088	0.003	0.001	0.002	0.001	0.001	0.002	0.09	0.01	0	-	N/A	N/A	0
Phenanthrene	0.1		0.032	0.24	0.544	0.001	0.004	0.020	0.002	0.412	0.015	0.001	0.009	0.001	0.004	0.007	0.41	0.04	1	-	1	1	0
Anthracene	0.1		0.05	0.085	0.245	0.001	0.001	0.003	0.001	0.053	0.002	0.001	0.001	0.001	0.001	0.002	0.05	0.01	0	-	1	0	0
Fluoranthene	0.1		0.039	0.6	1.494	0.001	0.007	0.023	0.003	0.356	0.021	0.001	0.010	0.001	0.007	0.013	0.36	0.04	1	-	1	0	0
Pyrene	0.1		0.024	0.665	1.398	0.001	0.005	0.015	0.002	0.220	0.020	0.001	0.006	0.001	0.006	0.010	0.22	0.03	1	-	1	0	0
Benzo(a)anthracene	0.1		0.016	0.261	0.693	0.001	0.003	0.008	0.001	0.117	0.008	0.001	0.003	0.001	0.003	0.005	0.12	0.01	1	-	1	0	0
Chrysene	0.1		0.02	0.384	0.846	0.001	0.003	0.008	0.002	0.108	0.009	0.001	0.003	0.001	0.003	0.006	0.11	0.01	1	-	1	0	0
Benzo(b)fluoranthene	0.1		-	-	-	0.001	0.003	0.007	0.002	0.084	0.009	0.001	0.004	0.001	0.004	0.007	0.08	0.01	0	-	N/A	N/A	N/A
Benzo(k)fluoranthene	0.1		-	-	-	0.001	0.003	0.006	0.002	0.072	0.007	0.001	0.003	0.001	0.004	0.007	0.07	0.01	0	-	N/A	N/A	N/A
Benzo(a)pyrene	0.1		0.03	0.384	0.763	0.001	0.003	0.006	0.002	0.079	0.007	0.001	0.002	0.001	0.003	0.006	0.08	0.01	0	-	1	0	0
Indeno(1,2,3cd)pyrene	0.1		0.103	0.24	-	0.001	0.004	0.004	0.003	0.052	0.005	0.001	0.002	0.002	0.004	0.009	0.05	0.01	0	-	0	0	N/A
Benzo(ghi)perylene	0.1		0.08	0.085	-	0.001	0.003	0.003	0.003	0.041	0.005	0.001	0.002	0.001	0.004	0.008	0.04	0.01	0	-	0	0	N/A
Dibenzo(a,h)anthracene	0.01		-	-	0.135	0.001	0.001	0.001	0.001	0.014	0.001	0.001	0.001	0.001	0.001	0.001	0.01	0.00	0	-	N/A	N/A	0
THC	100		-	-	-	4	11	5	13	16	16	4	4	6	9	22	22.20	10.10	0	-	N/A	N/A	N/A
PCBs	0.02	0.18	-	-	0.189	0.00056	0.00180	0.00088	0.00056	0.02171	0.00056	0.00216	0.00056	0.00056	0.00056	0.00056	0.0217	0.0028	1	0	N/A	N/A	0
TBT	0.1	0.5	-	-	-	0.001	0.005	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0050	0.0017	0	0	N/A	N/A	N/A

Note: Underlined Values are <LOD. Values highlighted red are equal to or greater than AL1.
PEL Data Source: http://ceqg-rcqe.ccme.ca/en/index.html#void

Summary Table B

Sampling Results Incorporated with BPEO Assessment (mg/kg)

						Lerwick North Harbour																							
	AL1	AL2	BAC	ERL	PEL	24-01	24-01	24-02	24-02	24-03	24-04	24-04	24-05	24-05	24-06	24-06	24-07	24-07	24-08	24-08	24-09	24-10	24-10	24-12	24-12					
Source			CSEMP	CSEMP	Canada	0.0-0.15m	0.0-0.42m	0 0-0.15m	0.0-0.55m	0.0-0.15m	0.0-0.15m	0.0-0.35m	0.0-0.15m	0.0-0.55m	0.0-0.15m	0.15-0.64m	0.0-0.15m	0.0-0 36m	0.0-0.15m	0.15-0.7m	0.0-0.15m	0.0-0.15m	0.0-0.28m	0.0-0.15m	0.0-0.46m	Max	AVERAGE	No. Exceed RAL 1	No. Exceed RAL 2	No.Exceed BAC?	No. Exceed ERL	No. Exceed PEL?
Arsenic	20	70	25		41.6	7.9	9.5	4.6	7.8	5.6	4.2	4.7	7.8	13.3	3.8	13.9	4.2	5.1	5.4	17	4.5	2.1	1.4	2.8	4.1	17.00	6.49	0	0	0	-	0
Cadmium	0.4	4	0.31	1.2	4.2	0.37	0.12	0.26	0.08	0.26	0.24	0.27	0.42	0.19	0.19	0.1	0.11	0.31	0.36	0.17	0.11	0.05	0.06	0.07	<0.04	0.42	0.20	1	0	3	0	0
Chromium	50	370	81	81	160	36.6	29.2	23.9	22.4	29.2	25.8	32	28.4	26.3	20.7	20.1	16.4	26.7	23.3	29.7	10.1	9.1	10.2	15.4	10.2	36.60	22.29	0	0	0	0	0
Copper	30	300	27	34	108	36.8	10.2	19.2	8.5	19.3	24.2	18.7	32.9	17.1	21	10.7	18.3	22.8	39.6	19.2	22.6	6.6	7 3	12.8	2.2	39.60	18.50	3	0	3	2	0
Mercury	0.25	1.5	0.07	0.15	0.7	0.13	0.08	0.03	0.08	0.03	0.11	0.06	0.14	0.16	0.19	0.08	0.1	0.1	0.3	0.22	0.06	0.04	0.03	0.05	0 01	0.30	0.10	1	0	12	4	0
Nickel	30	150	36	-	-	26.6	20.3	22.9	15.4	23.4	18.8	20.6	21.0	19.2	15.9	14.6	13.8	19.8	17.0	22.4	55.3	8.2	6.4	16.6	5.7	55.30	19.20	1	0	1	N/A	N/A
Lead	50	400	38	47	112	34.2	30.2	58.8	27.9	32.6	23.7	20.1	29.8	55.9	22.2	37.7	17.4	23.5	56.4	62.6	12.1	15 6	7.7	12.6	7.9	62.60	29.45	4	0	4	4	0
Zinc	130	600	122	150	271	121.0	63.6	370.0	55.7	143.0	83.6	83.6	93	94	67	76	48.5	96.5	109.0	98.4	24.8	20.4	20.7	30.7	18.3	370.00	85.89	2	0	2	1	1
Napthalene	0.1		0.08	0.16	0.391	0.026	0.022	0.002	0.001	0.002	0.026	0.015	0.045	0.044	0.028	0.019	0.024	0 014	0.032	0.057	0.158	0.004	0.008	0.012	0.008	0.16	0.03	1	-	1	0	0
Acenaphthylene	0.1				0.128	0.008	0.034	0 001	0 001	0 001	0.018	0.014	0.005	0.042	0.012	0.020	0.007	0 017	0.038	0.064	0.006	0.001	0.002	0.008	0.012	0.06	0.02	0	-	N/A	N/A	0
Acenaphthene	0.1				0.0889	0.021	0.015	0.001	0.001	0.001	0.057	0.014	0.023	0.035	0.012	0.016	0.004	0 020	0.044	0.048	0.004	0.001	0.002	0.023	0.007	0.06	0.02	0	-	N/A	N/A	0
Fluorene	0.1				0.144	0.022	0.029	0.001	0.001	0.001	0.080	0.020	0.017	0.058	0.013	0.025	0.008	0 026	0.064	0.092	0.014	0.001	0.006	0.016	0.011	0.09	0.03	0	-	N/A	N/A	0
Phenanthrene	0.1		0.032	0.24	0.544	0.128	0.199	0.003	0.001	0.003	0.506	0.077	0.097	0.380	0.105	0.160	0.068	0.161	0.528	0.584	0.047	0.004	0.040	0.155	0.065	0.58	0.17	10	-	16	4	1
Anthracene	0.1		0.05	0.085	0.245	0.045	0.067	0.002	0.001	0.001	0.212	0.032	0.042	0.122	0.024	0.053	0.018	0 052	0.124	0.191	0.010	0.001	0.009	0.033	0.020	0.21	0.05	4	-	7	4	0
Fluoranthene	0.1		0.039	0.6	1.494	0.278	0.416	0.005	0.001	0.004	0.804	0.135	0.432	0.736	0.173	0.326	0.119	0 305	0.983	0.982	0.016	0.005	0.070	0.344	0.126	0.98	0.31	14	-	15	4	0
Pyrene	0.1		0.024	0.665	1.398	0.292	0.422	0.006	0.002	0.006	0.755	0.130	0.773	0.723	0.186	0.314	0.118	0 317	0.916	1.040	0.044	0.006	0.065	0.293	0.113	1.04	0.33	14	-	16	5	0
Benzo(a)anthracene	0.1		0.016	0.261	0.693	0.157	0.184	0.003	0.001	0.002	0.401	0.064	0.370	0.361	0.088	0.158	0.058	0.168	0.427	0.524	0.012	0.003	0.035	0.134	0.057	0.52	0.16	10	-	15	5	0
Chrysene	0.1		0.02	0.384	0.846	0.162	0.197	0.003	0.001	0.002	0.380	0.069	0.282	0.373	0.097	0.165	0.067	0.181	0.464	0.522	0.013	0.004	0.040	0.154	0.052	0.52	0.16	10	-	15	2	0
Benzo(b)fluoranthene	0.1		-	-	-	0.147	0.181	0.003	0.001	0.003	0.289	0.054	0.250	0.338	0.087	0.153	0.064	0.128	0.416	0.512	0.009	0.005	0.034	0.133	0.050	0.51	0.14	10	-	N/A	N/A	N/A
Benzo(k)fluoranthene	0.1		-	-	-	0.160	0.186	0.003	0.001	0.003	0.335	0.066	0.279	0.347	0.094	0.149	0.063	0.167	0.409	0.526	0.009	0.003	0.028	0.126	0.048	0.53	0.15	10	-	N/A	N/A	N/A
Benzo(a)pyrene	0.1		0.03	0.384	0.763	0.190	0.235	0.003	0.001	0.003	0.427	0.074	0.316	0.444	0.113	0.191	0.077	0.193	0.512	0.670	0.011	0.004	0.035	0.157	0.065	0.67	0.19	11	-	15	4	0
Indeno(1,2,3cd)pyrene	0.1		0.103	0.24	-	0.130	0.165	0.003	0.001	0.003	0.259	0.039	0.136	0.293	0.076	0.126	0.054	0.101	0.324	0.462	0.006	0.004	0.023	0.095	0.043	0.46	0.12	9	-	8	4	N/A
Benzo(ghi)perylene	0.1		0.08	0.085	-	0.126	0.164	0.003	0.001	0.004	0.226	0.065	0.125	0.273	0.071	0.119	0.053	0.103	0.311	0.413	0.013	0.005	0.024	0.095	0.041	0.41	0.11	9	-	10	10	N/A
Dibenzo(a,h)anthracene	0.01		-	-	0.135	0.029	0.028	0.001	0.001	0.001	0.056	0.015	0.033	0.053	0.017	0.021	0.012	0 021	0.079	0.087	0.002	0.001	0.007	0.024	0.009	0.09	0.02	0	-	N/A	N/A	0
THC	100		-	-	-	169	178	16	6	20	148	72	432	279	88	149	69	77	315	361	29	19	32	45	30	432.00	126.69	8	-	N/A	N/A	N/A
PCBs	0.02	0.18	-	-	0.189	0.00085	0.00063	0.00056	0.00056	0.00056	0.00059	0.00056	0.00088	0.00219	0.00059	0.00072	0.00053	0.00056	0.00222	0.00533	0.00056	0.00088	0.00056	0.00056	0.00056	0.0053	0.0010	0	0	N/A	N/A	0
TBT	0.1	0.5	-	-	-	0.027	0.018	0.002	0.001	0 001	0.013	0.010	0.043	0.058	0.170	0.048	0 005	0.023	0.066	0.030	0.002	0 001	0.004	0 005	0.002	0.1700	0.0264	1	0	N/A	N/A	N/A

