Granton Harbour Dredging 2018
Best Practicable Environmental Option Report

June 2022

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1 INTRODUCTION

1.1 Scope of Report

Granton Central Developments/Edinburgh Marina are required to undertake a Best Practicable Environmental Option (BPEO) assessment for the disposal of dredged material from Granton Harbour to facilitate the development of a planned marina and associated commercial infrastructure.

Sediment sampling was undertaken in November 2017 and discussions have been ongoing with Marine Scotland since this time regarding the various options available due to the presence of some contaminants of concern in exceedance of Revised Action Level 2.

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 further consideration given to the options in an environmental and strategic context.

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

1.2 Background to Application

As outlined above, the dredging application is being submitted to enable the dredging of the western harbour. These works are required to facilitate the development of the proposed marina. The Edinburgh Marina development will provide the city with its own state of the art Marina with 315 berths with 23,500 square meters approximate prime letting space, which will enable the city to extend its maritime connections to Europe and beyond.

1.3 Source of Materials

Samples from the proposed dredge area were collected in November 2017 and submitted for analysis in line with Marine Scotland's Guidance. The associated report from this exercise is provided in Appendix B.

Sediments sampled within the proposed dredge area are reported as primarily silt.

Multiple contaminants of concern were recorded above Revised Action Level1 including

- Metals
- PAHs
- PCBs
- Petroleum Hydrocarbons

Mercury was recorded in exceedance of Revised Action Level 2 in multiple locations.

Further review of the information and discussion with a view to segregating the material with exceedances above REV AL2 was undertaken and communicated with Marine Scotland. The key points being that if all material with mercury concentrations >RAL2 are excluded for sea disposal i.e. the material is dredged to a fixed depth of 1.6m the average concentration is 1.06 mg/kg which is also <RAL 2.

On this basis, it was proposed that the upper 1.2m of material would be dredged, excluding a large buffer around VC 8 and VC9 where shallow mercury contamination was also encountered with a view to disposing this material at sea on the basis that sufficient supporting evidence could be provided to justify this in the presence of REV AL1 exceedances. All remaining material would be taken to land for a land based disposal solution. This area is represented by AREA C on Fairhurst Drawing 115875-0101 in Appendix A.

1.4 Dredge Volume and Disposal Routes

Based on a dredging plan for the harbour which is provided in Appendix 2 the volume split is as follows based on chemical quality.

Table 1.1: Dredge Volumes

Dredge	Volume (m^3)	Comment
Total Dredge Volume	241,365	Total proposed dredge volume
Dredge Volume for Areas for surface to 1.2m Dredge	86,980	Proposed for Sea Disposal
Dredge Volume from below 1.2mto base of dredge plus Area around VC8 & VC9 with Shallow Contamination	164,368*	Land Based Disposal Options

*Note: Updated to include recently accreted sediments as outlined in 1.4.1.

1.4.1 Update June 2022

Following discussion with Marine Scotland with regards to a temporal variation for the dredge licence, further work was undertaken to establish the change in volume since the original sampling work was conducted in 2017 as this material also needs to be managed as part of licensed dredging works. To help facilitate the process and manage potential delays, it was agreed with all parties that the recently accreted material would not be subject to sampling and analysis if all of the material was brought to land for disposal along with the other sediment ear marked for the treatment and disposal/reuse route.

Based on recent bathymetric survey, this additional sediment equates to an additional 9,983m^3 which will be brought to land for treatment/disposal/reuse.

2 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.

However, due to initial discussions with Marine Scotland and the challenges associated with disposal of the material with contaminant levels >REV AL2, the selection process and discussion will be somewhat abbreviated as there is a proposed split disposal route and clearly defined disposal options. An initial screening has been undertaken for completeness and is included in the following section.

2.1 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 2.1 along with justification for screening out those options which have not been taken forward for further consideration.

Table 2.1: Initial Best Practicable Available Options

Location	Options	Screening Assessment	Carry forward?
Estuary/ Riverbank	Do nothing Scenario/ Leave in situ	Not an option due to the requirement to develop a marina and associated facilities.	No
	Infilling of an existing dry dock/harbour facility	No projects have been identified which are available for utilisation.	No
	Beach Nourishment	Large areas of the Firth of Forth and Inner Estuary are designated sites (SSSI, SPA, RAMSAR) and hold both national and international importance to nature conservation. Specific beach nourishment projects would require to be supported by Environmental Assessments as a minimum to inform how the project could affect the environment as a result of disturbance to the intertidal area, changes to the sediment levels, the variable composition and quality of the material and measures devised from the assessment outcomes to minimise impacts on the environment. Considering the physical characteristics, in isolation from the chemical characteristics, silts are not typically used for beach nourishment projects. Large dredging operations undertaken at Grangemouth are typically disposed of at Bo'ness disposal ground as there is no requirement for the dredged silts in the estuary.	No
Land	Landfill Disposal	Material which is not suitable for sea disposal must be brought to land. Landfill is an option for the material which is not suitable for a sea based disposal, however it is not considered to be the most sustainable option available.	Yes
	Recycling/Re-use	Preliminary discussions have been undertaken regarding the potential for utilising the material, following suitable treatment and subject to necessary land based risk assessment and regulatory agreement.	Yes

	Land Incineration	The dredged material consists of non-combustible material (silts) with a low combustible component and very high water content.	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 arising's. Large volumes each year are unlikely to be viable to dispose of in this manner.	No
Sea	Aquatic disposal direct to seabed.	Relatively low cost, minimal transportation requirements compared to all other options and potential for low environmental risk. This option has been identified as a viable disposal route, subject to further consideration of the sediment from between surface and 1.2m below surface. Further consideration of this material is provided in Section 3.	Yes

2.2 Summary of Identified BPEO Options

Three options were identified for further assessment as follows:-

- Landfill Disposal;
- Recycling/Re-use and
- Sea Disposal.

As outline previously, the proposed disposal routes are to be split with 36% of the total volume considered for sea based disposal subject to agreement and the remaining 64% to be brought to land for a land based disposal option.

Further supporting information and detailed assessment of the sea based disposal is considered in Section 3.

Since the material below 1.2m is not considered suitable for a sea based disposal it will need to come to land for disposal. As such the material will be subject to land based re-use or disposal. These activities will be undertaken under appropriate SEPA licenses with respect to waste regulation. Initially it is proposed that the dredge arisings are brought onto the Granton development site for dewatering and stockpiling, prior to subsequent re-use and/or land based disposal.

The land based options will not be considered further in this document and the remainder of the document will focus on the material from surface to 1.2m below surface, excluding the area of shallow contamination around VC 8 & VC9, which has been identified for sea based disposal. This area is represented by AREA C on Fairhurst Drawing 115875-0101 in Appendix A.

Due to the limited disposal options available for the material with contaminants > REV AL2 no cost analysis has been undertaken as it is accepted this material must go to land it ultimately means that the cost will be the cost.

3 FURTHER ASSESSMENT

This section details the sediment quality of the material which is proposed to be disposed of at sea within one of the licensed spoil grounds. The material to be considered for disposal is the upper 1.2m from the whole harbour development excluding an area of 16,000m2 around VC8 and VC9 where mercury >REV AL2 was recorded at surface. This area was identified as the midpoint between other sample locations where mercury levels were recorded below REV AL2. Additionally, as discussed earlier, there are no exceedances of REV AL2 recorded for mercury above 1.6m, and average concentrations are below REV AL2 for all contaminants of concern.

To provide a buffer for the physical excavation of the sediment the material will be excavated to 1.2m below surface. Early discussions with dredging contractors to ascertain if segregation is possible have indicated that modern excavation methods using 3D technology and GPS can provide very accurate excavation depths.

The original chemical sampling report is provided in Appendix A, and chemical quality data summaries all relate to samples which do not record levels of mercury > REV AL2 with all of these samples removed from the data set including shallow contamination recorded around VC8 & VC9.

The following section considers the following key elements:

- The available disposal sites;
- The material for disposal; and
- Consideration of the risks.

3.1 Assessment Outline

The purpose of this assessment is to provide an overview of the proposed dredge material and the identified disposal site(s) including existing chemical monitoring data for the site where available.

Compare existing chemical data with other recognised sediment assessment criteria including those listed below.

- **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 ERM 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 table in Appendix A, 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).

Draw conclusions from available information and provide recommendation for proposed disposal Route(s).

3.2 Background Data – Dredge and Disposal Site

There are multiple disposal grounds in proximity to the site which are summarised below in Table 3.1. They are provided in order of distance closest to Granton Harbour. The information below was provided by Marine Scotland.

3.2.1 Disposal Volumes

Table 3.1: Summary of Disposal Sites

Site ID	2018 Licensed Capacity	2017 Deposited volumes	2016 Deposited volumes
FO038 – Narrow Deep and Narrow Deep B	No set capacity	0	0
FO041 – Oxcars Main	No set capacity	84,185 tonnes	159,057 tonnes
FO042 – Oxcars Ext A	No set capacity	87,610 tonnes	0
FO043 – Oxcars Ext B	No set capacity	407,720 tonnes	0
FO044 – Bo'Ness	No set capacity	1,074,335 tonnes	0

Source:

The closest disposal site to Granton Harbour is FO038 Narrow Deep and Narrow Deep (B).

Drawing 769967-003 in Appendix A details the location and footprint of the disposal sites.

3.2.2 Chemical Quality Screening of Dredge Material

All data are summarised in the original sampling report which is provided in Appendix B The samples with levels of mercury > REV AL2 have been removed from the data set to mimic the proposed segregation during dredging works. All data included within the assessment is summarised in Table A in Appendix C with exceedances summarised below.

Revised Action Level 1

- Up to 18 of 18 samples exceed REV AL1 for metals, PAHs and PCBs

BAC

- Up to 18 of 18 samples exceed for metals, PAHs and PCBs

ERL

- Up to 18 of 18 samples exceed ERL levels where available for metals and PAHs.

PEL

- Up to 18 of 18 samples exceed PEL levels where available for metals and PAHs. 18 samples exceed the PEL for mercury

Revised Action Level 2

- No exceedances of REV AL 2 are recorded where they are available.

3.2.3 Chemical Data at Disposal Site

The sampling data for three of the local disposal sites was provided by Marine Scotland as a means of baseline assessment. Oxcars, Narrow Deep and Bo'ness, the largest disposal site in the area were all included for the assessment. A summary of key contaminants including maximum, minimum and average concentrations is provided in Appendix C in TABLE C, Table D and Table E for the all of the sites where data was provided by Marine Scotland. All Data has been assessed as metals do not degrade and historic concentrations are of interest. Total concentrations may have altered over the time, but the data is considered useful for comparative purposes.

Data for all contaminants was not provided for each sample, so the summaries are of the data provided only and the number of data points vary accordingly.

Total PCB concentrations have been compiled by adding the ICES 7 congener concentrations as per the dredge material to enable a like for like comparison. Congeners included are PCB 28, 52, 101, 118, 138 153 and 180.

Marine Scotland noted that in Scotland the preference for disposal site selection is those which are dispersive, and as such it is assumed that all of the disposal grounds listed above are dispersive.

Table 3.2: Summary of Exceedances at Disposal Sites

Site ID	Total No. of Samples	No. of BAC Exceedances	No. of ERL Exceedances	No. of PEL Exceedances	Comments
FO038 – Narrow Deep and Narrow Deep B	68	52	52	29	Exceedances include mercury (29 samples exceed PELs) and various PAH species and 1 sample exceeds PEL for PCBs
OF041 Oxcars	66	56	56	28	Exceedances include mercury (28 samples exceed PELs) and various PAH species and 1 sample exceeds PEL for PCBs
FO044 – Bo'Ness	43	42	42	31	All 31 samples which exceed the PEL are for Mercury

Source:

In summary, the Oxcars Narrow Deep and Bo'ness disposal sites have a history of contaminants of concern exceeding the adopted PELs for metals, PAHs species and PCBs.

On average, between 42% and 72% of samples exceed the PEL for mercury. Other contaminants present include PAH species and minor PEL exceedances for PCBs.

3.3 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 summarised in corresponding Tables B and F within Appendix C and the findings summarised below.

3.3.1 Granton Harbour

- The average concentration of mercury in the sediments exceed the PEL for mercury for Granton Harbour.
- Various PAH species average concentrations exceed the PEL for Granton Harbour

3.3.2 Disposal Sites

- All three disposal sites record average mercury concentrations above the PEL,
- Narrow deep recorded average concentrations of fluorene above the PEL
- Oxcars – recorded average concentrations of fluorene above the PEL

3.4 Other Data

Marine Scotland provided sediment quality data also for the Grangemouth (G21-27) site which is dredged on a frequent basis and is understood to constitute a large proportion of all disposed sediments in the Firth of Forth. It is noted that the samples collected share similarities to the Granton sediments (although TBT > Rev Al2 was recorded in one sample). The key point of note is that mercury is recorded above REV AL1 in all samples (and also the PEL in all samples with average mercury concentrations (0.93mg/kg) similar to those recorded in the sediments (0-1.2m) at Granton). These multiple sets of data highlighting widespread elevated mercury would suggest that mercury is a consideration in the entire estuary rather than just Granton Harbour and it either reflects natural baseline levels or anthropogenic inputs from large scale industry into the estuary.

3.5 Contaminant Sources

The contamination within the harbour is considered to be historic, with the worst noted at depth in most instances. PAHs and hydrocarbons are readily attributed to heavy industry, waste oils, with PAHs readily attributed to combustion of organic materials.

The current harbour is considered to have limited local contamination sources barring standard run-off of urban roadways. The harbour will remain open for movement of sediment from within the Firth of Forth and as such it is considered that there is not a suitable means for managing future sediment quality, barring routine maintenance dredging.

3.6 Chemical Assessment Conclusions

While exceedances of REV AL1, BAC, ERL and PEL (where available) values have been recorded for various contaminants of concern in the harbour sediments excluding all samples/depths with levels > Rev AL2.

Additionally, review of the background contaminant levels at three of the potential disposal sites has identified that there are contaminants of concern in exceedance ERL and PELs, and average concentrations of mercury in the historic data sets are recorded above the PEL value for all the sites.

On this basis, it is considered that while many contaminants are recorded above their respective REV AL1 levels within the Granton Harbour sediment identified for sea disposal, the levels at the disposal sites (FO038, FO041 & Fo044), especially mercury, are very similar in nature, and would suggest an estuary wide mercury issue.

Further consideration of the potential risks associated with the proposed disposal is considered in the following sections.

4 WATER FRAMEWORK DIRECTIVE ASSESSMENT

This section details the assessment the dredge and disposal sites within the context of the Water Framework Directive as required by Marine Scotland.

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 4.5 below:

Table 4.1: Receptor Risk Assessment

Key Receptor	Brief Summary of Potential Effects on Receptor	Further Consideration Required?	Comment
Hydromorphology	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 to be dredged are berths which naturally accumulate sediment , the disposal site is a sacrificial part of the Firth of Forth designated and licensed for this purpose
Biology - habitats	Included to assess potential impacts to sensitive/high value habitats.	No	Not considered to be a significant risk considering the dredge areas are historic harbour areas and the disposal site is a sacrificial disposal site which has been used for the deposition of sediments. Key contaminants of concern within the disposal ground, as well as other areas within the estuary based on data available on the Marine Scotland Interactive GIS database https://marinescotland.atkinsgeospatial.com/nmpi/ , sediments are noted to exceed PEL values for mercury.
Biology - fish	Consideration of fish both within the estuary and also potential effects on migratory fish in transit through the estuary	No	

Water Quality	Consideration must be given to water quality when contaminants are present in exceedance of CEFAS RAL1.	Yes	Contaminants noted to exceed CEFAS RAL1 within sediment samples
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	A SSSI, SPA and RAMSAR designations for the Granton Eastern Harbour and the shoreline along the coast

Source: Taken from https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters

4.1 Potential Risk to Water Quality

The potential risks to water quality at both the dredge sites and disposal site are further considered below.

The coastal classification of this area of water in and around Granton Harbour and the disposal ground is good (2016 Kinghorn to Leith Docks polygon) as detailed on Scotland's Environment (http://www.environment.scotland.gov.uk/).

Although there are contaminants of concern above the Rev AL1 for sediment disposal, it is considered that these levels will not contribute to an overall degradation of water quality as the potential for dilution in the Firth of Forth is very considerable. 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 (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.

Additionally, the sediment quality within the disposal ground which is also noted to contain levels of contaminants above the adopted PELs, which does not appear to have impacted on the Water Quality classification of good in this area.

The key 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 short term event and has been factored in to the selection and location of the agreed disposal ground. 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 significant adverse effect on the overall water quality.

4.2 Protected Areas

The coastline immediately either side of Granton Harbour and the eastern harbour (outwith dredge area) have ecological designations as SSSI, SPA and RAMSAR sites. The designations are for a variety of birds, invertebrates, habitat and geomorphological features.

The key potential risk to the sensitive features are considered to be attributed to the transport of suspended material from the dredge site during dredging whereby contaminants associated with particulate material could be transported from the western harbour towards the protected areas.

Considering the presence of contaminants within the harbour sediments, mitigation measures will be required during the dredging works to minimise this potential risk.

To minimise the potential suspension and distribution of sediment several options are available and will need to be employed to minimise the potential impact on designated sites, and to reduce the potential for offsite distribution of material. This needs to be considered during all stages, but more so when the areas with contaminants in exceedance of REV AL2 are being dredged and moved from the water environment to land for a land based disposal option.

The key proposed mitigation measures for the dredge works are as follows:

- Dredging method to be designed to limit release of sediment during works.
- Physical Barrier – a physical silt barrier will be placed between dredging within the western harbour and Eastern harbours/Firth of Forth.
- Turbidity Monitoring – to ensure that material is not being widely displaced. A baseline would need to be established for contaminant levels within the eastern harbour sediments as well as baseline turbidity levels prior to dredging to enable direct comparisons.

4.3 Assessment Summary

Review of available information has highlighted that although several chemical contaminants exceed RAL1 within the sediments which have been identified for a sea based disposal (0-1.2m below surface), assessment of key receptors identified from the Water Framework Directive assessment for estuarine and coastal waters concluded that there is a low risk to the key receptor of Water Quality. The chemical levels in the sediment are not considered likely to have a significant impact on the sediment quality already located within the disposal grounds and it is recognised that this part of the sea floor is a sacrificial site for the disposal of dredge material. The preferred disposal site would be FO038 Narrow Deep due to its proximity to Granton Harbour.

Further assessment of the risks to Protected Areas have identified a potential risk and that mitigation measures should be adopted during dredging works. The specific details of dredging and associated mitigation measures will need to be finalised.

While the risk to migratory fish (particularly salmon) was screened out at the start of the risk assessment process, it should be considered as best practice that these are considered during the dredging works and that timing for these is considered as far as practicable to mitigate against any potential risks.

4.4 Other Considerations

The other point to consider as part of this assessment is the proposed volume total in comparison to the total volumes of sediment disposed of within the various licensed disposal site within the Firth of Forth. Data supplied by Marine Scotland indicated that just under 1.25 million tonnes (wet) of dredged material were disposed of within the licensed sites in 2017.

In comparison, the proposed material for disposal form Granton Harbour is 86,980m^3, assuming a bulk density of 1.8, would equate to 156,564 tonnes wet of material.

5 CONCLUSIONS

As previously outlined, the proposed method for disposal is a split waste stream with c. 36% of material earmarked for a sea based disposal (upper 1.2m of dredge) and the remaining 64% being disposed of on land due to the presence of contaminants in exceedance of Rev AL2.

Land based disposal will also include the accreted sediment which has built up within the harbour since the original sampling works in 2017 (calculated to be c. 9,983m^3) which has been agreed with Marine Scotland in-lieu of testing requirements to help facilitate the provision of a temporal variation to the existing licence.

Following the review of available disposal options and assessment of material in relation to sea based disposal, the Best Practicable Environmental Option for the disposal of dredging's from Granton Harbour has therefore been assessed as a combination of sea and land based disposal.

While it is noted that contaminants are present in the material ear marked for a sea based disposal, it is also noted that the key contaminant of concern, mercury, is also present in the disposal grounds as well as the wider estuary sediments at similar levels.

The exclusion of the more contaminated sediments in the areas previously identified for sea disposal is considered to minimise the long term impact on the marine environment as well as providing the most cost effective disposal solution.

REFERENCES

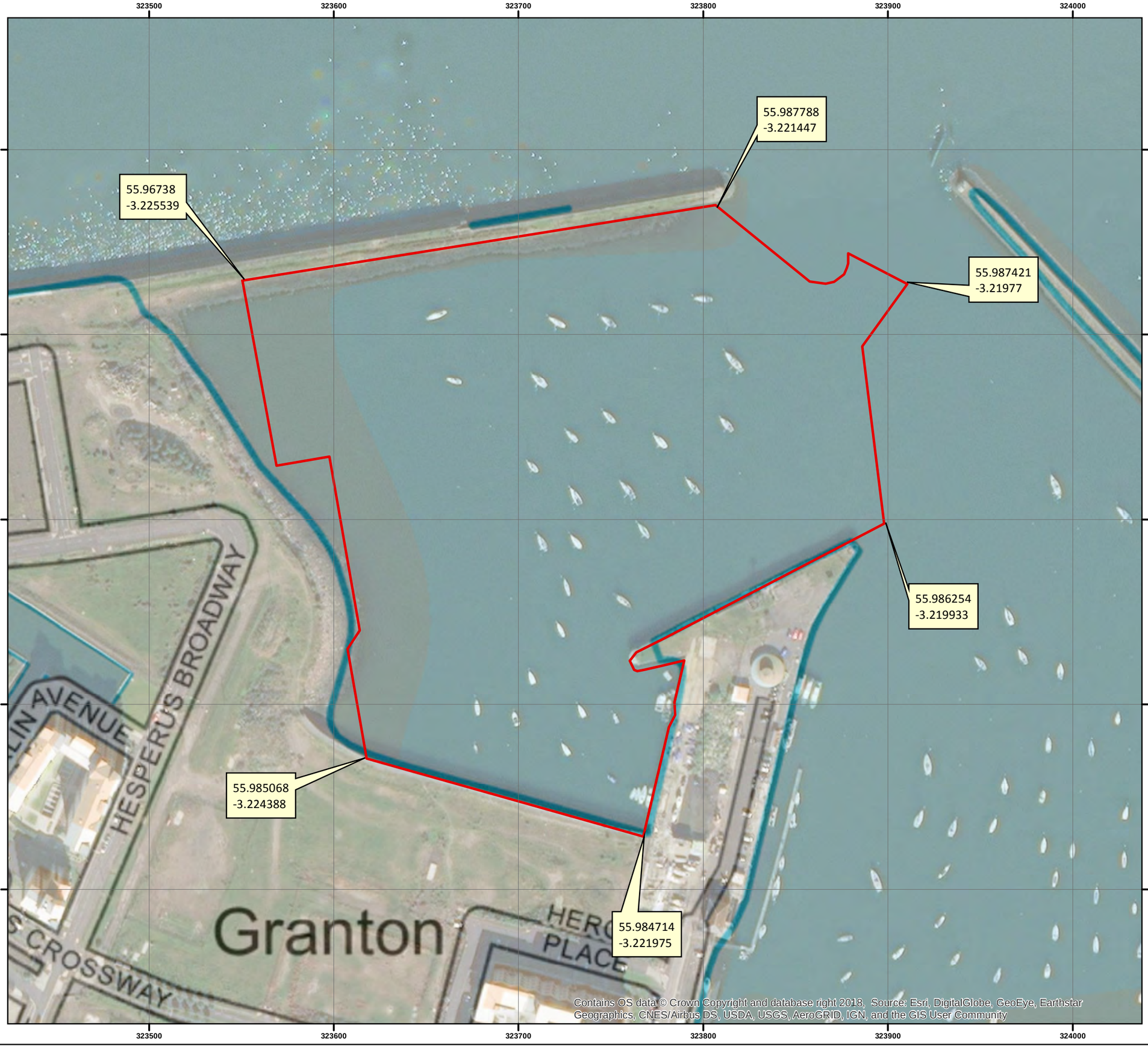
Canadian Council for Minsters of the Environment (CCME), Canadian Environmental Quality Guidelines, https://www.ccme.ca/en/resources/canadian_environmental_quality_guidelines/

Marine Scotland (2017). *Pre-DredgeSampling Guidance Version 1*: Scottish Government.

