



**KYLE AKIN GEOTECHNICAL SURVEY**

**ISLE OF SKYE**

**AUGUST 2016**

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**WALLACE STONE**

**Client:**

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## 1. Introduction

Aspect Land & Hydrographic Surveys Ltd (herein ALHS) were contracted by Wallace Stone LLP on behalf of Marine Harvest to carry out sediment sampling using vibrocore and surface grab techniques to support assessment of options for a Feed Mill development and associated infrastructure.

## 2. Scope of Works

The sampling was to be carried out in the areas depicted in Figure 1 below.

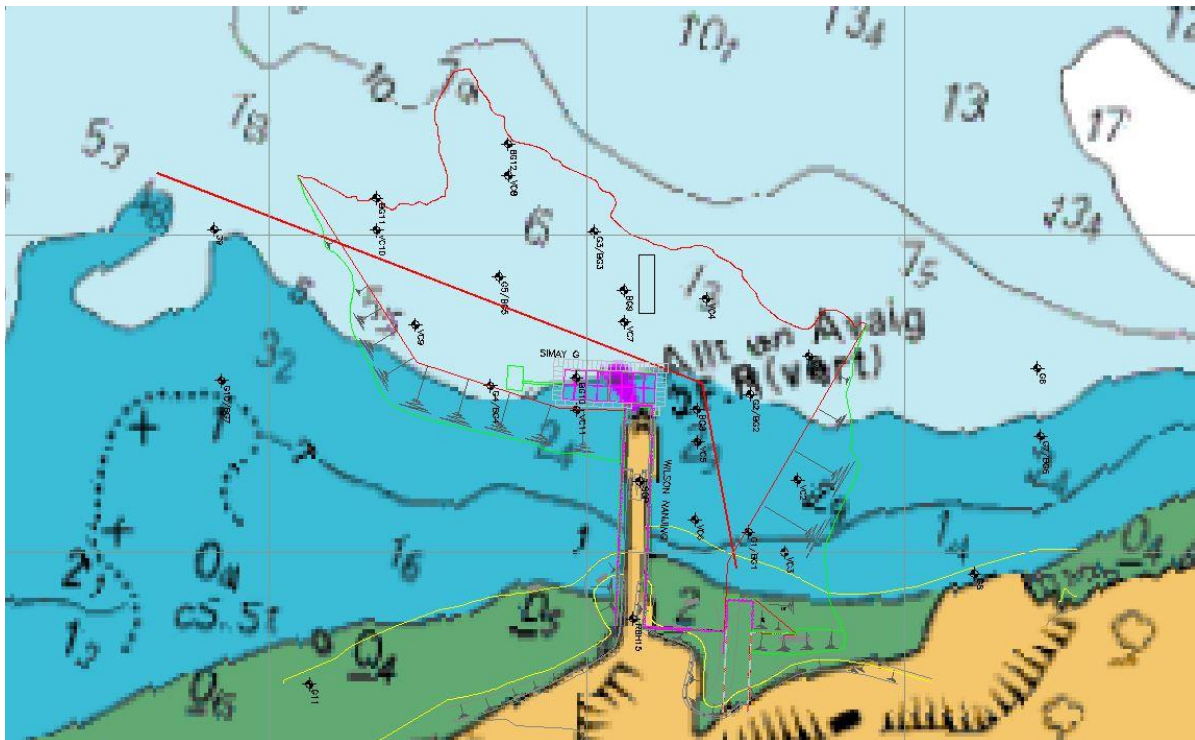


FIGURE 1 – KYLE AKIN VIBRACORE AND GRAB LOCATIONS

One vibrocore sample was retained from each sample location. A minimum of 3 attempts were made at each location. The aim was to obtain 3 sub samples where the core was returned longer than 1.5m and 2 sub samples where the core length was <1.5m in length. Where it was not possible to obtain a sample by vibrocore additional grab samples were obtained to allow sufficient analysis to be undertaken.

### 3. Sequence of Events

TABLE 1 - SEQUENCE OF EVENTS

DATE	EVENT
5 July 2016	Vigilance transits from TROON to Kyle Akin
6 July 2016	Vigilance Arrives Kyle Akin
11 July 2016	Mobilise Vibrocore equipment and Day Grab
12 July 2016	Vibrocore and Grab sampling
13 July 2016	Vibrocore and Grab sampling
14 July 2016	Grab Sampling
15 July 2016	De Mobilise and Transfer Samples to laboratory for analysis

### 4. Conduct of Sampling

Within all areas the aim was to obtain a minimum core depth of 1.5m wherever possible. This was to allow the cores to be split into 3 separate sections of at least 0.5m and a sample for analysis to be obtained from each of these sections.

The vessel was manoeuvred to each of the locations in turn and anchored fore and aft to avoid swinging during the sampling operation.



FIGURE 2 – CONDUCTING A CORE AT VC6

Vibrocore locations 2, 3 and 6 were sampled on 12 July 2016 and all remaining vibrocore and grab samples for the PSD, metals and chemicals analysis were carried out on 13 and 14 July 2016.

It was found that the seabed in much of the area particularly offshore was dominated by a surface layer of cobbles which made a number of the vibrocores impossible to recover a sample. This was particularly the case at Vibrocore locations 4, 8 & 10 and Grab location 10 where no core or grab was possible and. Where no sample was recovered the vessel was manoeuvred around the area around the instructed sample location to attempt to find a location where the vibrocore could penetrate through the surface layer of cobbles or gravel. Failing this resulting in a sample being returned repeated grab sampling attempts were made. In these cases the grab sampling only returned cobbles as detailed below. Grab location 10 did not even return cobbles suggesting that this location may be outcropping rock.

TABLE 2 - VIBROCORE LOCATIONS

Sample Location	Date / Time	Easting	Northing	Remarks
VC1	13/7/16 1556	173940.38	826728.64	0.84m core
VC2	12/7/16 1143	173937.58	826645.65	1.0m core
VC3	12/7/16 1341	173942.3	826609.6	0.93m core
VC4	13/7/16 1420	173879.7	826767.7	Grab
VC5	13/7/16 1659	173874.83	826669.03	1.14m core
VC6	12/7/16 1443	173867.69	826632.52	1.5m core
VC7	13/7/16 1136	173820.30	826741.07	0.25m core
VC8	13/7/16 1127	173749.05	826837.97	Grab
VC9	13/7/16 0827	173688.18	826747.00	0.43m core
VC10	13/7/16 0946	173668.3	826804.2	Grab
VC11	13/7/16 1332	173804.73	826685.46	0.25m core
G1	14/7/16 1415	173899.4	826613.0	Grab
G2	14/7/16 1152	173903.8	826704.6	Grab
G3	14/7/16 1014	173806.1	826798.2	Grab
G4	14/7/16 1254	173740.9	826702.6	Grab
G5	14/7/16 0937	173749.4	826771.9	Grab
G6	14/7/16 1334	174081.6	826716.6	Grab
G7	14/7/16 1348	174085.8	826673.9	Grab
G8	Armour Stone / Cobbles - no sample			
G9	14/7/16 0802	173547.8	826806.9	Grab
G10	No Sample / Weed only returned from grab			
G11	14/7/16 1436	173632.8	826518.6	Grab



## 5. Equipment Used for Coring

A Speciality Devices Incorporated D-4 vibrocoringer was used for all samples. A 76mm diameter, 3m long core was fitted for all sample attempts and each core tube was constructed of aluminium.

As the sediment was too dense to push out of the core tube prior to sampling the cores were cut into sections of equal length prior to removal from the core tube and sampling. The cores were then split longitudinally prior to being sampled with care being taken not to sample material that had come into direct contact with the sample tube wall or close to where the tube had been cut.



FIGURE 3 - SDI D-4 VIBROCORER ON DECK

## 6. Sample Analysis

The laboratory analysis was carried out by Environmental Scientifics Group (ESG) in Burton on Trent. The intention was that all vibrocore samples would be sub sampled at 0.5m intervals of the length of the core and each sub sample analysed for Particle Size, Metals and Chemicals. In addition, after the sampling had been undertaken and the samples dispatched to the lab a request was made to expand the analysis with the addition of leachate analysis. In communication with the laboratory this was able to be accommodated within the samples already taken.

Sample Location	Sample Achieved	Analysis Ordered	Sediment Descriptor
VC1	0.84m core	2 sub samples for PSD, Metals, Chemicals & Leachate	1 – Fine to Coarse Sand 2 – Sandy Silt
VC2	1.0m core	2 sub samples for PSD, Metals, Chemicals & Leachate	1 - Fine to Coarse Sand 2 – Fine Sand
VC3	0.93m core	2 sub samples for PSD, Metals, Chemicals & Leachate	1 – Fine to Coarse Sand 2 – Fine Sand
VC4	No core-Grab	Grab sampled for PSD, Metals, Chemicals & Leachate	Gravelly, Sandy Pebbles
VC5	1.14m Core	2 sub samples for PSD, Metals, Chemicals & Leachate	1 – Silty Sand 2 – Silty Sand
VC6	1.5m core	3 sub samples for PSD, Metals, Chemicals & Leachate	1 – Clayey, Silty Sand 2 – Silty Sand 3 – Silty Sand
VC7	0.25m core	Sampled for PSD, Metals, Chemicals & Leachate	Sandy Pebbles
VC8	No core - Grab	Grab Sampled for PSD, Metals, Chemicals & Leachate - Cobbles, Gravel & sand	1 – Gravel & Cobbles
VC9	0.43m core	Sampled for PSD, Metals, Chemicals & Leachate	Silty, Sandy Pebbles
VC10	No core - Grab	Grab Sampled for PSD, Metals, Chemicals & Leachate - Cobbles, Gravel & sand	Sandy, Gravelly Pebbles
VC11	0.25 core	Sampled for PSD, Metals, Chemicals & Leachate	Sandy, Gravelly Pebbles
G1	Grab	PSD	Pebbles
G2	Grab	PSD	Sandy Pebbles
G3	Grab	PSD	Sandy Pebbles
G4	Grab	Sampled for PSD, Metals, Chemicals & Leachate	Gravelly Sand
G5	Grab	PSD	Sandy Pebbles
G6	Grab	PSD	Sandy Pebbles

Sample Location	Sample Achieved	Analysis Ordered	Sediment Descriptor
G7	Grab	Sampled for PSD, Metals, Chemicals & Leachate	Sandy Pebbles
G8	No Sample	Armour Stone / made ground	No sample
G9	Grab	PSD	Sandy Pebbles
G10	No Sample	N/A	
G11	Grab	Sampled for PSD, Metals, Chemicals & Leachate	Medium to Coarse Sand

**TABLE 3 – VIBRACORE SAMPLE ANALYSIS**

The samples have been analysed against the Action Levels quoted by Marine Scotland, listed in Figure 4. When the detected levels in samples were above action levels, they were highlighted red in the summary tables.