Note: Underlined Values are <LOD. Values highlighted red are equal to or greater than AL1.
PEL Data Source: http://ceqg-rcqe.ccme.ca/en/index.html#void

Summary Table C

Dales Voe Average Concentrations

All units in mg/kg

	AL1	AL2	BAC	<ERL	PEL	Dredge Average	Exceed AL1?	Exceed AL2?	Exceed BAC?	Exceed ERL ?	Exceed PEL?
Source			CSEMP	CSEMP	Canada						
Arsenic	20	70	25	-	41.6	5.1	No	No	No	N/A	No
Cadmium	0.4	4	0.31	1.2	4.2	0.1	No	No	No	No	No
Chromium	50	370	81	81	160	17.6	No	No	No	No	No
Copper	30	300	27	34	108	7.4	No	No	No	No	No
Mercury	0.25	1.5	0.07	0.15	0.7	0.0	No	No	No	No	No
Nickel	30	150	36	-	-	10.5	No	No	No	N/A	N/A
Lead	50	400	38	47	112	13.6	No	No	No	No	No
Zinc	130	600	122	150	271	42.4	No	No	No	No	No
					-						
Napthalene	0.1	-	0.08	0.16	0.319	0.01	No	N/A	No	No	No
Acenaphthylene	0.1	-	-	-	0.128	0.01	No	N/A	N/A	N/A	No
Acenaphthene	0.1	-	-	-	0.0889	0.00	No	N/A	N/A	N/A	No
Fluorene	0.1	-	-	-	0.144	0.01	No	N/A	N/A	N/A	No
Phenanthrene	0.1	-	0.032	0.24	0.544	0.04	No	N/A	**Yes**	No	No
Anthracene	0.1	-	0.05	0.085	0.245	0.01	No	N/A	No	No	No
Fluoranthene	0.1	-	0.039	0.6	1.494	0.04	No	N/A	**Yes**	No	No
Pyrene	0.1	-	0.024	0.665	1.398	0.03	No	N/A	**Yes**	No	No
Benzo(a)anthracene	0.1	-	0.016	0.261	0.693	0.01	No	N/A	No	No	No
Chrysene	0.1	-	0.02	0.384	0.846	0.01	No	N/A	No	No	No
Benzo(b)fluoranthene	0.1	-	-	-	-	0.01	No	N/A	N/A	N/A	N/A
Benzo(k)fluoranthene	0.1	-	-	-	-	0.01	No	N/A	N/A	N/A	N/A
Benzo(a)pyrene	0.1	-	0.03	0.384	0.763	0.01	No	N/A	No	No	No
Indeno(1,2,3cd)pyrene	0.1	-	0.103	0.24	-	0.01	No	N/A	No	No	N/A
Benzo(ghi)perylene	0.1	-	0.08	0.085	-	0.01	No	N/A	No	No	N/A
Dibenzo(a,h)anthracene	0.01	-	-	-	0.135	0.00	No	N/A	N/A	N/A	No
Total Hydrocarbons (THC)	100	-	-	-	-	10.10	No	N/A	N/A	N/A	N/A
PCBs	0.02	0.18	-	-	0.189	0.003	No	No	N/A	N/A	No
TBT	0.1	0.5	-	-	-	0.002	No	No	N/A	N/A	N/A

Summary Table D

Lerwick North Harbour Average Concentrations

All units in mg/kg

	AL1	AL2	BAC	<ERL	PEL	Dredge Average	Exceed AL1?	Exceed AL2?	Exceed BAC?	Exceed ERL ?	Exceed PEL?
Source			CSEMP	CSEMP	Canada						
Arsenic	20	70	25	-	41.6	6.5	No	No	No	N/A	No
Cadmium	0.4	4	0.31	1.2	4.2	0.2	No	No	No	No	No
Chromium	50	370	81	81	160	22.3	No	No	No	No	No
Copper	30	300	27	34	108	18.5	No	No	No	No	No
Mercury	0.25	1.5	0.07	0.15	0.7	0.1	No	No	**Yes**	No	No
Nickel	30	150	36	-	-	19.2	No	No	No	N/A	N/A
Lead	50	400	38	47	112	29.4	No	No	No	No	No
Zinc	130	600	122	150	271	85.9	No	No	No	No	No
					-						
Napthalene	0.1	-	0.08	0.16	0.319	0.03	No	N/A	No	No	No
Acenaphthylene	0.1	-	-	-	0.128	0.02	No	N/A	N/A	N/A	No
Acenaphthene	0.1	-	-	-	0.0889	0.02	No	N/A	N/A	N/A	No
Fluorene	0.1	-	-	-	0.144	0.03	No	N/A	N/A	N/A	No
Phenanthrene	0.1	-	0.032	0.24	0.544	0.17	**Yes**	N/A	**Yes**	No	No
Anthracene	0.1	-	0.05	0.085	0.245	0.05	No	N/A	**Yes**	No	No
Fluoranthene	0.1	-	0.039	0.6	1.494	0.31	**Yes**	N/A	**Yes**	No	No
Pyrene	0.1	-	0.024	0.665	1.398	0.33	**Yes**	N/A	**Yes**	No	No
Benzo(a)anthracene	0.1	-	0.016	0.261	0.693	0.16	**Yes**	N/A	**Yes**	No	No
Chrysene	0.1	-	0.02	0.384	0.846	0.16	**Yes**	N/A	**Yes**	No	No
Benzo(b)fluoranthene	0.1	-	-	-	-	0.14	**Yes**	N/A	N/A	N/A	N/A
Benzo(k)fluoranthene	0.1	-	-	-	-	0.15	**Yes**	N/A	N/A	N/A	N/A
Benzo(a)pyrene	0.1	-	0.03	0.384	0.763	0.19	**Yes**	N/A	**Yes**	No	No
Indeno(1,2,3cd)pyrene	0.1	-	0.103	0.24	-	0.12	**Yes**	N/A	**Yes**	No	N/A
Benzo(ghi)perylene	0.1	-	0.08	0.085	-	0.11	**Yes**	N/A	**Yes**	**Yes**	N/A
Dibenzo(a,h)anthracene	0.01	-	-	-	0.135	0.02	**Yes**	N/A	N/A	N/A	No
Total Hydrocarbons (THC)	100	-	-	-	-	126.69	**Yes**	N/A	N/A	N/A	N/A
PCBs	0.02	0.18	-	-	0.189	0.001	No	No	N/A	N/A	No
TBT	0.1	0.5	-	-	-	0.026	No	No	N/A	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