Marine Scotland (2018), National Marine Plan Interactive (NMPI), https://marinescotland.atkinsgeospatial.com/nmpi/

APPENDICES

A FIGURES



Legend

Dredge Area

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Client
Granton Central Developments

Project
Granton Harbour

Title
Dredge Area

Status
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Drawing No.
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28 Sep 2018

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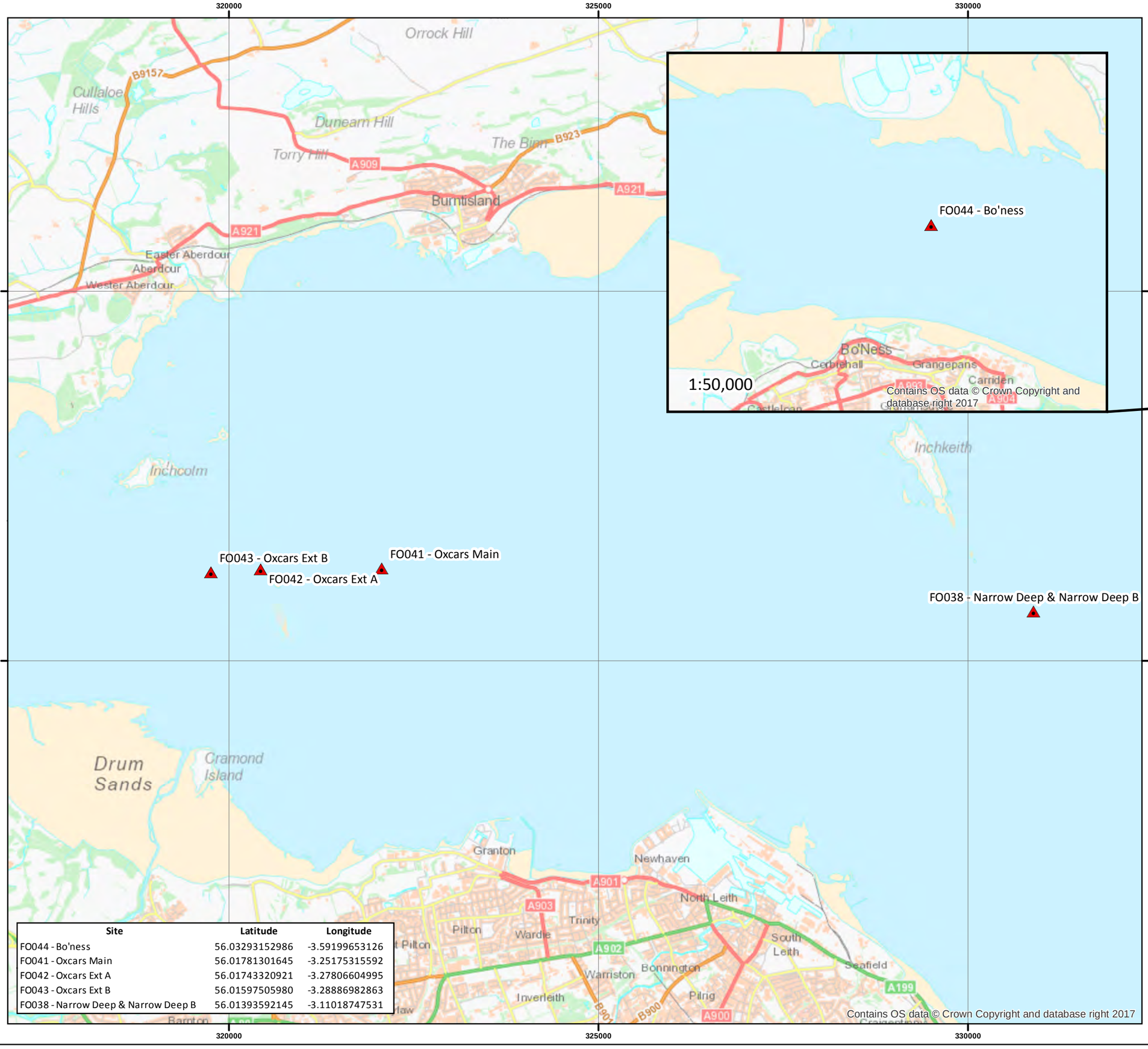

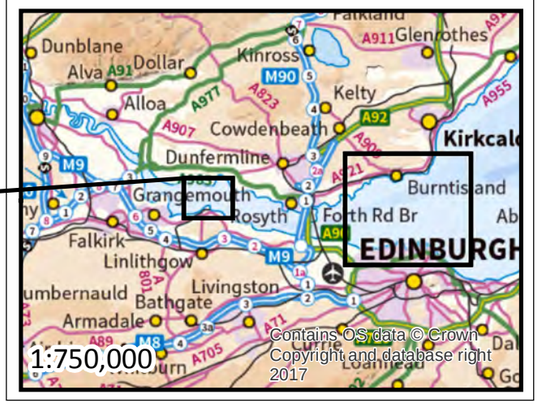

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Disposal Site

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Site	Latitude	Longitude
FO044 - Bo'ness	56.03293152986	-3.59199653126
FO041 - Oxcars Main	56.01781301645	-3.25175315592
FO042 - Oxcars Ext A	56.01743320921	-3.27806604995
FO043 - Oxcars Ext B	56.01597505980	-3.28886982863
FO038 - Narrow Deep & Narrow Deep B	56.01393592145	-3.11018747531

Client
Granton Central Developments

Project
Granton Harbour

Title
Sea Disposal Sites

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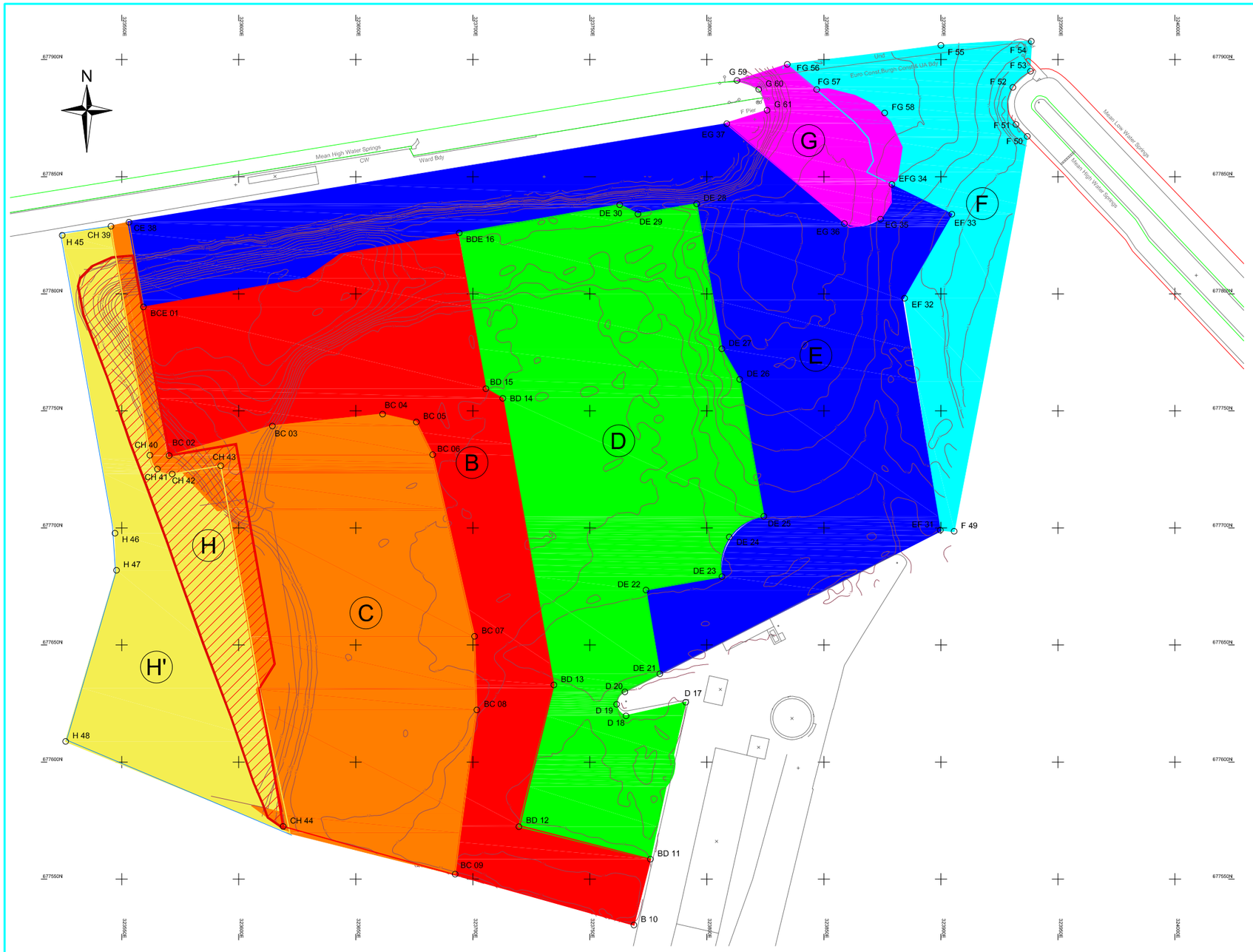

PLAN
(SCALE 1:1000)

Zone	Volume for Disposal at Sea (m^3) (Top 1.2m where applicable)	Volume for Disposal on Land (m^3)	NETT VOLUME (m^3)	Factored by 1.8 wet tonnes/m^3
A			N/A	
B	20,344	7,936	28,280	50,904
C		47,094	47,094	84,769
D	25,698	20,620	46,318	83,372
E	27,349	40,928	68,277	122,898
F	10,073	21,400	31,472	56,650
G	3,516	16,408	19,924	35,863
Total Nett Volume	**86,980**	**154,385**	**241,365**	**434,457**
H			19,322	34,780
Total Infill Volume			**19,322**	**34,780**

COORDINATES

POINTS	EASTING	NORTHING	LATITUDE	LONGITUDE
BCE 01	323559	677794	55° 59.220' N	3° 13.609' N
BC 02	323570	677731	55° 59.186' N	3° 13.597' N
BC 03	323614	677744	55° 59.194' N	3° 13.555' N
BC 04	323661	677749	55° 59.197' N	3° 13.510' N
BC 05	323676	677745	55° 59.195' N	3° 13.496' N
BC 06	323683	677731	55° 59.187' N	3° 13.489' N
BC 07	323701	677654	55° 59.146' N	3° 13.470' N
BC 08	323702	677622	55° 59.129' N	3° 13.468' N
BC 09	323692	677552	55° 59.091' N	3° 13.477' N
B 10	323769	677530	55° 59.080' N	3° 13.402' N
BD 11	323776	677559	55° 59.096' N	3° 13.396' N
BD 12	323720	677572	55° 59.102' N	3° 13.450' N
BD 13	323735	677633	55° 59.135' N	3° 13.437' N
BD 14	323713	677755	55° 59.201' N	3° 13.460' N
BD 15	323706	677759	55° 59.203' N	3° 13.467' N
BDE 16	323694	677826	55° 59.239' N	3° 13.480' N
D 17	323791	677626	55° 59.132' N	3° 13.383' N
D 18	323766	677620	55° 59.128' N	3° 13.407' N
D 19	323761	677625	55° 59.131' N	3° 13.412' N
D 20	323765	677630	55° 59.134' N	3° 13.408' N
DE 21	323780	677638	55° 59.138' N	3° 13.394' N
DE 22	323774	677673	55° 59.157' N	3° 13.400' N
DE 23	323806	677679	55° 59.161' N	3° 13.369' N
DE 24	323810	677696	55° 59.170' N	3° 13.366' N
DE 25	323824	677705	55° 59.175' N	3° 13.353' N
DE 26	323814	677763	55° 59.206' N	3° 13.363' N
DE 27	323806	677776	55° 59.213' N	3° 13.371' N
DE 28	323796	677838	55° 59.246' N	3° 13.382' N
DE 29	323771	677834	55° 59.244' N	3° 13.406' N
DE 30	323763	677838	55° 59.246' N	3° 13.413' N
EF 31	323900	677699	55° 59.172' N	3° 13.279' N
EF 32	323884	677798	55° 59.225' N	3° 13.296' N
EF 33	323905	677834	55° 59.245' N	3° 13.277' N
EFG 34	323879	677847	55° 59.252' N	3° 13.302' N
EG 35	323874	677832	55° 59.244' N	3° 13.307' N
EG 36	323859	677830	55° 59.242' N	3° 13.321' N
EG 37	323809	677873	55° 59.265' N	3° 13.370' N
CE 38	323553	677831	55° 59.240' N	3° 13.615' N
CH 39	323545	677829	55° 59.239' N	3° 13.623' N
CH 40	323562	677731	55° 59.186' N	3° 13.605' N
CH 41	323565	677725	55° 59.183' N	3° 13.602' N
CH 42	323572	677723	55° 59.182' N	3° 13.595' N
CH 43	323592	677727	55° 59.184' N	3° 13.576' N
CH 44	323619	677573	55° 59.102' N	3° 13.547' N
H 45	323525	677825	55° 59.237' N	3° 13.642' N
H 46	323547	677698	55° 59.168' N	3° 13.619' N
H 47	323548	677682	55° 59.160' N	3° 13.618' N
H 48	323526	677609	55° 59.120' N	3° 13.637' N
F 49	323906	677699	55° 59.172' N	3° 13.274' N
F 50	323937	677867	55° 59.263' N	3° 13.247' N
F 51	323932	677872	55° 59.266' N	3° 13.252' N
F 52	323931	677888	55° 59.274' N	3° 13.253' N
F 53	323938	677895	55° 59.278' N	3° 13.246' N
F 54	323939	677908	55° 59.285' N	3° 13.245' N
F 55	323900	677906	55° 59.284' N	3° 13.283' N
FG 56	323834	677898	55° 59.279' N	3° 13.346' N
FG 57	323847	677887	55° 59.273' N	3° 13.334' N
FG 58	323876	677877	55° 59.268' N	3° 13.305' N
G 59	323813	677891	55° 59.275' N	3° 13.366' N
G 60	323822	677887	55° 59.273' N	3° 13.358' N
G 61	323826	677878	55° 59.268' N	3° 13.354' N

Rev.	Date	Description	Drawn	Checked	Approved

NOTES:

1. DREDGE VOLUMES ARE ESTIMATED BASED ON BATHYMETRIC SURVEY COMPLETED BY ASPECT ON MAY 2017.
2. FINISHED DREDGE LEVELS TAKEN FROM WILSON AND GUNN ARCHITECTS DRAWING "A-P-00-G7-005 REV H" REVISED ON 26TH SEPTEMBER 2018.
3. VOLUMES HAVE BEEN FACTORED USING AN ASSUMED UNIT WEIGHT 1.8T/m^3 OF WET DENSITY.

Client: EDINBURGH MARINA

Project Title: MARINA BASIN

Drawing Title: PROPOSED DREDGE WORKS

FAIRHURST
225 Bath Street,
GLASGOW, G2 4GZ
Tel: 0141 204 8800 Fax: 0141 204 8801

Scale at A1:	Status:	
AS SHOWN	For Information	
Drawn: KAB	Checked: MM	Approved: GSDS
Date: 27/09/2018	Date: 27/09/2018	Date: 27/09/2018
Drawing No.: 115875/0101		Revision: –

B SAMPLING REPORT

Granton Harbour Pre-Dredge Sampling 2017
Sediment Quality Report

November 2017

Granton Harbour Pre-Dredge Sampling 2017
Sediment Quality Report

Client:	Granton Central Developments
Document number:	7972
Project number:	769967jj
Status:	Final
Author:	Campbell Stewart
Reviewer:	Graeme Duff
Date of issue:	24 November 2017
Filename:	Granton Sediment Samples Final

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Contents

Appendices

Tables

1 INTRODUCTION

1.1 Background

Granton Central Developments contracted EnviroCentre Ltd. to undertake the collection of cored samples within the Western Harbour at Granton Harbour. The samples were collected to inform proposed dredging and associated disposal options.

The purpose of these samples is to provide supporting information to Marine Scotland during the licensing process on sediment quality within the proposed dredge areas. The dredging and disposal activities are regulated by Marine Scotland under the Marine (Scotland) Act 2010. The licensing conditions require representative samples to be collected and the nature (i.e. physical composition), quality and contamination status to be determined.

The samples were sub-sampled for analysis in accordance with best practice.

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 AL1 and AL2.

Sediment with contaminant concentrations below AL1 is generally considered to be below background levels for contamination and is suitable for disposal at sea.

For samples between AL1 and AL2, 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. This would need to be agreed and approved by Marine Scotland.

Material above AL2 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 Scotland.

1.3 Scope of Report

The following report details the sampling methodology, field and laboratory analysis and provides a summary of the sediment quality present within the proposed dredge areas.

2 SEDIMENT SAMPLING REQUIREMENTS

2.1 Sampling Locations

Sampling locations are provided in the table below

Table 2.1: Sample Coordinates

Location	Latitude/Longditude
VC01	55.987711,-3.2215627
VC02	55.986567,-3.2218151
VC03	55.987117,-3.2234354
VC04	55.986215,-3.2229260
VC05	55.987015,-3.2246665
VC06	55.986266,-3.2241138
VC07B	55.986942,-3.2257061
VC08	55.986207,-3.2255385
VC09	55.985428,-3.2252094
VC10	55.985260,-3.2240660
VC11	55.984771,-3.2234896

2.2 Field Information

The draft following field data is recorded for each sample obtained. This field data included the following information:-

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

2.3 Sampling Requirements

The laboratory analysis required, and undertaken as part of this investigation, included metals, organic and particle size analysis. Samples for metals and particle size analysis were sub-sampled using a plastic spoon and stored in polyethylene bags. Samples for organic analysis were collected using stainless steel spoons and stored in glass jars. Samples were sent to Socotec for analysis.

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3 SAMPLING METHODOLOGY

All core samples were collected between the 30th October and 1st November 2017. The following sections detail the sampling methodology used to retrieve sediment samples from the site.

3.1 Survey Vessel

The sampling vessel was the "Forth Fighter" which was operated by Briggs Marine.

3.2 Navigation and Sample Location

Positions were navigated to using a Trimble GPS. Once on position the on-board spud legs were deployed to keep the vessel in position. Sampling equipment was deployed and then recovered. Once the sample had been recovered, the leg was lifted and the vessel moved to the next sampling position. Sample co-ordinates are provided in Appendix B sample logs.

3.3 Sample Retrieval

Core samples were recovered using a viborocorer with 75mm aluminium sample tubes. The vibrocorer was lifted and lowered using the deck mounted crane as well as recovering the corer from the harbour sediments following cessation of coring.

Once the sample was recovered, the core detatched from the head unit, cut in to sub sample sections and each sub-sample extruded from the tube. Un-sampled sections of core were labelled, capped and retained for freezing.

Core logs are provided in Appendix B including coordinates and sample descriptions.

3.4 Sample Preparation

Following collection, core sections were extruded into a plastic core holder, spilt length wise, photographed and then logged prior to sub-sampling

The stainless steel (organic analysis) and plastic sampling spoons (inorganic analysis) were cleaned with sea water between samples. The sample tub was washed with sea water between samples.

Once samples had been placed within appropriate containers, they were labelled and placed immediately into cool boxes. Samples were packed with 2kg bags of ice to cool the samples prior to dispatch to the project laboratory.

3.5 Sampling Constraints

There were no significant sampling constraints encountered during the sampling.

Sample location 7 was relocated on site as the original location identified was within an area which was already at or below the proposed dredge level. A sample from this area was not considered appropriate as it would not

provide information on the material to be dredged. The sample was relocated to an area where material will be dredged.

4 ANALYTICAL RESULTS

A summary table comparing the data to assessment criteria and the laboratory certificates are provided in Appendix C. It should be noted that the results presented in the summary table are in different units. Metals, PAHs and TPH are provided in mg/kg (ppm) and the TBT and PCBs have been provided in µg/kg (ppb). The corresponding action levels have been converted to µg/kg to facilitate direct comparison of the data and appropriate action level.

4.1 Physical Analysis

4.1.1 Particle Size Distribution (PSD)

Particle Size Distribution data set for each sample is included within Appendix C. Sediments sampled within the proposed dredge area is reported as being predominately medium and coarse silt.

Field descriptions of the sediments and accompanying comment on sedimentology are included within Appendix B within the sample logs. PSD descriptions for each of the samples are provided in Table 4.1.

Table 4.1: Particle Size Analysis Results

Sample ID	Particle Size Description
VC01	Coarse Silt
VC02	Coarse Silt
VC03	Medium Silt
VC04	Coarse/Medium Silt
VC05	Medium Silt
VC06	Medium/Coarse Silt
VC07	Medium Silt
VC08	Medium Silt
VC09	Medium Silt
VC10	Medium/Coarse Silt
VC11	Medium/Coarse Silt

4.2 Chemical Analysis

4.2.1 Chemical Analysis Assessment Criteria

All chemical analytical results were assessed against Revised Action levels criteria as adopted by Marine Scotland. The results are summarised in the following sections with respect to the Marine Scotland Revised Action Levels (RAL).

4.2.2 Metals

- Arsenic – 3 of 31 samples recorded arsenic levels above REV AL1. The maximum concentration recorded was 23 mg/kg.
- Cadmium –23 of 31 samples recorded cadmium levels above REV AL1. The maximum concentration recorded was 2.8mg/kg.

- Chromium - 31 of 31 samples recorded chromium levels above REV AL1. The maximum concentration recorded was 93.8 mg/kg.
- Copper –31 of 31 samples recorded copper levels above REV AL1. The maximum concentration recorded was 106.9 mg/kg.
- Lead –31 of 31 samples recorded lead levels above REV AL1. The maximum concentration recorded was 255 mg/kg.
- Mercury – 31 of 31 samples recorded mercury levels above REV Al1.The maximum concentration recorded was 3.15 mg/kg.
- Nickel – 30 of 31 samples recorded nickel levels above REV Al1.The maximum concentration recorded was 45 mg/kg.
- Zinc – 31 of 31 samples recorded zinc levels above REV Al1.The maximum concentration recorded was 317 mg/kg.

All metal levels were below RAL 2 with the exception of mercury which recorded 13 samples in exceedance of RAL 2

4.2.3 Tributyl Tin (TBT)

All samples were recorded below RAL 1with the maximum concentration recorded as 4.69µg Sn/kg

4.2.4 Polyaromatic Hydrocarbons (PAHs)

All 31 samples recorded at least one PAH species above RAL 1. The maximum concentration was 5.33mg/kg for Pyrene.

4.2.5 Polychlorinated Biphenyls

9 of 31 samples recorded individual PCB congeners in exceedance of RAL 1. There were no exceedances of RAL 2.

4.2.6 Total Hydrocarbons (THC)

All 31 samples collected recorded hydrocarbons above Rev AL1. The maximum concentration was 2,854 mg/kg.

5 SUMMARY

The sediment sampling can be summarized as follows:

- 11 core samples were recovered from the Western Harbour at Granton Harbour up to 3.0m in depth
- 31 samples were submitted for chemical analysis with all 31 samples exceeding the REV Al1 levels for certain contaminants including metals, TBT, THC PAHs and PCBs
- 13 of the 31 samples recorded mercury above RAL2.

Table 5.1 summarises the results of the laboratory analysis with respect to the Action Levels adopted by Marine Scotland. Any concentration recorded below the action level is noted as a pass and above the action level as a fail.

Table 5.1: Chemical Analysis Screening Summary –

Sample ID	Metals		TBT		Hydrocarbons	PAHs	PCBs	
Action Level	AL1	AL2	AL1	AL2	AL1	AL1	AL1	AL2
VC01 0.00-0.50	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC01 0.50-1.00	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC02 0.00-0.65	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC02 0.65-1.30	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC03 0.00-0.50	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC03 1.50-2.00	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC03 2.50-3.00	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass
VC04 0.00-0.50	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC04 1.00-1.50	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC04 2.15-2.65	Fail	Fail	Pass	Pass	Fail	Fail	Fail	Pass
VC05 0.00-0.50	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC05 1.00-1.50	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC05 1.50-2.00	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass
VC06 0.00-0.50	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC06 1.20-1.70	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass

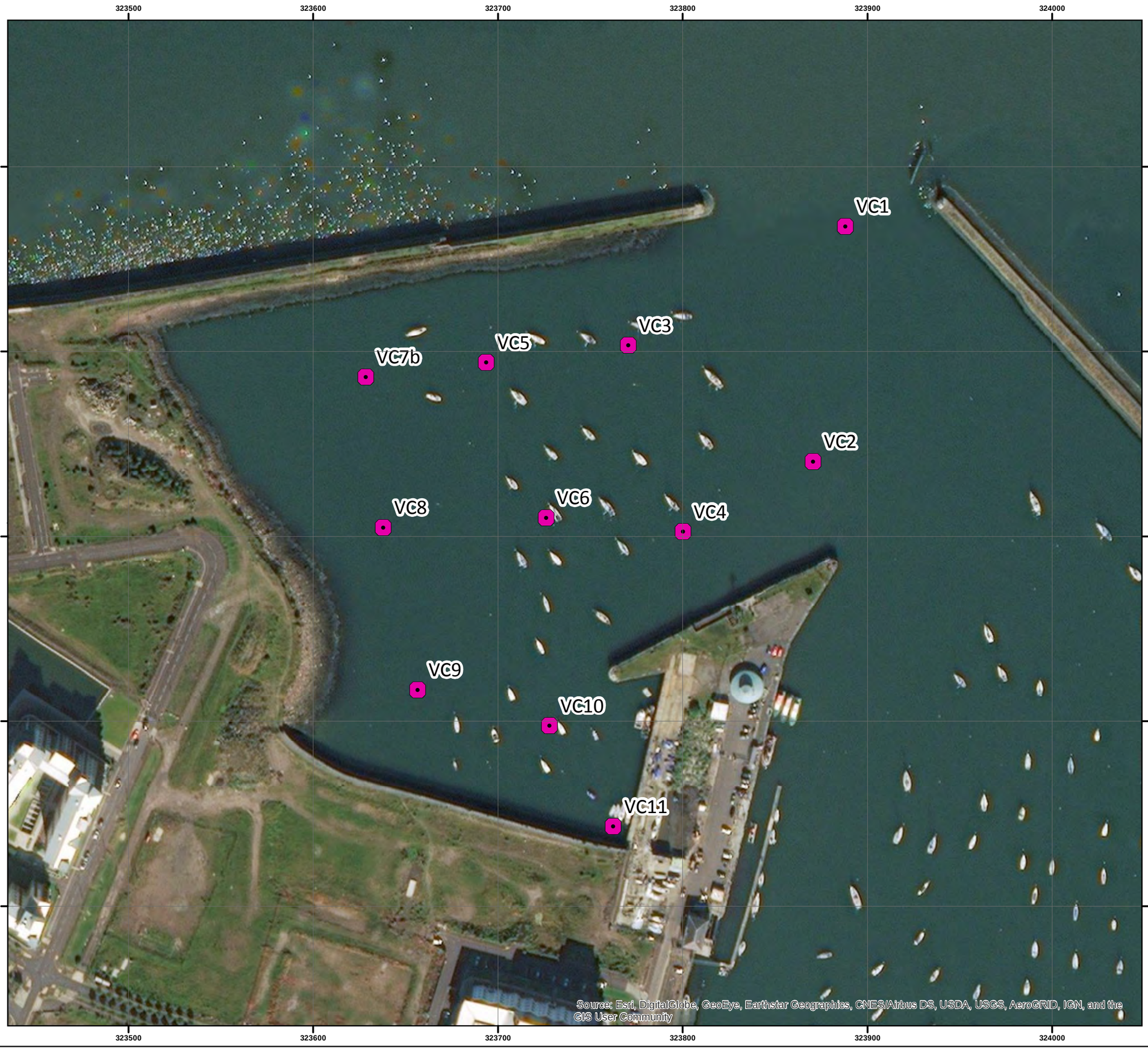
VC06 2.40-2.90	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass
VC07B 0.00-0.50	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC07B 1.25-1.75	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC07B 2.00-2.55	Fail	Fail	Pass	Pass	Fail	Fail	Fail	Pass
VC08 0.00-0.50	Fail	Fail	Pass	Pass	Fail	Fail	Fail	Pass
VC08 1.45-1.95	Fail	Fail	Pass	Pass	Fail	Fail	Fail	Pass
VC08 2.40-2.90	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass
VC09 0.00-0.50	Fail	Fail	Pass	Pass	Fail	Fail	Fail	Pass
VC09 1.30-1.80	Fail	Fail	Pass	Pass	Fail	Fail	Fail	Pass
VC09 0.65-1.15	Fail	Fail	Pass	Pass	Fail	Fail	Fail	Pass
VC10 0.00-0.50	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC10 1.25-1.75	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC10 2.00-2.50	Fail	Fail	Pass	Pass	Fail	Fail	Fail	Pass
VC11 0.00-0.50	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC11 1.50-2.00	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC11 2.50-3.00	Fail	Fail	Pass	Pass	Fail	Fail	Fail	Pass

REFERENCES

Marine Scotland (2017). *Pre-DredgeSampling Guidance Version 1*: Scottish Government.

APPENDICES

A FIGURES



Legend

Locations Sampled

Do not scale this map

Client: Granton Central Developments

Project: Granton Harbour

Title: Locations Sampled

Status: Final

Drawing No.: 769967-001

Revision:

Scale: 1:2,000

A3

Date: 2 November 2017

Drawn	Checked	Approved
SMC	FR	CCAS

ENVIRO Centre
Craighall Business Park, Eagle Street, Glasgow, G4 9XA
Tel: 0141 341 5040
Fax: 0141 341 5045

B SAMPLE LOGS AND PHOTOGRAPHS

Granton Harbour	VC01	
Sample Date/Time:	31/10/2017	10:01
Position:	55.987711,-3.2215627	
Water Depth:	6.6m	
Core Length:	1m	
Remarks:	0.0 – 0.1m	Very fine brown silt
	1.0 – 1.0m	Black – grey silt with sandy bands
	0.85m	*small stick of wood*
	0.9m	*Plant remains*
Samples:	0.0 – 0.5m, 0.5 – 1.0m	
Biota:	None noted	
Notes:	Attempt 1 and 2 washed out; attempt 4 retained 0.77m.	