**Table 2 – Sediment QC criteria for trace metal (mg/kg) and TBT (µg/kg) concentrations**

Quality Criteria	As	Cd	Cr	Cu	Hg	Ni	Pb	Zn	TBT
33% AL1	6.6	0.1	16.5	9.9	0.1	9.9	16.5	42.9	33.3
Precision (%)	25	25	25	25	25	25	25	25	25
LOD	1.0	0.05	0.2	0.1	0.05	0.2	0.2	2.0	10.0

**Table 3 – Sediment QC criteria for chlorinated biphenyl (µg/kg) concentrations**

Quality Criteria	CB28	CB52	CB101	CB118	CB153	CB138	CB180	ICES7 CB	TOTAL CB
33% AL1	0.47	0.47	0.47	0.47	0.47	0.47	0.47	3.30	6.80
Precision (%)	25	25	25	25	25	25	25	25	25
LOD	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.7	1.4

**Table 4 - Sediment QC criteria for polycyclic aromatic hydrocarbon (µg/kg) concentrations**

Quality Criteria	Naphthalene	Phenanthrene	Anthracene
33% AL1	33.3	33.3	33.3
Precision (%)	25	25	25
LOD	2.0	2.0	2.0
Quality Criteria	Fluoranthene	Pyrene	Benz[a]anthracene
33% AL1	33.3	33.3	33.3
Precision (%)	25	25	25
LOD	2.0	2.0	2.0
Quality Criteria	Benzofluoranthenes	Benzo[a]pyrene	Indenopyrene
33% AL1	33.3	33.3	33.3
Precision (%)	25	25	25
LOD	2.0	2.0	2.0
Quality Criteria	Benzoperylene	Acenaphthylene	Acenaphthene
33% AL1	33.3	33.3	33.3
Precision (%)	25	25	25
LOD	2.0	2.0	2.0
Quality Criteria	Fluorene	Dibenz[a,h]anthracene	Chrysene
33% AL1	33.3	3.3	33.3
Precision (%)	25	25	25
LOD	2.0	0.5	2.0

Please note that these detection limits are to be used as a guide. Where these detection limits cannot be met, please contact the Marine Scotland Licensing Operations Team (MS-LOT) for approval before undertaking testing: [ms.marinelicensing@scotland.gsi.gov.uk](mailto:ms.marinelicensing@scotland.gsi.gov.uk). Detection limits **must be below** Revised Action Level 1 (Appendix 2) in order to gain approval.

**FIGURE 4 - MARINE SCOTLAND ACTION LEVELS TAKEN FROM GUIDANCE ON SAMPLING AND ANALYSIS OF SEDIMENT**

Detail on the analysis of individual items is provided in the accompanying lab records for each sample.

A summary of the analysis of each sub sample is contained in the tables below. Data is organised in order of Table 3, under sample name.

It should be noted that the limits of detection for PCB were above the quoted 0.47 but below Revised Action Level 1 as specified in Appendix 2 of the guidance document. PCB are reported in comparison to RAL1 of 20µg/Kg.

In the case of the leachate the graphics below list the methods used to analyse the samples for each tested parameter.

		Units :	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l	mg/l	mg/l	mg/l
		Method Codes :	ICPMSW	KONENS	KONENS	SFAPI	WSLM27	PAHMSW	ICPWATVAR	FNH3CALC	WSLM13
		Method Reporting Limits :	0.001	0.01	0.01	0.05	5		0.01	0.01	0.2
		UKAS Accredited :	Yes	Yes	Yes	Yes	No	No	No	No	No
LAB ID Number	Client Sample Description	Sample Date	Antimony as Sb (Dissolved)	Ammoniacal Nitrogen as N	Chromium VI as Cr	Phenol Index as C6H5OH	Total Dissolved Solids w	PAH GC-MS (16) o	Aluminium as Al (Dissolved) a	Ammonia (Free) as N calc a	Dissolved Organic Carbon w

		Units :	pH units	µS/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
		Method Codes :	WSLM3	WSLM2	KONENS	ISEF	ICPWATVAR	ICPWATVAR	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	
		Method Reporting Limits :	Yes	100	1	0.1	3	0.01	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.0001	0.001	
		UKAS Accredited :	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
LAB ID Number	Client Sample Description	Sample Date	pH units w	Conductivity µS/cm @ 25C w	Chloride as Cl w	Fluoride as F a	Total Sulphur as SO4 (Dissolved) a	Barium as Ba (Dissolved) a	Nickel as Ni (Dissolved)	Chromium as Cr (Dissolved)	Cadmium as Cd (Dissolved)	Copper as Cu (Dissolved)	Lead as Pb (Dissolved)	Zinc as Zn (Dissolved)	Arsenic as As (Dissolved)	Mercury as Hg (Dissolved)	Selenium as Se (Dissolved)	Molybdenum as Mo (Dissolved)

Matrix	MethodID	Analysis Basis	Method Description
Water	FNH3CALC	As Received	Calculation of Free Ammonia from Ammonium
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	ISEF	As Received	Determination of Fluoride in water samples by Ion Selective Electrode (ISE)
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	PAHMSW	As Received	Determination of PolyAromatic Hydrocarbons in water by pentane extraction GCMS quantitation
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	WSLM13	As Received	Instrumental analysis using acid/persulphate digestion and non-dispersive IR detection
Water	WSLM2	As Received	Determination of the Electrical Conductivity (µS/cm) by electrical conductivity probe.
Water	WSLM27	As Received	Gravimetric Determination
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Further details on these tests are available in the accompanying lab reports.

TABLE 4 - MARINE SCOTLAND REVISED ACTION LEVELS AGAINST DETECTED LEVELS IN VC1-2-1

Sample ID: VC1-2-1				
METALS	Action Level 1 (mg/Kg)	VC1-2-1 (mg/Kg)	Action Level 2 (mg/Kg)	VC1-2-1 (mg/Kg)
Arsenic	20	1.9	70	1.9
Cadmium	0.4	< 0.1	4	< 0.1
Chromium	50	57.3	370	57.3
Copper	30	14.5	300	14.5
Mercury	0.25	< 0.01	1.5	< 0.01
Nickel	30	19.6	150	19.6
Lead	50	17	400	17
Zinc	130	33.9	600	33.9
Dibutyltin		< 0.005		< 0.005
Tributyltin	0.1	< 0.002	0.5	< 0.002

POLYAROMATIC HYDROCARBONS	Action Level (µg/Kg)	VC1-2-1 (ng/g)
Acenaphthene	100	< 1
Acenaphthylene	100	< 1
Anthracene	100	< 1
Fluorene	100	< 1
Naphthalene	100	< 1
Phenanthrene	100	< 1
Benzo[a]anthracene	100	< 1
Benzo[b]fluoranthene	100	< 1
Benzo[k]fluoranthene	100	< 1
Benzo[a]pyrene	100	< 1
Benzo[g,h,i]perylene	100	< 1
Dibenzo[a,h]anthracene	10	< 1
Chrysene	100	< 1
Fluoranthene	100	< 1
Pyrene	100	< 1
Indeno(1,2,3cd)pyrene	100	< 1

PCB (mg/kg) AL1=0.02 AL2=0.18

PCB28	PCB52	PCB101	PCB118	PCB153	PCB138	PCB180
<0.0069	<0.0069	<0.0069	<0.0069	<0.0069	<0.0069	<0.0069

TABLE 5 – DETECTED LEVELS IN VC1-2-1 LEACHATE

Sample ID: VC1-2-1		
	Units	VC1-2-1
pH	pH Units	7.6
Conductivity	uS/cm	5820
Chloride	mg/l	1890
Fluoride	mg/l	1.1
Total Sulphur (Dissolved)	mg/l	324
Barium (Dissolved)	mg/l	0.13
Nickel (Dissolved)	mg/l	0.001
Chromium (Dissolved)	mg/l	<0.001
Cadium (Dissolved)	mg/l	<0.0001
Copper (Dissolved)	mg/l	0.011
Lead (Dissolved)	mg/l	0.003
Zinc (Dissolved)	mg/l	0.032
Arsenic (Dissolved)	mg/l	0.004
Mercury (Dissolved)	mg/l	<0.0001
Selenium (Dissolved)	mg/l	0.009
Molybdenum (Dissolved)	mg/l	0.035
Antimony as Sb (Dissolved)	mg/l	0.004
Ammoniacal Nitrogen	mg/l	13.8
Chromium VI	mg/l	<0.01
Phenol Index	mg/l	<0.05
Total Dissolved solids	mg/l	4400
Aluminium (Dissolved)	mg/l	0.04
Ammonia (Free)	mg/l	0.2
Dissolved Organic Carbon	mg/l	2.9

POLYAROMATIC HYDROCARBONS	VC1-2-1 Concentration (µg/l)
Naphthalene	<0.020
Acenaphthylene	<0.010
Acenaphthene	0.017
Fluorene	<0.010
Phenanthrene	0.012
Anthracene	<0.010
Fluoranthene	0.036
Pyrene	0.028
Benzo(a)anthracene	<0.010
Chrysene	<0.010
Benzo(b)fluoranthene	<0.010
Benzo(k)fluoranthene	<0.010
Benzo(a)pyrene	<0.010
Indeno(1,2,3-cd)pyrene	<0.010
Dibenzo(a,h)anthracene	<0.010
Benzo(g,h,i)perylene	<0.010
Total (USEPA16) PAHs	<0.223