SOCOTEC

Test Report ID MAR02326

Issue Version: 1

Customer: Envirocentre, Craighall Business Park, 8 Eagle Street, Glasgow, G4 9XA

Customer Reference: 679749 Dales Voe

Date Sampled: 12-13-May-24

Date Samples Received: 23-May-24

Test Report Date: 21-Jun-24

Condition of samples: Cold 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	MAR02326
Issue Version	1
Customer Reference	679749 Dales Voe

		Units	%	%	%	%	%	N/A
		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	UKAS
Client Reference	**SOCOTEC Ref**	**Matrix**	**Total Moisture @ 120°C**	**Total Solids**	**Gravel (>2mm)**	**Sand (63-2000 µm)**	**Silt (<63 µm)**	**Asbestos**
24-DV-01 0.0-0.15m	MAR02326 001	Sediment	30.1	69.9	13.35	83.91	2.74	NAIIS
24-DV-02A 0.0-0.15m	MAR02326 002	Sediment	23.6	76.4	67.10	22.95	9.96	NAIIS
24-DV-03 0.0-0.15m	MAR02326 003	Sediment	32.4	67.6	8.44	79.32	12.24	NAIIS
24-DV-04 0.0-0.15m	MAR02326 004	Sediment	30.4	69.6	37.23	59.05	3.72	NAIIS
24-DV-05 0.0-0.15m	MAR02326 005	Sediment	30.4	69.6	17.12	80.89	1.99	NAIIS
24-DV-06 0.0-0.15m	MAR02326 006	Sediment	22 0	78.0	2 03	92.19	5.78	NAIIS
24-DV-07 0.0-0.15m	MAR02326 007	Sediment	31 5	68.5	21.02	69.19	9.79	NAIIS
		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

NAIIS - No Asbestos Identified In Sample

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	MAR02326
Issue Version	1
Customer Reference	679749 Dales Voe

		Units	% M/M
		Method No	WSLM59*
		Limit of Detection	0.02
		Accreditation	UKAS
Client Reference	**SOCOTEC Ref**	**Matrix**	**TOC**
24-DV-01 0.0-0.15m	MAR02326 001	Sediment	0.61
24-DV-02A 0.0-0.15m	MAR02326 002	Sediment	0.65
24-DV-03 0.0-0.15m	MAR02326 003	Sediment	0.54
24-DV-04 0.0-0.15m	MAR02326 004	Sediment	0.35
24-DV-05 0.0-0.15m	MAR02326 005	Sediment	0.50
24-DV-06 0.0-0.15m	MAR02326 006	Sediment	0.37
24-DV-07 0.0-0.15m	MAR02326 007	Sediment	0.75
		Reference Material (% Recovery)	110
		QC Blank	<0.02

* See Report Notes

NAIIS - No Asbestos Identified In Sample

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	MAR02326
Issue Version	1
Customer Reference	679749 Dales Voe

		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**
24-DV-01 0.0-0.15m	MAR02326 001	Sediment	3.0	0 05	11.4	3.7	0.01	6.5	4.0	19.2
24-DV-02A 0.0-0.15m	MAR02326 002	Sediment	8.8	0.15	20.0	9.3	0.13	15.0	9.5	42.2
24-DV-03 0.0-0.15m	MAR02326 003	Sediment	4.1	0 08	17.8	7.5	0.06	12.5	7.8	46.5
24-DV-04 0.0-0.15m	MAR02326 004	Sediment	3.8	0.11	19.9	11.3	0.04	14.4	6.8	58.3
24-DV-05 0.0-0.15m	MAR02326 005	Sediment	7.1	0 08	15.8	5.0	0.02	8.9	7.4	39.6
24-DV-06 0.0-0.15m	MAR02326 006	Sediment	4.4	0 07	22.0	7.5	0.02	14.7	8.7	50.2
24-DV-07 0.0-0.15m	MAR02326 007	Sediment	5.0	0.12	14.8	8.1	0.03	11.5	9.9	36.3
Certified Reference Material SETOC 768 (% Recovery)			88	89	93	93	95	94	93	90
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	MAR02326
Issue Version	1
Customer Reference	679749 Dales Voe

		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)**
24-DV-01 0.0-0.15m	MAR02326 001	Sediment	<1	<1
24-DV-02A 0.0-0.15m	MAR02326 002	Sediment	<5	<5
24-DV-03 0.0-0.15m	MAR02326 003	Sediment	<1	<1
24-DV-04 0.0-0.15m	MAR02326 004	Sediment	5.34	<1
24-DV-05 0.0-0.15m	MAR02326 005	Sediment	<1	<1
24-DV-06 0.0-0.15m	MAR02326 006	Sediment	<1	<1
24-DV-07 0.0-0.15m	MAR02326 007	Sediment	<5	<5
Certified Reference Material BCR-646 (% Recovery)			101	88
QC Blank			<1	<1

* 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	MAR02326
Issue Version	1
Customer Reference	679749 Dales Voe

		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**
24-DV-01 0.0-0.15m	MAR02326 001	Sediment	<1	<1	<1	<1	<1	<1
24-DV-02A 0.0-0.15m	MAR02326 002	Sediment	<1	<1	<1	2.65	2.62	3.17
24-DV-03 0.0-0.15m	MAR02326 003	Sediment	<1	<1	<1	<1	1.71	2 34
24-DV-04 0.0-0.15m	MAR02326 004	Sediment	134	2.69	52.9	117	78.6	84.3
24-DV-05 0.0-0.15m	MAR02326 005	Sediment	<1	<1	<1	<1	<1	<1
24-DV-06 0.0-0.15m	MAR02326 006	Sediment	<1	<1	<1	<1	<1	<1
24-DV-07 0.0-0.15m	MAR02326 007	Sediment	<1	<1	1.82	5.19	6.35	7 32
Certified Reference Material NIST 1941b (% Recovery)			62	109	65	65	63	88
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	MAR02326
Issue Version	1
Customer Reference	679749 Dales Voe

		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	N*
Client Reference	**SOCOTEC Ref**	**Matrix**	**BENZGHIP**	**BKF***	**CHRYSENE ***	**DBENZAH**	**FLUORANT**	**FLUORENE**
24-DV-01 0.0-0.15m	MAR02326 001	Sediment	<1	<1	<1	<1	<1	<1
24-DV-02A 0.0-0.15m	MAR02326 002	Sediment	3.04	3.00	2.87	<1	6.59	<1
24-DV-03 0.0-0.15m	MAR02326 003	Sediment	2.65	2.05	1.81	<1	3.01	<1
24-DV-04 0.0-0.15m	MAR02326 004	Sediment	41 0	72.0	108	13.9	356	88.3
24-DV-05 0.0-0.15m	MAR02326 005	Sediment	<1	<1	<1	<1	<1	<1
24-DV-06 0.0-0.15m	MAR02326 006	Sediment	1.48	<1	<1	<1	<1	<1
24-DV-07 0.0-0.15m	MAR02326 007	Sediment	8.00	6.92	5.81	<1	12.5	1.60
Certified Reference Material NIST 1941b (% Recovery)			80	84	84	120	75	50
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	MAR02326
Issue Version	1
Customer Reference	679749 Dales Voe