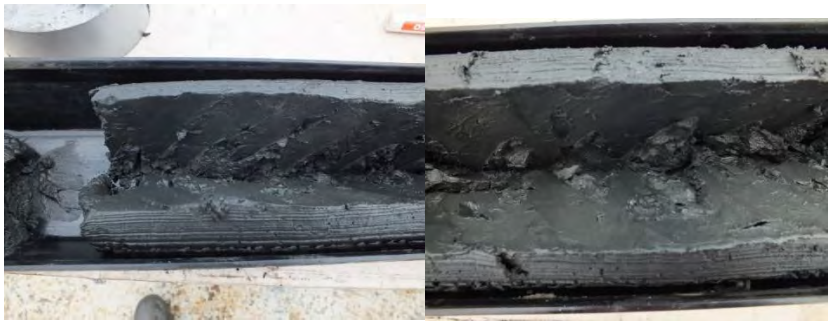
Granton Harbour	VC02	
Sample Date/Time:	31/10/2017	13:20
Position:	55.986567,-3.2218151	
Core Length:	1.3m	
Remarks:	0.0 – 0.1m	Very soft black silt
	0.1 – 1.3m	Soft black silt. Dark brown fine sand band at 0.55m.
Samples:	0-0.65m, 0.65-1.3m	
Biota:	None noted	
Notes:	Attempt 1 - 1.3m at gravel base	

Granton Harbour	VC03	
Sample Date/Time:	31/10/2017	10:25
Position:	55.987117,-3.2234354	
Core Length:	3.0m	
Remarks:	0.0 – 0.5m	Very soft brown silt over black silt.
	1.5 – 2.0m	Soft black silt
	2.5 – 3.0m	Slightly firm to firm black silt
Samples collected:	0 – 0.5m, 1.5 – 2.0m, 2.5 – 3.0m	
Biota:	None noted	
Notes:	-	

Granton Harbour	VC04	
Sample Date/Time:	30/10/2017	14:16
Position:	55.986215,-3.2229260	
Core Length:	2.65m	
Remarks:	0.0 – 0.5m	Soft black silt. Very slight anoxic odour. Very soft at top. Drier with depth.
	1.0 – 1.5m	Soft black silt. Drier than top length.
	2.15 – 2.65m	Black silt. Firmer than previous.
Samples collected:	0 – 0.5m, 1.0 – 1.5m, 2.15 – 2.65m	
Biota:	None noted	
Notes:	-	

0.0 – 0.5m:

1.0 – 1.5m:

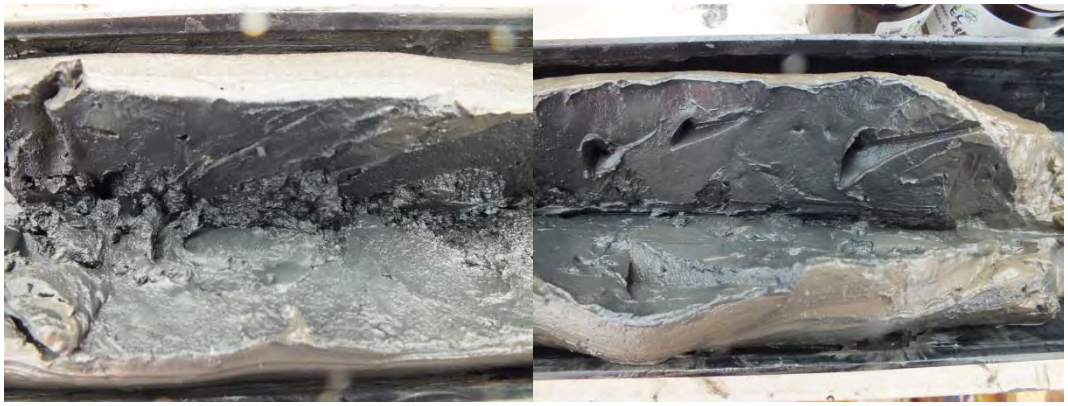


2.15 – 2.65m:

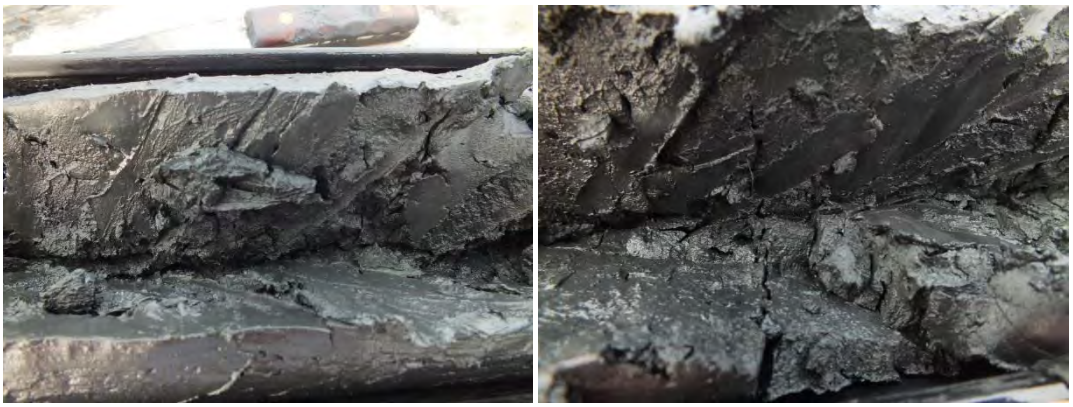
Granton Harbour	VC05	
Sample Date/Time:	31/10/2017	11:00
Position:	55.987015,-3.2246665	
Core Length:	2.0m	
Remarks:	0.0 – 0.5m	Very soft to soft silt. Brown at top over dark brown-grey silt.
	1.0 – 1.5m	Soft to firm black-grey silt.
	1.5 – 2.0m	Soft to firm black silt
Samples collected:	0 – 0.5m, 1.0 – 1.5m, 1.5 – 2.0m	
Biota:	None noted	
Notes:	Attempt 1 – 1.8m; Attempt 2 – 2.0m	

Granton Harbour	VC06	
Sample Date/Time:	30/10/2017	
Position:	55.986266,-3.2241138	
Core Length:	2.9m	
Remarks:	0.0 – 0.5m	Very soft to soft black silt. 0.2m.
	1.2 – 1.7m	Very rare black shell fragments (fine gravel) at top. Soft black silt.
	2.4 – 2.8m	Firm black silt.
	2.8 – 2.9m	Firmer grey-brown slightly sandy silt. Rare black seashell fragments. Black sub-rounded coarse gravel at interface.
Samples collected:	0.0 – 0.5m, 1.2 – 1.7m, 2.4 – 2.9m	
Biota:	None noted	
Notes:	-	

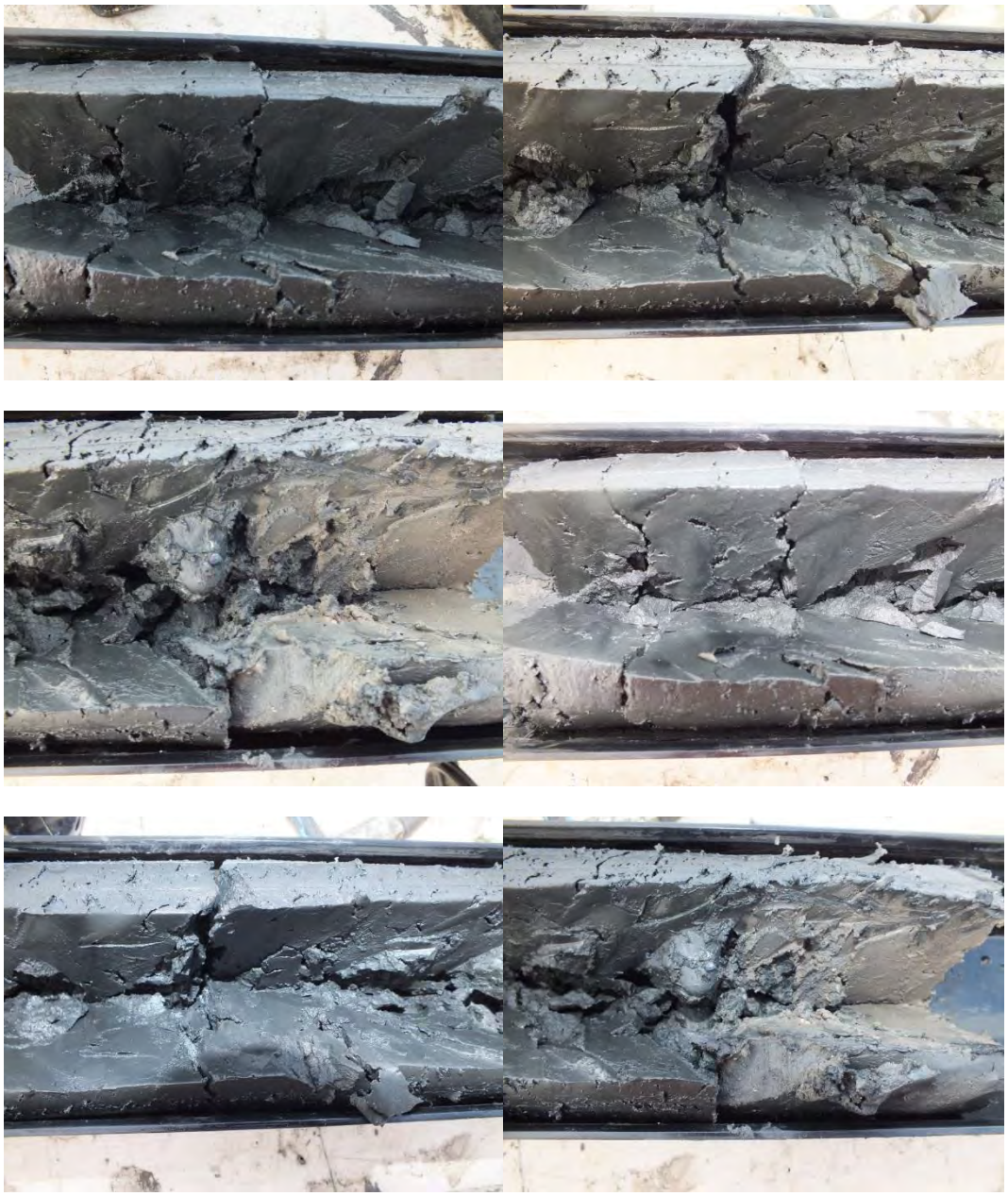
0.0 – 0.5m



1.2 – 1.7m



2.4 – 2.9m



Granton Harbour	VC07B	
Sample Date/Time:	31/10/2017	14:04
Position:	55.986942,-3.2257061	
Core Length:	2.55m	
Remarks:	0.0 – 0.5m	Very soft brown and black silt
	1.20 – 1.75m	Soft to slightly firm black – grey silt
	2.0 – 2.55m	Slightly firm black silt
Samples collected:	0.0 – 0.5m, 1.20 – 1.75m, 2.0 – 2.55m	
Biota:	None noted	
Notes:	-	

Granton Harbour	VC08	
Sample Date/Time:	30/10/2017	12:56
Position:	55.986207,-3.2255385	
Core Length:	2.9m	
Remarks:	0.0 – 0.5m	Soft black silt becoming firmer with depth. H_2S odour
	1.45 – 1.95m	Black silt, firmer with depth.
	2.4 – 2.9m	Black silt, firmer with depth. Dryer than top.
Samples collected:	0 – 0.5m, 1.45 – 1.95m, 2.4 – 2.9m	
Biota:	None noted	
Notes:	Attempt 1 – 1.7m; Attempt 2 – 2.9m.	

0.0 – 0.5m


1.45 – 1.95m

2.4 – 2.9m

Granton Harbour	VC09	
Sample Date/Time:	30/10/2017	11:52
Position:	55.985428,-3.2252094	
Core Length:	1.8m	
Remarks:	0.0 – 0.5m	Soft black silt. Very soft for top 0.1m.
	0.65 – 1.15m	Black-grey silt with fine sand beds. Moderately firm. Few fibres.
	1.15 – 1.8m	Black-grey silt. Becoming drier at base. Moderately firm.
Samples collected:	0.0 – 0.5m, 0.65 – 1.15m. 1.3 – 1.8m	
Biota:	None noted	
Notes:	Slight sulphurous odour.	

0.0 – 0.5m

0.65 – 1.15m

1.3 – 1.8m

Granton Harbour	VC10	
Sample Date/Time:	31/10/2017	12:56
Position:	55.985260,-3.2240660	
Core Length:	2.5m	
Remarks:	0.0 – 0.5m	Very soft – soft black silt. Brown at top.
	1.25 – 1.75m	Soft black silt
	2.0 – 2.5m	Soft black silt. Firmer with depth. Minor gravel.
Samples collected:	0.0 – 0.5m, 1.25 – 1.75m, 2.0 – 2.5m	
Biota:	None noted	
Notes:	-	

Granton Harbour	VC11	
Sample Date/Time:	31/10/2017	12:20
Position:	55.984771,-3.2234896	
Core Length:	3.0m	
Remarks:	0.0 – 0.5m	Very soft - soft silt. Brown at surface, depth uncertain since smeared.
	1.5 – 2.0m	Black-grey soft silt.
	2.5 – 3.0m	Black silt with fine sandy bands. Soft becoming firm with depth. Dry at base. Fine gravel layer at 2.6m.
Samples collected:	0.0 – 0.5m, 1.5 – 2.0m, 2.5 – 3.0m.	
Biota:	None noted	
Notes:	-	


Project number
Site
GRANTON HARBOUR
Sample number
VC11
Sample location
2.5 - 3.0m
Date / Time
31/10/17


Project number
Site
GRANTON HARBOUR
Sample number
VC11
Sample location
2.5 - 3.0m
Date / Time
31/10/17

C SUMMARY TABLE AND ANALYTICAL DATA

Granton Harbour Sediments
November 2017

	Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug Sn/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
ID Number	Sample ID	Copper	Arsenic	Cadmium	Chromium	Lead	Mercury	Nickel	Zinc	Tributyl Tin	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene *	Pyrene	Benzo[a]anthracene	Chrysene	Benzo[b]fluoranthene	Benzo[k]fluoranthene	Benzo[a]pyrene	Perylene *	Indeno[123,cd]pyrene	Dibenzo[a,h]anthracene	Benzo[ghi]perylene *	Total Oil	PCB28*	PCB52*	PCB101*	PCB118*	PCB153*	PCB138*	PCB180*
	RAL1/RAL2	30/300	20/70	0.4/4	50/370	50/400	0.25/1.5	30/150	130/160	100/500	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	100	20/180	20/180	20/180	20/180	20/180	20/180	20/180
S1782106	VC01 0.00-0.50	42.1	15.8	0.45	57.8	79.6	0.88	32.9	141.1	1.29	0.18	0.05	0.13	0.15	0.85	0.32	1.17	1.49	0.67	0.54	0.45	0.32	0.68	0.18	0.31	0.08	0.34	510	5.0	3.2	4.3	3.1	4.8	7.6	4.3
S1782107	VC01 0.50-1.00	51.6	16.7	0.87	57	93.9	1.13	30.9	155.1	2.71	0.20	0.06	0.27	0.29	1.31	0.45	1.88	2.06	1.11	0.94	0.84	0.46	1.01	0.27	0.43	0.11	0.50	330	10.2	8.8	9.9	6.4	11.2	14.0	8.5
S1782108	VC02 0.00-0.65	46.5	15.1	0.52	52.8	83.2	1.04	29.6	141.7	<1	0.22	0.06	0.17	0.19	1.12	0.40	1.66	2.00	1.34	1.08	0.92	0.60	1.28	0.38	0.58	0.14	0.63	474	8.6	5.8	7.7	4.9	9.3	13.2	8.5
S1782109	VC02 0.65-1.30	60.6	17.6	0.99	75.5	107.6	1.42	33.9	172.1	2.32	0.31	0.12	0.26	0.23	1.12	0.50	1.75	2.28	1.01	0.82	0.75	0.47	0.98	0.34	0.48	0.12	0.78	817	11.9	7.6	10.9	8.5	13.0	17.3	9.7
S1782110	VC03 0.00-0.50	40.2	17.4	0.29	56.4	77.9	0.86	31.9	141.3	<1	0.20	0.05	0.06	0.11	0.45	0.19	0.63	0.84	0.40	0.33	0.62	0.29	0.41	0.20	0.23	0.05	0.27	530	5.9	3.4	5.0	3.7	6.0	8.8	5.3
S1782111	VC03 1.50-2.00	55.6	19.5	0.44	72.7	107.2	1.22	38.4	173.7	<1	0.22	0.06	0.09	0.13	0.59	0.26	0.89	1.16	0.52	0.50	0.56	0.25	0.53	0.25	0.28	0.07	0.32	571	9.3	6.5	8.6	6.2	11.1	16.5	10.9
S1782112	VC03 2.50-3.00	60.4	19.4	0.74	80.1	116.3	1.5	36.4	179.8	<1	0.33	0.09	0.15	0.24	0.91	0.49	1.47	1.93	0.88	0.64	0.76	0.41	0.89	0.32	0.48	0.12	0.55	939	8.3	4.2	7.0	5.4	7.1	10.9	5.4
S1782113	VC04 0.00-0.50	40.3	17.9	0.35	54.1	78.5	0.88	31.9	141.5	<1	0.22	0.07	0.10	0.16	0.54	0.22	0.82	1.04	0.48	0.43	0.40	0.27	0.52	0.20	0.29	0.07	0.33	540	5.9	3.6	5.0	3.9	6.1	8.6	5.8
S1782114	VC04 1.00-1.50	58.2	19.4	0.72	68.2	119	1.3	35.7	183.3	<1	0.28	0.08	0.12	0.18	0.65	0.29	0.99	1.33	0.62	0.45	0.69	0.32	0.60	0.29	0.35	0.09	0.38	775	11.0	5.9	9.5	6.2	11.8	16.4	10.7
S1782115	VC04 2.15-2.65	81	18.1	2.83	84.5	162.7	1.88	38.1	223.5	2.03	0.27	0.10	0.14	0.25	0.72	0.39	1.27	1.53	0.71	0.56	0.48	0.33	0.65	0.27	0.37	0.09	0.30	163	22.7	13.7	17.6	10.3	21.8	24.3	17.3
S1782116	VC05 0.00-0.50	47.6	18.7	0.38	59.6	152	0.93	33.8	151.9	<1	0.22	0.07	0.13	0.19	0.73	0.27	1.01	1.24	0.60	0.51	0.53	0.30	0.60	0.22	0.32	0.08	0.37	574	6.8	4.1	5.8	4.1	7.0	8.9	6.5
S1782117	VC05 1.00-1.50	55.1	18.7	0.63	69.3	110.1	1.19	35.4	177.2	1.24	0.25	0.07	0.10	0.17	0.62	0.31	0.75	1.33	0.60	0.46	0.46	0.30	0.67	0.28	0.26	0.07	0.30	659	10.0	6.1	8.9	5.5	10.8	13.7	8.2
S1782118	VC05 1.50-2.00	63.3	19.6	0.75	77	126.3	1.5	37.2	184.7	1.14	0.29	0.06	0.11	0.18	0.72	0.35	1.30	1.46	0.68	0.51	0.74	0.34	0.70	0.31	0.50	0.12	0.58	1074	11.1	7.9	10.0	7.0	11.6	17.4	8.4
S1782119	VC06 0.00-0.50	45.5	17.5	0.42	57.3	96.7	1	32.6	151.2	<1	0.24	0.06	0.09	0.15	0.62	0.27	1.00	1.20	0.59	0.52	0.62	0.29	0.63	0.21	0.44	0.10	0.49	672	8.3	5.7	7.3	5.1	9.0	11.2	8.6
S1782120	VC06 1.20-1.70	59.9	18.2	0.81	72.2	110.4	1.38	34.3	175.9	3.33	0.33	0.07	0.18	0.24	0.85	0.38	1.34	1.62	0.74	0.52	0.70	0.36	0.77	0.34	0.56	0.14	0.65	2854	9.4	6.0	8.6	6.0	10.8	14.4	8.4
S1782121	VC06 2.40-2.90	79.9	18.4	1.69	65.1	176.6	2.02	32.6	230.5	<1	0.54	0.11	0.23	0.40	1.12	0.63	2.10	2.30	1.31	0.97	1.15	0.59	1.30	0.41	0.91	0.22	0.99	1323	12.2	9.3	12.0	7.2	13.2	15.2	10.0
S1782122	VC07B 0.00-0.50	40.3	18.8	0.34	56.7	83	0.88	33.5	146.8	<1	0.20	0.04	0.05	0.10	0.41	0.16	0.61	0.72	0.37	0.28	0.42	0.20	0.39	0.15	0.31	0.07	0.34	544	4.1	2.8	3.4	2.5	4.1	5.6	3.4
S1782123	VC07B 1.25-1.75	48.8	20.2	0.35	71.8	97.2	1.05	37.1	164.4	<1	0.24	0.05	0.07	0.14	0.48	0.20	0.73	0.85	0.44	0.35	0.50	0.23	0.48	0.25	0.40	0.09	0.45	590	7.1	4.3	5.7	3.9	6.9	9.7	5.7
S1782124	VC07B 2.00-2.55	90.6	18.2	1.62	83.6	188.6	2.16	39.2	252.6	1.26	0.26	0.07	0.11	0.20	0.67	0.34	1.12	1.41	0.69	0.58	0.52	0.34	0.74	0.31	0.54	0.13	0.60	836	21.5	15.2	17.4	10.5	21.5	26.7	20.8
S1782646	VC08 0.00-0.50	98.4	18.2	2.41	85.7	185.3	2.41	36.1	256.3	4.34	0.35	0.08	0.15	0.25	0.86	0.48	1.43	1.69	0.84	0.59	0.61	0.37	0.79	0.29	0.58	0.15	0.68	1309	41.8	22.0	25.2	15.3	35.3	41.3	33.1
S1782647	VC08 1.45-1.95	106.9	16.7	2.28	93.8	182.9	2.64	37	253.9	4.69	0.44	0.09	0.17	0.28	1.05	0.56	1.65	1.98	1.01	0.74	0.89	0.44	0.95	0.34	0.70	0.18	0.82	179	27.5	16.2	20.4	12.7	25.2	31.5	24.8
S1782648	VC08 2.40-2.90	86.7	22.6	1.14	67.5	241.1	3.15	35.3	268.2	<1	0.75	0.28	0.39	0.83	2.24	1.49	4.53	5.33	2.91	2.01	1.68	1.13	2.68	0.81	1.76	0.41	1.92	1663	6.5	6.1	7.1	3.5	10.9	11.9	12.7
S1782649	VC09 0.00-0.50	76.3	18.2	1.49	64.4	197.7	2.1	36.1	251.8	11.8	0.34	0.14	0.23	0.34	1.29	0.67	2.52	2.96	1.41	1.01	0.94	0.65	1.50	0.48	1.02	0.25	1.15	1229	32.4	29.7	35.5	24.1	28.1	35.8	24.1
S1782650	VC09 1.30-1.80	90.4	19.5	1.97	80.2	206.1	2.3	40.1	255.8	3.31	0.43	0.15	0.28	0.47	1.56	0.79	2.79	3.08	1.65	1.09	1.36	0.72	1.65	0.57	1.12	0.27	1.24	2510	39.0	32.2	32.7	22.2	20.8	32.4	11.7
S1782125	VC09 0.65-1.15	98.9	20.5	2	85.2	255.1	2.39	45.1	317	3.69	0.45	0.11	0.20	0.34	1.24	0.65	2.17	2.49	1.26	0.96	1.19	0.56	1.22	0.50	0.94	0.24	1.08	1634	24.8	19.5	24.7	16.0	22.0	26.8	16.0
S1782126	VC10 0.00-0.50	43.7	19.3	0.34	62	92	1.01	34.9	153.4	<1	0.20	0.04	0.06	0.11	0.39	0.16	0.57	0.67	0.33	0.24	0.31	0.17	0.35	0.15	0.29	0.06	0.32	508	5.1	3.5	4.1	3.0	4.7	6.7	3.9
S1782127	VC10 1.25-1.75	48.7	19.7	0.43	59.8	102.9	0.98	34.4	158.2	<1	0.24	0.05	0.08	0.14	0.62	0.24	0.95	1.05	0.54	0.43	0.45	0.27	0.57	0.23	0.45	0.11	0.50	598	7.1	4.8	6.0	3.8	6.6	9.4	5.8
S1782128	VC10 2.00-2.50	65.2	19.2	0.78	76.8	168	1.58	39.4	199.9	<1	0.27	0.06	0.11	0.19	0.69	0.32	1.23	1.36	0.69	0.52	0.70	0.33	0.73	0.31	0.55	0.13	0.60	796	11.9	11.0	12.8	7.4	19.2	21.3	14.9
S1782129	VC11 0.00-0.50	45.1	19	0.28	63.6	92.8	0.97	35.7	154.4	<1	0.22	0.04	0.06	0.11	0.42	0.17	0.65	0.76	0.40	0.30	0.38	0.22	0.45	0.19	0.39	0.09	0.44	658	5.5	3.4	5.0	3.8	5.7	7.5	5.3
S1782130	VC11 1.50-2.00	46.7	19.4	0.32	66.8	113.8	1.08	37	164.7	<1	0.24	0.05	0.07	0.13	0.54	0.23	0.89	1.03	0.54	0.41	0.57	0.28	0.60	0.30	0.49	0.11	0.55	720	7.7	4.9	6.0	4.7	7.2	10.7	5.6
S1782131	VC11 2.50-3.00	82.8	16.3	0.97	62.7	208.8	1.67	39.6	251.6	<1	0.39	0.11	0.34	0.43	1.99	0.87	3.60	3.70	2.06	1.57	1.47	0.97	2.22	0.67	1.53	0.36	1.56	1927	33.0	40.9	53.3	30.6	55.0	66.2	47.9

Our Ref: EFS/180403 (Ver. 1)
Your Ref:

December 1, 2017

Environmental Chemistry
SOCOTEC UK Limited
Bretby Business Park
Ashby Road
Burton-on-Trent
Staffordshire
DE15 0YZ

Telephone: 01283 554400
Facsimile: 01283 554422

Campbell Stewart
EnviroCentre
Envirocentre
Craighall Business Park
Eagle St
Glasgow
G4 9XA

For the attention of Campbell Stewart

Dear Campbell Stewart

Sample Analysis - Granton Harbour 769967j

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

The samples will be kept until the agreed date when they will be discarded. Please call 01283 554467 for an extension of this date.
Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with SOCOTEC UK Limited (Multi-Sector Services) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for SOCOTEC UK Limited

L Thompson
Project Co-ordinator
01283 554467

TEST REPORT

1252

Report No. EFS/180403 (Ver. 1)

EnviroCentre
Envirocentre
Craighall Business Park
Eagle St
Glasgow
G4 9XA

Site: Granton Harbour 769967j

The 37 samples described in this report were registered for analysis by SOCOTEC UK Limited on 07-Nov-2017. This report supersedes any versions previously issued by the laboratory.
The analysis was completed by: 01-Dec-2017

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

On behalf of
SOCOTEC UK Lim
Tim Barnes Operations Director
Energy & Waste Services

Date of Issue: 01-Dec-2017

Tests marked '^' have been subcontracted to another laboratory.
Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected.
SOCOTEC UK Limited accepts no responsibility for any sampling not carried out by our personnel.