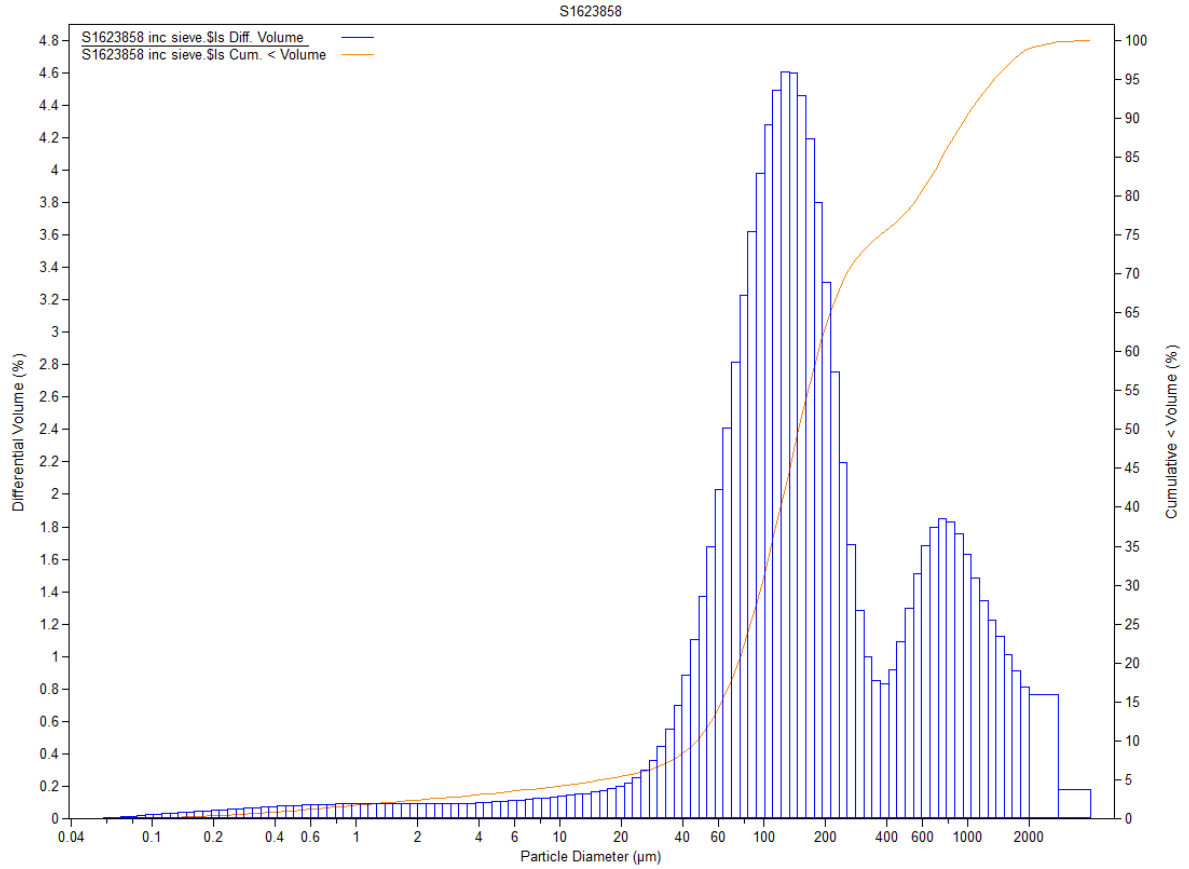


FIGURE 5 - VC1-2-1 PARTICLE SIZE ANALYSIS

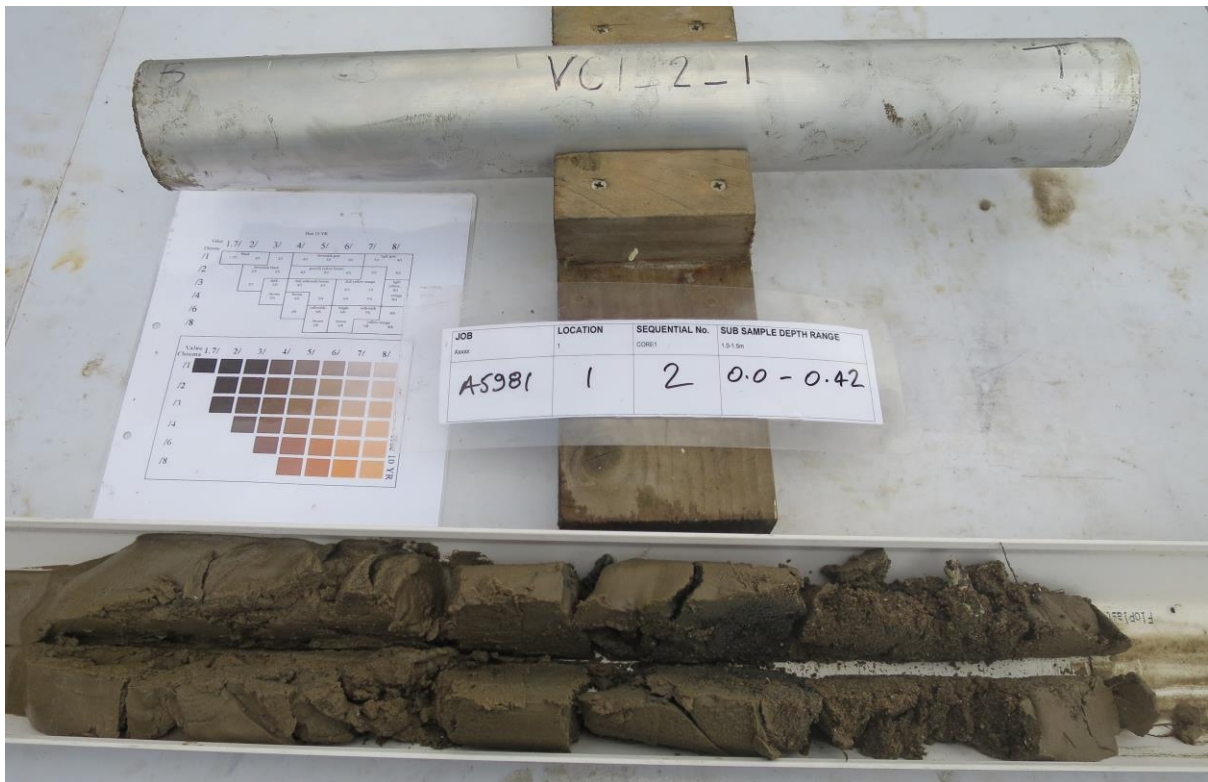


FIGURE 6 - VC1-2-1



**TABLE 6 - MARINE SCOTLAND REVISED ACTION LEVELS AGAINST DETECTED LEVELS IN VC1-2-2**

<b>METALS</b>	Action Level 1 (mg/Kg)	VC1-2-2 (mg/Kg)	Action Level 2 (mg/Kg)	VC1-2-2 (mg/Kg)
Arsenic	20	1	70	1
Cadmium	0.4	0.1	4	0.1
Chromium	50	46.4	370	46.4
Copper	30	13	300	13
Mercury	0.25	<0.01	1.5	<0.01
Nickel	30	20.7	150	20.7
Lead	50	14.6	400	14.6
Zinc	130	27.2	600	27.2
Dibutyltin		< 0.005		< 0.005
Tributyltin	0.1	< 0.002	0.5	< 0.002

<b>POLYAROMATIC HYDROCARBONS</b>	Action Level (µg/Kg)	VC1-2-2 (ng/g)
Acenaphthene	100	< 1
Acenaphthylene	100	< 1
Anthracene	100	< 1
Fluorene	100	< 1
Naphthalene	100	< 1
Phenanthrene	100	< 1
Benzo[a]anthracene	100	< 1
Benzo[b]fluoranthene	100	< 1
Benzo[k]fluoranthene	100	< 1
Benzo[a]pyrene	100	< 1
Benzo[g,h,i]perylene	100	< 1
Dibenzo[a,h]anthracene	10	< 1
Chrysene	100	< 1
Fluoranthene	100	< 1
Pyrene	100	< 1
Indeno(1,2,3cd)pyrene	100	< 1

PCB (mg/kg) AL1=0.02 AL2=0.18

<b>PCB28</b>	<b>PCB52</b>	<b>PCB101</b>	<b>PCB118</b>	<b>PCB153</b>	<b>PCB138</b>	<b>PCB180</b>
<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059

TABLE 7 – DETECTED LEVELS IN VC1-2-2 LEACHATE

Sample ID: VC1-2-2		
	Units	VC1-2-2
pH	pH Units	7.2
Conductivity	uS/cm	5600
Chloride	mg/l	1690
Fluoride	mg/l	0.6
Total Sulphur (Dissolved)	mg/l	245
Barium (Dissolved)	mg/l	0.34
Nickel (Dissolved)	mg/l	0.001
Chromium (Dissolved)	mg/l	<0.001
Cadium (Dissolved)	mg/l	<0.0001
Copper (Dissolved)	mg/l	0.004
Lead (Dissolved)	mg/l	<0.001
Zinc (Dissolved)	mg/l	0.037
Arsenic (Dissolved)	mg/l	0.006
Mercury (Dissolved)	mg/l	<0.0001
Selenium (Dissolved)	mg/l	0.011
Molybdenum (Dissolved)	mg/l	0.005
Antimony as Sb (Dissolved)	mg/l	0.003
Ammoniacal Nitrogen	mg/l	<0.01
Chromium VI	mg/l	<0.01
Phenol Index	mg/l	<0.05
Total Dissolved solids	mg/l	
Aluminium (Dissolved)	mg/l	0.03
Ammonia (Free)	mg/l	<0.01
Dissolved Organic Carbon	mg/l	4.5

POLYAROMATIC HYDROCARBONS	VC1-2-2 Concentration (ug/l)
Naphthalene	<0.020
Acenaphthylene	<0.010
Acenaphthene	<0.010
Fluorene	<0.010
Phenanthrene	0.023
Anthracene	<0.010
Fluoranthene	<0.010
Pyrene	<0.010
Benzo(a)anthracene	<0.010
Chrysene	<0.010
Benzo(b)fluoranthene	<0.010
Benzo(k)fluoranthene	<0.010
Benzo(a)pyrene	<0.010
Indeno(1,2,3-cd)pyrene	<0.010
Dibenzo(a,h)anthracene	<0.010
Benzo(g,h,i)perylene	<0.010
Total (USEPA16) PAHs	<0.183

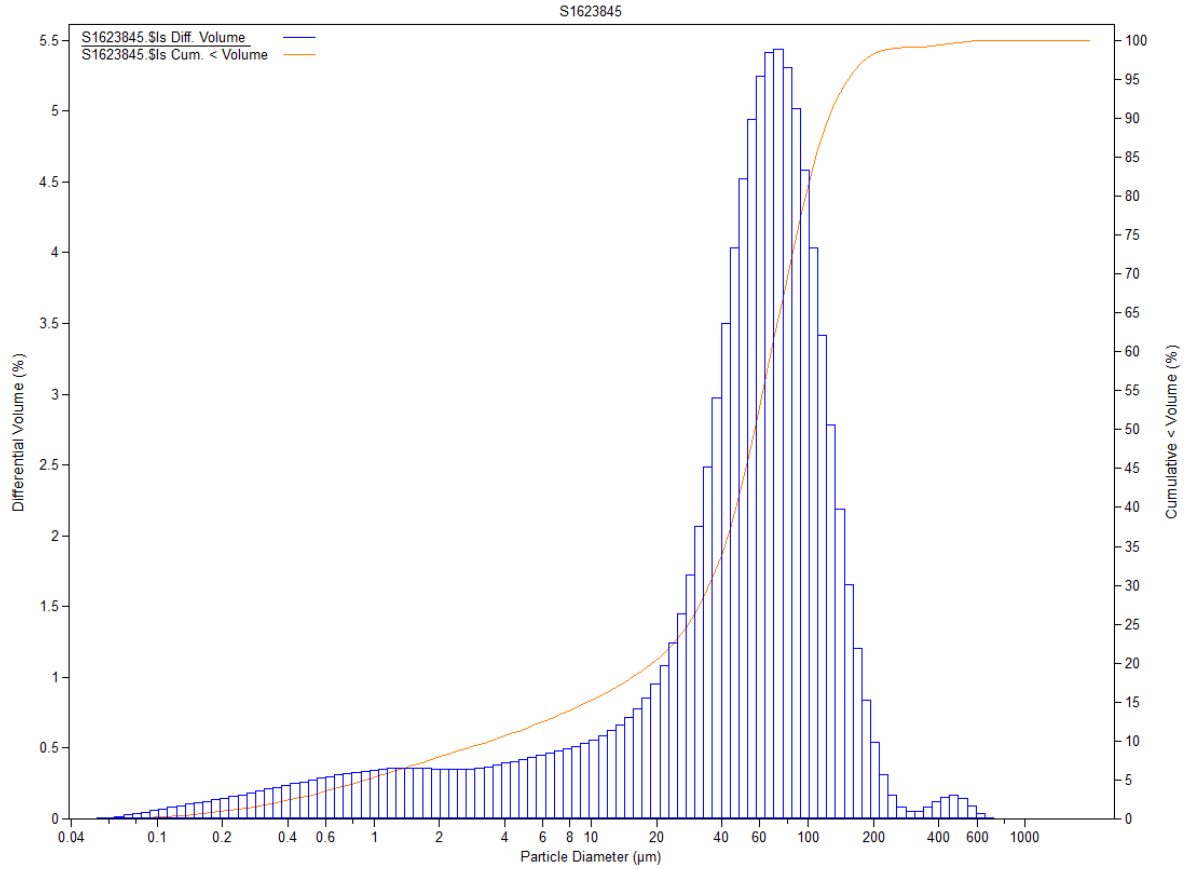


FIGURE 7 - VC1-2-2 PARTICLE SIZE ANALYSIS



FIGURE 8 - VC1-2-2

TABLE 8 - MARINE SCOTLAND REVISED ACTION LEVELS AGAINST DETECTED LEVELS IN VC2-2-1

Sample ID: VC2-2-1				
METALS	Action Level 1 (mg/Kg)	VC2-2-1 (mg/Kg)	Action Level 2 (mg/Kg)	VC2-2-1 (mg/Kg)
Arsenic	20	1.6	70	1.6
Cadmium	0.4	0.1	4	0.1
Chromium	50	50.7	370	50.7
Copper	30	13.2	300	13.2
Mercury	0.25	< 0.01	1.5	< 0.01
Nickel	30	22.1	150	22.1
Lead	50	15	400	15
Zinc	130	26.4	600	26.4
Dibutyltin		< 0.005		< 0.005
Tributyltin	0.1	< 0.002	0.5	< 0.002

POLYAROMATIC HYDROCARBONS	Action Level (µg/Kg)	VC2-2-1 (ng/g)
Acenaphthene	100	2.3
Acenaphthylene	100	< 1
Anthracene	100	1.7
Fluorene	100	1.1
Naphthalene	100	< 1
Phenanthrene	100	9.1
Benzo[a]anthracene	100	8.8
Benzo[b]fluoranthene	100	7.8
Benzo[k]fluoranthene	100	11.6
Benzo[a]pyrene	100	11.1
Benzo[g,h,i]perylene	100	6.9
Dibenzo[a,h]anthracene	10	1.3
Chrysene	100	10.3
Fluoranthene	100	23.1
Pyrene	100	17.5
Indeno(1,2,3cd)pyrene	100	9.3