		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	UKAS	UKAS	UKAS	N
Client Reference	**SOCOTEC Ref**	**Matrix**	**INDPYR**	**NAPTH**	**PHENANT**	**PYRENE**	**THC**
24-DV-01 0.0-0.15m	MAR02326 001	Sediment	<1	<1	<1	<1	4020
24-DV-02A 0.0-0.15m	MAR02326 002	Sediment	3.69	1.86	4.49	5.03	10800
24-DV-03 0.0-0.15m	MAR02326 003	Sediment	3.17	2.85	1.86	2.47	12900
24-DV-04 0.0-0.15m	MAR02326 004	Sediment	52.1	68.9	412	220	16200
24-DV-05 0.0-0.15m	MAR02326 005	Sediment	<1	<1	<1	<1	4430
24-DV-06 0.0-0.15m	MAR02326 006	Sediment	1.85	<1	<1	<1	6350
24-DV-07 0.0-0.15m	MAR02326 007	Sediment	9.04	2.89	6.84	9.86	22200
Certified Reference Material NIST 1941b (% Recovery)			89	60	76	67	102~
QC Blank			<1	<1	<1	<1	<100

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	MAR02326
Issue Version	1
Customer Reference	679749 Dales Voe

		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**	**PCB180**
24-DV-01 0.0-0.15m	MAR02326 001	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
24-DV-02A 0.0-0.15m	MAR02326 002	Sediment	<0.08	0.25	0.40	0.27	0.39	0.33	<0.08
24-DV-03 0.0-0.15m	MAR02326 003	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
24-DV-04 0.0-0.15m	MAR02326 004	Sediment	0.61	3.16	4.77	3.94	4.61	3.22	1.40
24-DV-05 0.0-0.15m	MAR02326 005	Sediment	0.21	0.40	0.48	0.42	0.24	0.33	<0.08
24-DV-06 0.0-0.15m	MAR02326 006	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
24-DV-07 0.0-0.15m	MAR02326 007	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Certified Reference Material NIST 1941b (% Recovery)			75	96	99	100	96	100	91
QC Blank			<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

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, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID MAR02326
Issue Version 1
Customer Reference 679749 Dales Voe

REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
WSLM59*	MAR02326.001-007	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
ICPMSS*	MAR02326.001-007	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
SUB_01*	MAR02326.001-007	Analysis was conducted by an approved subcontracted laboratory.
SUB_02*	MAR02326.001-007	Analysis was conducted by an approved subcontracted laboratory.
ASC/SOP/301	MAR02326 002, 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/303/304	MAR02326.001-007	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 (FLUORENE) . These circumstances should be taken into consideration when utilising the data.
ASC/SOP/303/304	MAR02326.001-007	Benzo[k]fluoranthene is known to coelute with Benzo[j]fluoranthene and these peaks can not be resolved. t 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	MAR02326.001-007	Chrysene is known to coelute with Triphenylene and these peaks can not be resolved. t is believed Triphenylene is 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.

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	MAR02326
Issue Version	1
Customer Reference	679749 Dales Voe

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/ND R.
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-F D analysis.
Polychlorinated Biphenyls (PCBs)	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	DIELDR N	Dieldrin
BBF	Benzo[b]fluoranthene	FLUORENE	Fluorene	HCB	Hexachlorobenzene
BEP	Benzo[e]pyrene	NDPYR	Indeno[1,2,3-cd]pyrene	DDD	p,p'-Dichlorodiphenyldichloroethane
BENZGH P	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		

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 MAR02464

Issue Version: 1

Customer: EnviroCentre Ltd, Craighall Business Park, 8 Eagle Street, Glasgow, G4 9XA

Customer Reference: 679749 - Dales Voe

Date Sampled: 13-Aug-24

Date Samples Received: 26-Sep-24

Test Report Date: 17-Oct-24

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	MAR02464
Issue Version	1
Customer Reference	679749 - Dales Voe

		Units	%	%	% M/M
		Method No	ASC/SOP/303	ASC/SOP/303	WSLM59*
		Limit of Detection	0 2	0 2	0 02
		Accreditation	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Total Moisture @ 120°C**	**Total Solids**	**TOC**
24-DV-02A 0 00-0 33m	MAR02464 001	Sediment	21 5	78 5	0 59
24-DV-04 0 00-0 29m	MAR02464 002	Sediment	20 3	79 7	0 59
24-DV-05 0 00-0 37m	MAR02464 003	Sediment	19 8	80 2	0 42
24-DV-06 0 00-0 22m	MAR02464 004	Sediment	17 6	82 4	0 58
		Reference Material (% Recovery)	N/A	N/A	105
		QC Blank	N/A	N/A	<0 02

* 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 MAR02464
Issue Version 1
Customer Reference 679749 - Dales Voe

		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**
24-DV-02A 0 00-0 33m	MAR02464 001	Sediment	6 1	0 09	14 3	7 0	0 02	7 2	8 7	34 7
24-DV-04 0 00-0 29m	MAR02464 002	Sediment	4 4	0 15	33 4	14 9	0 04	11 8	72 3	92 7
24-DV-05 0 00-0 37m	MAR02464 003	Sediment	6 8	0 09	12 6	3 6	0 02	5 8	9 3	25 4
24-DV-06 0 00-0 22m	MAR02464 004	Sediment	2 5	0 07	11 9	4 0	0 01	7 7	5 0	21 6
Certified Reference Material SETOC 768 (% Recovery)			98	106	99	104	91	102	101	103
QC Blank			<0 5	<0 04	<0 5	<0 5	<0 01	<0 5	<0 5	<2

* 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	MAR02464
Issue Version	1
Customer Reference	679749 - Dales Voe

		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)**
24-DV-02A 0 00-0 33m	MAR02464 001	Sediment	<1	<1
24-DV-04 0 00-0 29m	MAR02464 002	Sediment	2 35	<1
24-DV-05 0 00-0 37m	MAR02464 003	Sediment	<1	<1
24-DV-06 0 00-0 22m	MAR02464 004	Sediment	<1	<1
Certified Reference Material BCR-646 (% Recovery)			79	92
QC Blank			<1	<1

* 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 MAR02464
Issue Version 1
Customer Reference 679749 - Dales Voe

		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**
24-DV-02A 0 00-0 33m	MAR02464 001	Sediment	6 73	<1	2 91	7 85	5 69	6 54
24-DV-04 0 00-0 29m	MAR02464 002	Sediment	4 48	<1	2 12	8 04	6 57	8 64
24-DV-05 0 00-0 37m	MAR02464 003	Sediment	2 90	<1	<1	3 25	2 49	3 57
24-DV-06 0 00-0 22m	MAR02464 004	Sediment	<1	<1	1 47	2 86	3 00	4 14
Certified Reference Material NIST 1941b (% Recovery)			70	114	65	64	56	80
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 MAR02464
Issue Version 1
Customer Reference 679749 - Dales Voe

		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**	**BENZGHIP**	**BKF***	**CHRYSENE ***	**DBENZAH**	**FLUORANT**	**FLUORENE**
24-DV-02A 0 00-0 33m	MAR02464 001	Sediment	3 40	6 07	7 92	<1	23 3	4 27
24-DV-04 0 00-0 29m	MAR02464 002	Sediment	4 65	6 90	9 23	<1	21 0	2 71
24-DV-05 0 00-0 37m	MAR02464 003	Sediment	2 41	2 84	3 32	<1	9 68	1 64
24-DV-06 0 00-0 22m	MAR02464 004	Sediment	3 65	3 64	3 22	<1	7 42	<1
Certified Reference Material NIST 1941b (% Recovery)			56	75	88	90	80	56
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 MAR02464
Issue Version 1
Customer Reference 679749 - Dales Voe

		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	UKAS	UKAS	UKAS	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**INDPYR**	**NAPTH**	**PHENANT**	**PYRENE**	**THC**
24-DV-02A 0 00-0 33m	MAR02464 001	Sediment	3 71	<1	19 6	15 0	5100
24-DV-04 0 00-0 29m	MAR02464 002	Sediment	5 17	<1	15 3	19 9	16100
24-DV-05 0 00-0 37m	MAR02464 003	Sediment	2 32	1 26	9 13	6 31	4310
24-DV-06 0 00-0 22m	MAR02464 004	Sediment	3 73	<1	4 46	5 86	8640
Certified Reference Material NIST 1941b (% Recovery)			65	65	78	71	90~
QC Blank			<1	<1	<1	<1	<100

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	MAR02464
Issue Version	1
Customer Reference	679749 - Dales Voe

		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**	**PCB180**
24-DV-02A 0 00-0 33m	MAR02464 001	Sediment	<0 08	0 11	0 14	0 20	0 15	0 12	<0 08
24-DV-04 0 00-0 29m	MAR02464 002	Sediment	<0 08	<0 08	<0 08	<0 08	<0 08	<0 08	<0 08
24-DV-05 0 00-0 37m	MAR02464 003	Sediment	<0 08	<0 08	<0 08	<0 08	<0 08	<0 08	<0 08
24-DV-06 0 00-0 22m	MAR02464 004	Sediment	<0 08	<0 08	<0 08	<0 08	<0 08	<0 08	<0 08
Certified Reference Material NIST 1941b (% Recovery)			61	81	90	97	109	79	90
QC Blank			<0 08	<0 08	<0 08	<0 08	<0 08	<0 08	<0 08