Units :			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/kg	ug Sn/kg	µg/kg	%	µg/kg	
Method Codes :			ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	PAHSED	OGSNSED	PCBMS3Q	Sub061	TPHSED	
Method Reporting Limits :			0.5	0.5	0.04	0.5	0.5	0.5	0.5	0.015	0.5	2	1	1	0.08		10	
UKAS Accredited :			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**Copper (MS) Sediment**	**Arsenic (MS) Sediments**	**Cadmium (MS) Sediments**	**Chromium (MS) Sediments**	**Cobalt (MS) Sediments**	**Lead (MS) Sediments**	**Manganese (MS) Sediments**	**Mercury (MS) Sediments**	**Nickel (MS) Sediments**	**Zinc (MS) Sediments**	**PAH by MS Dti**	**Tributyl Tin (Sediments)**	**PCB- 7 Congeners (Marine Sediments)**	**^Particle Size Analysis (Sediment)**	**TPH GCFID (Si)+Sats**	
1782106	VC01 0.00-0.50	31-Oct-17	42.1	15.8	0.45	57.8	11.5	79.6	429.7	0.88	32.9	141.1	Req	1.29	Req	Req	Req	
1782107	VC01 0.50-1.00	31-Oct-17	51.6	16.7	0.87	57	10.7	93.9	400	1.13	30.9	155.1	Req	2.71	Req	Req	Req	
1782108	VC02 0.00-0.65	31-Oct-17	46.5	15.1	0.52	52.8	10.6	83.2	404.7	1.04	29.6	141.7	Req	<1	Req	Req	Req	
1782109	VC02 0.65-1.30	31-Oct-17	60.6	17.6	0.99	75.5	11.9	107.6	468.6	1.42	33.9	172.1	Req	2.32	Req	Req	Req	
1782110	VC03 0.00-0.50	31-Oct-17	40.2	17.4	0.29	56.4	11.8	77.9	590.4	0.86	31.9	141.3	Req	<1	Req	Req	Req	
1782111	VC03 1.50-2.00	31-Oct-17	55.6	19.5	0.44	72.7	13.3	107.2	587.2	1.22	38.4	173.7	Req	<1	Req	Req	Req	
1782112	VC03 2.50-3.00	31-Oct-17	60.4	19.4	0.74	80.1	12.9	116.3	715.4	1.5	36.4	179.8	Req	<1	Req	Req	Req	
1782113	VC04 0.00-0.50	31-Oct-17	40.3	17.9	0.35	54.1	11.6	78.5	603.1	0.88	31.9	141.5	Req	<1	Req	Req	Req	
1782114	VC04 1.00-1.50	31-Oct-17	58.2	19.4	0.72	68.2	12.4	119	559.1	1.3	35.7	183.3	Req	<1	Req	Req	Req	
1782115	VC04 2.15-2.65	31-Oct-17	81	18.1	2.83	84.5	12.5	162.7	463.6	1.88	38.1	223.5	Req	2.03	Req	Req	Req	
1782116	VC05 0.00-0.50	31-Oct-17	47.6	18.7	0.38	59.6	12.1	152	564.3	0.93	33.8	151.9	Req	<1	Req	Req	Req	
1782117	VC05 1.00-1.50	31-Oct-17	55.1	18.7	0.63	69.3	12.3	110.1	561.4	1.19	35.4	177.2	Req	1.24	Req	Req	Req	
1782118	VC05 1.50-2.00	31-Oct-17	63.3	19.6	0.75	77	12.9	126.3	604	1.5	37.2	184.7	Req	1.14	Req	Req	Req	
1782119	VC06 0.00-0.50	30-Oct-17	45.5	17.5	0.42	57.3	11.5	96.7	517.1	1	32.6	151.2	Req	<1	Req	Req	Req	
1782120	VC06 1.20-1.70	30-Oct-17	59.9	18.2	0.81	72.2	12.2	110.4	539.5	1.38	34.3	175.9	Req	3.33	Req	Req	Req	
1782121	VC06 2.40-2.90	30-Oct-17	79.9	18.4	1.69	65.1	10.8	176.6	330.3	2.02	32.6	230.5	Req	<1	Req	Req	Req	
1782122	VC07B 0.00-0.50	31-Oct-17	40.3	18.8	0.34	56.7	12	83	668	0.88	33.5	146.8	Req	<1	Req	Req	Req	
1782123	VC07B 1.25-1.75	31-Oct-17	48.8	20.2	0.35	71.8	13.3	97.2	685.4	1.05	37.1	164.4	Req	<1	Req	Req	Req	
1782124	VC07B 2.00-2.55	31-Oct-17	90.6	18.2	1.62	83.6	13	188.6	374.3	2.16	39.2	252.6	Req	1.26	Req	Req	Req	
1782125	VC09 0.65-1.15	30-Oct-17	98.9	20.5	2	85.2	15.3	255.1	505.7	2.39	45.1	317	Req	3.69	Req	Req	Req	

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Client Name EnviroCentre

Contact Campbell Stewart

Granton Harbour 769967j

Sample Analysis

Date Printed	**23-Nov-2017**
Report Number	**EFS/180284**
Table Number	**1**

Where individual results are flagged see report notes for status.

Units :			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/kg	ug Sn/kg	µg/kg	%	µg/kg	
Method Codes :			ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	PAHSED	OGSNSED	PCBMS3Q	Sub061	TPHSED	
Method Reporting Limits :			0.5	0.5	0.04	0.5	0.5	0.5	0.5	0.015	0.5	2	1	1	0.08		10	
UKAS Accredited :			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**Copper (MS) Sediment**	**Arsenic (MS) Sediments**	**Cadmium (MS) Sediments**	**Chromium (MS) Sediments**	**Cobalt (MS) Sediments**	**Lead (MS) Sediments**	**Manganese (MS) Sediments**	**Mercury (MS) Sediments**	**Nickel (MS) Sediments**	**Zinc (MS) Sediments**	**PAH by MS Dti**	**Tributyl Tin (Sediments)**	**PCB- 7 Congeners (Marine Sediments)**	**^Particle Size Analysis (Sediment)**	**TPH GCFID (Si)+Sats**	
1782126	VC10 0.00-0.50	31-Oct-17	43.7	19.3	0.34	62	12.5	92	642.4	1.01	34.9	153.4	Req	<1	Req	Req	Req	
1782127	VC10 1.25-1.75	31-Oct-17	48.7	19.7	0.43	59.8	12.4	102.9	633.3	0.98	34.4	158.2	Req	<1	Req	Req	Req	
1782128	VC10 2.00-2.50	31-Oct-17	65.2	19.2	0.78	76.8	13.7	168	602	1.58	39.4	199.9	Req	<1	Req	Req	Req	
1782129	VC11 0.00-0.50	31-Oct-17	45.1	19	0.28	63.6	12.8	92.8	665.3	0.97	35.7	154.4	Req	<1	Req	Req	Req	
1782130	VC11 1.50-2.00	31-Oct-17	46.7	19.4	0.32	66.8	13.4	113.8	734.7	1.08	37	164.7	Req	<1	Req	Req	Req	
1782131	VC11 2.50-3.00	31-Oct-17	82.8	16.3	0.97	62.7	13.6	208.8	495.3	1.67	39.6	251.6	Req	<1	Req	Req	Req	
1782132	CRM	31-Oct-17											Req §		Req			
1782133	QC Blank	31-Oct-17	<0.5 §	<0.5 §	<0.04 §	<0.5 §	<0.5 §	<0.5 §	<0.5 §	<0.015 §	<0.5 §	<2 §	Req §	<1	Req		Req	
1782134	Reference Material (% Recovery)	31-Oct-17	103 §	100 §	91 §	103 §	100 §	95 §	99 §	94 §	101 §	102 §	Req §	84	Req		Req	
1782646	VC08 0.00-0.50	31-Oct-17	98.4	18.2	2.41	85.7	11.8	185.3	334.9	2.41	36.1	256.3	Req	4.34	Req	Req	Req	
1782647	VC08 1.45-1.95	31-Oct-17	106.9	16.7	2.28	93.8	12.1	182.9	317.6	2.64	37	253.9	Req	4.69	Req	Req	Req	
1782648	VC08 2.40-2.90	31-Oct-17	86.7	22.6	1.14	67.5	11.9	241.1	300.8	3.15	35.3	268.2	Req	<1	Req	Req	Req	
1782649	VC09 0.00-0.50	31-Oct-17	76.3	18.2	1.49	64.4	12.5	197.7	435.7	2.1	36.1	251.8	Req	11.8	Req	Req	Req	
1782650	VC09 1.30-1.80	30-Oct-17	90.4	19.5	1.97	80.2	13.5	206.1	402.7	2.3	40.1	255.8	Req	3.31	Req	Req	Req	
1782651	CRM	30-Oct-17											Req §		Req			
1782652	QC Blank	30-Oct-17	<0.5 §	<0.5 §	<0.04 §	<0.5 §	<0.5 §	<0.5 §	<0.5 §	<0.015 §	<0.5 §	<2 §	Req §	<1	Req		Req	
1782653	Reference Material (% Recovery)	31-Oct-17	104 §	93 §	96 §	99 §	95 §	103 §	96 §	104 §	96 §	100 §	Req §	95	Req		Req	
		31-Oct-17																
		31-Oct-17																
		30-Oct-17																

SOCOTEC

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Sample Analysis

Date Printed	**23-Nov-2017**
Report Number	**EFS/180284**
Table Number	**1**

Where individual results are flagged see report notes for status.

Polychlorinated Biphenyls (congeners)

Customer and Site Details: EnviroCentre: Granton Harbour 769967j
Job Number: S18_0284
QC Batch Number: 170012
Directory: 151117PCB.TQ1
Method: Ultrasonic

Matrix: Soil
Date Booked in: 02-Nov-17
Date Extracted: 15-Nov-17
Date Analysed: 17-Nov-17

Compounds marked * are not UKAS or MCerts accredited

		Concentration, (µg/kg)						
Sample ID	**Customer ID**	**PCB28***	**PCB52***	**PCB101***	**PCB118***	**PCB153***	**PCB138***	**PCB180***
CL1782106	VC01 0.00-0.50	5.0	3.2	4.3	3.1	4.8	7.6	4.3
CL1782107	VC01 0.50-1.00	10.2	8.8	9.9	6.4	11.2	14.0	8.5
CL1782108	VC02 0.00-0.65	8.6	5.8	7.7	4.9	9.3	13.2	8.5
CL1782109	VC02 0.65-1.30	11.9	7.6	10.9	8.5	13.0	17.3	9.7
CL1782110	VC03 0.00-0.50	5.9	3.4	5.0	3.7	6.0	8.8	5.3
CL1782111	VC03 1.50-2.00	9.3	6.5	8.6	6.2	11.1	16.5	10.9
CL1782112	VC03 2.50-3.00	8.3	4.2	7.0	5.4	7.1	10.9	5.4
CL1782113	VC04 0.00-0.50	5.9	3.6	5.0	3.9	6.1	8.6	5.8
CL1782114	VC04 1.00-1.50	11.0	5.9	9.5	6.2	11.8	16.4	10.7
CL1782115	VC04 2.15-2.65	22.7	13.7	17.6	10.3	21.8	24.3	17.3
CL1782116	VC05 0.00-0.50	6.8	4.1	5.8	4.1	7.0	8.9	6.5
CL1782117	VC05 1.00-1.50	10.0	6.1	8.9	5.5	10.8	13.7	8.2
CL1782118	VC05 1.50-2.00	11.1	7.9	10.0	7.0	11.6	17.4	8.4
CL1782119	VC06 0.00-0.50	8.3	5.7	7.3	5.1	9.0	11.2	8.6
CL1782120	VC06 1.20-1.70	9.4	6.0	8.6	6.0	10.8	14.4	8.4
CL1782121	VC06 2.40-2.90	12.2	9.3	12.0	7.2	13.2	15.2	10.0
CL1782122	VC07B 0.00-0.50	4.1	2.8	3.4	2.5	4.1	5.6	3.4
CL1782123	VC07B 1.25-1.75	7.1	4.3	5.7	3.9	6.9	9.7	5.7
CL1782124	VC07B 2.00-2.55	21.5	15.2	17.4	10.5	21.5	26.7	20.8
CL1782132	CRM	2.9	4.9	5.1	2.8	4.4	4.7	3.1
CL1782133	QC Blank	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CL1782134	Reference Material (% Recovery)	96	101	100	94	95	98	99

Where individual results are flagged see report notes for status.

Polychlorinated Biphenyls (congeners)

Customer and Site Details:	EnviroCentre: Granton Harbour 769967j	**Matrix:**	Soil
Job Number:	S18_0284	**Date Booked in:**	02-Nov-17
QC Batch Number:	170013	**Date Extracted:**	15-Nov-17
Directory:	151117PCB.TQ1	**Date Analysed:**	17-Nov-17
Method:	Ultrasonic		

Compounds marked * are not UKAS or MCerts accredited

		Concentration, (µg/kg)						
Sample ID	**Customer ID**	**PCB28***	**PCB52***	**PCB101***	**PCB118***	**PCB153***	**PCB138***	**PCB180***
CL1782125	VC09 0.65-1.15	39.0	32.2	32.7	22.2	20.8	32.4	11.7
CL1782126	VC10 0.00-0.50	5.1	3.5	4.1	3.0	4.7	6.7	3.9
CL1782127	VC10 1.25-1.75	7.1	4.8	6.0	3.8	6.6	9.4	5.8
CL1782128	VC10 2.00-2.50	11.9	11.0	12.8	7.4	19.2	21.3	14.9
CL1782129	VC11 0.00-0.50	5.5	3.4	5.0	3.8	5.7	7.5	5.3
CL1782130	VC11 1.50-2.00	7.7	4.9	6.0	4.7	7.2	10.7	5.6
CL1782131	VC11 2.50-3.00	33.0	40.9	53.3	30.6	55.0	66.2	47.9
CL1782132	CRM	3.1	4.6	5.0	2.4	4.0	4.5	2.7
CL1782133	QC Blank	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CL1782134	Reference Material (% Recovery)	101	104	105	98	107	108	108

Where individual results are flagged see report notes for status.

Polychlorinated Biphenyls (congeners)

Customer and Site Details:	EnviroCentre: Granton Harbour 769967j	**Matrix:**	Soil
Job Number:	S18_0403	**Date Booked in:**	07-Nov-17
QC Batch Number:	170013	**Date Extracted:**	15-Nov-17
Directory:	151117PCB.TQ1	**Date Analysed:**	17-Nov-17
Method:	Ultrasonic		

Compounds marked * are not UKAS or MCerts accredited

		Concentration, (µg/kg)						
Sample ID	**Customer ID**	**PCB28***	**PCB52***	**PCB101***	**PCB118***	**PCB153***	**PCB138***	**PCB180***
CL1782646	VC08 0.00-0.50	41.8	22.0	25.2	15.3	35.3	41.3	33.1
CL1782647	VC08 1.45-1.95	27.5	16.2	20.4	12.7	25.2	31.5	24.8
CL1782648	VC08 2.40-2.90	6.5	6.1	7.1	3.5	10.9	11.9	12.7
CL1782649	VC09 0.00-0.50	32.4	29.7	35.5	24.1	28.1	35.8	24.1
CL1782650	VC09 1.30-1.80	24.8	19.5	24.7	16.0	22.0	26.8	16.0
CL1782651	CRM	3.1	4.6	5.0	2.4	4.0	4.5	2.7
CL1782652	QC Blank	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CL1782653	Reference Material (% Recovery)	101	104	105	98	107	108	108

Where individual results are flagged see report notes for status.

Polyaromatic Hydrocarbon Concentrations (ng/g dry weight basis) UKAS accredited?: Yes

		Sample ID :	CL1782133a	CL1782134a	CL1782106	CL1782107	CL1782108	CL1782109	CL1782110	CL1782111	CL1782112	CL1782113	CL1782114	CL1782115	CL1782116	CL1782117
		Station :	QC Blank	ce Material (% R	VC01 0.00-0.50	VC01 0.50-1.00	VC02 0.00-0.65	VC02 0.65-1.30	VC03 0.00-0.50	VC03 1.50-2.00	VC03 2.50-3.00	VC04 0.00-0.50	VC04 1.00-1.50	VC04 2.15-2.65	VC05 0.00-0.50	VC05 1.00-1.50
PAH Fraction	***# PAH***	***Mass***														
Naphthalene	1	128	<1	94.8	183.3	203.6	218.3	312.0	201.6	224.2	332.7	219.3	283.8	267.4	217.8	252.1
C1 Naphthalenes *	2	142	<1	95.5	513.1	749.0	646.4	818.6	568.0	629.4	832.8	816.8	883.1	976.6	668.1	679.9
C2 Naphthalenes *		156	<1	N.D	609.0	941.6	756.4	1107.1	621.1	677.9	923.5	868.5	978.6	1066.2	774.2	744.8
C3 Naphthalenes *		170	<1	N.D	636.3	1120.1	883.5	1258.2	700.3	121.2	1102.5	894.3	987.3	1185.9	980.3	827.6
C4 Naphthalenes *		184	<1	N.D	547.7	723.1	558.3	681.7	409.2	438.1	766.8	548.9	588.1	708.2	619.7	533.5
Sum Naphthalenes *			0	95	2489	3737	3063	4178	2500	2091	3958	3348	3721	4204	3260	3038
Phenanthrene / Anthracene	2	178	0.0	94.5	1162.9	1751.8	1516.7	1613.6	639.1	847.5	1402.8	755.6	936.8	1117.2	1003.0	929.6
C1 178 *		192	<1	N.D	796.8	1109.9	1073.6	1246.7	615.3	740.3	1277.3	686.9	860.6	966.0	881.6	843.4
C2 178 *		206	<1	N.D	645.4	839.6	898.0	1050.2	561.1	638.9	1181.1	642.6	753.6	782.3	702.7	751.2
C3 178 *		220	<1	N.D	586.3	730.6	578.8	1022.1	605.2	397.4	868.7	369.6	581.9	715.5	690.9	643.7
Sum 178 *			0	94	3191.4	4432.0	4067.1	4932.6	2420.7	2624.1	4729.8	2454.7	3132.9	3581.1	3278.2	3167.9
Dibenzothiophene *		184	<1	95	65.8	86.1	73.9	95.2	42.8	55.8	115.0	50.1	61.4	76.8	58.7	73.3
C1 Dibenzothiophenes *		198	<1	N.D	110.2	150.5	142.5	213.2	107.8	121.4	288.1	115.3	138.3	179.4	132.1	178.1
C2 Dibenzothiophenes *		212	<1	N.D	172.2	211.1	246.6	386.9	185.2	218.0	670.5	205.7	299.7	331.5	212.5	335.1
C3 Dibenzothiophenes *		226	<1	N.D	89.8	92.2	131.4	188.1	139.5	111.2	560.4	121.5	186.9	204.7	107.7	261.9
Sum Dibenzothiophenes *			0	95	437.9	539.9	594.4	883.3	475.4	506.3	1634.2	492.6	686.4	792.3	510.9	848.5
Fluoranthene * / pyrene	2	202	0	90	2667.3	3941.1	3660.8	4032.9	1467.3	2050.7	3399.0	1853.4	2321.5	2806.0	2254.3	2083.3
C1 202 *		216	<1	N.D	1110.2	1764.5	1556.4	1764.2	795.8	939.8	1673.1	916.7	1092.8	1159.0	1117.3	1158.8
C2 202 *		230	<1	N.D	790.9	1272.0	875.0	1692.3	659.4	553.5	1062.3	742.8	889.1	874.8	869.7	871.7
C3 202 *		244	<1	N.D	493.3	669.9	821.7	641.5	362.4	511.7	913.0	383.4	480.8	614.1	463.6	502.8
Sum 202 *			0	90	5061.7	7647.6	6913.9	8130.9	3284.9	4055.7	7047.4	3896.4	4784.1	5453.9	4705.0	4616.7
Benzoanthracene / Chrysene	2	228	0	84	1206.8	2050.7	2412.6	1833.0	724.5	1019.1	1525.9	913.2	1066.8	1274.6	1105.1	1065.5
C1 228 *		242	<1	N.D	698.1	1060.4	1279.5	1010.3	518.0	622.1	1080.8	623.7	703.8	767.2	730.7	769.8
C2 228 *		256	<1	N.D	582.5	742.3	707.9	608.7	458.3	374.2	677.3	439.4	471.7	518.4	513.2	645.5
Sum 228 *			0	84	2487.4	3853.5	4400.0	3451.9	1700.8	2015.5	3284.0	1976.2	2242.4	2560.1	2348.9	2480.8
Benzofluoranthenes / benzopyrenes	4	252	0	87	1972.7	3080.7	3834.5	3010.4	1711.1	1816.9	2844.3	1635.6	2148.3	2026.4	1946.1	2003.7
C1 252 *		266	<1	N.D	825.7	1203.8	1602.1	1294.5	648.9	723.7	1314.3	758.0	871.4	693.6	873.3	730.5
C2 252 *		280	<1	N.D	485.2	676.9	832.4	779.3	353.7	358.2	861.7	395.1	545.2	487.1	462.8	429.3
Sum 252 *			0	87	3283.6	4961.4	6269.1	5084.2	2713.7	2898.8	5020.3	2788.6	3564.9	3207.2	3282.2	3163.5
Dibenzoanthracene / Indenopyrene / Benzoperylene *	3	276	0	57	730.1	1038.1	1356.5	1386.6	561.4	662.9	1155.9	687.4	819.1	753.0	773.9	623.6
C1 276 *		290	<1	N.D	155.3	266.2	303.3	255.8	141.8	201.7	391.1	180.3	300.1	213.5	162.3	169.2
C2 276 *		304	<1	N.D	67.1	100.7	88.2	93.2	51.6	82.2	79.3	70.7	77.7	55.8	56.3	56.1
Sum 276 *			0	57	952.5	1405.1	1747.9	1735.7	754.8	946.8	1626.3	938.5	1196.9	1022.2	992.4	848.9
Sum of all fractions *			0	86	17904.0	26576.7	27055.4	28396.3	13850.4	15137.8	27300.3	15894.8	19328.5	20821.1	18377.8	18164.2
Sum of NPD fraction *			0	95	6118.8	8709.1	7724.5	9993.6	5396.3	5221.0	10322.3	6295.1	7540.2	8577.6	7049.3	7054.3
NPD / 4-6 ring PAH ratio *			#DIV/0!	0.30	0.52	0.49	0.40	0.54	0.64	0.53	0.61	0.66	0.64	0.70	0.62	0.63

N.D = Not Determined as these compounds are not in the reference material spike.

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

* Denotes not UKAS accredited

Polyaromatic Hydrocarbon Concentrations (ng/g dry weight basis) UKAS accredited?: Yes

EPA 16 PAHs Compounds marked with a * are reported not UKAS.

	Sample ID :	CL1782133a	CL1782134a	CL1782106	CL1782107	CL1782108	CL1782109	CL1782110	CL1782111	CL1782112	CL1782113	CL1782114	CL1782115	CL1782116	CL1782117
	Station :	QC Blank	:e Material (% R	VC01 0.00-0.50	VC01 0.50-1.00	VC02 0.00-0.65	VC02 0.65-1.30	VC03 0.00-0.50	VC03 1.50-2.00	/C03 2.50-3.0	/C04 0.00-0.5	/C04 1.00-1.5	/C04 2.15-2.6	/C05 0.00-0.5	/C05 1.00-1.5
PAH	***Mass***														
Naphthalene	128	<1	94.8	183.3	203.6	218.3	312.0	201.6	224.2	332.7	219.3	283.8	267.4	217.8	252.1
Acenaphthylene	152	<1	97.0	45.4	62.6	55.8	119.4	50.8	57.0	85.6	71.7	79.8	96.7	70.9	72.3
Acenaphthene	154	<1	99.0	131.2	268.2	168.7	261.7	64.4	85.0	154.5	102.9	121.9	141.6	128.4	104.3
Fluorene	166	<1	99.3	154.1	285.9	191.5	231.9	113.0	134.3	240.0	162.7	177.6	252.4	187.1	169.6
Phenanthrene	178	<1	98.1	845.3	1305.3	1117.5	1118.2	451.2	587.0	910.6	537.6	646.4	723.3	729.0	624.3
Dibenzothiophene *	184	<1	94.7	65.8	86.1	73.9	95.2	42.8	55.8	115.0	50.1	61.4	76.8	58.7	73.3
Anthracene	178	<1	90.8	317.6	446.5	399.3	495.4	188.0	260.5	492.1	218.0	290.4	393.9	274.0	305.4
Fluoranthene *	202	<1	83.7	1172.6	1882.5	1660.2	1749.6	628.9	894.1	1467.9	817.9	994.4	1274.4	1010.3	752.2
Pyrene	202	<1	96.0	1494.7	2058.6	2000.6	2283.3	838.4	1156.5	1931.1	1035.5	1327.1	1531.6	1244.1	1331.1
Benzo[a]anthracene	228	<1	82.0	668.3	1111.6	1336.5	1010.1	399.0	521.4	883.3	483.6	618.8	713.1	596.6	600.5
Chrysene	228	<1	86.9	538.5	939.1	1076.1	822.9	325.5	497.7	642.6	429.6	448.0	561.5	508.5	465.0
Benzo[b]fluoranthene	252	<1	94.2	450.6	841.4	918.9	747.9	617.3	560.5	755.8	402.9	691.9	481.1	529.9	462.1
Benzo[k]fluoranthene	252	<1	89.3	315.6	458.8	601.6	466.2	293.3	254.6	410.9	267.2	319.7	327.7	298.4	298.2
Benzo[e]pyrene	252	<1	83.3	530.3	771.9	1030.5	818.4	391.0	468.4	786.4	446.8	534.6	568.8	518.0	574.1
Benzo[a]pyrene	252	<1	80.0	676.2	1008.6	1283.6	977.9	409.5	533.5	891.2	518.6	602.2	648.8	599.8	669.3
Perylene *	252	<1	<1	180.6	268.1	376.3	336.2	195.3	251.3	322.4	195.3	289.1	273.3	222.9	277.6
Indeno[123,cd]pyrene	276	<1	57.1	308.2	428.3	582.0	482.5	234.4	277.3	481.2	291.4	351.2	365.3	324.0	261.2
Dibenzo[a,h]anthracene	278	<1	53.4	81.6	108.8	139.8	123.1	53.8	69.8	122.0	69.4	86.6	90.1	78.9	67.4
Benzo[ghi]perylene *	276	<1	61.8	340.2	501.0	634.8	780.9	273.2	315.8	552.7	326.7	381.4	297.5	371.0	295.1

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

Polyaromatic Hydrocarbon Concentrations (ng/g dry weight basis) UKAS accredited?: Yes