PCB (mg/kg) AL1=0.02 AL2=0.18

PCB28	PCB52	PCB101	PCB118	PCB153	PCB138	PCB180
<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006

**TABLE 9 - DETECTED LEVELS IN VC2-2-1 LEACHATE**

<b>Sample ID: VC2-2-1</b>		
	Units	VC2-2-1
pH	pH Units	7.2
Conductivity	uS/cm	5130
Chloride	mg/l	1640
Fluoride	mg/l	0.5
Total Sulphur (Dissolved)	mg/l	238
Barium (Dissolved)	mg/l	0.11
Nickel (Dissolved)	mg/l	<0.001
Chromium (Dissolved)	mg/l	<0.001
Cadium (Dissolved)	mg/l	<0.0001
Copper (Dissolved)	mg/l	0.008
Lead (Dissolved)	mg/l	<0.001
Zinc (Dissolved)	mg/l	0.018
Arsenic (Dissolved)	mg/l	0.003
Mercury (Dissolved)	mg/l	<0.0001
Selenium (Dissolved)	mg/l	0.007
Molybdenum (Dissolved)	mg/l	0.009
Antimony as Sb (Dissolved)	mg/l	0.001
Ammoniacal Nitrogen	mg/l	0.2
Chromium VI	mg/l	<0.01
Phenol Index	mg/l	<0.05
Total Dissolved solids	mg/l	3900
Aluminium (Dissolved)	mg/l	0.04
Ammonia (Free)	mg/l	<0.01
Dissolved Organic Carbon	mg/l	1.1

<b>POLYAROMATIC HYDROCARBONS</b>	VC2-2-1 Concentration (µg/l)
Naphthalene	0.024
Acenaphthylene	<0.010
Acenaphthene	0.013
Fluorene	<0.010
Phenanthrene	<0.010
Anthracene	<0.010
Fluoranthene	0.014
Pyrene	0.011
Benzo(a)anthracene	<0.010
Chrysene	<0.010
Benzo(b)fluoranthene	<0.010
Benzo(k)fluoranthene	<0.010
Benzo(a)pyrene	<0.010
Indeno(1,2,3-cd)pyrene	<0.010
Dibenzo(a,h)anthracene	<0.010
Benzo(g,h,i)perylene	<0.010
Total (USEPA16) PAHs	<0.182

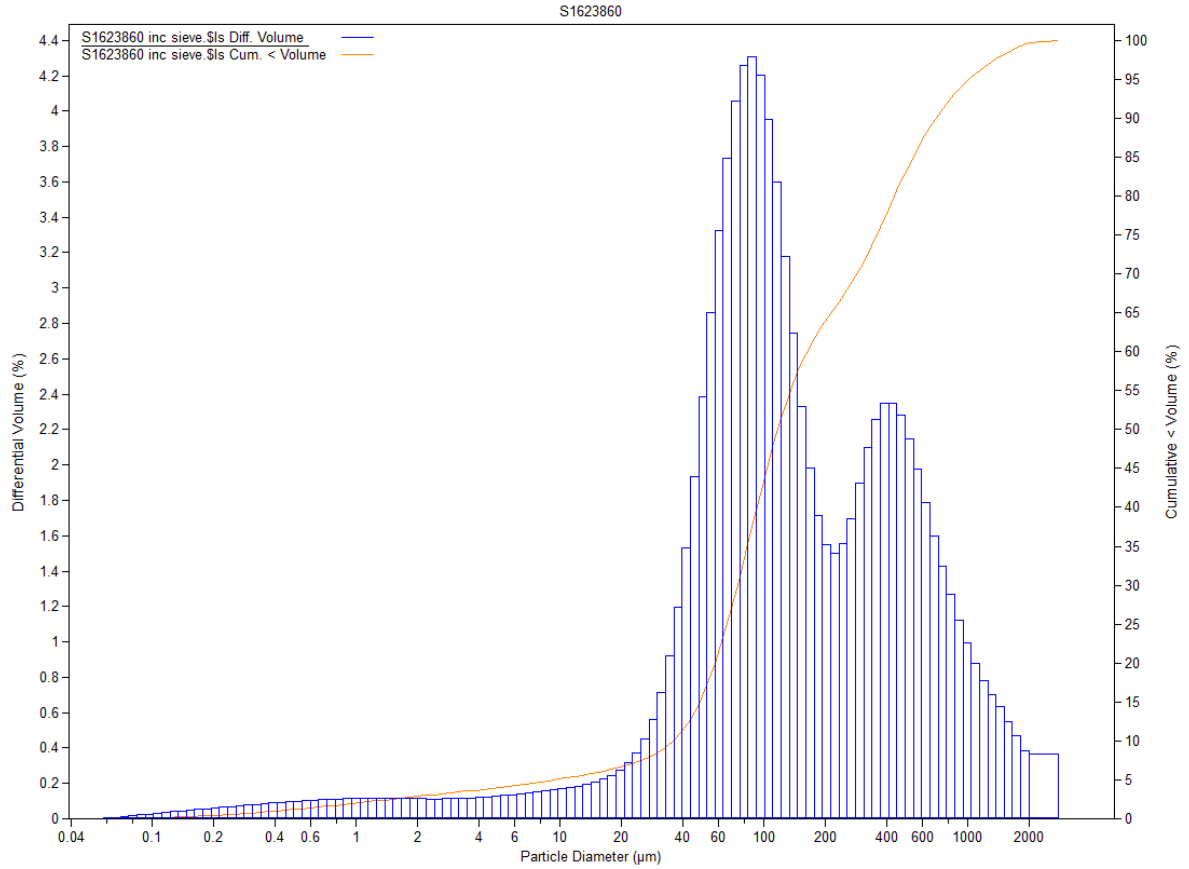


FIGURE 9 - VC2-2-1 PARTICLE SIZE ANALYSIS



FIGURE 10 - VC2-2-1

TABLE 10 - MARINE SCOTLAND REVISED ACTION LEVELS AGAINST DETECTED LEVELS IN VC2-2-2

Sample ID: VC2-2-2				
METALS	Action Level 1 (mg/Kg)	VC2-2-2 (mg/Kg)	Action Level 2 (mg/Kg)	VC2-2-2 (mg/Kg)
Arsenic	20	< 1	70	< 1
Cadmium	0.4	< 0.1	4	< 0.1
Chromium	50	36.8	370	36.8
Copper	30	13.6	300	13.6
Mercury	0.25	< 0.01	1.5	< 0.01
Nickel	30	16.2	150	16.2
Lead	50	15.9	400	15.9
Zinc	130	20.4	600	20.4
Dibutyltin		< 0.005		< 0.005
Tributyltin	0.1	< 0.002	0.5	< 0.002

POLYAROMATIC HYDROCARBONS	µg/Kg	VC2-2-2 (ng/g)
Acenaphthene	100	< 1
Acenaphthylene	100	< 1
Anthracene	100	< 1
Fluorene	100	< 1
Naphthalene	100	< 1
Phenanthrene	100	< 1
Benzo[a]anthracene	100	< 1
Benzo[b]fluoranthene	100	< 1
Benzo[k]fluoranthene	100	< 1
Benzo[a]pyrene	100	< 1
Benzo[g,h,i]perylene	100	< 1
Dibenzo[a,h]anthracene	10	< 1
Chrysene	100	< 1
Fluoranthene	100	< 1
Pyrene	100	< 1
Indeno(1,2,3cd)pyrene	100	< 1

PCB (mg/kg) AL1=0.02 AL2=0.18

PCB28	PCB52	PCB101	PCB118	PCB153	PCB138	PCB180
<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061

TABLE 11 - DETECTED LEVELS IN VC2-2-2 LEACHATE

Sample ID: VC2-2-2		
	Units	VC2-2-2
pH	pH Units	6.8
Conductivity	uS/cm	5800
Chloride	mg/l	1940
Fluoride	mg/l	0.6
Total Sulphur (Dissolved)	mg/l	261
Barium (Dissolved)	mg/l	0.09
Nickel (Dissolved)	mg/l	<0.001
Chromium (Dissolved)	mg/l	<0.001
Cadium (Dissolved)	mg/l	<0.0001
Copper (Dissolved)	mg/l	0.001
Lead (Dissolved)	mg/l	0.001
Zinc (Dissolved)	mg/l	0.044
Arsenic (Dissolved)	mg/l	0.001
Mercury (Dissolved)	mg/l	<0.0001
Selenium (Dissolved)	mg/l	0.007
Molybdenum (Dissolved)	mg/l	0.005
Antimony as Sb (Dissolved)	mg/l	<0.001
Ammoniacal Nitrogen	mg/l	<0.01
Chromium VI	mg/l	<0.01
Phenol Index	mg/l	<0.05
Total Dissolved solids	mg/l	44600
Aluminium (Dissolved)	mg/l	0.05
Ammonia (Free)	mg/l	<0.01
Dissolved Organic Carbon	mg/l	1.6

POLYAROMATIC HYDROCARBONS	VC2-2-2 Concentration (µg/l)
Naphthalene	0.021
Acenaphthylene	<0.010
Acenaphthene	<0.010
Fluorene	<0.010
Phenanthrene	0.013
Anthracene	<0.010
Fluoranthene	<0.010
Pyrene	<0.010
Benzo(a)anthracene	<0.010
Chrysene	<0.010
Benzo(b)fluoranthene	<0.010
Benzo(k)fluoranthene	<0.010
Benzo(a)pyrene	<0.010
Indeno(1,2,3-cd)pyrene	<0.010
Dibenzo(a,h)anthracene	<0.010
Benzo(g,h,i)perylene	<0.010
Total (USEPA16) PAHs	<0.174