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, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID MAR02464
Issue Version 1
Customer Reference 679749 - Dales Voe

REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
WSLM59*	MAR02464 001-004	Analysis was conducted by an internal SOCOTEC laboratory UKAS accredited analysis by this laboratory is under UKAS number 1252
ICPMSS*	MAR02464 001-004	Analysis was conducted by an internal SOCOTEC laboratory UKAS accredited analysis by this laboratory is under UKAS number 1252
ASC/SOP/303/304	MAR02464 001-004	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	MAR02464 001-004	Chrysene is known to coelute with Triphenylene and these peaks can not be resolved It is believed Triphenylene is 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

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	MAR02464
Issue Version	1
Customer Reference	679749 - Dales Voe

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
Total Organic Carbon (TOC)	Air dried and ground	Carbonate removal and sulphurous acid/combustion at 1600°C/ND R
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-F D analysis
Polychlorinated Biphenyls (PCBs)	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	D ELDR N	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		

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 MAR02325

Issue Version: 1

Customer: EnviroCentre Ltd, Craighall Business Park, 8 Eagle Street, Glasgow, G4 9XA

Customer Reference: 679749 Lerwick North Harbour

Date Sampled: 14-15-May-24

Date Samples Received: 23-May-24

Test Report Date: 21-Jun-24

Condition of samples: Cold 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

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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

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Issue Version 1
Customer Reference 679749 Lerwick North Harbour

		Units	%	%	%	%	%	N/A
		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	UKAS
Client Reference	**SOCOTEC Ref**	**Matrix**	**Total Moisture @ 120°C**	**Total Solids**	**Gravel (>2mm)**	**Sand (63-2000 µm)**	**Silt (<63 µm)**	**Asbestos**
24-01 0.0-0.15m	MAR02325 001	Sediment	49 3	50.7	1.08	59.48	39.44	NAIIS
24-02 0.0-0.15m	MAR02325 002	Sediment	28 9	71.1	20.58	65.77	13.64	NAIIS
24-03 0.0-0.15m	MAR02325 003	Sediment	28.1	71.9	12.76	56.87	30.37	NAIIS
24-04 0.0-0.15m	MAR02325 004	Sediment	43.7	56.3	2.13	69.12	28.75	NAIIS
24-05 0.0-0.15m	MAR02325 005	Sediment	59.6	40.4	2.73	62.27	35 0	NAIIS
24-06 0.0-0.15m	MAR02325 006	Sediment	28 3	71.7	0.53	75.0	24.48	NAIIS
24-07 0.0-0.15m	MAR02325 007	Sediment	35 9	64.1	5.62	65.17	29.21	NAIIS
24-08 0.0-0.15m	MAR02325 008	Sediment	41 3	58.7	0.90	57.27	41.82	NAIIS
24-09 0.0-0.15m	MAR02325 009	Sediment	22.6	77.4	68.66	25.09	6.25	NAIIS
24-10 0.0-0.15m	MAR02325 010	Sediment	20 0	80.0	12.93	78.54	8.53	NAIIS
24-12 0.0-0.15m	MAR02325 011	Sediment	36.7	63.3	20.39	66.47	13.14	NAIIS
		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
NAIIS - No Asbestos Identified In Sample

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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	MAR02325
Issue Version	1
Customer Reference	679749 Lerwick North Harbour

		Units	% M/M
		Method No	WSLM59*
		Limit of Detection	0.02
		Accreditation	UKAS
Client Reference	**SOCOTEC Ref**	**Matrix**	**TOC**
24-01 0.0-0.15m	MAR02325 001	Sediment	1.93
24-02 0.0-0.15m	MAR02325 002	Sediment	1.27
24-03 0.0-0.15m	MAR02325 003	Sediment	0.28
24-04 0.0-0.15m	MAR02325 004	Sediment	0.86
24-05 0.0-0.15m	MAR02325 005	Sediment	3.68
24-06 0.0-0.15m	MAR02325 006	Sediment	1.11
24-07 0.0-0.15m	MAR02325 007	Sediment	10.8
24-08 0.0-0.15m	MAR02325 008	Sediment	1.67
24-09 0.0-0.15m	MAR02325 009	Sediment	2.25
24-10 0.0-0.15m	MAR02325 010	Sediment	1.39
24-12 0.0-0.15m	MAR02325 011	Sediment	4.56
		Reference Material (% Recovery)	104
		QC Blank	<0.02

* See Report Notes

NAIIS - No Asbestos Identified In Sample

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 MAR02325
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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	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference	**SOCOTEC Ref**	**Matrix**	**Arsenic**	**Cadmium**	**Chromium**	**Copper**	**Mercury**	**Nickel**	**Lead**	**Zinc**
24-01 0.0-0.15m	MAR02325 001	Sediment	7.90	0 37	36.6	36.8	0.13	26.6	34.2	121
24-02 0.0-0.15m	MAR02325 002	Sediment	4.60	0 26	23.9	19.2	0.03	22.9	58.8	370
24-03 0.0-0.15m	MAR02325 003	Sediment	5.60	0 26	29.2	19.3	0.03	23.4	32.6	143
24-04 0.0-0.15m	MAR02325 004	Sediment	4.20	0 24	25.8	24.2	0.11	18.8	23.7	83.6
24-05 0.0-0.15m	MAR02325 005	Sediment	7.80	0.42	28.4	32.9	0.14	21.0	29.8	92.5
24-06 0.0-0.15m	MAR02325 006	Sediment	3.80	0.19	20.7	21.0	0.19	15.9	22.2	67.4
24-07 0.0-0.15m	MAR02325 007	Sediment	4.20	0.11	16.4	18.3	0.10	13.8	17.4	48.5
24-08 0.0-0.15m	MAR02325 008	Sediment	5.40	0 36	23.3	39.6	0.30	17.0	56.4	109
24-09 0.0-0.15m	MAR02325 009	Sediment	4.50	0.11	10.1	22.6	0.06	55.3	12.1	24.8
24-10 0.0-0.15m	MAR02325 010	Sediment	2.10	0 05	9.10	6.60	0.04	8.20	15.6	20.4
24-12 0.0-0.15m	MAR02325 011	Sediment	2.80	0 07	15.4	12.8	0.05	16.6	12.6	30.7
Certified Reference Material SETOC 768 (% Recovery)			98	98	103	102	104	101	103	99
QC Blank			<0.5	<0.04	<0.5	<0.5	<0.01	<0.5	<0.5	<2

* 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	MAR02325
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Customer Reference	679749 Lerwick North Harbour

		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)**
24-01 0.0-0.15m	MAR02325 001	Sediment	11.9	27.1
24-02 0.0-0.15m	MAR02325 002	Sediment	<1	1.72
24-03 0.0-0.15m	MAR02325 003	Sediment	<1	<1
24-04 0.0-0.15m	MAR02325 004	Sediment	<5	13.4
24-05 0.0-0.15m	MAR02325 005	Sediment	<5	43.2
24-06 0.0-0.15m	MAR02325 006	Sediment	57.6	170
24-07 0.0-0.15m	MAR02325 007	Sediment	<5	<5
24-08 0.0-0.15m	MAR02325 008	Sediment	28.5	65.5
24-09 0.0-0.15m	MAR02325 009	Sediment	<1	1.94
24-10 0.0-0.15m	MAR02325 010	Sediment	<1	<1
24-12 0.0-0.15m	MAR02325 011	Sediment	<5	<5
Certified Reference Material BCR-646 (% Recovery)			101	88
QC Blank			<1	<1

* See Report Notes

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Test Report ID	MAR02325
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Customer Reference	679749 Lerwick North Harbour

		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**
24-01 0.0-0.15m	MAR02325 001	Sediment	8.03	21.1	45.3	157	190	147
24-02 0.0-0.15m	MAR02325 002	Sediment	<1	<1	2.23	3.01	3.22	2 81
24-03 0.0-0.15m	MAR02325 003	Sediment	<1	<1	<1	2.06	3.39	3 09
24-04 0.0-0.15m	MAR02325 004	Sediment	17.7	57.4	212	401	427	289
24-05 0.0-0.15m	MAR02325 005	Sediment	<5	23.1	42.3	370	316	250
24-06 0.0-0.15m	MAR02325 006	Sediment	11 8	12.0	23.7	88.1	113	86.6
24-07 0.0-0.15m	MAR02325 007	Sediment	6.91	4.43	18.3	58.2	76.9	64.3
24-08 0.0-0.15m	MAR02325 008	Sediment	37.7	43.9	124	427	512	416
24-09 0.0-0.15m	MAR02325 009	Sediment	6.35	3.55	9.79	12.3	10.8	9.40
24-10 0.0-0.15m	MAR02325 010	Sediment	<1	<1	1.38	3.12	4.37	4.63
24-12 0.0-0.15m	MAR02325 011	Sediment	7.52	22.9	33.1	134	157	133
		Certified Reference Material NIST 1941b (% Recovery)	70	110	69	60	55	85
		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