		Sample ID :	CL1782133b	CL1782134b	CL1782118	CL1782119	CL1782120	CL1782121	CL1782122	CL1782123	CL1782124	CL1782125	CL1782126	CL1782127	CL1782128	CL1782129	CL1782130	CL1782131	CL1782132
		Station :	QC Blank	ce Material (% R	VC05 1.50-2.00	VC06 0.00-0.50	VC06 1.20-1.70	VC06 2.40-2.90	VC07B 0.00-0.50	VC07B 1.25-1.75	VC07B 2.00-2.55	VC09 0.65-1.15	VC10 0.00-0.50	VC10 1.25-1.75	VC10 2.00-2.50	VC11 0.00-0.50	VC11 1.50-2.00	VC11 2.50-3.00	CRM 1941b
PAH Fraction	***# PAH***	***Mass***																	
Naphthalene	1	128	<1	94.9	292.2	237.1	327.1	539.6	199.9	241.5	264.7	431.9	195.1	239.9	270.9	220.2	241.0	393.5	463.8
C1 Naphthalenes *	2	142	<1	96.4	813.7	669.6	923.5	1189.5	553.7	726.6	705.8	1040.3	582.0	684.4	754.2	667.1	590.1	779.5	309.3
C2 Naphthalenes *		156	<1	N.D	911.4	726.4	1070.7	1295.1	608.7	774.3	792.1	1246.4	630.2	660.5	784.7	704.8	643.8	984.5	210.9
C3 Naphthalenes *		170	<1	N.D	967.2	807.5	1400.3	1417.3	694.6	850.4	901.1	1639.6	684.0	767.2	900.8	750.3	690.6	1130.5	168.7
C4 Naphthalenes *		184	<1	N.D	632.9	501.9	670.3	984.5	399.0	523.2	416.6	1184.9	405.6	434.2	574.9	445.8	462.2	747.5	122.3
Sum Naphthalenes *			0	96	3617	2942	4392	5426	2456	3116	3080	5543	2497	2786	3286	2788	2628	4036	1275
Phenanthrene * / Anthracene	2	178	0.0	92.9	1071.5	883.6	1225.5	1747.6	563.3	684.1	1013.3	2353.8	550.5	866.1	1011.3	587.8	769.1	2857.4	423.4
C1 178 *		192	<1	N.D	896.9	780.8	1094.5	1464.5	544.7	654.4	863.3	1902.5	507.4	738.0	798.2	597.6	711.1	1824.2	231.7
C2 178 *		206	<1	N.D	857.2	716.6	985.2	1583.2	588.0	676.9	828.4	1831.8	478.0	663.7	957.6	629.1	779.6	1598.5	204.2
C3 178 *		220	<1	N.D	868.9	658.5	946.9	1114.7	472.8	422.4	531.6	1517.8	383.7	549.6	729.7	540.5	447.4	1404.2	157.6
Sum 178 *			0	93	3694.5	3039.5	4252.0	5909.9	2168.8	2437.8	3236.6	7605.9	1919.7	2817.5	3496.9	2354.9	2707.3	7684.3	1016.9
Dibenzothiophene *		184	<1	93	71.3	62.5	84.8	191.2	39.5	48.9	89.0	187.0	37.6	50.9	71.8	40.9	52.1	177.6	36.5
C1 Dibenzothiophenes *		198	<1	N.D	182.6	144.0	205.6	400.7	96.6	120.9	213.9	426.4	92.0	122.3	153.3	106.2	127.0	317.6	58.9
C2 Dibenzothiophenes *		212	<1	N.D	172.0	255.9	373.0	874.6	181.6	206.1	411.7	899.6	152.5	201.5	266.5	192.5	221.5	569.0	93.5
C3 Dibenzothiophenes *		226	<1	N.D	380.9	301.4	516.6	904.8	159.2	228.5	433.8	1105.1	182.6	203.0	324.6	185.3	235.8	635.9	50.3
Sum Dibenzothiophenes *			0	93	806.9	763.7	1179.9	2371.2	476.9	604.5	1148.4	2618.0	464.8	577.7	816.2	524.8	636.4	1700.1	239.2
Fluoranthene * / pyrene	2	202	0	89	2756.1	2200.3	2957.2	4399.6	1330.2	1583.5	2532.6	5869.0	1236.3	1996.1	2594.8	1404.9	1919.4	7302.3	852.5
C1 202 *		216	<1	N.D	1279.6	1118.9	1420.8	2301.6	674.7	833.9	1328.9	3153.0	646.7	963.1	1164.2	735.5	970.9	2737.2	246.6
C2 202 *		230	<1	N.D	1039.6	877.8	1201.1	1340.9	604.7	730.5	802.2	1694.4	556.3	803.2	898.1	687.6	840.0	2173.9	212.3
C3 202 *		244	<1	N.D	571.6	497.9	693.5	966.3	387.2	436.9	596.8	1126.6	318.8	476.1	517.7	501.2	478.2	1291.3	105.7
Sum 202 *			0	89	5646.9	4694.8	6272.7	9008.4	2996.8	3584.8	5260.5	11843.0	2758.0	4238.5	5174.7	3329.2	4208.5	13504.7	1417.1
Benzoanthracene / Chrysene	2	228	0	92	1194.8	1110.4	1266.2	2277.7	645.2	797.1	1275.4	2734.8	572.7	977.8	1205.3	702.3	949.0	3632.6	611.8
C1 228 *		242	<1	N.D	850.0	727.8	1112.6	1432.4	476.0	586.9	889.3	1960.3	431.4	677.0	826.9	560.7	737.5	2155.0	274.4
C2 228 *		256	<1	N.D	549.2	506.5	573.1	862.6	336.0	397.5	877.7	1153.8	400.8	684.9	514.1	457.2	562.1	1942.3	163.5
Sum 228 *			0	92	2594.0	2344.7	2951.9	4572.6	1457.1	1781.5	3042.5	5848.9	1404.9	2339.7	2546.2	1720.2	2248.5	7729.9	1049.8
Benzofluoranthenes / benzopyrenes	4	252	0	87	2440.5	2083.9	2563.6	4154.4	1372.6	1675.2	2260.8	5135.3	1168.5	1800.4	2408.3	1460.4	2000.2	6395.6	1294.6
C1 252 *		266	<1	N.D	993.5	919.9	1184.5	1883.9	582.8	774.1	1150.5	2590.6	571.6	863.5	1008.6	759.1	913.2	2634.2	417.3
C2 252 *		280	<1	N.D	604.6	577.0	787.2	1248.4	396.9	468.1	653.5	1348.4	373.8	525.0	601.7	446.5	547.4	1387.6	199.7
Sum 252 *			0	87	4038.6	3580.7	4535.2	7286.7	2352.3	2917.4	4064.8	9074.3	2113.9	3188.9	4018.6	2666.0	3460.8	10417.4	1911.5
Dibenzoanthracene / Indenopyrene / Benzoperylene *	3	276	0	59	1201.2	1024.4	1352.7	2120.9	727.0	945.8	1269.8	2627.0	672.3	1052.0	1276.5	920.2	1161.3	3444.7	662.4
C1 276 *		290	<1	N.D	302.9	246.2	477.3	587.7	182.7	253.1	488.1	743.6	171.3	389.8	282.6	230.4	269.1	997.3	110.4
C2 276 *		304	<1	N.D	73.2	67.9	110.9	221.6	65.6	84.4	129.5	301.0	79.1	80.4	110.7	111.6	108.1	261.6	45.4
Sum 276 *			0	59	1577.3	1338.6	1940.9	2930.2	975.2	1283.3	1887.3	3671.6	922.7	1522.2	1669.8	1262.2	1538.6	4703.5	818.2
Sum of all fractions *			0	87	21975.6	18704.5	25524.7	37505.2	12883.0	15725.3	21720.3	46204.7	12080.8	17470.8	21008.0	14645.6	17427.7	49775.6	7727.6
Sum of NPD fraction *			0	94	8118.7	6745.7	9823.9	13707.2	5101.6	6158.4	7465.3	15767.0	4881.3	6181.4	7598.7	5668.0	5971.3	13420.0	2531.0
NPD / 4-6 ring PAH ratio *			#DIV/0!	0.29	0.59	0.56	0.63	0.58	0.66	0.64	0.52	0.52	0.68	0.55	0.57	0.63	0.52	0.37	0.49

N.D = Not Determined as these compounds are not in the reference material spike.

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

* Denotes not UKAS accredited

Polyaromatic Hydrocarbon Concentrations (ng/g dry weight basis) UKAS accredited?: Yes

EPA 16 PAHs Compounds marked with a * are reported not UKAS.

	Sample ID :	CL1782133b	CL1782134b	CL1782118	CL1782119	CL1782120	CL1782121	CL1782122	CL1782123	CL1782124	CL1782125	CL1782126	CL1782127	CL1782128	CL1782129	CL1782130	CL1782131	CL1782132
	Station :	QC Blank	:e Material (% R	VC05 1.50-2.00	VC06 0.00-0.50	VC06 1.20-1.70	VC06 2.40-2.90	VC07B 0.00-0.50	/C07B 1.25-1.7	C07B 2.00-2.5	/C09 0.65-1.1	/C10 0.00-0.5	/C10 1.25-1.7	/C10 2.00-2.5	/C11 0.00-0.5	/C11 1.50-2.0	/C11 2.50-3.0	CRM 1941b
PAH	***Mass***																	
Naphthalene	128	<1	94.9	292.2	237.1	327.1	539.6	199.9	241.5	264.7	431.9	195.1	239.9	270.9	220.2	241.0	393.5	463.8
Acenaphthylene	152	<1	97.0	59.0	62.0	73.2	106.5	35.1	54.8	73.3	152.6	36.1	45.1	56.8	39.8	50.5	109.4	56.7
Acenaphthene	154	<1	98.3	106.5	93.0	177.9	231.3	54.4	68.6	111.0	281.0	57.7	83.7	109.6	57.3	71.1	339.4	28.6
Fluorene	166	<1	98.5	178.2	147.2	242.8	401.2	101.9	137.0	204.1	468.3	109.8	135.9	188.4	112.9	128.0	428.2	49.1
Phenanthrene *	178	<1	95.7	720.7	616.8	850.4	1118.1	405.1	484.0	672.7	1560.5	394.2	624.6	689.0	419.5	541.0	1986.7	302.0
Dibenzothiophene *	184	<1	92.7	71.3	62.5	84.8	191.2	39.5	48.9	89.0	187.0	37.6	50.9	71.8	40.9	52.1	177.6	36.5
Anthracene *	178	<1	90.1	350.8	266.8	375.0	629.6	158.2	200.2	340.6	793.4	156.3	241.6	322.3	168.2	228.1	870.7	121.4
Fluoranthene *	202	<1	84.0	1297.2	1004.4	1341.4	2100.5	610.4	729.6	1121.2	2786.5	568.2	945.8	1231.4	646.0	887.8	3600.9	477.3
Pyrene	202	<1	94.8	1458.8	1195.9	1615.8	2299.1	719.7	853.9	1411.4	3082.5	668.0	1050.3	1363.4	758.9	1031.6	3701.4	375.2
Benzo[a]anthracene	228	<1	89.6	683.0	594.3	743.0	1311.3	369.8	443.8	693.8	1649.4	333.0	544.2	685.5	403.0	542.4	2060.6	255.9
Chrysene	228	<1	95.0	511.8	516.0	523.2	966.4	275.4	353.2	581.6	1085.4	239.7	433.6	519.8	299.3	406.6	1571.9	356.0
Benzo[b]fluoranthene	252	<1	88.8	743.6	624.6	698.7	1147.5	419.9	504.5	524.3	1364.7	312.4	448.5	703.3	375.5	567.4	1465.4	464.9
Benzo[k]fluoranthene	252	<1	92.8	344.0	291.6	360.2	592.4	197.5	234.4	339.5	715.9	169.5	265.8	334.0	220.3	280.4	969.6	213.8
Benzo[e]pyrene	252	<1	85.5	657.3	541.2	736.1	1116.5	368.6	459.1	658.4	1400.6	335.8	513.5	641.2	416.1	554.5	1739.4	359.3
Benzo[a]pyrene	252	<1	81.4	695.6	626.5	768.5	1298.1	386.6	477.2	738.6	1654.0	350.9	572.6	729.9	448.5	597.9	2221.3	256.7
Perylene *	252	<1	<1	306.0	212.4	338.8	414.1	151.6	254.0	314.0	567.9	148.8	232.8	312.2	185.8	296.0	672.9	279.0
Indeno[123,cd]pyrene	276	<1	59.0	502.2	435.9	564.8	910.7	310.2	399.9	542.2	1118.6	286.8	446.5	550.6	391.4	492.7	1525.9	337.4
Dibenzo[a,h]anthracene	278	<1	54.7	119.5	103.3	136.4	221.2	73.4	91.8	130.4	272.7	63.8	105.2	130.4	89.4	114.4	356.9	76.6
Benzo[ghi]perylene *	276	<1	63.8	579.4	485.3	651.5	989.0	343.3	454.1	597.2	1235.7	321.7	500.3	595.5	439.4	554.2	1562.0	248.4

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

AREA RECOVERIES

n-alkanes (ng/g) **UKAS accredited?: No** As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

Sample ID :	CL1782133a	CL1782134a	CL1782133b	CL1782134b	CL1782106	CL1782107	CL1782108	CL1782109	CL1782110	CL1782111	CL1782112	CL1782113	CL1782114
Station :	QC Blank	nce Material (% Re	QC Blank	ence Material (% Rec	VC01 0.00-0.50	VC01 0.50-1.00	VC02 0.00-0.65	VC02 0.65-1.30	VC03 0.00-0.50	VC03 1.50-2.00	VC03 2.50-3.00	VC04 0.00-0.50	VC04 1.00-1.50
Alkane													
nC10	<1	101.0	<1	99.2	134.1	131.7	151.0	168.1	124.4	132.8	162.7	117.0	142.8
nC11	<1	<0.08	<1	<0.08	156.4	157.5	144.0	47.4	132.6	148.4	16.1	124.0	161.6
nC12	<1	107.5	<1	90.7	220.7	246.4	233.2	44.0	167.3	173.2	48.9	175.4	275.2
nC13	<1	<0.08	<1	<0.08	155.8	196.6	205.0	104.0	165.3	199.6	79.7	207.3	241.0
nC14	<1	96.9	<1	92.0	335.7	286.6	326.1	140.7	217.9	194.7	160.0	237.7	291.2
nC15	<1	<0.08	<1	<0.08	518.3	606.1	518.5	493.5	327.8	283.5	443.9	383.6	492.4
nC16	<1	121.7	<1	107.8	417.5	473.8	417.0	285.0	280.6	253.8	292.1	324.6	413.5
nC17	<1	<0.08	<1	<0.08	423.9	353.6	452.4	408.1	603.6	379.5	466.5	545.6	553.8
pristane	<1	<0.08	<1	<0.08	760.2	1,072.3	932.0	1,111.0	654.6	579.7	1,088.1	704.0	977.8
nC18	<1	96.7	<1	102.8	281.4	244.7	349.7	326.9	185.0	185.5	406.6	242.4	362.7
phytane	<1	<0.08	<1	<0.08	1,260.6	2,137.2	1,754.6	1,729.0	434.0	537.0	1,432.8	835.0	949.8
nC19	<1	<0.08	<1	<0.08	341.7	365.4	398.0	496.6	300.8	249.7	469.9	333.2	365.9
nC20	<1	104.9	<1	108.3	488.8	720.0	778.1	887.4	460.2	349.0	786.5	456.6	776.5
nC21	<1	<0.08	<1	<0.08	766.4	483.6	834.6	3,301.0	562.6	536.4	2,835.4	462.0	617.7
nC22	<1	105.1	<1	113.1	602.0	690.4	770.4	654.3	565.4	751.4	633.0	605.6	741.0
nC23	<1	<0.08	<1	<0.08	530.5	275.0	448.9	789.9	469.2	455.0	796.2	380.9	465.5
nC24	<1	104.6	<1	111.8	352.9	288.7	278.9	546.5	339.8	343.9	560.0	282.4	318.9
nC25	<1	<0.08	<1	<0.08	805.1	849.2	881.9	661.1	310.4	387.6	719.4	357.5	545.9
nC26	<1	107.7	<1	109.3	501.3	404.8	590.5	950.7	588.9	682.4	1,000.0	2,638.8	589.0
nC27	<1	<0.08	<1	<0.08	1,190.4	799.1	1,118.5	1,607.7	1,247.6	1,228.0	1,765.1	1,152.9	1,026.8
nC28	<1	105.4	<1	104.4	479.9	358.1	399.2	644.0	499.5	440.1	892.9	374.7	592.2
nC29	<1	<0.08	<1	<0.08	1,196.1	800.0	1,063.8	1,960.5	1,557.1	1,415.2	2,723.5	1,317.7	1,566.2
nC30	<1	112.7	<1	97.7	546.2	403.6	549.9	916.7	594.1	630.5	1,021.2	517.4	725.0
nC31	<1	<0.08	<1	<0.08	1,818.0	1,111.5	1,996.8	2,695.0	2,226.4	2,105.2	4,002.5	1,953.2	2,942.1
nC32	<1	106.5	<1	101.7	226.8	104.3	291.0	479.0	236.0	213.4	427.0	264.5	232.9
nC33	<1	<0.08	<1	<0.08	2,055.7	1,846.2	2,035.7	2,937.8	1,757.8	2,184.8	3,117.0	1,609.4	2,438.0
nC34	<1	113.2	<1	118.8	89.6	547.6	290.7	347.4	132.1	316.6	227.0	84.1	754.2
nC35	<1	<0.08	<1	<0.08	77.1	72.1	317.6	500.8	293.9	221.1	774.8	400.3	239.9
nC36	<1	117.7	<1	112.0	52.3	4.4	19.7	58.1	234.6	46.5	102.0	16.9	19.5
nC37	<1	<0.08	<1	<0.08	85.1	6.7	36.2	121.6	257.0	176.8	108.3	11.5	27.4
Total Oil (ug/kg)	29.6	0.0	48.7	0.0	509,613.1	330,411.5	474,379.2	817,296.6	530,188.4	570,916.7	938,969.3	539,779.9	775,019.9
Total n alkanes (ng/g)	0	1,502	0	1,470	14,850	12,828	15,897	22,574	14,838	14,684	25,038	15,577	17,919
Carbon Preference Index	#DIV/0!	0.00	#DIV/0!	0.00	2.14	1.62	1.92	2.50	2.21	2.12	2.73	1.46	1.87
Pristane	<1	<0.08	<1	<0.08	760	1072	932	1111	655	580	1088	704	978
Phytane	<1	<0.08	<1	<0.08	1261	2137	1755	1729	434	537	1433	835	950
Pristane / phytane ratio					0.6	0.5	0.5	0.6	1.5	1.1	0.8	0.8	1.0

Note: sample data are NOT blank corrected

AREA RECOVERIES

n-alkanes (ng/g) **UKAS accredited?: No** As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

Sample ID :	CL1782133a	CL1782134a	CL1782133b	CL1782134b	CL1782115	CL1782116	CL1782117	CL1782118	CL1782119	CL1782120	CL1782121	CL1782122	CL1782124	CL1782123	CL1782125	CL1782126	CL1782127	CL1782128	CL1782129	CL1782130	CL1782131
Station :	QC Blank	nce Material (% Re	QC Blank	nce Material (% Rec	VC04 2.15-2.65	VC05 0.00-0.50	VC05 1.00-1.50	VC05 1.50-2.00	VC06 0.00-0.50	VC06 1.20-1.70	VC06 2.40-2.90	VC07B 0.00-0.50	VC07B 1.25-1.75	VC07B 2.00-2.55	VC09 0.65-1.15	VC10 0.00-0.50	VC10 1.25-1.75	VC10 2.00-2.50	VC11 0.00-0.50	VC11 1.50-2.00	VC11 2.50-3.00
Alkane																					
nC10	<1	101.0	<1	99.2	19.3	96.4	117.4	164.9	141.1	224.0	345.0	96.0	164.6	95.7	251.5	137.5	89.7	164.4	112.2	144.2	242.3
nC11	<1	<0.08	<1	<0.08	5.6	113.1	120.0	128.9	92.0	699.4	258.1	116.8	119.2	42.3	285.5	103.5	79.8	153.7	90.4	95.7	184.2
nC12	<1	107.5	<1	90.7	10.6	146.9	194.1	168.9	91.9	567.5	401.6	90.1	188.1	227.9	383.2	76.4	102.2	181.1	104.8	169.5	329.8
nC13	<1	<0.08	<1	<0.08	34.4	148.5	183.2	162.5	92.1	524.1	391.4	140.6	208.6	80.4	308.2	147.0	152.2	188.5	161.8	127.1	401.9
nC14	<1	96.9	<1	92.0	33.9	182.3	254.2	325.3	192.9	1,368.2	416.3	203.3	272.0	118.3	424.8	170.7	196.7	237.7	173.3	151.2	465.9
nC15	<1	<0.08	<1	<0.08	64.9	340.2	463.8	516.1	398.5	1,476.8	746.0	321.5	603.1	442.5	844.6	331.4	352.7	505.4	297.0	330.7	1,066.6
nC16	<1	121.7	<1	107.8	44.6	266.0	386.3	280.8	349.7	1,638.2	695.1	242.7	503.8	230.2	781.5	252.1	269.0	292.8	258.4	233.9	903.5
nC17	<1	<0.08	<1	<0.08	51.6	499.6	476.2	540.7	476.3	1,203.8	704.4	484.8	524.4	459.6	659.2	471.7	517.3	439.5	549.7	537.5	766.1
pristane	<1	<0.08	<1	<0.08	263.0	590.9	767.1	1,132.3	698.1	2,897.9	1,999.1	527.8	1,088.7	539.2	1,997.1	564.7	761.7	833.4	638.7	694.7	1,563.1
nC18	<1	96.7	<1	102.8	71.5	213.0	221.3	333.4	238.2	1,280.3	608.2	501.1	376.2	499.0	661.9	206.7	262.1	372.6	281.5	263.0	624.7
phytane	<1	<0.08	<1	<0.08	348.5	712.7	659.7	814.3	708.0	1,000.9	1,412.0	559.9	876.7	162.3	1,738.8	576.3	855.6	997.8	569.4	648.7	2,694.8
nC19	<1	<0.08	<1	<0.08	77.4	302.4	306.0	397.3	335.6	1,045.3	717.2	264.0	444.3	342.9	702.9	276.6	363.4	429.7	350.2	402.1	793.1
nC20	<1	104.9	<1	108.3	122.7	540.1	536.2	764.4	360.8	1,104.4	1,331.8	410.1	641.5	415.0	1,396.5	386.5	545.8	655.4	503.8	564.6	1,320.8
nC21	<1	<0.08	<1	<0.08	115.1	307.4	511.5	769.7	490.0	1,173.6	1,056.7	385.6	648.3	499.6	1,005.8	368.5	533.1	577.8	497.7	484.4	602.4
nC22	<1	105.1	<1	113.1	92.5	502.4	738.2	911.6	468.4	917.0	1,533.1	391.6	716.2	480.0	1,474.5	365.8	662.2	691.3	426.0	608.1	1,179.0
nC23	<1	<0.08	<1	<0.08	98.2	404.4	461.4	846.9	571.6	761.8	889.7	495.2	738.6	593.7	931.4	478.9	691.9	678.3	639.9	732.9	719.0
nC24	<1	104.6	<1	111.8	61.2	286.5	368.2	648.2	362.5	586.6	732.5	341.5	557.2	391.1	699.4	301.3	403.0	606.6	484.0	499.1	601.0
nC25	<1	<0.08	<1	<0.08	89.0	502.1	325.6	803.4	640.4	557.5	1,511.5	305.6	801.5	682.5	1,745.4	320.6	413.0	566.8	345.7	571.5	1,621.2
nC26	<1	107.7	<1	109.3	87.0	400.4	656.1	875.2	615.0	1,428.7	1,375.2	549.8	1,140.0	655.3	1,025.9	475.6	711.6	877.2	687.7	836.4	1,149.9
nC27	<1	<0.08	<1	<0.08	174.1	1,027.7	1,673.5	2,192.5	1,195.0	1,985.0	2,974.3	1,435.2	2,067.6	1,629.9	2,807.6	1,211.4	2,034.8	1,812.1	1,594.3	1,810.1	2,087.3
nC28	<1	105.4	<1	104.4	87.8	490.4	746.3	1,014.2	607.0	831.9	1,517.3	632.6	928.8	704.7	1,251.2	505.0	644.5	937.1	624.1	823.8	977.7
nC29	<1	<0.08	<1	<0.08	348.2	1,335.2	1,670.6	3,613.6	2,271.6	2,887.0	4,531.9	2,093.5	3,441.2	2,586.2	3,888.3	2,125.3	3,022.9	2,791.8	2,926.9	3,261.5	2,652.8
nC30	<1	112.7	<1	97.7	137.1	489.2	770.1	1,149.9	835.8	1,162.1	1,489.5	695.8	1,159.8	795.8	1,561.3	645.5	913.2	1,112.2	859.4	1,082.3	1,156.5
nC31	<1	<0.08	<1	<0.08	547.8	1,974.5	2,962.2	6,433.2	4,324.9	5,415.2	14,159.3	3,521.8	7,454.9	4,887.0	9,651.4	3,759.0	4,661.3	5,188.6	5,027.4	5,994.2	5,906.5
nC32	<1	106.5	<1	101.7	64.0	253.7	196.8	535.6	382.4	473.9	744.6	314.1	575.4	482.1	999.3	371.4	423.0	551.7	488.4	677.1	367.3
nC33	<1	<0.08	<1	<0.08	316.5	1,858.2	1,700.6	5,207.9	3,367.5	4,695.5	10,318.3	2,696.5	6,034.9	3,649.3	6,850.5	2,541.1	4,227.0	4,135.1	3,179.8	4,297.1	4,962.8
nC34	<1	113.2	<1	118.8	32.3	77.5	371.4	453.2	217.6	389.0	1,382.4	551.2	718.6	234.3	1,433.2	324.0	488.6	658.1	376.4	370.8	706.3
nC35	<1	<0.08	<1	<0.08	45.6	143.6	446.2	609.7	234.2	911.5	842.3	387.4	283.4	1,037.5	772.0	138.8	444.8	381.2	390.7	153.9	173.3
nC36	<1	117.7	<1	112.0	11.8	1.2	36.4	76.4	50.8	175.6	35.4	96.2	84.9	160.0	46.3	49.3	57.7	35.2	72.1	32.6	7.3
nC37	<1	<0.08	<1	<0.08	16.5	6.9	9.3	238.8	35.4	155.9	32.5	274.2	165.3	165.2	51.7	256.8	184.1	112.1	288.4	85.1	14.6
Total Oil (ug/kg)	29.6	0.0	48.7	0.0	162,807.2	574,357.7	659,344.0	1,074,000.0	671,507.5	2,854,456.1	1,323,284.5	544,209.8	589,673.1	835,987.2	2,510,083.8	508,313.7	598,053.7	796,128.9	658,331.3	719,592.5	1,927,495.3
Total n alkanes (ng/g)	0	1,502	0	1,470	2,862	12,910	16,903	30,163	19,439	35,640	51,742	18,039	31,562	22,588	42,895	16,799	23,448	25,334	21,792	25,340	31,984
Carbon Preference Index	#DIV/0!	0.00	#DIV/0!	0.00	2.27	2.27	2.02	2.92	2.96	1.93	3.10	2.53	2.93	3.11	2.46	2.94	3.06	2.44	3.00	2.92	2.19
Pristane	<1	<0.08	<1	<0.08	263	591	767	1132	698	2898	1999	528	1089	539	1997	565	762	833	639	695	1563
Phytane	<1	<0.08	<1	<0.08	349	713	660	814	708	1001	1412	560	877	162	1739	576	856	998	569	649	2695
Pristane / phytane ratio					0.8	0.8	1.2	1.4	1.0	2.9	1.4	0.9	1.2	3.3	1.1	1.0	0.9	0.8	1.1	1.1	0.6

Note: sample data are NOT blank corrected

Polyaromatic Hydrocarbon Concentrations (ng/g dry weight basis) UKAS accredited?: Yes

		Sample ID :	CL1782652	CL1782653	CL1782646	CL1782647	CL1782648	CL1782649	CL1782650	CL1782651
		Station :	QC Blank	ce Material (% R	VC08 0.00-0.50	VC08 1.45-1.95	VC08 2.40-2.90	VC09 0.00-0.50	VC09 1.30-1.80	CRM 1941b
PAH Fraction	***# PAH***	***Mass***								
Naphthalene	1	128	<1	106.2	350.0	439.0	754.0	343.7	453.7	463.8
C1 Naphthalenes *	2	142	<1	114.9	903.3	1184.0	1750.9	818.4	1150.6	309.3
C2 Naphthalenes *		156	<1	N.D	1057.5	1274.6	2178.1	998.3	1241.1	210.9
C3 Naphthalenes *		170	<1	N.D	1187.2	1434.3	2303.6	1230.1	1197.6	168.7
C4 Naphthalenes *		184	<1	N.D	730.6	991.9	1607.2	884.8	1071.5	122.3
Sum Naphthalenes *			0	111	4229	5324	8594	4275	5114	1275
Phenanthrene * / Anthracene *	2	178	0.0	92.3	1336.0	1609.2	3730.7	1959.7	1888.8	423.4
C1 178 *		192	<1	N.D	1118.5	1445.5	3269.2	1554.5	1627.8	231.7
C2 178 *		206	<1	N.D	1120.4	1412.2	3396.8	1463.2	1584.7	204.2
C3 178 *		220	<1	N.D	1171.6	1429.3	1895.1	1129.8	1684.1	157.6
Sum 178 *			0	92	4746.4	5896.2	12291.9	6107.3	6785.4	1016.9
Dibenzothiophene *		184	<1	91	136.5	152.5	599.1	141.8	162.7	36.5
C1 Dibenzothiophenes *		198	<1	N.D	365.4	400.0	1274.6	292.7	393.6	58.9
C2 Dibenzothiophenes *		212	<1	N.D	985.0	1158.5	2408.3	602.5	933.4	93.5
C3 Dibenzothiophenes *		226	<1	N.D	1215.1	1453.0	1682.1	681.8	1169.3	50.3
Sum Dibenzothiophenes *			0	91	2701.9	3164.0	5964.1	1718.8	2658.9	239.2
Fluoranthene * / pyrene *	2	202	0	83	3118.7	3638.2	9861.3	5485.5	4662.4	852.5
C1 202 *		216	<1	N.D	1649.8	1837.2	5769.5	2780.4	2479.8	246.6
C2 202 *		230	<1	N.D	1271.7	1534.5	3908.6	2020.9	1869.1	212.3
C3 202 *		244	<1	N.D	787.6	1041.8	1831.0	1108.2	1231.9	105.7
Sum 202 *			0	83	6827.8	8051.7	21370.4	11395.0	10243.2	1417.1
Benzoanthracene / Chrysene	2	228	0	90	1428.2	1750.2	4924.9	2424.1	2213.7	611.8
C1 228 *		242	<1	N.D	1038.4	1107.1	3146.0	1760.2	1434.7	274.4
C2 228 *		256	<1	N.D	1052.0	882.5	2798.5	1445.8	1420.0	163.5
Sum 228 *			0	90	3518.6	3739.8	10869.5	5630.1	5068.4	1049.8
Benzofluoranthenes / benzopyrenes	4	252	0	107	2468.5	3163.4	7747.1	4361.0	4095.1	1294.6
C1 252 *		266	<1	N.D	1265.7	1436.3	3803.6	2212.7	1878.1	417.3
C2 252 *		280	<1	N.D	706.3	824.3	2013.6	1140.1	1238.4	199.7
Sum 252 *			0	107	4440.4	5424.0	13564.2	7713.7	7211.6	1911.5
Dibenzoanthracene / Indenopyrene / Benzoperylene	3	276	0	88	1412.5	1704.9	4099.7	2421.8	2265.9	662.4
C1 276 *		290	<1	N.D	417.4	442.5	1102.5	646.7	609.3	110.4
C2 276 *		304	<1	N.D	114.1	148.8	450.1	180.5	193.6	45.4
Sum 276 *			0	88	1943.9	2296.2	5652.2	3249.0	3068.8	818.2
Sum of all fractions *			0	95	28407.6	33895.7	78306.2	40089.2	40150.7	7727.6
Sum of NPD fraction *			0	98	11676.9	14384.0	26849.9	12101.4	14558.8	2531.0
NPD / 4-6 ring PAH ratio *			#DIV/0!	0.27	0.70	0.74	0.52	0.43	0.57	0.49

N.D = Not Determined as these compounds are not in the reference material spike.