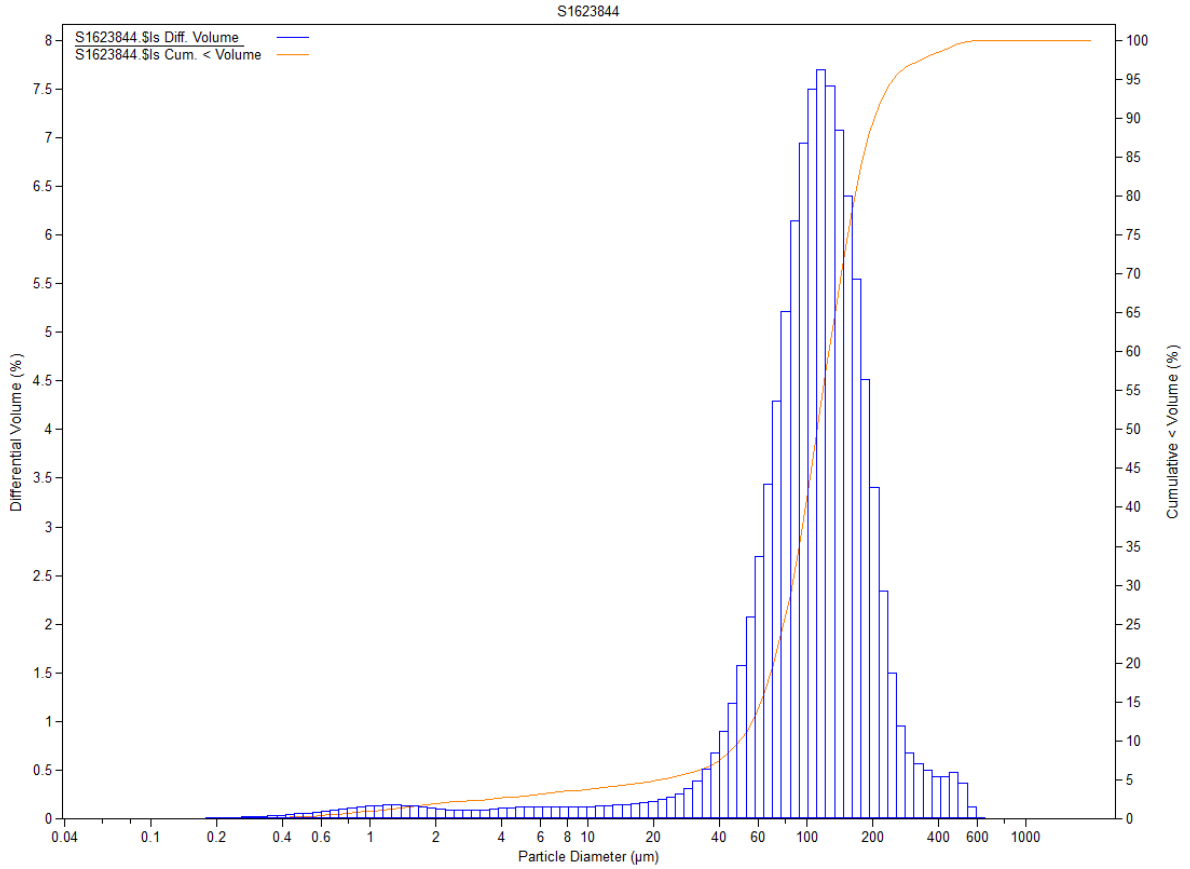


FIGURE 11 - VC2-2-2 PARTICLE SIZE ANALYSIS



FIGURE 12 - VC2-2-2

TABLE 12 - MARINE SCOTLAND REVISED ACTION LEVELS AGAINST DETECTED LEVELS IN VC3-2-1

Sample ID: VC3-2-1				
METALS	Action Level 1 (mg/Kg)	VC3-2-1 (mg/Kg)	Action Level 2 (mg/Kg)	VC3-2-1 (mg/Kg)
Arsenic	20	< 1	70	< 1
Cadmium	0.4	< 0.1	4	< 0.1
Chromium	50	43.7	370	43.7
Copper	30	19.3	300	19.3
Mercury	0.25	< 0.01	1.5	< 0.01
Nickel	30	18.6	150	18.6
Lead	50	12.1	400	12.1
Zinc	130	22.8	600	22.8
Dibutyltin		< 0.005		< 0.005
Tributyltin	0.1	< 0.002	0.5	< 0.002

POLYAROMATIC HYDROCARBONS	Action Level (µg/Kg)	VC3-2-1 (ng/g)
Acenaphthene	100	< 1
Acenaphthylene	100	< 1
Anthracene	100	< 1
Fluorene	100	< 1
Naphthalene	100	< 1
Phenanthrene	100	< 1
Benzo[a]anthracene	100	< 1
Benzo[b]fluoranthene	100	< 1
Benzo[k]fluoranthene	100	< 1
Benzo[a]pyrene	100	< 1
Benzo[g,h,i]perylene	100	< 1
Dibenzo[a,h]anthracene	10	< 1
Chrysene	100	< 1
Fluoranthene	100	< 1
Pyrene	100	< 1
Indeno(1,2,3cd)pyrene	100	< 1

PCB (mg/kg) AL1=0.02 AL2=0.18

PCB28	PCB52	PCB101	PCB118	PCB153	PCB138	PCB180
<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006

TABLE 13 - DETECTED LEVELS IN VC3-2-1 LEACHATE

Sample ID: VC3-2-1		
	Units	VC3-2-1
pH	pH Units	7
Conductivity	uS/cm	5690
Chloride	mg/l	1860
Fluoride	mg/l	0.8
Total Sulphur (Dissolved)	mg/l	300
Barium (Dissolved)	mg/l	0.18
Nickel (Dissolved)	mg/l	<0.001
Chromium (Dissolved)	mg/l	<0.001
Cadium (Dissolved)	mg/l	0.0007
Copper (Dissolved)	mg/l	0.004
Lead (Dissolved)	mg/l	<0.001
Zinc (Dissolved)	mg/l	0.037
Arsenic (Dissolved)	mg/l	0.002
Mercury (Dissolved)	mg/l	<0.0001
Selenium (Dissolved)	mg/l	0.008
Molybdenum (Dissolved)	mg/l	0.017
Antimony as Sb (Dissolved)	mg/l	0.002
Ammoniacal Nitrogen	mg/l	<0.01
Chromium VI	mg/l	<0.01
Phenol Index	mg/l	<0.05
Total Dissolved solids	mg/l	4500
Aluminium (Dissolved)	mg/l	0.04
Ammonia (Free)	mg/l	<0.01
Dissolved Organic Carbon	mg/l	2.1

POLYAROMATIC HYDROCARBONS	VC3-2-1 Concentration (µg/l)
Naphthalene	<0.020
Acenaphthylene	<0.010
Acenaphthene	<0.010
Fluorene	<0.010
Phenanthrene	<0.010
Anthracene	<0.010
Fluoranthene	0.019
Pyrene	0.012
Benzo(a)anthracene	<0.010
Chrysene	<0.010
Benzo(b)fluoranthene	<0.010
Benzo(k)fluoranthene	<0.010
Benzo(a)pyrene	<0.010
Indeno(1,2,3-cd)pyrene	<0.010
Dibenzo(a,h)anthracene	<0.010
Benzo(g,h,i)perylene	<0.010
Total (USEPA16) PAHs	<0.181

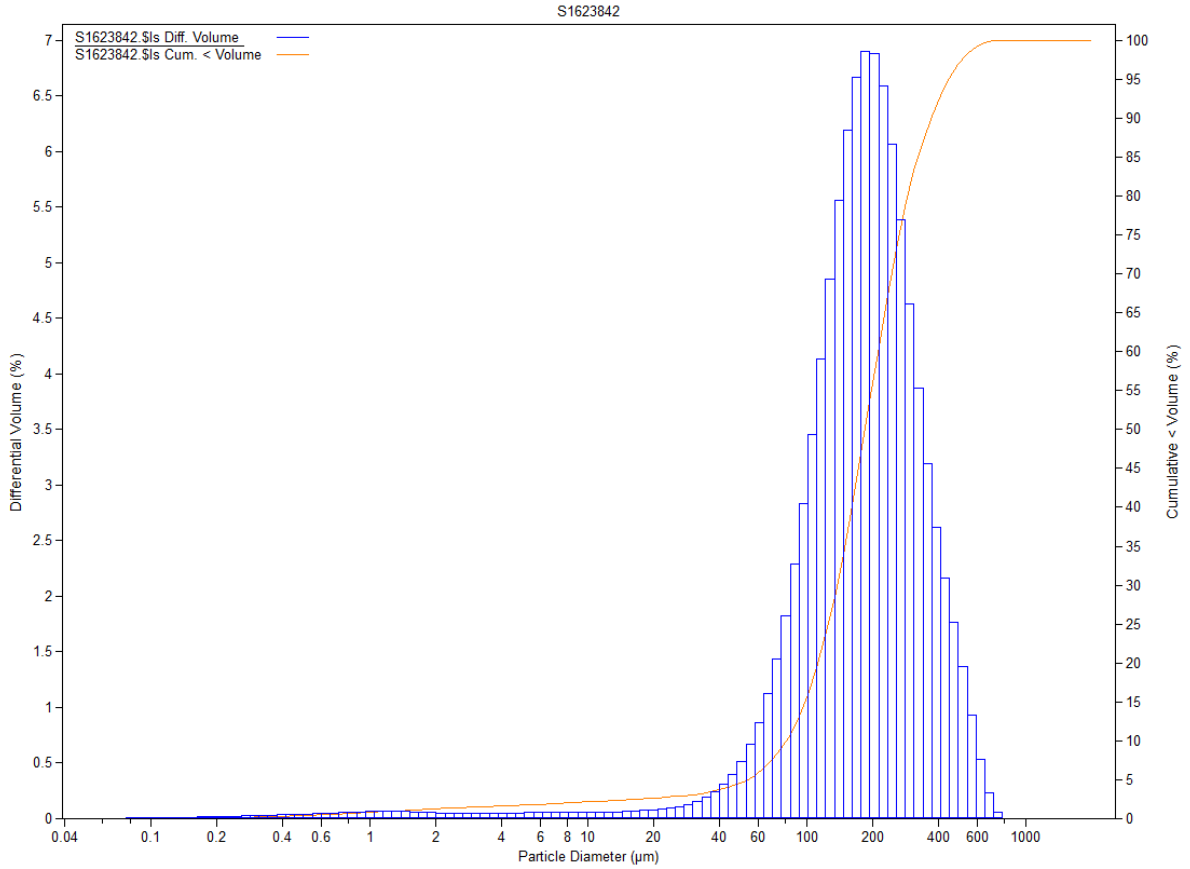


FIGURE 13 - VC3-2-1 PARTICLE SIZE ANALYSIS

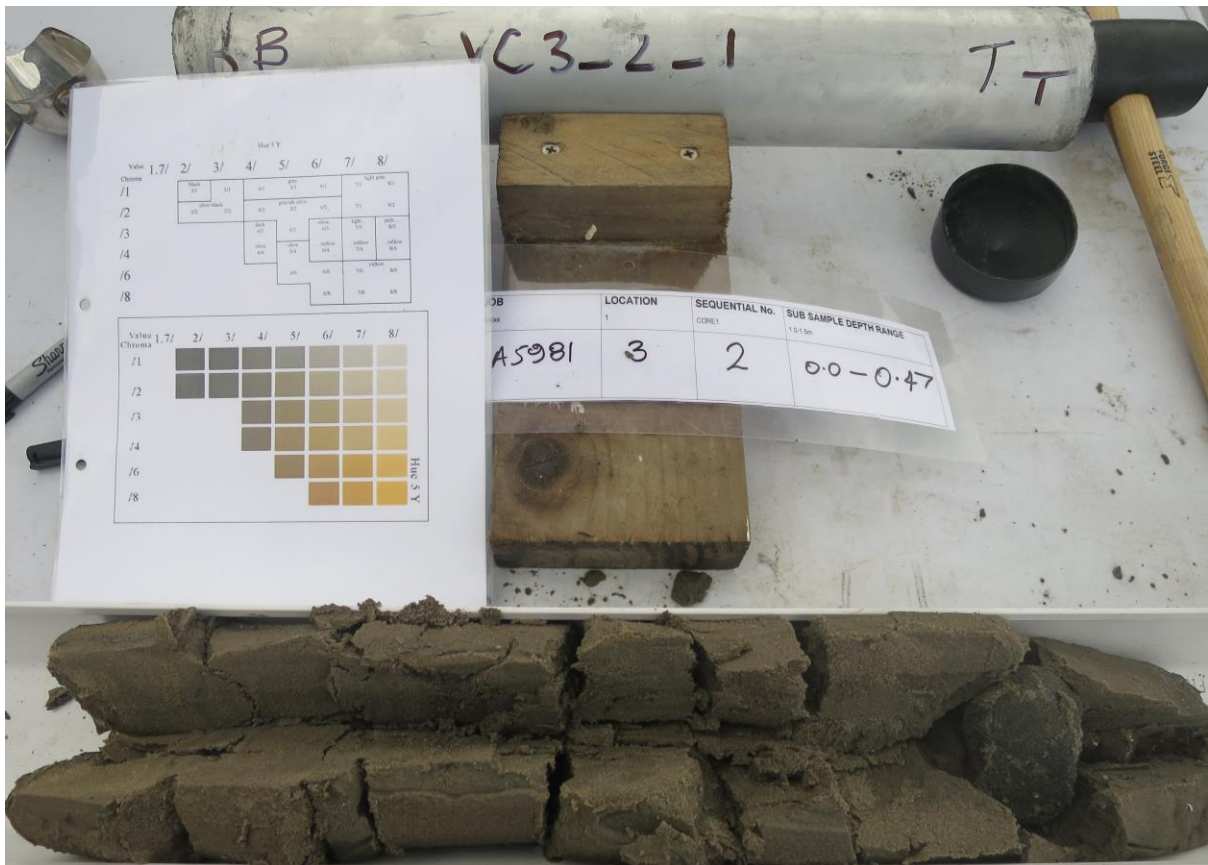


FIGURE 14 - VC3-2-1

TABLE 14 - MARINE SCOTLAND REVISED ACTION LEVELS AGAINST DETECTED LEVELS IN VC3-2-2

Sample ID: VC3-2-2				
METALS	Action Level 1 (mg/Kg)	VC3-2-2 (mg/Kg)	Action Level 2 (mg/Kg)	VC3-2-2 (mg/Kg)
Arsenic	20	< 1	70	< 1
Cadmium	0.4	< 0.2	4	< 0.2
Chromium	50	38.3	370	38.3
Copper	30	14	300	14
Mercury	0.25	< 0.01	1.5	< 0.01
Nickel	30	17.1	150	17.1
Lead	50	13.5	400	13.5
Zinc	130	18.5	600	18.5
Dibutyltin		< 0.005		< 0.005
Tributyltin	0.1	< 0.002	0.5	< 0.002