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Issue Version 1
Customer Reference 679749 Lerwick North Harbour

		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**	**BENZGHIP**	**BKF***	**CHRYSENE ***	**DBENZAH**	**FLUORANT**	**FLUORENE**
24-01 0.0-0.15m	MAR02325 001	Sediment	126	160	162	28.7	278	21.7
24-02 0.0-0.15m	MAR02325 002	Sediment	2.93	3.47	3.46	<1	4.88	<1
24-03 0.0-0.15m	MAR02325 003	Sediment	3.94	3.01	2.41	<1	4.16	<1
24-04 0.0-0.15m	MAR02325 004	Sediment	226	335	380	56.0	804	79.6
24-05 0.0-0.15m	MAR02325 005	Sediment	125	279	282	32.6	432	16.7
24-06 0.0-0.15m	MAR02325 006	Sediment	71 3	93.9	96.6	16.6	173	13.2
24-07 0.0-0.15m	MAR02325 007	Sediment	52 9	63.1	67.2	11.8	119	7 84
24-08 0.0-0.15m	MAR02325 008	Sediment	311	409	464	79.1	983	64.1
24-09 0.0-0.15m	MAR02325 009	Sediment	12 5	9.24	13.3	2.21	16.3	13.9
24-10 0.0-0.15m	MAR02325 010	Sediment	4.63	3.40	3.88	<1	4.99	<1
24-12 0.0-0.15m	MAR02325 011	Sediment	95.1	126	154	23.8	344	15.5
Certified Reference Material NIST 1941b (% Recovery)			67	77	81	97	79	56
QC Blank			<1	<1	<1	<1	<1	<1

For full analyte name see method summaries
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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)
		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	UKAS	UKAS	UKAS	N
Client Reference	**SOCOTEC Ref**	**Matrix**	**INDPYR**	**NAPTH**	**PHENANT**	**PYRENE**	**THC**
24-01 0.0-0.15m	MAR02325 001	Sediment	130	25.6	128	292	169000
24-02 0.0-0.15m	MAR02325 002	Sediment	2.77	1.81	2.86	6.02	16000
24-03 0.0-0.15m	MAR02325 003	Sediment	3.12	1.92	2.62	5.52	20200
24-04 0.0-0.15m	MAR02325 004	Sediment	259	26.4	506	755	148000
24-05 0.0-0.15m	MAR02325 005	Sediment	136	44.6	96.5	773	432000
24-06 0.0-0.15m	MAR02325 006	Sediment	75.7	27.5	105	186	88100
24-07 0.0-0.15m	MAR02325 007	Sediment	53 8	23.6	68.0	118	69000
24-08 0.0-0.15m	MAR02325 008	Sediment	324	32.4	528	916	315000
24-09 0.0-0.15m	MAR02325 009	Sediment	5.83	158	46.7	43.8	29100
24-10 0.0-0.15m	MAR02325 010	Sediment	4.24	3.52	4.22	5.68	19000
24-12 0.0-0.15m	MAR02325 011	Sediment	94.7	12.3	155	293	44700
Certified Reference Material NIST 1941b (% Recovery)			65	57	77	67	95~
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

Certificate of Analysis

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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)
		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**	**PCB180**
24-01 0.0-0.15m	MAR02325 001	Sediment	<0.08	<0.08	0.11	0.13	0.16	0.21	<0.08
24-02 0.0-0.15m	MAR02325 002	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
24-03 0.0-0.15m	MAR02325 003	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
24-04 0.0-0.15m	MAR02325 004	Sediment	<0.08	<0.08	<0.08	0.08	<0.08	0.11	<0.08
24-05 0.0-0.15m	MAR02325 005	Sediment	<0.08	<0.08	0.15	<0.08	0.10	0.26	0.13
24-06 0.0-0.15m	MAR02325 006	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	0.11	<0.08
24-07 0.0-0.15m	MAR02325 007	Sediment	<0.08	<0.08	<0.08	0.05	<0.08	<0.08	<0.08
24-08 0.0-0.15m	MAR02325 008	Sediment	<0.08	0.13	0.37	0.36	0.45	0.59	0.24
24-09 0.0-0.15m	MAR02325 009	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
24-10 0.0-0.15m	MAR02325 010	Sediment	<0.08	<0.08	0.10	<0.08	0.26	0.15	0.13
24-12 0.0-0.15m	MAR02325 011	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Certified Reference Material NIST 1941b (% Recovery)			69	101	99	98	104	98	94
QC Blank			0.08	0.08	0.08	0.08	0.08	0.08	0.08

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

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Test Report ID MAR02325
Issue Version 1
Customer Reference 679749 Lerwick North Harbour

REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
WSLM59*	MAR02325.001-011	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
ICPMSS*	MAR02325.001-011	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
SUB_01*	MAR02325.001-011	Analysis was conducted by an approved subcontracted laboratory.
SUB_02*	MAR02325.001-011	Analysis was conducted by an approved subcontracted laboratory.
ASC/SOP/301	MAR02325.004-005, .007, 011	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/303/304	MAR02325 005	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/303/304	MAR02325.001-011	Benzo[k]fluoranthene is known to coelute with Benzo[j]fluoranthene and these peaks can not be resolved. t 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	MAR02325.001-011	Chrysene is known to coelute with Triphenylene and these peaks can not be resolved. t is believed Triphenylene is 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.

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

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Test Report ID	MAR02325
Issue Version	1
Customer Reference	679749 Lerwick North Harbour

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/ND R.
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-F D analysis.
Polychlorinated Biphenyls (PCBs)	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	DIELDR N	Dieldrin
BBF	Benzo[b]fluoranthene	FLUORENE	Fluorene	HCB	Hexachlorobenzene
BEP	Benzo[e]pyrene	NDPYR	Indeno[1,2,3-cd]pyrene	DDD	p,p'-Dichlorodiphenyldichloroethane
BENZGH P	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		

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 MAR02457

Issue Version: 1

Customer: EnviroCentre Ltd

Customer Reference: 679749 - Lerwick North Harbour

Date Sampled: 14-May-24

Date Samples Received: 23-Sep-24

Test Report Date: 16-Oct-24

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	MAR02457
Issue Version	1
Customer Reference	679749 - Lerwick North Harbour

		Units	%	%	% M/M
		Method No	ASC/SOP/303	ASC/SOP/303	WSLM59*
		Limit of Detection	0 2	0 2	0 02
		Accreditation	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Total Moisture @ 120°C**	**Total Solids**	**TOC**
24-01	MAR02457 001	Sediment	28 7	71 3	1 33
24-02	MAR02457 002	Sediment	14 1	85 9	0 36
24-05	MAR02457 003	Sediment	33 7	66 3	2 30
24-06 0 15-0 64m	MAR02457 004	Sediment	29 1	70 9	1 78
24-08 0 15-0 7m	MAR02457 005	Sediment	33 3	66 7	1 00
24-12	MAR02457 006	Sediment	26 0	74 0	1 11
		Reference Material (% Recovery)	N/A	N/A	97
		QC Blank	N/A	N/A	<0 02

* 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 MAR02457
Issue Version 1
Customer Reference 679749 - Lerwick North Harbour

		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**
24-01	MAR02457 001	Sediment	9 5	0 12	29 2	10 2	0 08	20 3	30 2	63 6
24-02	MAR02457 002	Sediment	7 8	0 08	22 4	8 5	0 08	15 4	27 9	55 7
24-05	MAR02457 003	Sediment	13 3	0 19	26 3	17 1	0 16	19 2	55 9	94 4
24-06 0 15-0 64m	MAR02457 004	Sediment	13 9	0 10	20 1	10 7	0 08	14 6	37 7	75 6
24-08 0 15-0 7m	MAR02457 005	Sediment	17 0	0 17	29 7	19 2	0 22	22 4	62 6	98 4
24-12	MAR02457 006	Sediment	4 1	<0 04	10 2	2 2	0 01	5 7	7 9	18 3
Certified Reference Material SETOC 768 (% Recovery)			95	103	91	97	90	95	95	97
QC Blank			<0 5	<0 04	<0 5	<0 5	<0 01	<0 5	<0 5	<2

* 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	MAR02457
Issue Version	1
Customer Reference	679749 - Lerwick North Harbour

		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)**
24-01	MAR02457 001	Sediment	6 41	17 6
24-02	MAR02457 002	Sediment	<1	<1
24-05	MAR02457 003	Sediment	17 3	57 6
24-06 0 15-0 64m	MAR02457 004	Sediment	11 6	48 1
24-08 0 15-0 7m	MAR02457 005	Sediment	6 42	30 4
24-12	MAR02457 006	Sediment	<1	1 83
Certified Reference Material BCR-646 (% Recovery)			79	92
QC Blank			<1	<1