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

* Denotes not UKAS accredited

Polyaromatic Hydrocarbon Concentrations (ng/g dry weight basis) UKAS accredited?: Yes

EPA 16 PAHs Compounds marked with a * are reported not UKAS.

	Sample ID :	CL1782652	CL1782653	CL1782646	CL1782647	CL1782648	CL1782649	CL1782650	CL1782651
	Station :	QC Blank	ce Material (% R	VC08 0.00-0.50	VC08 1.45-1.95	VC08 2.40-2.90	VC09 0.00-0.50	VC09 1.30-1.80	CRM 1941b
PAH	***Mass***								
Naphthalene	128	<1	106.2	350.0	439.0	754.0	343.7	453.7	463.8
Acenaphthylene	152	<1	117.9	78.2	92.6	283.9	140.3	114.4	56.7
Acenaphthene	154	<1	117.5	152.8	168.8	390.3	228.6	200.8	28.6
Fluorene *	166	<1	125.5	246.3	277.2	827.6	340.2	335.3	49.1
Phenanthrene *	178	<1	94.8	858.4	1047.3	2235.8	1289.2	1236.9	302.0
Dibenzothiophene *	184	<1	91.2	136.5	152.5	599.1	141.8	162.7	36.5
Anthracene *	178	<1	89.7	477.5	561.9	1494.9	670.5	652.0	121.4
Fluoranthene *	202	<1	78.5	1426.6	1653.5	4528.0	2523.2	2172.1	477.3
Pyrene *	202	<1	88.2	1692.2	1984.7	5333.3	2962.3	2490.3	375.2
Benzo[a]anthracene	228	<1	88.5	840.0	1013.9	2912.6	1414.5	1257.9	255.9
Chrysene	228	<1	92.1	588.2	736.4	2012.3	1009.6	955.7	356.0
Benzo[b]fluoranthene	252	<1	84.6	606.1	890.8	1683.8	936.7	1187.8	464.9
Benzo[k]fluoranthene	252	<1	111.2	369.4	440.2	1132.2	645.0	557.8	213.8
Benzo[e]pyrene	252	<1	116.2	699.8	882.9	2248.0	1277.0	1133.5	359.3
Benzo[a]pyrene	252	<1	114.1	793.2	949.5	2683.1	1502.2	1216.0	256.7
Perylene *	252	<1	<1	286.5	337.5	808.7	476.9	497.7	279.0
Indeno[123,cd]pyrene	276	<1	89.1	583.5	704.1	1762.0	1021.5	938.3	337.4
Dibenzo[a,h]anthracene	278	<1	83.0	145.9	177.1	413.9	249.9	243.1	76.6
Benzo[ghi]perylene	276	<1	90.7	683.0	823.7	1923.8	1150.4	1084.6	248.4

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

AREA RECOVERIES

n-alkanes (ng/g) **UKAS accredited?: No** As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

Sample ID :	CL1782652	CL1782653	CL1782646	CL1782647	CL1782648	CL1782649	CL1782650
Station :	QC Blank	nce Material (% Re	VC08 0.00-0.50	VC08 1.45-1.95	VC08 2.40-2.90	VC09 0.00-0.50	VC09 1.30-1.80
Alkane							
nC10	<1	88.3	302.6	291.3	393.0	163.1	229.8
nC11	<1	<0.08	30.5	219.4	350.6	152.9	117.1
nC12	<1	89.4	107.0	226.5	730.7	96.6	84.0
nC13	<1	<0.08	264.8	356.2	620.1	295.0	301.9
nC14	<1	78.8	193.5	275.1	611.9	291.8	214.7
nC15	<1	<0.08	545.7	634.3	1,365.1	778.1	681.2
nC16	<1	121.0	451.0	585.5	1,203.8	585.2	793.3
nC17	<1	<0.08	496.6	761.8	918.2	629.5	766.5
pristane	<1	<0.08	1,795.1	2,792.8	2,555.6	1,593.2	2,355.7
nC18	<1	88.9	496.3	719.5	653.2	476.8	713.9
phytane	<1	<0.08	658.3	1,220.0	2,522.0	1,660.5	892.3
nC19	<1	<0.08	551.0	853.0	1,148.8	615.1	731.3
nC20	<1	110.8	784.5	1,123.2	2,125.8	1,097.3	1,370.2
nC21	<1	<0.08	865.3	1,067.4	1,442.3	750.3	1,182.4
nC22	<1	101.2	860.7	1,725.1	1,971.9	782.7	1,225.5
nC23	<1	<0.08	1,056.7	1,073.0	1,179.5	867.3	1,284.3
nC24	<1	110.2	818.5	871.5	782.2	637.2	747.1
nC25	<1	<0.08	614.2	695.1	2,795.0	1,340.8	808.2
nC26	<1	100.3	1,142.8	1,706.6	1,891.5	1,455.9	1,197.3
nC27	<1	<0.08	1,920.3	2,763.0	4,077.5	1,795.5	2,526.9
nC28	<1	106.6	1,095.9	1,494.9	2,005.8	910.0	1,301.2
nC29	<1	<0.08	4,012.7	5,018.0	8,024.1	4,008.5	5,033.1
nC30	<1	106.0	1,325.8	1,851.0	2,148.6	1,472.9	1,759.3
nC31	<1	<0.08	8,375.4	10,537.1	25,116.1	9,224.7	10,437.8
nC32	<1	110.4	680.3	932.3	1,122.7	590.6	973.2
nC33	<1	<0.08	5,939.9	7,424.4	16,591.0	7,430.8	7,147.2
nC34	<1	123.9	222.1	610.7	661.0	423.6	423.9
nC35	<1	<0.08	148.0	402.3	3,137.8	662.6	272.2
nC36	<1	107.3	246.3	291.1	317.1	145.0	214.9
nC37	<1	<0.08	97.2	236.6	298.3	202.6	75.1
Total Oil (ug/kg)	54.2	0.0	1,309,331.8	178,696.2	1,663,373.9	1,228,836.7	1,634,056.0
Total n alkanes (ng/g)	0	1,443	33,646	44,746	83,684	37,882	42,614
Carbon Preference Index	#DIV/0!	0.00	2.86	2.52	4.04	3.15	2.79
Pristane	<1	<0.08	1795	2793	2556	1593	2356
Phytane	<1	<0.08	658	1220	2522	1661	892
Pristane / phytane ratio			2.7	2.3	1.0	1.0	2.6

Note: sample data are NOT blank corrected

DATA SUBMISSION REPORT

FROM:	Gary Robinson
EMAIL:	Gary.robinson@ocean-ecology.com
TO:	Stacey Tonkin (stacey.tonkin@ocean-ecology.com) Sample Submission (subcon@esg.co.uk) David Ratcliffe (David.Ratcliffe@esg.co.uk) Ross Griffin (Ross.griffin@ocean-ecology.com)

PROJECT NO:	ESG051117
CLIENT:	ESG
DATA:	Particle Size Analysis
DATA REFERENCE:	S180284
SAMPLE NUMBER:	31
LEAD ANALYST:	Stacey Tonkin
QUALITY CONTROL:	Gary Robinson

LOGIN DATE:	13/11/17
COMPLETION DATE:	22/11/17
QC DATE:	23/11/17
SUBMISSION DATE:	23/11/17

COVER NOTES
Sample S1782107 completed by a combination of dry sieve and laser diffraction due to mixed nature of sediments, in line with NMBAQC guidance. Subsample taken for laser analysis. All remaining samples completed by laser diffraction only due to sediment being <1mm, in line with NMBAQC guidance. No subsample needed to be taken for laser analysis due to small sample size. Samples were determined to be either Mud (M) or Sandy Mud (sM). No TOC analysis was undertaken on these samples by request of the client.

Sample Processing								
Sample ID	Client sample description		Storage	Visual Sediment Description	Wet Split (Y/N)	Dry Sieve (Y/N)	Laser Analysis	Analyst(s)
S1782106	VC01 0.00-0.50	ID991	Nalgene	Sandy Mud	N	N	Y	ST
S1782107	VC01 0.50-1.00	ID992	Foil Tray / Nalgene / PSA Bag	Sandy Mud (shell and organic detritus)	Y	Y	Y	ST
S1782108	VC02 0.00-0.65	ID993	Nalgene	Sandy Mud	N	N	Y	ST
S1782109	VC02 0.65-1.30	ID994	Nalgene	Sandy Mud	N	N	Y	ST
S1782110	VC03 0.00-0.50	ID995	Nalgene	Mud	N	N	Y	ST
S1782111	VC03 1.50-2.00	ID996	Nalgene	Sandy Mud	N	N	Y	ST
S1782112	VC03 2.50-3.00	ID997	Nalgene	Sandy Mud	N	N	Y	ST
S1782113	VC04 0.00-0.50	ID998	Nalgene	Sandy Mud	N	N	Y	ST
S1782114	VC04 1.00-1.50	ID999	Nalgene	Sandy Mud	N	N	Y	ST
S1782115	VC04 2.15-2.65	IE001	Nalgene	Sandy Mud	N	N	Y	ST
S1782116	VC05 0.00-0.50	IE002	Nalgene	Sandy Mud	N	N	Y	ST
S1782117	VC05 1.00-1.50	IE003	Nalgene	Sandy Mud	N	N	Y	ST
S1782118	VC05 1.50-2.00	IE004	Nalgene	Sandy Mud	N	N	Y	ST
S1782119	VC06 0.00-0.50	IE005	Nalgene	Sandy Mud	N	N	Y	ST
S1782120	VC06 1.20-1.70	IE006	Nalgene	Sandy Mud	N	N	Y	ST
S1782121	VC06 2.40-2.90	IE007	Nalgene	Sandy Mud	N	N	Y	ST
S1782122	VC07B 0.00-0.50	IE008	Nalgene	Sandy Mud	N	N	Y	ST
S1782123	VC07B 1.25-1.75	IE009	Nalgene	Mud	N	N	Y	ST
S1782124	VC07B 2.00-2.55	IE010	Nalgene	Sandy Mud	N	N	Y	ST
S1782125	VC09 0.65-1.15	IE012	Nalgene	Sandy Mud	N	N	Y	ST
S1782126	VC10 0.00-0.50	IE014	Nalgene	Sandy Mud	N	N	Y	ST
S1782127	VC10 1.25-1.75	IE015	Nalgene	Sandy Mud	N	N	Y	ST
S1782128	VC10 2.00-2.50	IE016	Nalgene	Sandy Mud	N	N	Y	ST
S1782129	VC11 0.00-0.50	IE017	Nalgene	Mud	N	N	Y	ST
S1782130	VC11 1.50-2.00	IE018	Nalgene	Sandy Mud	N	N	Y	ST
S1782131	VC11 2.50-3.00	IE019	Nalgene	Sandy Mud	N	N	Y	ST

Sample Tracking											
Sample ID		S1782106	S1782107	S1782108	S1782109	S1782110	S1782111	S1782112	S1782113	S1782114	S1782115
Sample Log In	Sample Wet Weight (g)	139.22	108.69	164.68	126.77	148.41	145.29	148.64	145.54	140.93	137.84
	Initials	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE
	Date	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17
Dry Sieving	<1mm Dry weight (g)	-	56.37	-	-	-	-	-	-	-	-
	Pan weight (g)	-	0.10	-	-	-	-	-	-	-	-
	>1mm Dry Weight (g)	-	0.46	-	-	-	-	-	-	-	-
	Sample Total Dry Weight (g)	-	56.93	-	-	-	-	-	-	-	-
	Initials	-	ST/SE	-	-	-	-	-	-	-	-
	Date	-	20/11/17	-	-	-	-	-	-	-	-
Laser Diffraction	Subsample Wet Weight (g)	-	49.10	-	-	-	-	-	-	-	-
	Date	-	14/11/17	-	-	-	-	-	-	-	-
	Initials	-	ST	-	-	-	-	-	-	-	-
	Date	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17
	Initial	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST
LOI / TOC	Start weight (g)	-	-	-	-	-	-	-	-	-	-
	Final weight (g)	-	-	-	-	-	-	-	-	-	-
	Initials	-	-	-	-	-	-	-	-	-	-
	Date	-	-	-	-	-	-	-	-	-	-
Data Merge	Initials	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST
	Date	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17
QC	Initials	GR	GR	GR	GR	GR	GR	GR	GR	GR	GR
	Date	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17

Sample Tracking											
Sample ID		S1782116	S1782117	S1782118	S1782119	S1782120	S1782121	S1782122	S1782123	S1782124	S1782125
Sample Log In	Sample Wet Weight (g)	114.21	147.70	152.26	127.30	125.57	152.84	152.01	158.06	141.04	170.04
	Initials	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE
	Date	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17
Dry Sieving	<1mm Dry weight (g)	-	-	-	-	-	-	-	-	-	-
	Pan weight (g)	-	-	-	-	-	-	-	-	-	-
	>1mm Dry Weight (g)	-	-	-	-	-	-	-	-	-	-
	Sample Total Dry Weight (g)	-	-	-	-	-	-	-	-	-	-
	Initials	-	-	-	-	-	-	-	-	-	-
	Date	-	-	-	-	-	-	-	-	-	-
Laser Diffraction	Subsample Wet Weight (g)	-	-	-	-	-	-	-	-	-	-
	Date	-	-	-	-	-	-	-	-	-	-
	Initials	-	-	-	-	-	-	-	-	-	-
	Date	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17
	Initial	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST
LOI / TOC	Start weight (g)	-	-	-	-	-	-	-	-	-	-
	Final weight (g)	-	-	-	-	-	-	-	-	-	-
	Initials	-	-	-	-	-	-	-	-	-	-
	Date	-	-	-	-	-	-	-	-	-	-
Data Merge	Initials	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST
	Date	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17
QC	Initials	GR	GR	GR	GR	GR	GR	GR	GR	GR	GR
	Date	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17

Sample Tracking							
Sample ID		S1782126	S1782127	S1782128	S1782129	S1782130	S1782131
Sample Log In	Sample Wet Weight (g)	144.62	126.84	146.14	142.81	149.50	171.75
	Initials	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE
	Date	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17
Dry Sieving	<1mm Dry weight (g)	-	-	-	-	-	-
	Pan weight (g)	-	-	-	-	-	-
	>1mm Dry Weight (g)	-	-	-	-	-	-
	Sample Total Dry Weight (g)	-	-	-	-	-	-
	Initials	-	-	-	-	-	-
	Date	-	-	-	-	-	-
Laser Diffraction	Subsample Wet Weight (g)	-	-	-	-	-	-
	Date	-	-	-	-	-	-
	Initials	-	-	-	-	-	-
	Date	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17
	Initial	ST	ST	ST	ST	ST	ST
LOI / TOC	Start weight (g)	-	-	-	-	-	-
	Final weight (g)	-	-	-	-	-	-
	Initials	-	-	-	-	-	-
	Date	-	-	-	-	-	-
Data Merge	Initials	ST	ST	ST	ST	ST	ST
	Date	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17
QC	Initials	GR	GR	GR	GR	GR	GR
	Date	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17

Summary of Methods

Methods followed the NMBAQC PSA SOP for supporting biological data:

Mason, C. 2016. NMBAQC's Best Practice Guidance. Particle Size Analysis (PSA) for Supporting Biological Analysis. National Marine Biological AQC Coordinating Committee, 77pp, First published 2011, updated January 2016.

Dry Sieve Equipment	
Sieve Shaker	Retsch AS200 Sieve Shaker
Sieves	Retsch Test Sieves ISO 3310-1
Sieve Series	Wentworth half-phi
Drying Oven	Memmert / Gallenkamp
Weighing Scales	Ohaus PA2202 (Max' Capacity 2200g and Readability 0.01g)

Laser Equipment	
Laser model/manufacturer	Malvern Mastersizer Hydro 3000 MU
Optical model (Refractive index, Absorption index; Fraunhofer)	Blue Light
Obscuration (%)	10-15%
Pump speed (%, rpm, unit of speed)	
Stirrer speed (%, rpm, unit of speed)	2550rpm
Ultrasonic duration (seconds)	Continuous
Ultrasonic level (eg %, unit as described by instrument manual)	100%
Background duration (seconds)	10
Measurement duration (seconds)	10
Number of runs	1 x 5

DATA SUBMISSION REPORT

FROM:	Gary Robinson
EMAIL:	Gary.robinson@ocean-ecology.com
TO:	Stacey Tonkin (stacey.tonkin@ocean-ecology.com) Sample Submission (subcon@esg.co.uk) David Ratcliffe (David.Ratcliffe@esg.co.uk) Ross Griffin (Ross.griffin@ocean-ecology.com)

PROJECT NO:	ESG051117
CLIENT:	ESG
DATA:	Particle Size Analysis
DATA REFERENCE:	S180403
SAMPLE NUMBER:	5
LEAD ANALYST:	Stacey Tonkin
QUALITY CONTROL:	Gary Robinson

LOGIN DATE:	13/11/17
COMPLETION DATE:	22/11/17
QC DATE:	23/11/17
SUBMISSION DATE:	23/11/17

COVER NOTES
All samples completed by laser diffraction only due to sediment being <1mm in line with NMBAQC guidance. No subsample needed to be taken for laser analysis due to small sample size. Samples were determined to be either Mud (M) or Sandy Mud (sM). No TOC analysis was undertaken on these samples by request of the client.

Sample Processing								
Sample ID	Client Sample Description		Storage	Visual Sediment Description	Wet Split (Y/N)	Dry Sieve (Y/N)	Laser Analysis	Analyst(s)
S1782646	VC08 0.00-0.50	IE086	Nalgene	Mud	N	N	Y	ST
S1782647	VC08 1.45-1.95	IE087	Nalgene	Mud	N	N	Y	ST
S1782648	VC08 2.40-2.90	IE088	Nalgene	Mud	N	N	Y	ST
S1782649	VC09 0.00-0.50	IE011	Nalgene	Mud	N	N	Y	ST
S1782650	VC09 1.30-1.80	IE013	Nalgene	Mud	N	N	Y	ST

Sample Tracking						
Sample ID		S1782646	S1782647	S1782648	S1782649	S1782650
Sample Log In	Sample Wet Weight (g)	142.97	113.86	114.31	151.39	154.71
	Initials	ST	ST	ST	ST	ST
	Date	13/11/2017	13/11/2017	13/11/2017	13/11/2017	13/11/2017
Dry Sieving	<1mm Dry weight (g)	-	-	-	-	-
	Pan weight (g)	-	-	-	-	-
	>1mm Dry Weight (g)	-	-	-	-	-
	Sample Total Dry Weight (g)	-	-	-	-	-
	Initials	-	-	-	-	-
	Date	-	-	-	-	-
Laser Diffraction	Initials	ST	ST	ST	ST	ST
	Date	21/11/2017	21/11/2017	21/11/2017	21/11/2017	21/11/2017
LOI / TOC	Start weight (g)	-	-	-	-	-
	Final weight (g)	-	-	-	-	-
	Initials	-	-	-	-	-
	Date	-	-	-	-	-
Data Merge	Initials	ST	ST	ST	ST	ST
	Date	22/11/2017	22/11/2017	22/11/2017	22/11/2017	22/11/2017
QC	Initials	GR	GR	GR	GR	GR
	Date	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17

Summary of Methods
Methods followed the NMBAQC PSA SOP for supporting biological data: *Mason, C. 2016. NMBAQC's Best Practice Guidance. Particle Size Analysis (PSA) for Supporting Biological Analysis. National Marine Biological AQC Coordinating Committee, 77pp, First published 2011, updated January 2016.*

Dry Sieve Equipment	
Sieve Shaker	Retsch AS200 Sieve Shaker
Sieves	Retsch Test Sieves ISO 3310-1
Sieve Series	Wentworth half-phi
Drying Oven	Memmert / Gallenkamp
Weighing Scales	Ohaus PA2202 (Max' Capacity 2200g and Readability 0.01g)

Laser Equipment	
Laser model/manufacturer	Malvern Mastersizer Hydro 3000 MU
Optical model (Refractive index, Absorption index; Fraunhofer)	Blue Light
Obscuration (%)	10-15%
Pump speed (%, rpm, unit of speed)	
Stirrer speed (%, rpm, unit of speed)	2550rpm
Ultrasonic duration (seconds)	Continuous
Ultrasonic level (eg %, unit as described by instrument manual)	100%
Background duration (seconds)	10
Measurement duration (seconds)	10
Number of runs	1 x 5

Sample Analysis

Socotec Environmental Chemistry

S180284

Analytical and Deviating Sample Overview

Customer EnviroCentre
Site Granton Harbour 769967j
Report No S180284

Consignment No S70221
Date Logged 02-Nov-2017
In-House Report Due 22-Nov-2017

Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

ID Number	Description	MethodID	CustServ	ICPMSS										OGSNSED	PAHSED	PCBMS3Q	Sub061	TPHSED
		Sampled	Report C	Copper (MS) Sediment	Arsenic (MS) Sediments	Cadmium (MS) Sediments	Chromium (MS) Sediments	Cobalt (MS) Sediments	Lead (MS) Sediments	Manganese (MS) Sediments	Mercury (MS) Sediments	Nickel (MS) Sediments	Zinc (MS) Sediments	Tributyl Tin (Sediments)	PAH by MS Dti	PCB- 7 Congeners (Marine Sediments)	^Particle Size Analysis (Sediment)	TPH GCFID (Si)+Sats
CL/1782106	VC01 0.00-0.50	31/10/17																
CL/1782107	VC01 0.50-1.00	31/10/17																
CL/1782108	VC02 0.00-0.65	31/10/17																
CL/1782109	VC02 0.65-1.30	31/10/17																
CL/1782110	VC03 0.00-0.50	31/10/17																
CL/1782111	VC03 1.50-2.00	31/10/17																
CL/1782112	VC03 2.50-3.00	31/10/17																
CL/1782113	VC04 0.00-0.50	31/10/17																
CL/1782114	VC04 1.00-1.50	31/10/17																
CL/1782115	VC04 2.15-2.65	31/10/17																
CL/1782116	VC05 0.00-0.50	31/10/17																
CL/1782117	VC05 1.00-1.50	31/10/17																
CL/1782118	VC05 1.50-2.00	31/10/17																
CL/1782119	VC06 0.00-0.50	30/10/17																
CL/1782120	VC06 1.20-1.70	30/10/17																

Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.

If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.

Deviating Sample Key

A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key

	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Where individual results are flagged see report notes for status.

Sample Analysis

Socotec Environmental Chemistry

S180284

Analytical and Deviating Sample Overview

Customer EnviroCentre
Site Granton Harbour 769967j
Report No S180284

Consignment No S70221
Date Logged 02-Nov-2017
In-House Report Due 22-Nov-2017

Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

ID Number	Description	MethodID	CustServ	ICPMSS										OGSNSED	PAHSED	PCBMS3Q	Sub061	TPHSED
		Sampled	Report C	Copper (MS) Sediment	Arsenic (MS) Sediments	Cadmium (MS) Sediments	Chromium (MS) Sediments	Cobalt (MS) Sediments	Lead (MS) Sediments	Manganese (MS) Sediments	Mercury (MS) Sediments	Nickel (MS) Sediments	Zinc (MS) Sediments	Tributyl Tin (Sediments)	PAH by MS Dti	PCB- 7 Congeners (Marine Sediments)	^Particle Size Analysis (Sediment)	TPH GCFID (Si)+Sats
CL/1782121	VC06 2.40-2.90	30/10/17																
CL/1782122	VC07B 0.00-0.50	31/10/17																
CL/1782123	VC07B 1.25-1.75	31/10/17																
CL/1782124	VC07B 2.00-2.55	31/10/17																
CL/1782125	VC09 0.65-1.15	30/10/17																
CL/1782126	VC10 0.00-0.50	31/10/17																
CL/1782127	VC10 1.25-1.75	31/10/17																
CL/1782128	VC10 2.00-2.50	31/10/17																
CL/1782129	VC11 0.00-0.50	31/10/17																
CL/1782130	VC11 1.50-2.00	31/10/17																
CL/1782131	VC11 2.50-3.00	31/10/17																
CL/1782132	CRM	31/10/17																
CL/1782133	QC Blank																	
CL/1782134	Reference Material (% Recovery)																	

Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.