POLYAROMATIC HYDROCARBONS	Action Level (µg/Kg)	VC3-2-2 (ng/g)
Acenaphthene	100	< 1
Acenaphthylene	100	< 1
Anthracene	100	< 1
Fluorene	100	< 1
Naphthalene	100	< 1
Phenanthrene	100	< 1
Benzo[a]anthracene	100	< 1
Benzo[b]fluoranthene	100	< 1
Benzo[k]fluoranthene	100	< 1
Benzo[a]pyrene	100	< 1
Benzo[g,h,i]perylene	100	< 1
Dibenzo[a,h]anthracene	10	< 1
Chrysene	100	< 1
Fluoranthene	100	< 1
Pyrene	100	< 1
Indeno(1,2,3cd)pyrene	100	< 1

PCB (mg/kg) AL1=0.02 AL2=0.18

PCB28	PCB52	PCB101	PCB118	PCB153	PCB138	PCB180
<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006

TABLE 15 - DETECTED LEVELS IN VC3-2-2 LEACHATE

Sample ID: VC3-2-2		
	Units	VC3-2-2
pH	pH Units	6.9
Conductivity	uS/cm	6180
Chloride	mg/l	1960
Fluoride	mg/l	2.4
Total Sulphur (Dissolved)	mg/l	266
Barium (Dissolved)	mg/l	0.12
Nickel (Dissolved)	mg/l	<0.001
Chromium (Dissolved)	mg/l	<0.001
Cadium (Dissolved)	mg/l	<0.0001
Copper (Dissolved)	mg/l	0.002
Lead (Dissolved)	mg/l	0.003
Zinc (Dissolved)	mg/l	0.041
Arsenic (Dissolved)	mg/l	0.001
Mercury (Dissolved)	mg/l	<0.0001
Selenium (Dissolved)	mg/l	0.007
Molybdenum (Dissolved)	mg/l	0.006
Antimony as Sb (Dissolved)	mg/l	<0.001
Ammoniacal Nitrogen	mg/l	<0.01
Chromium VI	mg/l	<0.01
Phenol Index	mg/l	<0.05
Total Dissolved solids	mg/l	4700
Aluminium (Dissolved)	mg/l	0.06
Ammonia (Free)	mg/l	<0.01
Dissolved Organic Carbon	mg/l	2

POLYAROMATIC HYDROCARBONS	VC3-2-2 Concentration (µg/l)
Naphthalene	0.024
Acenaphthylene	<0.010
Acenaphthene	0.015
Fluorene	<0.010
Phenanthrene	0.063
Anthracene	0.021
Fluoranthene	0.04
Pyrene	0.033
Benzo(a)anthracene	<0.010
Chrysene	<0.010
Benzo(b)fluoranthene	<0.010
Benzo(k)fluoranthene	<0.010
Benzo(a)pyrene	<0.010
Indeno(1,2,3-cd)pyrene	<0.010
Dibenzo(a,h)anthracene	<0.010
Benzo(g,h,i)perylene	<0.010
Total (USEPA16) PAHs	<0.296

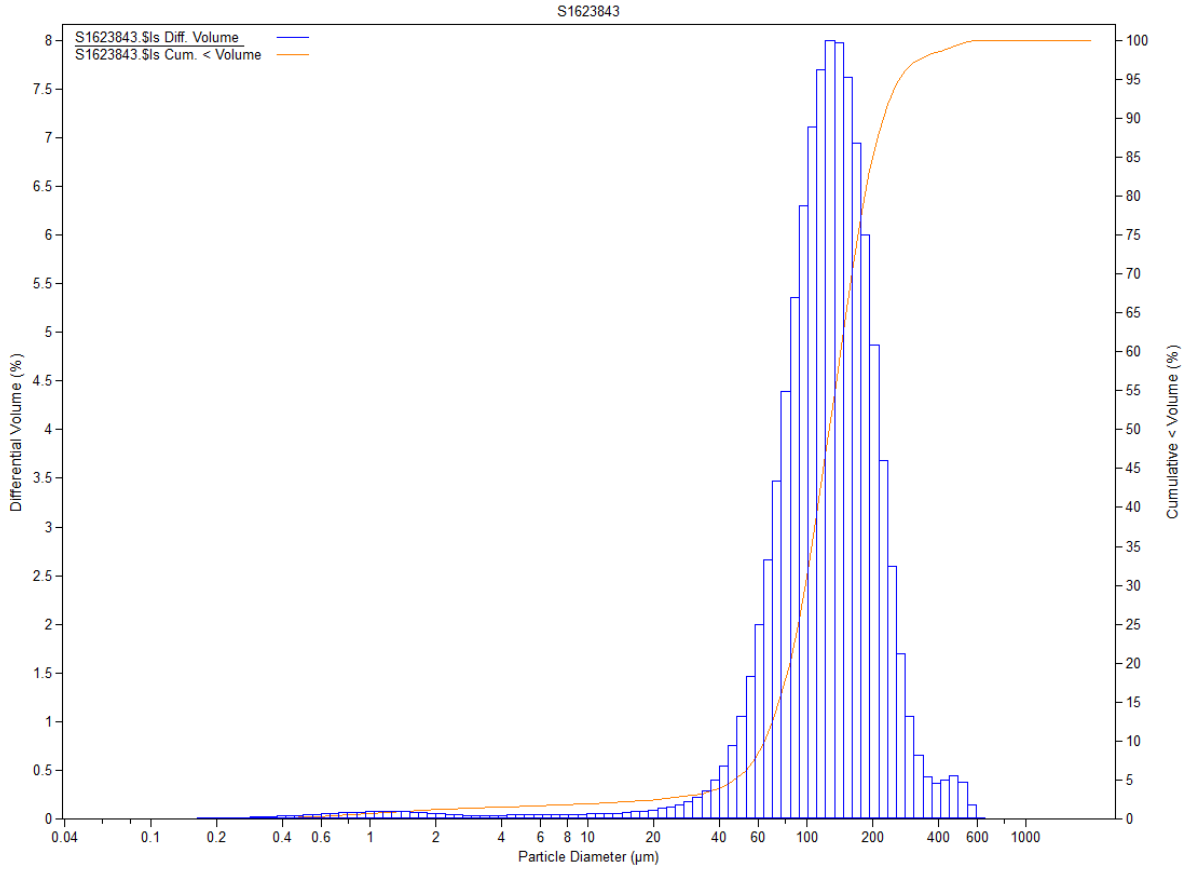


FIGURE 15 - VC3-3-2 PARTICLE SIZE ANALYSIS



FIGURE 16 - VC3-2-2

TABLE 16 - MARINE SCOTLAND REVISED ACTION LEVELS AGAINST DETECTED LEVELS IN GRVC4

Sample ID: GRVC4				
METALS	Action Level 1 (mg/Kg)	GRVC4 (mg/Kg)	Action Level 2 (mg/Kg)	GRVC4 (mg/Kg)
Arsenic	20	3.3	70	3.3
Cadmium	0.4	< 0.1	4	< 0.1
Chromium	50	36.5	370	36.5
Copper	30	10.1	300	10.1
Mercury	0.25	< 0.01	1.5	< 0.01
Nickel	30	13.7	150	13.7
Lead	50	15.7	400	15.7
Zinc	130	29.4	600	29.4
Dibutyltin		< 0.005		< 0.005
Tributyltin	0.1	< 0.002	0.5	< 0.002

POLYAROMATIC HYDROCARBONS	Action Level (µg/Kg)	GRVC4 (ng/g)
Acenaphthene	100	< 1
Acenaphthylene	100	< 1
Anthracene	100	< 1
Fluorene	100	< 1
Naphthalene	100	< 1
Phenanthrene	100	< 1
Benzo[a]anthracene	100	< 1
Benzo[b]fluoranthene	100	< 1
Benzo[k]fluoranthene	100	< 1
Benzo[a]pyrene	100	< 1
Benzo[g,h,i]perylene	100	< 1
Dibenzo[a,h]anthracene	10	< 1
Chrysene	100	< 1
Fluoranthene	100	< 1
Pyrene	100	< 1
Indeno(1,2,3cd)pyrene	100	< 1

PCB (mg/kg) AL1=0.02 AL2=0.18

PCB28	PCB52	PCB101	PCB118	PCB153	PCB138	PCB180
<0.0067	<0.0067	<0.0067	<0.0067	<0.0067	<0.0067	<0.0067



TABLE 17 - DETECTED LEVELS IN GRVC4 LEACHATE

Sample ID: GRVC4		
	Units	GRVC4
pH	pH Units	8
Conductivity	uS/cm	7450
Chloride	mg/l	2790
Fluoride	mg/l	0.9
Total Sulphur (Dissolved)	mg/l	176
Barium (Dissolved)	mg/l	0.21
Nickel (Dissolved)	mg/l	0.003
Chromium (Dissolved)	mg/l	<0.001
Cadium (Dissolved)	mg/l	<0.0001
Copper (Dissolved)	mg/l	0.009
Lead (Dissolved)	mg/l	0.002
Zinc (Dissolved)	mg/l	0.051
Arsenic (Dissolved)	mg/l	0.144
Mercury (Dissolved)	mg/l	<0.0001
Selenium (Dissolved)	mg/l	0.014
Molybdenum (Dissolved)	mg/l	0.012
Antimony as Sb (Dissolved)	mg/l	0.002
Ammoniacal Nitrogen	mg/l	15.3
Chromium VI	mg/l	<0.01
Phenol Index	mg/l	<0.05
Total Dissolved solids	mg/l	4900
Aluminium (Dissolved)	mg/l	0.03
Ammonia (Free)	mg/l	0.55
Dissolved Organic Carbon	mg/l	18

POLYAROMATIC HYDROCARBONS	GRVC4 Concentration (µg/l)
Naphthalene	<0.020
Acenaphthylene	<0.010
Acenaphthene	0.015
Fluorene	<0.010
Phenanthrene	0.062
Anthracene	0.01
Fluoranthene	0.046
Pyrene	0.027
Benzo(a)anthracene	<0.010
Chrysene	<0.010
Benzo(b)fluoranthene	<0.010
Benzo(k)fluoranthene	<0.010
Benzo(a)pyrene	<0.010
Indeno(1,2,3-cd)pyrene	<0.010
Dibenzo(a,h)anthracene	<0.010
Benzo(g,h,i)perylene	<0.010
Total (USEPA16) PAHs	<0.280