* 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 MAR02457
Issue Version 1
Customer Reference 679749 - Lerwick North Harbour

		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**
24-01	MAR02457 001	Sediment	14 6	33 9	66 9	184	235	181
24-02	MAR02457 002	Sediment	<1	<1	<1	<1	<1	<1
24-05	MAR02457 003	Sediment	34 9	41 9	122	361	444	338
24-06 0 15-0 64m	MAR02457 004	Sediment	15 5	20 2	53 2	158	191	153
24-08 0 15-0 7m	MAR02457 005	Sediment	47 5	64 3	191	524	670	512
24-12	MAR02457 006	Sediment	6 62	12 0	20 2	57 1	65 3	50 2
Certified Reference Material NIST1941b (% Recovery)			71	100	66	68	63	87
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 MAR02457
Issue Version 1
Customer Reference 679749 - Lerwick North Harbour

		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	N*
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**BENZGHIP**	**BKF***	**CHRYSENE ***	**DBENZAH**	**FLUORANT**	**FLUORENE**
24-01	MAR02457 001	Sediment	164	186	197	27 6	416	29 4
24-02	MAR02457 002	Sediment	<1	<1	<1	<1	<1	<1
24-05	MAR02457 003	Sediment	273	347	373	53 0	736	57 7
24-06 0 15-0 64m	MAR02457 004	Sediment	119	149	165	21 0	326	24 8
24-08 0 15-0 7m	MAR02457 005	Sediment	413	526	522	86 6	982	92 3
24-12	MAR02457 006	Sediment	41 4	47 5	52 4	9 37	126	10 5
Certified Reference Material NIST1941b (% Recovery)			57	85	88	102	82	55
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 MAR02457
Issue Version 1
Customer Reference 679749 - Lerwick North Harbour

		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	UKAS	UKAS	UKAS	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**INDPYR**	**NAPTH**	**PHENANT**	**PYRENE**	**THC**
24-01	MAR02457 001	Sediment	165	22 3	199	422	178000
24-02	MAR02457 002	Sediment	<1	<1	<1	1 52	5850
24-05	MAR02457 003	Sediment	293	44 1	380	723	279000
24-06 0 15-0 64m	MAR02457 004	Sediment	126	18 7	160	314	149000
24-08 0 15-0 7m	MAR02457 005	Sediment	462	57 1	584	1040	361000
24-12	MAR02457 006	Sediment	42 8	8 43	65 3	113	30300
Certified Reference Material NIST1941b (% Recovery)			80	61	79	72	95~
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

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 MAR02457
Issue Version 1
Customer Reference 679749 - Lerwick North Harbour

		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	N*	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB138**	**PCB153**	**PCB180**
24-01	MAR02457 001	Sediment	<0 08	<0 08	<0 08	0 10	0 08	0 13	<0 08
24-02	MAR02457 002	Sediment	<0 08	<0 08	<0 08	<0 08	<0 08	<0 08	<0 08
24-05	MAR02457 003	Sediment	0 12	0 08	0 31	0 33	0 53	0 56	0 26
24-06 0 15-0 64m	MAR02457 004	Sediment	<0 08	<0 08	0 09	0 10	0 16	0 13	<0 08
24-08 0 15-0 7m	MAR02457 005	Sediment	0 13	0 48	0 89	1 10	1 18	1 11	0 44
24-12	MAR02457 006	Sediment	<0 08	<0 08	<0 08	<0 08	<0 08	<0 08	<0 08
Certified Reference Material NIST1941b (% Recovery)			78	88	110	89	118	106	97
QC Blank			<0 08	<0 08	<0 08	<0 08	<0 08	<0 08	<0 08

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 MAR02457
Issue Version 1
Customer Reference 679749 - Lerwick North Harbour

REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
WSLM59*	MAR02457 001-006	Analysis was conducted by an internal SOCOTEC laboratory UKAS accredited analysis by this laboratory is under UKAS number 1252
ICPMSS*	MAR02457 001-006	Analysis was conducted by an internal SOCOTEC laboratory UKAS accredited analysis by this laboratory is under UKAS number 1252
ASC/SOP/302	MAR02457 001-006	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 (PCB118) These circumstances should be taken into consideration when utilising the data
ASC/SOP/303/304	MAR02457 001-006	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 (Fluorene) These circumstances should be taken into consideration when utilising the data
ASC/SOP/303/304	MAR02457 001-006	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	MAR02457 001-006	Chrysene is known to coelute with Triphenylene and these peaks can not be resolved It is believed Triphenylene is 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

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	MAR02457
Issue Version	1
Customer Reference	679749 - Lerwick North Harbour

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
Total Organic Carbon (TOC)	Air dried and ground	Carbonate removal and sulphurous acid/combustion at 1600°C/ND R
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-F D analysis
Polychlorinated Biphenyls (PCBs)	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		

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 MAR02465

Issue Version: 1

Customer: EnviroCentre Ltd, Craighall Business Park, 8 Eagle Street, Glasgow, G4 9XA

Customer Reference: 679749 - Lerwick North Harbour

Date Sampled: 14-May-24

Date Samples Received: 26-Sep-24

Test Report Date: 17-Oct-24

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	MAR02465
Issue Version	1
Customer Reference	679749 - Lerwick North Harbour

		Units	%	%	% M/M
		Method No	ASC/SOP/303	ASC/SOP/303	WSLM59*
		Limit of Detection	0 2	0 2	0 02
		Accreditation	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Total Moisture @ 120°C**	**Total Solids**	**TOC**
24-04 - 0 35m	MAR02465 001	Sediment	28 3	71 7	0 81
24-07 - 0 36m	MAR02465 002	Sediment	28 3	71 7	1 06
24-10 - 0 28m	MAR02465 003	Sediment	20 1	79 9	0 56
		Reference Material (% Recovery)	N/A	N/A	105
		QC Blank	N/A	N/A	<0 02

* 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 MAR02465
Issue Version 1
Customer Reference 679749 - Lerwick North Harbour

		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**
24-04 - 0 35m	MAR02465 001	Sediment	4 7	0 27	32	18 7	0 06	20 6	20 1	83 6
24-07 - 0 36m	MAR02465 002	Sediment	5 1	0 31	26 7	22 8	0 1	19 8	23 5	96 5
24-10 - 0 28m	MAR02465 003	Sediment	1 4	0 06	10 2	7 3	0 03	6 4	7 7	20 7
Certified Reference Material SETOC 768 (% Recovery)			100	107	99	105	99	98	104	103
QC Blank			<0 5	<0 04	<0 5	<0 5	<0 01	<0 5	<0 5	<2

* 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	MAR02465
Issue Version	1
Customer Reference	679749 - Lerwick North Harbour

		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)**
24-04 - 0 35m	MAR02465 001	Sediment	5 00	9 73
24-07 - 0 36m	MAR02465 002	Sediment	6 55	22 5
24-10 - 0 28m	MAR02465 003	Sediment	1 83	3 90
		Certified Reference Material BCR-646 (% Recovery)	79	92
		QC Blank	<1	<1

* 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 MAR02465
Issue Version 1
Customer Reference 679749 - Lerwick North Harbour

		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**
24-04 - 0 35m	MAR02465 001	Sediment	14 2	14 1	32 3	63 8	74 3	53 5
24-07 - 0 36m	MAR02465 002	Sediment	17 0	20 4	52 2	168	193	128
24-10 - 0 28m	MAR02465 003	Sediment	2 36	2 05	9 13	34 8	35 3	33 5
Certified Reference Material NIST 1941b (% Recovery)			70	114	65	64	56	80
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

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Test Report ID MAR02465
Issue Version 1
Customer Reference 679749 - Lerwick North Harbour

		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**	**BENZGHIP**	**BKF***	**CHRYSENE ***	**DBENZAH**	**FLUORANT**	**FLUORENE**
24-04 - 0 35m	MAR02465 001	Sediment	64 5	65 7	69 1	14 5	135	20 2
24-07 - 0 36m	MAR02465 002	Sediment	103	167	181	21 0	305	25 8
24-10 - 0 28m	MAR02465 003	Sediment	24 4	28 2	39 9	6 89	70 1	5 90
Certified Reference Material NIST 1941b (% Recovery)			56	75	88	90	80	56
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 MAR02465
Issue Version 1
Customer Reference 679749 - Lerwick North Harbour

		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	UKAS	UKAS	UKAS	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**INDPYR**	**NAPTH**	**PHENANT**	**PYRENE**	**THC**
24-04 - 0 35m	MAR02465 001	Sediment	39 0	15 4	77 4	130	72300
24-07 - 0 36m	MAR02465 002	Sediment	101	13 8	161	317	76500
24-10 - 0 28m	MAR02465 003	Sediment	23 2	7 56	39 5	64 6	31700
Certified Reference Material NIST 1941b (% Recovery)			65	65	78	71	90~
QC Blank			<1	<1	<1	<1	<100