If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Where individual results are flagged see report notes for status.

Sample Analysis

Socotec Environmental Chemistry

S180403

Analytical and Deviating Sample Overview

Customer EnviroCentre
Site Granton Harbour 769967j
Report No S180403

Consignment No S70229
Date Logged 07-Nov-2017
In-House Report Due 22-Nov-2017

Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

ID Number	Description	MethodID	CustServ	ICPMSS										OGSNSED	PAHSED	PCBMS3Q	Sub061	TPHSED
		Sampled	Report C	Copper (MS) Sediment	Arsenic (MS) Sediments	Cadmium (MS) Sediments	Chromium (MS) Sediments	Cobalt (MS) Sediments	Lead (MS) Sediments	Manganese (MS) Sediments	Mercury (MS) Sediments	Nickel (MS) Sediments	Zinc (MS) Sediments	Tributyl Tin (Sediments)	PAH by MS Dti	PCB- 7 Congeners (Marine Sediments)	^Particle Size Analysis (Sediment)	TPH GCFID (Si)+Sats
CL/1782646	VC08 0.00-0.50	30/10/17																
CL/1782647	VC08 1.45-1.95	30/10/17																
CL/1782648	VC08 2.40-2.90	30/10/17																
CL/1782649	VC09 0.00-0.50	30/10/17																
CL/1782650	VC09 1.30-1.80	30/10/17																
CL/1782651	CRM																	
CL/1782652	QC Blank																	
CL/1782653	Reference Material (% Recovery)																	

Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.

If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Where individual results are flagged see report notes for status.

Additional Report Notes

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
PAHSED	CL1782106 to CL1782117	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. However 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 (Dibenzothiophene, Fluoranthene, Benzo[ghi]perylene) . These circumstances should be taken into consideration when utilising the data.
PAHSED	CL1782118 to CL1782132	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. However 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 (Dibenzothiophene, Fluoranthene, Benzo[ghi]perylene, Anthracene, Phenanthrene) . These circumstances should be taken into consideration when utilising the data.
PAHSED	CL1782106 to CL1782132	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.
TPHSED	CL1782109 CL1782112 CL1782115	The matrix of this sample has been found to interfere with the result for this test. The sample has therefore been diluted to improve the signal to noise ratio but in doing so, the scale for the WMF files is smaller. This should be taken into consideration when utilising the data.

Report Number : EFS/180403

Additional Report Notes

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
PAHSED	CL1782646 to CL1782652	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. However 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 (Dibenzothiophene, Fluoranthene, Fluorene, Anthracene, Phenanthrene, Pyrene) . These circumstances should be taken into consideration when utilising the data.
PAHSED	CL1782646 to CL1782651	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.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	ICPMSS	Oven Dried @ < 35°C	Determination of Metals in Marine Sediments and Soil samples by aqua regia digestion followed by ICPMS detection
Soil	OGSNSED	As Received	Determination of Organo-tin compounds using sonic extraction in methanol , derivatiseation with Sodium Tetraethylborate and GCMS quantitation (SIM mode).
Soil	PAHSED	As Received	Determination of Polyaromatic Hydrocarbons in Sediments by Methanol/Dichloromethane ultrasonic extraction GC-MS quantification
Soil	PCBMS3Q	As Received	Determination of Polychlorinated Biphenyl (PCB) congeners by hexane/acetone extraction followed by GCECD detection
Soil	SubCon*	*	Contact Laboratory for details of the methodology used by the sub-contractor.
Soil	TPHSED	As Received	Determination of methanol/dichloromethane extractable Hydrocarbons in Marine & Esturine Sediments with GCFID detection including quantitation of Aliphatic fractions.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile **TR** Denotes Tremolite
CR Denotes Crocidolite **AC** Denotes Actinolite
AM Denotes Amosite **AN** Denotes Anthophylite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols. This may have resulted in deterioration of the sample(s) during transit to the laboratory. Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : EnviroCentre

Site : Granton Harbour 769967j

Report Numbers : S18_0284 S18_0403

Note: major constituent in upper case

Lab ID Number	Client ID	Description
CL/1782106	VC01 0.00-0.50	MARINE SEDIMENTS
CL/1782107	VC01 0.50-1.00	MARINE SEDIMENTS
CL/1782108	VC02 0.00-0.65	MARINE SEDIMENTS
CL/1782109	VC02 0.65-1.30	MARINE SEDIMENTS
CL/1782110	VC03 0.00-0.50	MARINE SEDIMENTS
CL/1782111	VC03 1.50-2.00	MARINE SEDIMENTS
CL/1782112	VC03 2.50-3.00	MARINE SEDIMENTS
CL/1782113	VC04 0.00-0.50	MARINE SEDIMENTS
CL/1782114	VC04 1.00-1.50	MARINE SEDIMENTS
CL/1782115	VC04 2.15-2.65	MARINE SEDIMENTS
CL/1782116	VC05 0.00-0.50	MARINE SEDIMENTS
CL/1782117	VC05 1.00-1.50	MARINE SEDIMENTS
CL/1782118	VC05 1.50-2.00	MARINE SEDIMENTS
CL/1782119	VC06 0.00-0.50	MARINE SEDIMENTS
CL/1782120	VC06 1.20-1.70	MARINE SEDIMENTS
CL/1782121	VC06 2.40-2.90	MARINE SEDIMENTS
CL/1782122	VC07B 0.00-0.50	MARINE SEDIMENTS
CL/1782123	VC07B 1.25-1.75	MARINE SEDIMENTS
CL/1782124	VC07B 2.00-2.55	MARINE SEDIMENTS
CL/1782125	VC09 0.65-1.15	MARINE SEDIMENTS
CL/1782126	VC10 0.00-0.50	MARINE SEDIMENTS
CL/1782127	VC10 1.25-1.75	MARINE SEDIMENTS
CL/1782128	VC10 2.00-2.50	MARINE SEDIMENTS
CL/1782129	VC11 0.00-0.50	MARINE SEDIMENTS
CL/1782130	VC11 1.50-2.00	MARINE SEDIMENTS
CL/1782131	VC11 2.50-3.00	MARINE SEDIMENTS
CL/1782132	CRM	QUALITY CONTROL SAMPLE
CL/1782133	QC Blank	QUALITY CONTROL SAMPLE
CL/1782134	Reference Material (% Recovery)	QUALITY CONTROL SAMPLE
CL/1782646	VC08 0.00-0.50	MARINE SEDIMENTS
CL/1782647	VC08 1.45-1.95	MARINE SEDIMENTS
CL/1782648	VC08 2.40-2.90	MARINE SEDIMENTS
CL/1782649	VC09 0.00-0.50	MARINE SEDIMENTS
CL/1782650	VC09 1.30-1.80	MARINE SEDIMENTS
CL/1782651	CRM	QUALITY CONTROL SAMPLE
CL/1782652	QC Blank	QUALITY CONTROL SAMPLE
CL/1782653	Reference Material (% Recovery)	QUALITY CONTROL SAMPLE

C DATA SUMMARY TABLES

Summary Table A

Sample information - Granton Action Level 2 Exceedances Removed

All units in mg/kg

	AL1	AL2	BAC	<ERL	ISQG/TEL	PEL	VC01 0.00-0.50	VC01 0.50-1.00	VC02 0.00-0.65	VC02 0.65-1.30	VC03 0.00-0.50	VC03 1.50-2.00	VC04 0.00-0.50	VC04 1.00-1.50	VC05 0.00-0.50	VC05 1.00-1.50	VC06 0.00-0.50	VC06 1.20-1.70	VC07B 0.00-0.50	VC07B 1.25-1.75	VC10 0.00-0.50	VC10 1.25-1.75	VC11 0.00-0.50	VC11 1.50-2.00	Average	No. Exceed Al1?	No. Exceed Al 2?	No.Exceed BAC?	No. Exceed ERL	No. Exceed PEL?
Source			CSEMP	CSEMP	Canada																									
Arsenic	20	70	25	-	7.2	41.6	15.8	16.7	15.1	17.6	17.4	19.5	17.9	19.4	18.7	18.7	17.5	18.2	18.8	20.2	19.3	19.7	19	19.4	18.3	1	0	0	-	0
Cadmium	0.4	4	0.31	1.2	0.7	4.2	0.45	0.87	0.52	0.99	0.29	0.44	0.35	0.72	0.38	0.63	0.42	0.81	0.34	0.35	0.34	0.43	0.28	0.32	0.5	10	0	16	0	0
Chromium	50	370	81	81	52.3	160	57.8	57	52.8	75.5	56.4	72.7	54.1	68.2	59.6	69.3	57.3	72.2	56.7	71.8	62	59.8	63.6	66.8	63.0	18	0	0	0	0
Copper	30	300	27	34	18.7	108	42.1	51.6	46.5	60.6	40.2	55.6	40.3	58.2	47.6	55.1	45.5	59.9	40.3	48.8	43.7	48.7	45.1	46.7	48.7	18	0	18	18	0
Mercury	0.25	1.5	0.07	0.15	0.13	0.7	0.88	1.13	1.04	1.42	0.86	1.22	0.88	1.3	0.93	1.19	1	1.38	0.88	1.05	1.01	0.98	0.97	1.08	1.1	18	0	18	18	18
Nickel	30	150	36	-	-	-	32.9	30.9	29.6	33.9	31.9	38.4	31.9	35.7	33.8	35.4	32.6	34.3	33.5	37.1	34.9	34.4	35.7	37	34.1	17	0	3	N/A	N/A
Lead	50	400	38	47	30.2	112	79.6	93.9	83.2	107.6	77.9	107.2	78.5	119	152	110.1	96.7	110.4	83	97.2	92	102.9	92.8	113.8	99.9	18	0	18	18	3
Zinc	130	600	122	150	124	271	141.1	155.1	141.7	172.1	141.3	173.7	141.5	183.3	151.9	177.2	151.2	175.9	146.8	164.4	153.4	158.2	154.4	164.7	158.2	18	0	18	13	0
					-	-																								
Napthalene	0.1		0.08	0.16	-	0.319	0.18	0.20	0.22	0.31	0.20	0.22	0.22	0.28	0.22	0.25	0.24	0.33	0.20	0.24	0.20	0.24	0.22	0.24	0.23	18	N/A	18	18	1
Acenaphthylene	0.1		-	-	0.00587	0.128	0.05	0.06	0.06	0.12	0.05	0.06	0.07	0.08	0.07	0.07	0.06	0.07	0.04	0.05	0.04	0.05	0.04	0.05	0.06	1	N/A	N/A	N/A	0
Acenaphthene	0.1		-	-	0.00671	0.0889	0.13	0.27	0.17	0.26	0.06	0.09	0.10	0.12	0.13	0.10	0.09	0.18	0.05	0.07	0.06	0.08	0.06	0.07	0.12	9	N/A	N/A	N/A	0
Fluorene	0.1		-	-	0.0212	0.144	0.15	0.29	0.19	0.23	0.11	0.13	0.16	0.18	0.19	0.17	0.15	0.24	0.10	0.14	0.11	0.14	0.11	0.13	0.16	18	N/A	N/A	N/A	10
Phenanthrene	0.1		0.032	0.24	0.0867	0.544	0.85	1.31	1.12	1.12	0.45	0.59	0.54	0.65	0.73	0.62	0.62	0.85	0.41	0.48	0.39	0.62	0.42	0.54	0.68	18	N/A	18	18	11
Anthracene	0.1		0.05	0.085	0.0469	0.245	0.32	0.45	0.40	0.50	0.19	0.26	0.22	0.29	0.27	0.31	0.27	0.38	0.16	0.20	0.16	0.24	0.17	0.23	0.28	18	N/A	18	18	10
Fluoranthene	0.1		0.039	0.6	0.113	1.494	1.17	1.88	1.66	1.75	0.63	0.89	0.82	0.99	1.01	0.75	1.00	1.34	0.61	0.73	0.57	0.95	0.65	0.89	1.02	18	N/A	18	17	3
Pyrene	0.1		0.024	0.665	0.153	1.398	1.49	2.06	2.00	2.28	0.84	1.16	1.04	1.33	1.24	1.33	1.20	1.62	0.72	0.85	0.67	1.05	0.76	1.03	1.26	18	N/A	18	18	5
Benzo(a)anthracene	0.1		0.016	0.261	0.0748	0.693	0.67	1.11	1.34	1.01	0.40	0.52	0.48	0.62	0.60	0.60	0.59	0.74	0.37	0.44	0.33	0.54	0.40	0.54	0.63	18	N/A	18	18	4
Chrysene	0.1		0.02	0.384	0.108	0.846	0.54	0.94	1.08	0.82	0.33	0.50	0.43	0.45	0.51	0.46	0.52	0.52	0.28	0.35	0.24	0.43	0.30	0.41	0.51	18	N/A	18	13	2
Benzo(b)fluoranthene	0.1		-	-	-	-	0.45	0.84	0.92	0.75	0.62	0.56	0.40	0.69	0.53	0.46	0.62	0.70	0.42	0.50	0.31	0.45	0.38	0.57	0.57	18	N/A	N/A	N/A	N/A
Benzo(k)fluoranthene	0.1		-	-	-	-	0.32	0.46	0.60	0.47	0.29	0.25	0.27	0.32	0.30	0.30	0.29	0.36	0.20	0.23	0.17	0.27	0.22	0.28	0.31	18	N/A	N/A	N/A	N/A
Benzo(a)pyrene	0.1		0.03	0.384	0.0888	0.763	0.68	1.01	1.28	0.98	0.41	0.53	0.52	0.60	0.60	0.67	0.63	0.77	0.39	0.48	0.35	0.57	0.45	0.60	0.64	18	N/A	18	17	4
Indeno(1,2,3cd)pyrene	0.1		0.103	0.24	-	-	0.31	0.43	0.58	0.48	0.23	0.28	0.29	0.35	0.32	0.26	0.44	0.56	0.31	0.40	0.29	0.45	0.39	0.49	0.38	18	N/A	18	17	N/A
Benzo(ghi)perylene	0.1		0.08	0.085	-	-	0.34	0.50	0.63	0.78	0.27	0.32	0.33	0.38	0.37	0.30	0.49	0.65	0.34	0.45	0.32	0.50	0.44	0.55	0.44	18	N/A	18	18	N/A
Dibenzo(a,h)anthracene	0.01		-	-	0.00622	0.135	0.08	0.11	0.14	0.12	0.05	0.07	0.07	0.09	0.08	0.07	0.10	0.14	0.07	0.09	0.06	0.11	0.09	0.11	0.09	7	N/A	N/A	N/A	2
PCBs	0.02	0.18	-	-	0.0215	0.189	0.032	0.069	0.058	0.079	0.038	0.069	0.039	0.071	0.043	0.063	0.055	0.064	0.026	0.043	0.031	0.044	0.036	0.047	0.1	18	0	N/A	N/A	0
TBT	0.1	0.5	-	-	-	-	0.00129	0.00271	<0.001	0.00232	<0.001	<0.001	<0.001	<0.001	<0.001	0.00124	<0.001	0.00333	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0	0	N/A	N/A	N/A

Summary Table B

Granton 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	18.3	No	No	No	-	No
Cadmium	0.4	4	0.31	1.2	4.2	0.5	**Yes**	No	**Yes**	No	No
Chromium	50	370	81	81	160	63.0	**Yes**	No	**Yes**	No	No
Copper	30	300	27	34	108	48.7	**Yes**	No	**Yes**	**Yes**	No
Mercury	0.25	1.5	0.07	0.15	0.7	1.07	**Yes**	No	**Yes**	**Yes**	**Yes**
Nickel	30	150	36	-	-	34.1	**Yes**	No	**Yes**	N/A	N/A
Lead	50	400	38	47	112	99.9	**Yes**	No	**Yes**	**Yes**	No
Zinc	130	600	122	150	271	158.2	**Yes**	No	**Yes**	**Yes**	No
					-						
Napthalene	0.1	-	0.08	0.16	0.319	0.234	**Yes**	N/A	**Yes**	**Yes**	No
Acenaphthylene	0.1	-	-	-	0.128	0.060	No	N/A	N/A	N/A	No
Acenaphthene	0.1	-	-	-	0.0889	0.117	**Yes**	N/A	N/A	N/A	**Yes**
Fluorene	0.1	-	-	-	0.144	0.162	**Yes**	N/A	N/A	N/A	**Yes**
Phenanthrene	0.1	-	0.032	0.24	0.544	0.683	**Yes**	N/A	**Yes**	**Yes**	**Yes**
Anthracene	0.1	-	0.05	0.085	0.245	0.277	**Yes**	N/A	**Yes**	**Yes**	**Yes**
Fluoranthene	0.1	-	0.039	0.6	1.494	1.016	**Yes**	N/A	**Yes**	**Yes**	No
Pyrene	0.1	-	0.024	0.665	1.398	1.259	**Yes**	N/A	**Yes**	**Yes**	No
Benzo(a)anthracene	0.1	-	0.016	0.261	0.693	0.629	**Yes**	N/A	**Yes**	**Yes**	No
Chrysene	0.1	-	0.02	0.384	0.846	0.505	**Yes**	N/A	**Yes**	**Yes**	No
Benzo(b)fluoranthene	0.1	-	-	-	-	0.565	**Yes**	N/A	N/A	N/A	N/A
Benzo(k)fluoranthene	0.1	-	-	-	-	0.311	**Yes**	N/A	N/A	N/A	N/A
Benzo(a)pyrene	0.1	-	0.03	0.384	0.763	0.639	**Yes**	N/A	**Yes**	**Yes**	No
Indeno(1,2,3cd)pyrene	0.1	-	0.103	0.24	-	0.382	**Yes**	N/A	**Yes**	**Yes**	N/A
Benzo(ghi)perylene	0.1	-	0.08	0.085	-	0.443	**Yes**	N/A	**Yes**	**Yes**	N/A
Dibenzo(a,h)anthracene	0.01	-	-	-	0.135	0.092	No	N/A	N/A	N/A	No
PCBs	0.02	0.18	-	-	0.189	0.050	**Yes**	No	N/A	N/A	No
TBT	0.1	0.5	-	-	-	0.002	No	No	N/A	N/A	N/A

Summary Table C

Disposal Site Data Summary Narrow Deep

All units in mg/kg

	AL1	AL2	BAC	<ERL	ISQG/TEL	PEL	1ND93	2ND93	3ND93	4ND93	5ND93	6ND93	7ND93	8ND93	9ND93	10ND93	11ND93
Source			CSEMP	CSEMP	Canada												
Arsenic	20	70	25	-	7.2	41.6	NA	11.85455	11.57009	7.620968	11.3301	10.9	7.626263	7.98	10.39604	11.41463	10.4375
Cadmium	0.4	4	0.31	1.2	0.7	4.2	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	50	370	81	81	52.3	160	NA	50.56818	33.8785	41.83468	40.65534	47.15909	18.93939	30	54.45545	37.0935	43.52679
Copper	30	300	27	34	18.7	108	NA	25	21.96262	25	24.75728	29.09091	29.79798	26	34.65347	22.35772	23.21429
Mercury	0.25	1.5	0.07	0.15	0.13	0.7	0.592	0.858	0.566	0.769	0.743	1.12	0.502	0.487	1.102	0.807	0.843
Nickel	30	150	36	-	-	-	NA	28.72909	22.18318	26.4871	24.65243	29.60727	19.93333	23.46	30.33267	23.78537	25.50536
Lead	50	400	38	47	30.2	112	NA	66.25	46.26168	57.43952	55.53398	70.75	35	39.325	68.61386	48.29268	50.82589
Zinc	130	600	122	150	124	271	NA	111.3636	100	101.8145	108.9806	117.9545	121.2121	76.25	121.0396	93.08943	98.88393
					-	-											
Napthalene	0.1		0.08	0.16	-	0.319	0.2084	0.0416		0.0725	0.0599			0.3935		0.0746	
Acenaphthylene	0.1		-	-	0.00587	0.128	0.001	0.0007		0.0012	0.0016			0.0066		0.0017	
Acenaphthene	0.1		-	-	0.00671	0.0889	0.0245	0.0107		0.0254	0.0446			0.1717		0.053	
Fluorene	0.1		-	-	0.0212	0.144	0.2236	0.1463		0.2969	0.9614			1.5809		0.5766	
Phenanthrene	0.1		0.032	0.24	0.0867	0.544	0.1946	0.0918		0.1738	0.4649			1.1159		0.3268	
Anthracene	0.1		0.05	0.085	0.0469	0.245	0.065	0.0336		0.0649	0.179			0.4384		0.1216	
Fluoranthene	0.1		0.039	0.6	0.113	1.494											
Pyrene	0.1		0.024	0.665	0.153	1.398	0.2373	0.1525		0.2945	0.7372			1.707		0.5384	
Benzo(a)anthracene	0.1		0.016	0.261	0.0748	0.693	0.1166	0.0737		0.1431	0.3486			0.7485		0.2815	
Chrysene	0.1		0.02	0.384	0.108	0.846	0.1249	0.0803		0.1617	0.3698			0.8511		0.3235	
Benzo(b)fluoranthene	0.1		-	-	-	-											
Benzo(k)fluoranthene	0.1		-	-	-	-											
Benzo(a)pyrene	0.1		0.03	0.384	0.0888	0.763	0.1155	0.0778		0.1578	0.2845			0.9643		0.2775	
Indeno(1,2,3cd)pyrene	0.1		0.103	0.24	-	-	0.0927	0.0623		0.1115	0.1975			0.723		0.1905	
Benzo(ghi)perylene	0.1		0.08	0.085	-	-											
Dibenzo(a,h)anthracene	0.01		-	-	0.00622	0.135											
PCBs	0.02	0.18	-	-	0.0215	0.189											
TBT	0.1	0.5	-	-	-	-											

	17/ND/04	15/ND/04	13/ND/04	11/ND/04	9/ND/04	7/ND/04	5/ND/04	3ND/04	1/ND/04	2/ND/04	4/ND/04	6/ND/04	8/ND/04	10/ND/04	12/ND/04	16/ND/04	3NDTWL04	2NDTWL04	1NDTWL04
Source																			
Arsenic	11.31612	11.60123	12.85831	8.462825	12.56628	10.485	11.32822	13.29725	12.21321	11.00569	12.3088	11.27284	11.0715	9.935941	9.547896	13.75			
Cadmium	0.264059	0.381571	1.092995	0.638582	1.310219	0.191	0.325858	0.205809	0.324007	0.193356	0.219276	0.253189	0.422571	0.626586	0.659168	1.06			
Chromium	54.50959	90.20395	55.8881	29.61634	60.89382	46.75365	51.52715	42.47168	50.15931	51.64443	57.78099	49.24806	48.19455	39.69152	38.4513	57.78			
Copper	30.77694	36.7711	54.14573	42.14269	95.77217	26.72853	30.70547	22.29938	28.85378	25.64324	28.40632	28.05683	29.29585	45.69644	47.05045	59.21			
Mercury	0.879353	0.826282	1.311845	0.695996	1.477136	0.745824	0.785837	0.7139	0.923201	0.772635	0.75216	0.791856	0.849408	0.867013	1.354108	1.52			
Nickel	29.08047	142.8995	34.70159	28.52668	41.8858	27.05888	28.93552	25.10778	28.56234	28.7906	30.90999	28.06042	28.45231	30.77752	32.76623	38.36			
Lead	72.21112	71.84391	105.5736	91.94215	132.1846	58.40353	68.28584	57.18527	69.05081	63.04809	63.10356	65.03776	69.54348	111.5318	92.6998	119.71			
Zinc	114.5822	137.2943	173.5485	162.9595	305.2746	106.9526	110.2609	89.68755	110.6192	101.5651	101.5495	104.5227	109.6514	146.1482	147.2111	189.50			
Napthalene												0.1136	0.1581	0.0794					
Acenaphthylene												0.0017	0.0025	0.0014					
Acenaphthene												0.033	0.0976	0.0248					
Fluorene												0.4552	2.9621	0.2745					
Phenanthrene												0.286	1.2338	0.2344					
Anthracene												0.1091	0.603	0.0714					
Fluoranthene												0	0	0					
Pyrene												0.464	2.2986	0.2716					
Benzo(a)anthracene												0.2344	1.8332	0.1192					
Chrysene												0.2563	1.9267	0.1472					
Benzo(b)fluoranthene												0	0	0					
Benzo(k)fluoranthene												0	0	0					
Benzo(a)pyrene												0.2462	1.2795	0.1365					
Indeno(1,2,3cd)pyrene												0.1915	0.7544	0.1168					
Benzo(ghi)perylene																			
Dibenzo(a,h)anthracene												0	0	0					
PCBs	0.013479	0.011409	0.042314	0.015942	0.046179	0.009131	0.010105	0.014854	0.015902										
TBT																			

	14ND07	15ND07	13ND07	17ND07	16ND07	12ND07	11ND07	10ND07	9ND07	8ND07	6ND07	7ND07	5ND07	4ND07	3ND07	2ND07	1ND07
Source																	
Arsenic		10.80						11.30	12.10		10.40	11.90			9.38		
Cadmium		0.64						BDL	BDL		BDL	BDL			BDL		
Chromium		51.70						39.00	44.50		47.90	38.40			53.80		
Copper		36.30						30.00	65.70		25.50	19.60			24.30		
Mercury		0.66						0.41	0.41		0.39	0.33			0.61		
Nickel		30.40						29.90	34.30		25.20	22.00			28.30		
Lead		84.20						66.70	69.40		43.20	35.80			57.20		
Zinc		136.00						163.00	243.00		87.20	87.00			96.90		
Napthalene			0.0443	0.0724	0.0431	0.1022	0.0609	0.0399	0.0299	0.0402	0.0628	0.2134	0.0625				
Acenaphthylene			0.001	0.0012	0.0008	0.0015	0.001	0.0009	0.0005	0.0009	0.0012	0.0027	0.0011				
Acenaphthene			0.0088	0.0118	0.0064	0.0275	0.0127	0.0119	0.0067	0.0239	0.0501	0.1753	0.0145				
Fluorene			0.1007	0.1122	0.0754	0.1692	0.0884	0.129	0.0699	0.1934	0.3416	0.8844	0.1235				
Phenanthrene			0.0753	0.0884	0.0596	0.1212	0.0591	0.0855	0.0446	0.1159	0.2299	0.8403	0.0905				
Anthracene			0.0291	0.031	0.0192	0.0441	0.0246	0.0321	0.0178	0.0457	0.0895	0.255	0.0369				
Fluoranthene																	
Pyrene			0.1243	0.1207	0.083	0.1686	0.0892	0.1338	0.0688	0.1839	0.3042	0.8009	0.1348				
Benzo(a)anthracene			0.0719	0.0734	0.0473	0.0983	0.06	0.0775	0.041	0.1042	0.1859	0.4405	0.0773				
Chrysene			0.0703	0.0719	0.0517	0.0971	0.0586	0.0781	0.041	0.1029	0.178	0.4232	0.0759				
Benzo(b)fluoranthene																	
Benzo(k)fluoranthene																	
Benzo(a)pyrene			0.0687	0.0698	0.0519	0.0952	0.0563	0.0716	0.0362	0.1022	0.1383	0.2435	0.0771				
Indeno(1,2,3cd)pyrene			0.0806	0.0844	0.0561	0.0986	0.0559	0.0723	0.0374	0.098	0.1272	0.2438	0.0797				
Benzo(ghi)perylene																	
Dibenzo(a,h)anthracene																	
PCBs			0.016756		0.037361			0.010107	0.283743		0.005155	0.005287			0.005932		
TBT																	