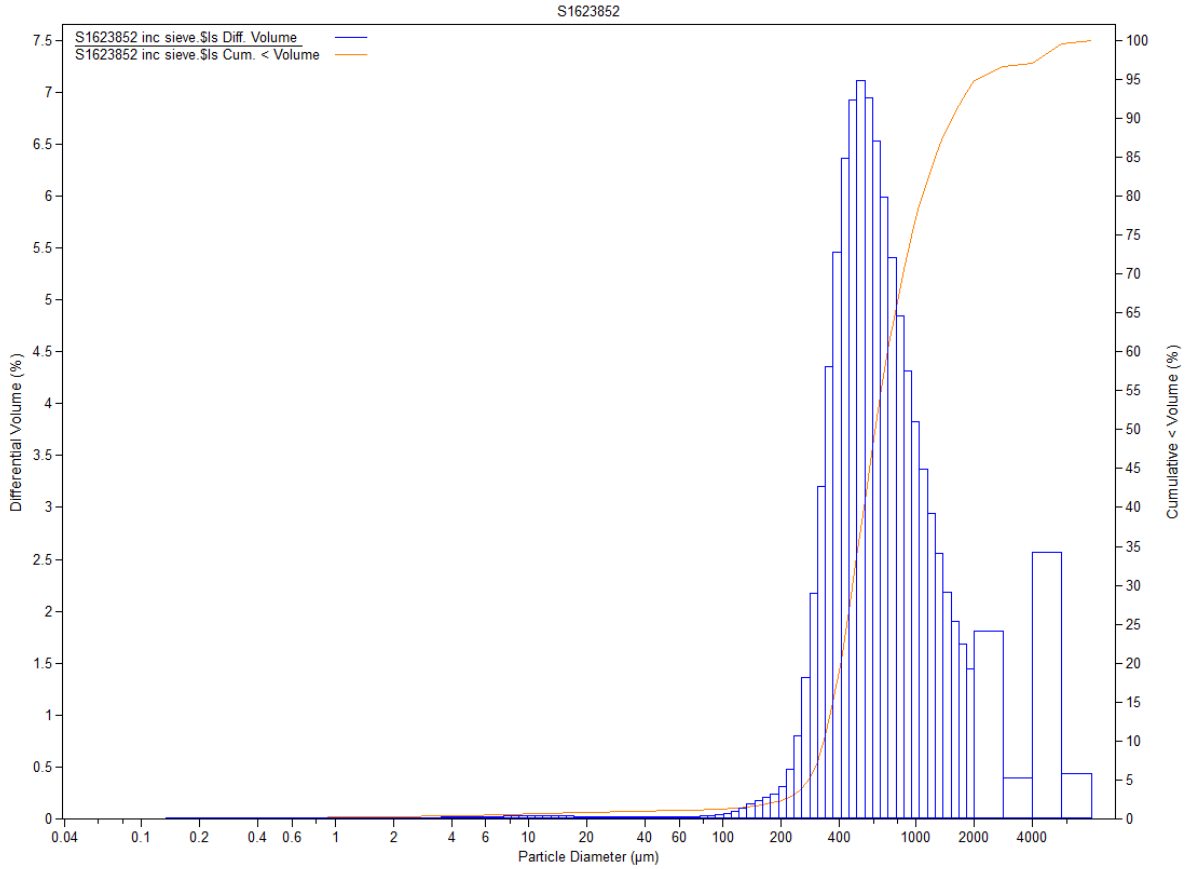


FIGURE 17 - GRVC4 PARTICLE SIZE ANALYSIS

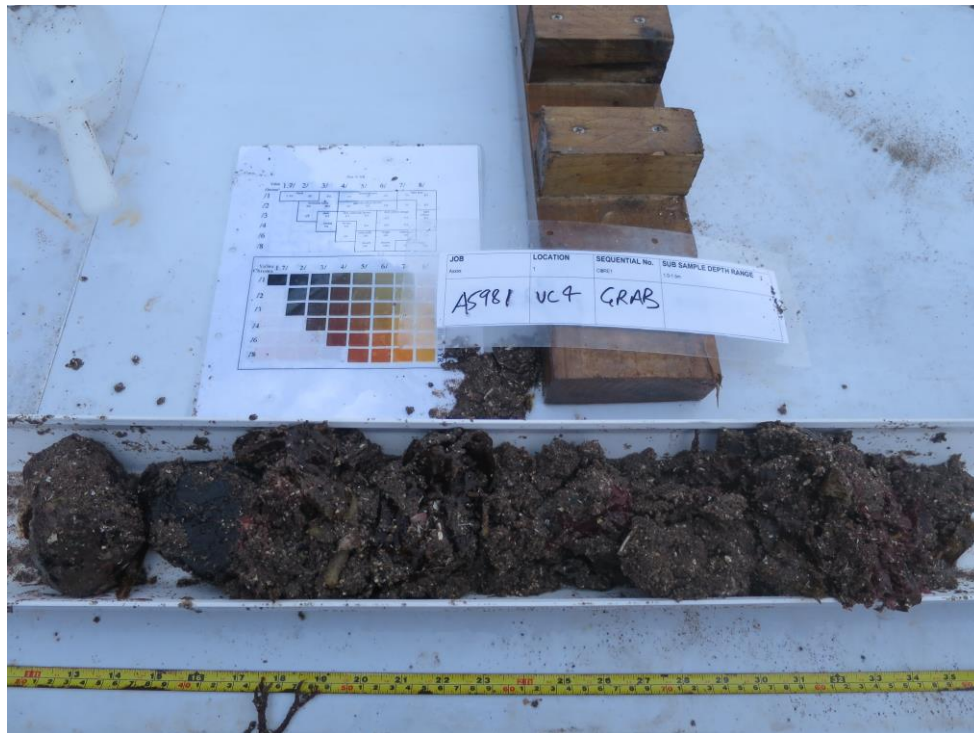


FIGURE 18 - VC4 GRAB SAMPLE

**TABLE 18 - MARINE SCOTLAND REVISED ACTION LEVELS AGAINST DETECTED LEVELS IN VC5-2-1**

<b>Sample ID: VC5-2-1</b>				
<b>METALS</b>	<b>Action Level 1 (mg/Kg)</b>	<b>VC5-2-1 (mg/Kg)</b>	<b>Action Level 2 (mg/Kg)</b>	<b>VC5-2-1 (mg/Kg)</b>
Arsenic	20	1.6	70	1.6
Cadmium	0.4	0.1	4	0.1
Chromium	50	41.9	370	41.9
Copper	30	14	300	14
Mercury	0.25	< 0.01	1.5	< 0.01
Nickel	30	15.8	150	15.8
Lead	50	12	400	12
Zinc	130	25	600	25
Dibutyltin		< 0.005		< 0.005
Tributyltin	0.1	< 0.002	0.5	< 0.002

<b>POLYAROMATIC HYDROCARBONS</b>	<b>Action Level (µg/Kg)</b>	<b>VC5-2-1 (ng/g)</b>
Acenaphthene	100	< 1
Acenaphthylene	100	< 1
Anthracene	100	< 1
Fluorene	100	< 1
Naphthalene	100	< 1
Phenanthrene	100	< 1
Benzo[a]anthracene	100	< 1
Benzo[b]fluoranthene	100	< 1
Benzo[k]fluoranthene	100	< 1
Benzo[a]pyrene	100	< 1
Benzo[g,h,i]perylene	100	< 1
Dibenzo[a,h]anthracene	10	< 1
Chrysene	100	< 1
Fluoranthene	100	< 1
Pyrene	100	< 1
Indeno(1,2,3cd)pyrene	100	< 1

**PCB (mg/kg) AL1=0.02 AL2=0.18**

<b>PCB28</b>	<b>PCB52</b>	<b>PCB101</b>	<b>PCB118</b>	<b>PCB153</b>	<b>PCB138</b>	<b>PCB180</b>
<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006

TABLE 19 DETECTED LEVELS IN VC5-2-1 LEACHATE

Sample ID VC5-2-1		
	Units	VC5-2-1
pH	pH Units	7.1
Conductivity	uS/cm	6400
Chloride	mg/l	2000
Fluoride	mg/l	0.5
Total Sulphur (Dissolved)	mg/l	292
Barium (Dissolved)	mg/l	0.11
Nickel (Dissolved)	mg/l	<0.001
Chromium (Dissolved)	mg/l	<0.001
Cadium (Dissolved)	mg/l	<0.0001
Copper (Dissolved)	mg/l	0.005
Lead (Dissolved)	mg/l	0.001
Zinc (Dissolved)	mg/l	0.026
Arsenic (Dissolved)	mg/l	0.002
Mercury (Dissolved)	mg/l	<0.0001
Selenium (Dissolved)	mg/l	0.007
Molybdenum (Dissolved)	mg/l	0.006
Antimony as Sb (Dissolved)	mg/l	0.001
Ammoniacal Nitrogen	mg/l	<0.01
Chromium VI	mg/l	<0.01
Phenol Index	mg/l	<0.05
Total Dissolved solids	mg/l	4700
Aluminium (Dissolved)	mg/l	0.02
Ammonia (Free)	mg/l	<0.01
Dissolved Organic Carbon	mg/l	0.3

POLYAROMATIC HYDROCARBONS	VC5-2-1 Concentration ( $\mu\text{g/l}$ )
Naphthalene	<0.020
Acenaphthylene	<0.010
Acenaphthene	<0.010
Fluorene	<0.010
Phenanthrene	0.016
Anthracene	<0.010
Fluoranthene	<0.010
Pyrene	<0.010
Benzo(a)anthracene	<0.010
Chrysene	<0.010
Benzo(b)fluoranthene	<0.010
Benzo(k)fluoranthene	<0.010
Benzo(a)pyrene	<0.010
Indeno(1,2,3-cd)pyrene	<0.010
Dibenzo(a,h)anthracene	<0.010
Benzo(g,h,i)perylene	<0.010
Total (USEPA16) PAHs	<0.176