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	MAR02465
Issue Version	1
Customer Reference	679749 - Lerwick North Harbour

		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**	**PCB180**
24-04 - 0 35m	MAR02465 001	Sediment	<0 08	<0 08	<0 08	<0 08	<0 08	<0 08	<0 08
24-07 - 0 36m	MAR02465 002	Sediment	<0 08	<0 08	<0 08	<0 08	<0 08	<0 08	<0 08
24-10 - 0 28m	MAR02465 003	Sediment	<0 08	<0 08	<0 08	<0 08	<0 08	<0 08	<0 08
Certified Reference Material NIST 1941b (% Recovery)			61	81	90	97	109	79	90
QC Blank			<0 08	<0 08	<0 08	<0 08	<0 08	<0 08	<0 08

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, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID MAR02465
Issue Version 1
Customer Reference 679749 - Lerwick North Harbour

REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
WSLM59*	MAR02465 001-003	Analysis was conducted by an internal SOCOTEC laboratory UKAS accredited analysis by this laboratory is under UKAS number 1252
ICPMSS*	MAR02465 001-003	Analysis was conducted by an internal SOCOTEC laboratory UKAS accredited analysis by this laboratory is under UKAS number 1252
ASC/SOP/301	MAR02465 001	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/303/304	MAR02465 001-003	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	MAR02465 001-003	Chrysene is known to coelute with Triphenylene and these peaks can not be resolved It is believed Triphenylene is 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

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	MAR02465
Issue Version	1
Customer Reference	679749 - Lerwick North Harbour

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
Total Organic Carbon (TOC)	Air dried and ground	Carbonate removal and sulphurous acid/combustion at 1600°C/ND R
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-F D analysis
Polychlorinated Biphenyls (PCBs)	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	D ELDR N	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		

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 MAR02324

Issue Version: 1

Customer: Envirocentre, Craighall Business Park, 8 Eagle Street, Glasgow, G4 9XA

Customer Reference: 579749 Lerwick Disposal Site

Date Sampled: 14-May-24

Date Samples Received: 23-May-24

Test Report Date: 21-Jun-24

Condition of samples: Cold 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

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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	MAR02324
Issue Version	1
Customer Reference	579749 Lerwick Disposal Site

		Units	%	%	%	%	%	N/A
		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	UKAS
Client Reference	**SOCOTEC Ref**	**Matrix**	**Total Moisture @ 120°C**	**Total Solids**	**Gravel (>2mm)**	**Sand (63-2000 µm)**	**Silt (<63 µm)**	**Asbestos**
24-DS-01 0.0-0.15m	MAR02324 001	Sediment	31.6	68.4	8.01	53.24	38.75	NAIIS
24-DS-02 0.0-0.15m	MAR02324 002	Sediment	35 8	64.2	3.51	73.10	23.39	NAIIS
24-DS-04 0.0-0.15m	MAR02324 003	Sediment	48 0	52.0	79.77	7.23	13.00	NAIIS
		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

NAIIS - No Asbestos Identified In Sample

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	MAR02324
Issue Version	1
Customer Reference	579749 Lerwick Disposal Site

		Units	% M/M
		Method No	WSLM59*
		Limit of Detection	0.02
		Accreditation	UKAS
Client Reference	**SOCOTEC Ref**	**Matrix**	**TOC**
24-DS-01 0.0-0.15m	MAR02324 001	Sediment	0.56
24-DS-02 0.0-0.15m	MAR02324 002	Sediment	0.40
24-DS-04 0.0-0.15m	MAR02324 003	Sediment	1.66
		Reference Material (% Recovery)	110
		QC Blank	<0.02

* See Report Notes

NAIIS - No Asbestos Identified In Sample

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 MAR02324
Issue Version 1
Customer Reference 579749 Lerwick Disposal Site

		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**
24-DS-01 0.0-0.15m	MAR02324 001	Sediment	1.9	0.11	20.8	9.6	0.04	18.5	9.2	33.6
24-DS-02 0.0-0.15m	MAR02324 002	Sediment	1.9	0.14	21.2	9.5	0.03	17.9	9.9	36.6
24-DS-04 0.0-0.15m	MAR02324 003	Sediment	3.5	0.19	25.4	15.6	0.05	20.6	13.8	48.9
Certified Reference Material SETOC 768 (% Recovery)			88	89	93	93	95	94	93	90
QC Blank			<0.5	<0.04	<0.5	<0.5	<0.01	<0.5	<0.5	<2

* 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	MAR02324
Issue Version	1
Customer Reference	579749 Lerwick Disposal Site

		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)**
24-DS-01 0.0-0.15m	MAR02324 001	Sediment	<5	<5
24-DS-02 0.0-0.15m	MAR02324 002	Sediment	<5	<5
24-DS-04 0.0-0.15m	MAR02324 003	Sediment	<5	<5
Certified Reference Material BCR-646 (% Recovery)			104	89
QC Blank			<1	<1

* 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	MAR02324
Issue Version	1
Customer Reference	579749 Lerwick Disposal Site

		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**
24-DS-01 0.0-0.15m	MAR02324 001	Sediment	2.08	2.54	6.72	24.4	22.0	18.4
24-DS-02 0.0-0.15m	MAR02324 002	Sediment	<1	<1	1.60	4.29	9.87	8.74
24-DS-04 0.0-0.15m	MAR02324 003	Sediment	<5	<5	<5	12.3	19.6	23.9
Certified Reference Material NIST 1941b (% Recovery)			65	112	66	63	62	78
QC Blank			<1	<1	<1	<1	<1	<1

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

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	MAR02324
Issue Version	1
Customer Reference	579749 Lerwick Disposal Site

		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**	**BENZGHIP**	**BKF***	**CHRYSENE ***	**DBENZAH**	**FLUORANT**	**FLUORENE**
24-DS-01 0.0-0.15m	MAR02324 001	Sediment	16.4	18.9	24.5	3.25	41.4	3 35
24-DS-02 0.0-0.15m	MAR02324 002	Sediment	10 2	10.1	4.98	2.24	5.79	<1
24-DS-04 0.0-0.15m	MAR02324 003	Sediment	34 3	22.8	16.2	5.13	26.3	<5
Certified Reference Material NIST 1941b (% Recovery)			73	86	85	102	75	50
QC Blank			<1	<1	<1	<1	<1	<1

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

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 MAR02324
Issue Version 1
Customer Reference 579749 Lerwick Disposal Site

		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	UKAS	UKAS	UKAS	N
Client Reference	**SOCOTEC Ref**	**Matrix**	**INDPYR**	**NAPTH**	**PHENANT**	**PYRENE**	**THC**
24-DS-01 0.0-0.15m	MAR02324 001	Sediment	17 3	5.25	20.2	39.4	27100
24-DS-02 0.0-0.15m	MAR02324 002	Sediment	10 0	3.07	3.00	9.06	22500
24-DS-04 0.0-0.15m	MAR02324 003	Sediment	32.1	8.81	13.0	32.7	126000
Certified Reference Material NIST 1941b (% Recovery)			74	59	75	69	113~
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

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	MAR02324
Issue Version	1
Customer Reference	579749 Lerwick Disposal Site

		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**	**PCB180**
24-DS-01 0.0-0.15m	MAR02324 001	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
24-DS-02 0.0-0.15m	MAR02324 002	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
24-DS-04 0.0-0.15m	MAR02324 003	Sediment	<0.08	<0.08	<0.08	<0.08	0.09	<0.08	<0.08
Certified Reference Material NIST 1941b (% Recovery)			69	101	99	98	104	98	94
QC Blank			<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

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, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID MAR02324
Issue Version 1
Customer Reference 579749 Lerwick Disposal Site

REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
WSLM59*	MAR02324.001-003	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
ICPMSS*	MAR02324.001-003	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
SUB_01*	MAR02324.001-003	Analysis was conducted by an approved subcontracted laboratory.
SUB_02*	MAR02324.001-003	Analysis was conducted by an approved subcontracted laboratory.
ASC/SOP/301	MAR02324.001-003	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/303/304	MAR02324 003	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/303/304	MAR02324.001-003	Benzo[k]fluoranthene is known to coelute with Benzo[j]fluoranthene and these peaks can not be resolved. t 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	MAR02324.001-003	Chrysene is known to coelute with Triphenylene and these peaks can not be resolved. t is believed Triphenylene is 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.

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	MAR02324
Issue Version	1
Customer Reference	579749 Lerwick Disposal Site

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/ND R.
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-F D analysis.
Polychlorinated Biphenyls (PCBs)	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	DIELDR N	Dieldrin
BBF	Benzo[b]fluoranthene	FLUORENE	Fluorene	HCB	Hexachlorobenzene
BEP	Benzo[e]pyrene	NDPYR	Indeno[1,2,3-cd]pyrene	DDD	p,p'-Dichlorodiphenyldichloroethane
BENZGH P	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		