	4/ND/11	3/ND/11	1/ND/11	6/ND/11	9/ND/11	13/ND/11	1/ND/15	2/ND/15	3/ND/15	4/ND/15	5/ND/15	6/ND/15
Source												
Arsenic	9.74	7.45	10.74	9.87	8.24	11.14	11.50	13.10		10.90	11.40	
Cadmium	0.14	0.11	0.18	0.20	0.25	0.35	0.16	0.17		0.17	0.25	
Chromium	47.98	31.24	49.88	46.42	32.92	49.14	69.90	67.90		56.10	61.40	
Copper	16.80	15.76	25.36	25.02	23.79	22.77	22.30	24.70		22.90	28.50	
Mercury	0.53	0.35	0.45	0.48	0.46	0.67	0.66	0.74		0.45	0.51	
Nickel	22.79	17.63	29.14	23.14	21.19	23.38	31.60	31.60		27.10	29.70	
Lead	54.05	37.66	48.14	59.22	60.97	60.45	62.70	62.90		55.40	52.40	
Zinc	81.81	64.27	91.30	149.11	168.41	101.26	109.00	111.00		95.60	108.00	
Napthalene							0.02930	0.04330		0.0452	0.052	0.0442
Acenaphthylene							0.00044	0.00102		0.00	0.00	0.00
Acenaphthene							0.00964	0.01170		0.01	0.01	0.01
Fluorene							0.01080	0.01570		0.02	0.02	0.01
Phenanthrene							0.08060	0.11800		0.11	0.09	0.08
Anthracene							0.02670	0.04130		0.04	0.03	0.03
Fluoranthene							0.10700	0.17700		0.14	0.12	0.09
Pyrene							0.11700	0.18900		0.13	0.13	0.10
Benzo(a)anthracene							0.05590	0.09240		0.07	0.06	0.05
Chrysene							0.05920	0.09590		0.07	0.06	0.06
Benzo(b)fluoranthene							0.13500	0.24600		0.16	0.14	0.13
Benzo(k)fluoranthene							0.00000	0.00000		0.00	0.00	0.00
Benzo(a)pyrene							0.05890	0.10500		0.07	0.06	0.06
Indeno(1,2,3cd)pyrene							0.04730	0.08660		0.05	0.05	0.05
Benzo(ghi)perylene												
Dibenzo(a,h)anthracene							0.00762	0.01150		0.01	0.01	0.01
PCBs			0.009823	0.00835	0.005837					0.049	0.035	0.005
TBT												

	9/ND/02	8/ND/02	7/ND/02	6/ND/02	5/ND/02	4/ND/02	3/ND/02	2/ND/02	1/ND/02	Average	No.Exceed BAC?	No. Exceed ERL	No. Exceed PEL?
Source													
Arsenic	13.40	12.60	13.30	12.60	9.31	11.60	12.50	13.30	13.4	11.1	0	-	0
Cadmium	0.55	0.20	0.21	0.43	0.20	NA	NA	0.34	1.2	0.4	16	1	0
Chromium	60.70	67.20	67.80	55.40	55.80	50.40	59.70	51.80	61.5	49.8	0	0	0
Copper	31.60	28.20	28.80	28.90	27.50	25.70	28.30	29.50	47.6	31.3	28	11	0
Mercury	0.69	0.66	0.80	0.72	0.77	0.61	0.82	0.71	1.3	0.75	52	52	29
Nickel	30.60	30.70	32.40	28.60	27.80	26.60	30.30	28.80	34.5	30.5	3	N/A	N/A
Lead	70.40	65.10	67.80	61.40	63.40	54.30	70.10	73.00	98.3	66.3	48	45	2
Zinc	129.00	123.00	117.00	131.00	104.00	97.00	109.00	148.00	158.0	123.0	17	8	1
Napthalene							0.0916			0.1	7	3	1
Acenaphthylene							0.001			0.0	N/A	N/A	0
Acenaphthene							0.018			0.0	N/A	N/A	0
Fluorene							0.21			0.151	N/A	N/A	14
Phenanthrene							0.16			0.1	26	6	3
Anthracene							0.06			0.0	11	7	3
Fluoranthene							0.00			0.1	5	0	0
Pyrene							0.23			0.2	26	4	2
Benzo(a)anthracene							0.11			0.1	26	5	2
Chrysene							0.19			0.1	26	3	2
Benzo(b)fluoranthene							0.00			0.1	N/A	N/A	N/A
Benzo(k)fluoranthene							0.00			0.0	N/A	N/A	N/A
Benzo(a)pyrene							0.13			0.1	26	2	2
Indeno(1,2,3cd)pyrene							0.11			0.1	10	3	N/A
Benzo(ghi)perylene											0	0	N/A
Dibenzo(a,h)anthracene							0.00			0.0	N/A	N/A	0
PCBs										0.0367	N/A	N/A	1
TBT										-	N/A	N/A	N/A

Summary Table D

Disposal Site Data Summary Oxcars

All units in mg/kg

	AL1	AL2	BAC	<ERL	ISQG/TEL	PEL	1OXC93	2OXC93	3OXC93	4OXC93	5OXC93	6OXC93	7OXC93	8OXC93	9OXC93	10OXC93	11OXC93	12OXC93
Source			CSEMP	CSEMP	Canada													
Arsenic	20	70	25	-	7.2	41.6	12.15	10.29	10.33	12.11	11.03	14.10	16.67	28.29	11.10	18.27	14.67	13.15
Cadmium	0.4	4	0.31	1.2	0.7	4.2	<0.1	<0.1	<0.1	0.16	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	50	370	81	81	52.3	160	40.66	27.98	36.18	40.87	27.24	14.84	16.77	14.25	28.98	31.89	56.49	46.27
Copper	30	300	27	34	18.7	108	21.30	19.92	24.61	24.53	19.19	9.54	26.13	15.66	19.94	34.36	104.98	30.91
Mercury	0.25	1.5	0.07	0.15	0.13	0.7	0.74	0.69	1.01	1.07	0.74	0.38	1.74	0.70	0.67	1.01	2.16	1.76
Nickel	30	150	36	-	-	-	16.48	15.77	20.09	21.89	16.39	10.33	12.90	17.67	18.44	19.01	29.59	24.15
Lead	50	400	38	47	30.2	112	45.12	43.21	51.86	53.15	45.13	58.17	43.60	45.11	43.50	218.32	90.17	55.79
Zinc	130	600	122	150	124	271	84.22	82.14	94.08	95.19	78.85	61.15	69.51	109.87	89.32	123.72	605.77	112.98
					-	-												
Napthalene	0.1		0.08	0.16	-	0.319	105.30	110.20	108.60									
Acenaphthylene	0.1		-	-	0.00587	0.128	2.60	2.00	2.50									
Acenaphthene	0.1		-	-	0.00671	0.0889	20	17.9	43.4									
Fluorene	0.1		-	-	0.0212	0.144	185.2	129.2	219.5									
Phenanthrene	0.1		0.032	0.24	0.0867	0.544	135.7	107.4	220.6									
Anthracene	0.1		0.05	0.085	0.0469	0.245	54.7	41	69.9									
Fluoranthene	0.1		0.039	0.6	0.113	1.494												
Pyrene	0.1		0.024	0.665	0.153	1.398	205.2	148.6	242.9									
Benzo(a)anthracene	0.1		0.016	0.261	0.0748	0.693	115	82.8	141.7									
Chrysene	0.1		0.02	0.384	0.108	0.846	115.9	83.9	140.7									
Benzo(b)fluoranthene	0.1		-	-	-	-												
Benzo(k)fluoranthene	0.1		-	-	-	-												
Benzo(a)pyrene	0.1		0.03	0.384	0.0888	0.763	128.1	87.8	159.1									
Indeno(1,2,3cd)pyrene	0.1		0.103	0.24	-	-	137.6	93.1	151.9									
Benzo(ghi)perylene	0.1		0.08	0.085	-	-												
Dibenzo(a,h)anthracene	0.01		-	-	0.00622	0.135												
PCBs	0.02	0.18	-	-	0.0215	0.189												0.013479
TBT	0.1	0.5	-	-	-	-			2.192269	-5.84711	18.76351	29.23101	5		4		5	

	13OXC93	14OXC93	15OXC93	16OXC93	17OXC93	18OXC93	19OXC93	20OXC93	21OXC93	22OXC93	23OXC93	13/OX/04	11/OX/04	9/OX/04	7/OX/04	5/OX/04	3/OX/04	1/OX/04	2/OX/04
Source																			
Arsenic	8.24	11.18	11.67	11.86	13.17	9.96	16.94	13.99	7.13	5.19	12.17	16.48	14.57	15.35	16.00	14.59	14.79	16.37	17.19
Cadmium	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chromium	22.28	26.19	13.24	17.71	20.22	14.50	17.79	19.31	27.85	21.45	21.46	34.59	44.95	52.37	45.25	42.96	66.41	52.45	54.81
Copper	11.62	20.41	16.00	10.66	11.37	14.07	46.33	30.77	15.30	14.11	26.92	18.62	24.31	29.57	23.73	24.11	40.85	26.60	30.62
Mercury	0.23	0.49	0.66	0.53	0.28	0.33	1.60	0.65	0.50	0.39	0.67	0.52	0.82	0.89	0.77	0.73	1.59	0.81	0.83
Nickel	24.46	15.77	14.50	12.65	11.26	13.25	15.39	16.72	18.72	15.69	15.19	19.93	23.50	27.62	24.29	21.89	30.12	26.61	28.35
Lead	25.05	44.26	41.48	41.02	56.42	36.96	196.10	116.26	32.67	26.69	37.22	47.37	57.25	64.50	55.26	53.44	74.47	69.38	66.99
Zinc	66.34	79.52	72.03	72.71	78.86	79.80	99.81	87.20	68.56	64.95	68.69	75.12	92.79	107.77	94.50	89.44	124.10	103.18	115.12
Napthalene	156.30	151.80	177.00	92.10	292.20	165.10			262.30										
Acenaphthylene	2.00	2.50	2.60	1.20	3.90	2.60			2.80										
Acenaphthene	20.5	19	24.8	9.9	38.3	24.8			29.1										
Fluorene	227	251.9	304.6	109.1	462.9	324.8			327.3										
Phenanthrene	176.8	202.1	244.2	95.1	386.4	254.5			276.9										
Anthracene	70.6	74.8	97.5	36.1	147.9	104.6			101.3										
Fluoranthene																			
Pyrene	266.4	293.6	372.8	137.4	560.2	392.4			393.5										
Benzo(a)anthracene	111.1	128.4	152	55.7	233.5	181			162.8										
Chrysene	142.9	159.3	195.7	72.5	299.1	233.4			203.9										
Benzo(b)fluoranthene																			
Benzo(k)fluoranthene																			
Benzo(a)pyrene	139.9	190	200.7	81.7	293	210.5			192.8										
Indeno(1,2,3cd)pyrene	99.6	133.3	146	59.8	216.1	146.9			143.9										
Benzo(ghi)perylene																			
Dibenzo(a,h)anthracene																			
PCBs	0.011409	0.042314	0.015942	0.046179	0.009131	0.010105	0.014854	0.015902											
TBT	10		9		4		<5			19	15			8		6			

	4/OX/04	6/OX/04	8/OX/04	10/OX/04	12/OX/04	14/OX/04	11OX2007	12OX2007	5OX2007	13OX2007	6OX2007	1OX2007	4OX2007	7OX2007	14OX2007	8OX2007	9OX2007	10OX2007	3OX2007	2OX2007
Source																				
Arsenic	16.25	16.46	11.08	17.14	13.92	29.13							11.80	16.00	15.10	14.40	12.40	13.30		
Cadmium	BDL	BDL	BDL	0.19	BDL	BDL							BDL	BDL	BDL	BDL	BDL	BDL		
Chromium	45.53	40.65	42.10	59.38	40.70	25.85							54.80	69.50	40.90	72.90	45.70	61.80		
Copper	26.28	23.22	23.65	36.75	21.28	13.46							25.60	35.00	17.90	37.30	21.60	32.50		
Mercury	0.77	0.70	0.65	1.09	0.61	0.31							0.66	0.93	0.40	0.85	0.53	0.69		
Nickel	25.00	22.04	26.66	30.84	21.05	17.60							27.20	33.50	22.30	34.30	24.00	31.20		
Lead	57.81	54.90	56.41	70.53	47.75	45.87							53.30	69.00	43.00	71.80	46.20	65.80		
Zinc	92.97	85.78	94.74	122.10	83.03	64.16							100.00	123.00	80.50	126.00	81.10	114.00		
Napthalene	77.00	161.10	107.40																	
Acenaphthylene	1.50	2.70	1.70																	
Acenaphthene	13.3	28.3	19.5																	
Fluorene	189.9	367.2	270.2																	
Phenanthrene	137.8	257.8	204.1																	
Anthracene	57.3	110.2	85.7																	
Fluoranthene																				
Pyrene	223.7	422.5	317																	
Benzo(a)anthracene	103.4	198.5	139																	
Chrysene	122.7	230	155.9																	
Benzo(b)fluoranthene																				
Benzo(k)fluoranthene																				
Benzo(a)pyrene	119.4	229.4	147.3																	
Indeno(1,2,3cd)pyrene	95.1	181.6	106.6																	
Benzo(ghi)perylene																				
Dibenzo(a,h)anthracene																				
PCBs		0.016756		0.037361			0.010107	0.283743		0.005155	0.005287			0.005932					0.009823	0.00835
TBT							<4	<4		<4	<4									

	10/OX/2011	12/OX/2011	3/OX/2011	7/OX/2011	4/OX/2011	8/OX/11	1/OX/15	3/OX/15	5/OX/15	7/OX/15	10/OX/15	4/OX/02	3/OX/02	2/OX/02	1/OX/02	Average	No.Exceed BAC?	No. Exceed ERL	No. Exceed PEL?
Source																			
Arsenic	13.43	12.30	7.48	9.75	13.89	10.47		16.30	15.20	15.50		10.40	16	13.3	12.5	13.8	2	-	0
Cadmium	0.09	0.11	0.22	0.12	0.12	0.11		0.12	0.14	0.67		NA	NA	NA	0.485	0.2	2	0	0
Chromium	37.02	52.15	35.10	47.20	42.74	41.04		62.90	74.00	102.00		48.80	71.1	36.3	37.8	40.8	1	1	0
Copper	17.16	21.21	24.79	20.95	22.76	26.23		23.90	26.70	74.30		24.20	37.7	17.6	16	26.0	14	9	0
Mercury	0.48	0.58	0.55	0.70	0.80	0.71		0.71	0.77	1.60		0.61	1.02	0.392	0.536	0.78	56	56	28
Nickel	20.84	24.65	24.98	19.27	22.76	21.43		29.10	30.50	47.80		23.10	31.1	18.6	14.4	22.2	1	N/A	N/A
Lead	49.17	61.10	655.37	45.53	54.70	54.86		56.10	63.30	115.00		46.40	70.2	40.4	46.2	71.0	51	35	5
Zinc	76.39	88.15	139.52	73.93	88.46	86.74		101.00	108.00	216.00		90.70	132	91.1	68.2	103.1	9	2	1
Napthalene												75.40	291.3	67.3	57.6	119.6	17	17	17
Acenaphthylene												2.10	5.6	2.4	1.5	2.5	N/A	N/A	17
Acenaphthene												21.4000	58.800	12.400	12.800	23.8	N/A	N/A	0
Fluorene												165.10	488.40	146.20	124.00	250.1	N/A	N/A	17
Phenanthrene												124.20	414.90	127.30	83.50	192.8	17	17	17
Anthracene												50.60	261.70	48.80	35.20	92.8	17	17	17
Fluoranthene																	0	0	0
Pyrene												186.60	557.20	151.00	138.20	285.2	17	17	17
Benzo(a)anthracene												110.10	291.40	87.30	75.60	143.6	17	17	17
Chrysene												112.70	286.90	83.90	75.40	152.5	17	17	17
Benzo(b)fluoranthene																	N/A	N/A	N/A
Benzo(k)fluoranthene																	N/A	N/A	N/A
Benzo(a)pyrene												128.20	296.60	92.20	74.10	155.3	17	17	17
Indeno(1,2,3cd)pyrene												128.10	324.10	94.90	78.10	144.1	17	17	N/A
Benzo(ghi)perylene																	0	0	N/A
Dibenzo(a,h)anthracene																	N/A	N/A	0
PCBs	0.005837					0.049	0.035	0.005								0.037	N/A	0	1
TBT				6	10.8	83.9	0.0039	0.0051	0.008	0.0255	0.0029	14		11	7	11.562	N/A	N/A	N/A

Summary Table E

Disposal Site Data Summary Bo'ness

	AL1	AL2	BAC	<ERL	ISQG/TEL	PEL	07/BON/1 1	06/BON/1 1	05/BON/1 1	04/BON/1 1	03/BON/1 1	02/BON/1 1	01/BON/1 1	1BSS93	2BSS93	3BSS93	4BSS93	5BSS93	6BSS93	7BSS93	8BSS93	1BSS01	2BSS01	3BSS01	4BSS01	5BSS01	6BSS01	7BSS01	8BSS01	9BSS01	10BSS01	11BSS01	12BSS01	13BSS01	14BSS01	15BSS01	16BSS01	17BSS01	18BSS01	19BSS01	20BSS01	21BSS01	22BSS01	23BSS01	1/BSS/15	2/BSS/15	3/BSS/15	5/BSS/15	6/BSS/15	Average	No.Exceed BAC?	No. Exceed ERL	No. Exceed PEL?
Source			CSEMP	CSEMP	Canada																																													
Arsenic	20	70	25	-	7.2	41.6	13.96	13.26	16.46	17.51	12.45	14.38	13.29	13.34	12.91	11.23	11.96	9.26	16.67	17.43	23.77	13.90	15.50	17.20	13.40	16.80	25.10	12.90	13.80	16.50	13.20	12.70	12.80	8.32	13.90	16.80	14.10	15.40	18.00	13.20	18.40	16.00	14.00	14.40	17.00	17.50	20.30	17.80	20.30	15.3	1	-	0
Cadmium	0.4	4	0.31	1.2	0.7	4.2	0.16	0.14	0.10	0.11	0.13	0.16	0.15	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.21	0.14	0.11	0.05	0.02	0.02	0.07	0.12	0.15	0.11	0.07	0.03	0.04	0.06	0.09	0.05	0.12	0.13	0.13	0.16	0.14	0.12	0.15	0.13	0.14	0.14	0.15	0.08	0.1	0	0	0
Chromium	50	370	81	81	52.3	160	59.19	52.94	35.59	43.63	50.82	58.78	54.72	73.43	40.69	58.50	16.52	30.08	40.39	36.05	22.15	77.20	68.60	60.10	56.00	25.20	22.50	49.20	57.00	61.20	62.00	42.30	30.20	27.90	40.80	53.10	37.00	53.90	58.80	65.60	66.70	62.90	64.40	75.20	62.00	71.10	69.70	57.10	38.10	50.9	0	0	0
Copper	30	300	27	34	18.7	108	26.15	24.65	17.33	24.14	22.54	24.65	23.76	58.57	33.16	44.09	16.85	18.19	35.01	26.53	18.88	45.80	42.00	40.30	25.20	14.90	50.70	26.60	38.60	42.90	37.90	24.70	10.30	16.10	24.00	33.90	13.90	37.60	36.90	39.90	44.60	40.90	38.80	44.80	26.40	30.10	29.40	28.60	17.90	30.7	22	17	0
Mercury	0.25	1.5	0.07	0.15	0.13	0.7	0.86	0.78	0.55	0.96	0.76	0.85	0.83	2.34	1.33	1.75	0.65	0.64	1.66	1.49	0.79	1.62	1.13	0.88	0.33	0.30	0.27	0.43	0.79	1.28	0.84	0.56	0.07	0.30	0.48	0.75	0.72	0.81	0.99	0.96	1.10	0.94	0.89	1.08	0.77	0.86	0.82	0.74	0.49	0.87	42	42	31
Nickel	30	150	36	-	-	-	26.55	24.25	19.75	20.95	22.49	26.46	24.82	29.84	23.00	27.59	11.60	21.07	21.10	18.45	14.88	28.30	31.30	30.00	24.00	14.20	13.40	26.30	27.20	28.40	28.20	21.10	20.00	13.90	22.10	25.10	20.50	25.40	27.50	31.80	31.00	30.80	29.90	34.00	26.60	31.00	30.80	29.60	19.60	24.5	0	N/A	N/A
Lead	50	400	38	47	30.2	112	62.59	58.15	46.70	50.91	53.68	63.54	63.04	84.41	49.50	60.07	29.32	29.13	58.24	47.58	38.23	69.30	73.20	69.50	36.00	43.80	43.80	38.30	56.80	65.30	62.50	49.00	25.20	30.60	47.50	58.50	50.30	57.90	64.90	66.70	65.60	64.60	62.30	70.30	53.00	58.20	59.10	57.20	43.60	54.4	38	32	0
Zinc	130	600	122	150	124	271	106.96	98.42	81.48	88.58	94.36	101.51	98.39	173.27	109.50	134.71	70.52	78.22	110.54	100.75	94.75	121.00	119.00	119.00	72.30	68.00	76.70	85.50	109.00	115.00	116.00	88.40	57.20	62.30	89.60	109.00	70.90	114.00	117.00	121.00	123.00	121.00	114.00	131.00	110.00	119.00	128.00	117.00	95.80	103.1	5	1	0
Napthalene	0.1		0.08	0.16	-	0.319			0.0831		0.1542	0.0649																																	0.0624	0.0837	0.0363	0.0527	0.0607	0.075	3	0	0
Acenaphthylene	0.1		-	-	0.00587	0.128			0.0013		0.0031	0.001																																	0.001	0.008	0.001	0.001	0.001	0.002	N/A	N/A	0
Acenaphthene	0.1		-	-	0.00671	0.0889			0.0123		0.0253	0.0111																																	0.011	0.079	0.007	0.009	0.010	0.021	N/A	N/A	0
Fluorene	0.1		-	-	0.0212	0.144			0.1567		0.3878	0.1224																																	0.02	0.02	0.01	0.01	0.02	0.094	N/A	N/A	0
Phenanthrene	0.1		0.032	0.24	0.0867	0.544			0.1264		0.2733	0.095																																	0.11	0.16	0.06	0.09	0.10	0.127	8	1	0
Anthracene	0.1		0.05	0.085	0.0469	0.245			0.0522		0.0986	0.0392																																	0.04	0.09	0.03	0.03	0.04	0.052	3	2	0
Fluoranthene	0.1		0.039	0.6	0.113	1.494																																					0.14	0.21	0.09	0.11	0.12	0.135	5	0	0
Pyrene	0.1		0.024	0.665	0.153	1.398			0.1833		0.375	0.1338																																	0.15	0.23	0.10	0.12	0.14	0.180	8	0	0
Benzo(a)anthracene	0.1		0.016	0.261	0.0748	0.693			0.0825		0.2112	0.0645																																	0.07	0.12	0.05	0.06	0.06	0.089	5	0	0
Chrysene	0.1		0.02	0.384	0.108	0.846			0.0909		0.2252	0.0698																																	0.08	0.12	0.05	0.06	0.07	0.096	8	0	0
Benzo(b)fluoranthene	0.1		-	-	-	-																																					0.18	0.28	0.11	0.15	0.17	0.178	N/A	N/A	N/A
Benzo(k)fluoranthene	0.1		-	-	-	-																																											0.000	N/A	N/A	N/A
Benzo(a)pyrene	0.1		0.03	0.384	0.0888	0.763			0.0981		0.249	0.0777																																	0.08	0.13	0.05	0.06	0.07	0.103	8	0	0
Indeno(1,2,3cd)pyrene	0.1		0.103	0.24	-	-			0.0806		0.1894	0.0611																																	0.06	0.10	0.04	0.05	0.06	0.080	1	0	N/A
Benzo(ghi)perylene	0.1		0.08	0.085	-	-																																												0	0	N/A
Dibenzo(a,h)anthracene	0.01		-	-	0.00622	0.135																																					0.01	0.01	0.01	0.01	0.01	0.009	N/A	N/A	0
PCBs	0.02	0.18	-	-	0.0215	0.189		0.005864	0.004308	0	0.004385											0.012654	0.010207	0.007604	0.002889	0.002382	0.002302	0.00961	0.00699	0.007479	0.007108	0.005006	0.001	0.005	0.005	0.007	0.002	0.007	0.007	0.009	0.009	0.007	0.008	0.009	0.004		0.005	0.004		0.0060	N/A	N/A	0
TBT	0.1	0.5	-	-	-	-	0.0081			0.00719																	BDL																0.0031	0.0047	0.006	0.00	0.004		0.005	N/A	N/A	N/A

Table F
Disposal Site Average Data

	AL1	AL2	BAC	<ERL	ISQG/TEL	PEL	Granton Harbour Dredge Average	Narrow Deep Average	Bo'ness Average
Source			CSEMP	CSEMP	Canada				
Arsenic	20	70	25	-	7.2	41.6	18.3	11.1	15.28
Cadmium	0.4	4	0.31	1.2	0.7	4.2	0.5	0.4	0.11
Chromium	50	370	81	81	52.3	160	63.0	49.8	50.91
Copper	30	300	27	34	18.7	108	48.7	31.3	30.66
Mercury	0.25	1.5	0.07	0.15	0.13	0.7	**1.07**	**0.7**	**0.87**
Nickel	30	150	36	-	-	-	34.1	30.5	24.53
Lead	50	400	38	47	30.2	112	99.9	66.3	54.37
Zinc	130	600	122	150	124	271	158.2	123.0	103.06
Napthalene	0.1		0.08	0.16	-	0.319	0.23	0.06	0.075
Acenaphthylene	0.1		-	-	0.00587	0.128	0.06	0.00	0.002
Acenaphthene	0.1		-	-	0.00671	0.0889	**0.12**	0.02	0.021
Fluorene	0.1		-	-	0.0212	0.144	**0.16**	0.15	0.094
Phenanthrene	0.1		0.032	0.24	0.0867	0.544	**0.68**	0.14	0.127
Anthracene	0.1		0.05	0.085	0.0469	0.245	**0.28**	0.05	0.052
Fluoranthene	0.1		0.039	0.6	0.113	1.494	1.02	0.11	0.135
Pyrene	0.1		0.024	0.665	0.153	1.398	1.26	0.18	0.180
Benzo(a)anthracene	0.1		0.016	0.261	0.0748	0.693	0.63	0.10	0.089
Chrysene	0.1		0.02	0.384	0.108	0.846	0.51	0.11	0.096
Benzo(b)fluoranthene	0.1		-	-	-	-	0.57	0.14	0.178
Benzo(k)fluoranthene	0.1		-	-	-	-	0.31	-	-
Benzo(a)pyrene	0.1		0.03	0.384	0.0888	0.763	0.64	0.09	0.103
Indeno(1,2,3cd)pyrene	0.1		0.103	0.24	-	-	0.38	0.08	0.080
Benzo(ghi)perylene	0.1		0.08	0.085	-	-	0.44	-	-
Dibenzo(a,h)anthracene	0.01		-	-	0.00622	0.135	0.09	0.0	0.009
PCBs	0.02	0.18	-	-	0.0215	0.189	0.050	0.0367	0.006
TBT	0.1	0.5	-	-	-	-	0.002	No data	0.005