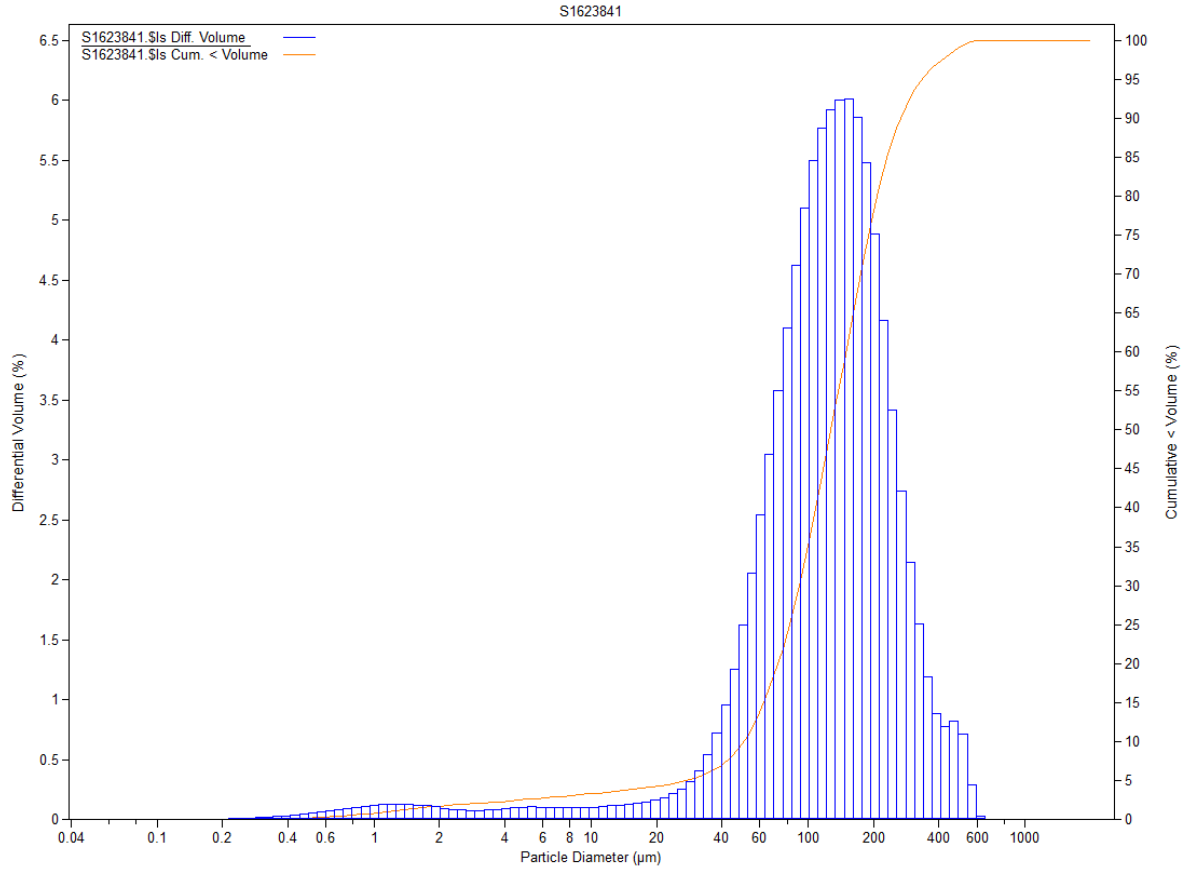


FIGURE 19 - VC5-2-1 PARTICLE SIZE ANALYSIS

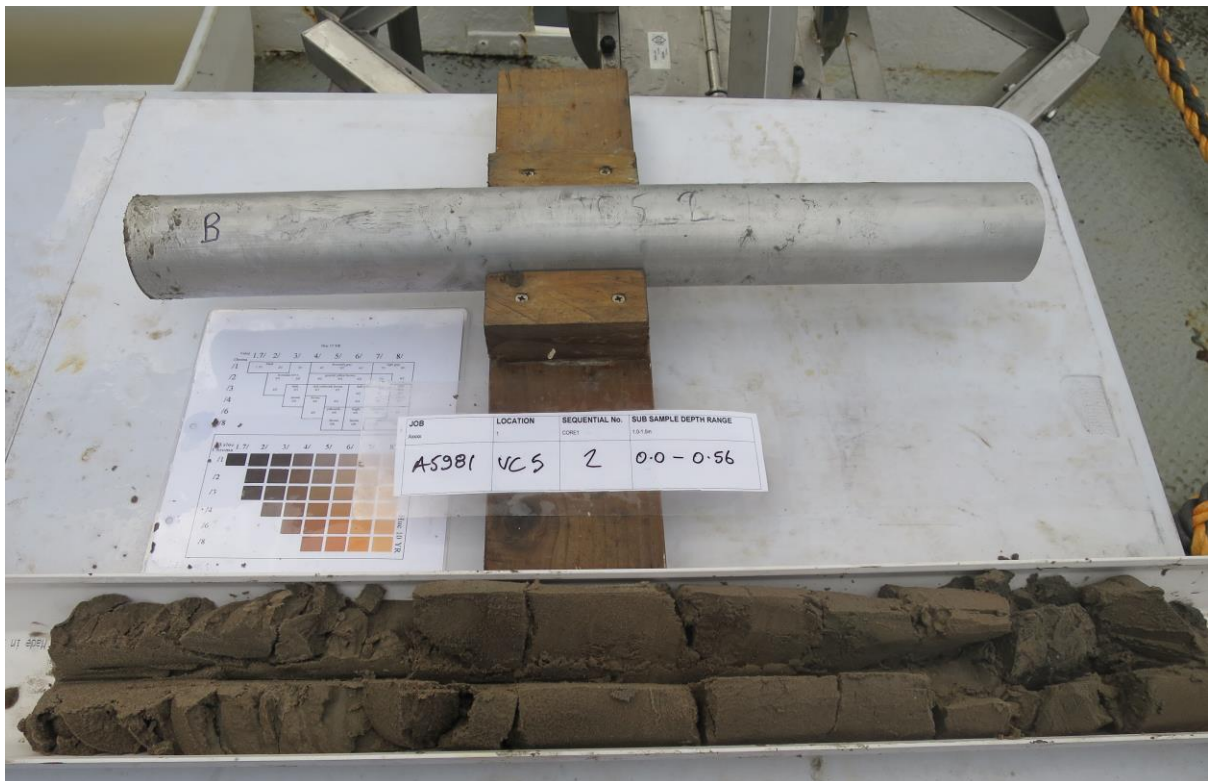


FIGURE 20 - VC5-2-1

**TABLE 20 - MARINE SCOTLAND REVISED ACTION LEVELS AGAINST DETECTED LEVELS IN VC5-2-2**

<b>Sample ID: VC5-2-2</b>				
<b>METALS</b>	<b>Action Level 1 (mg/Kg)</b>	<b>VC5-2-2 (mg/Kg)</b>	<b>Action Level 2 (mg/Kg)</b>	<b>VC5-2-2 (mg/Kg)</b>
Arsenic	20	< 1	70	< 1
Cadmium	0.4	0.1	4	0.1
Chromium	50	44.2	370	44.2
Copper	30	17.8	300	17.8
Mercury	0.25	< 0.01	1.5	< 0.01
Nickel	30	16.4	150	16.4
Lead	50	19.2	400	19.2
Zinc	130	24.3	600	24.3
Dibutyltin		< 0.005		< 0.005
Tributyltin	0.1	< 0.002	0.5	< 0.002

<b>POLYAROMATIC HYDROCARBONS</b>	<b>Action Level (µg/Kg)</b>	<b>VC5-2-2 (ng/g)</b>
Acenaphthene	100	< 1
Acenaphthylene	100	< 1
Anthracene	100	< 1
Fluorene	100	< 1
Naphthalene	100	< 1
Phenanthrene	100	< 1
Benzo[a]anthracene	100	< 1
Benzo[b]fluoranthene	100	< 1
Benzo[k]fluoranthene	100	< 1
Benzo[a]pyrene	100	< 1
Benzo[g,h,i]perylene	100	< 1
Dibenzo[a,h]anthracene	10	< 1
Chrysene	100	< 1
Fluoranthene	100	< 1
Pyrene	100	< 1
Indeno(1,2,3cd)pyrene	100	< 1

**PCB (mg/kg) AL1=0.02 AL2=0.18**

<b>PCB28</b>	<b>PCB52</b>	<b>PCB101</b>	<b>PCB118</b>	<b>PCB153</b>	<b>PCB138</b>	<b>PCB180</b>
<0.0069	<0.0069	<0.0069	<0.0069	<0.0069	<0.0069	<0.0069

TABLE 21 - DETECTED LEVELS IN VC5-2-2 LEACHATE

Sample ID: VC5-2-2		
	Units	VC5-2-2
pH	pH Units	7.2
Conductivity	uS/cm	6260
Chloride	mg/l	1980
Fluoride	mg/l	0.4
Total Sulphur (Dissolved)	mg/l	262
Barium (Dissolved)	mg/l	0.14
Nickel (Dissolved)	mg/l	<0.001
Chromium (Dissolved)	mg/l	<0.001
Cadium (Dissolved)	mg/l	<0.0001
Copper (Dissolved)	mg/l	0.003
Lead (Dissolved)	mg/l	<0.001
Zinc (Dissolved)	mg/l	0.025
Arsenic (Dissolved)	mg/l	0.003
Mercury (Dissolved)	mg/l	<0.0001
Selenium (Dissolved)	mg/l	0.009
Molybdenum (Dissolved)	mg/l	0.003
Antimony as Sb (Dissolved)	mg/l	<0.001
Ammoniacal Nitrogen	mg/l	<0.01
Chromium VI	mg/l	<0.01
Phenol Index	mg/l	<0.05
Total Dissolved solids	mg/l	4600
Aluminium (Dissolved)	mg/l	0.06
Ammonia (Free)	mg/l	<0.01
Dissolved Organic Carbon	mg/l	1.5

POLYAROMATIC HYDROCARBONS	VC5-2-2 Concentration (µg/l)
Naphthalene	0.029
Acenaphthylene	<0.010
Acenaphthene	0.014
Fluorene	<0.010
Phenanthrene	0.023
Anthracene	<0.010
Fluoranthene	<0.010
Pyrene	<0.010
Benzo(a)anthracene	<0.010
Chrysene	<0.010
Benzo(b)fluoranthene	<0.010
Benzo(k)fluoranthene	<0.010
Benzo(a)pyrene	<0.010
Indeno(1,2,3-cd)pyrene	<0.010
Dibenzo(a,h)anthracene	<0.010
Benzo(g,h,i)perylene	<0.010
Total (USEPA16) PAHs	<0.196

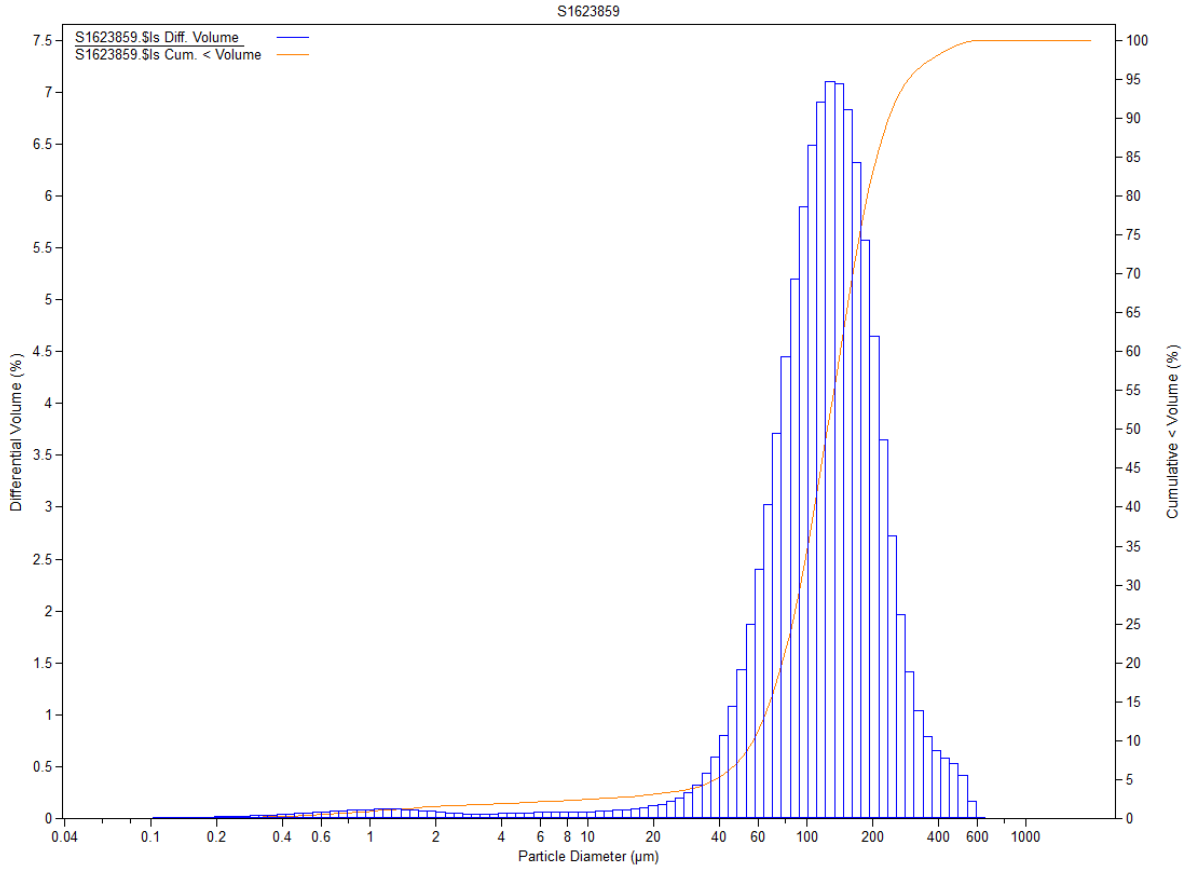


FIGURE 21 - VC5-2-2 PARTICLE SIZE ANALYSIS

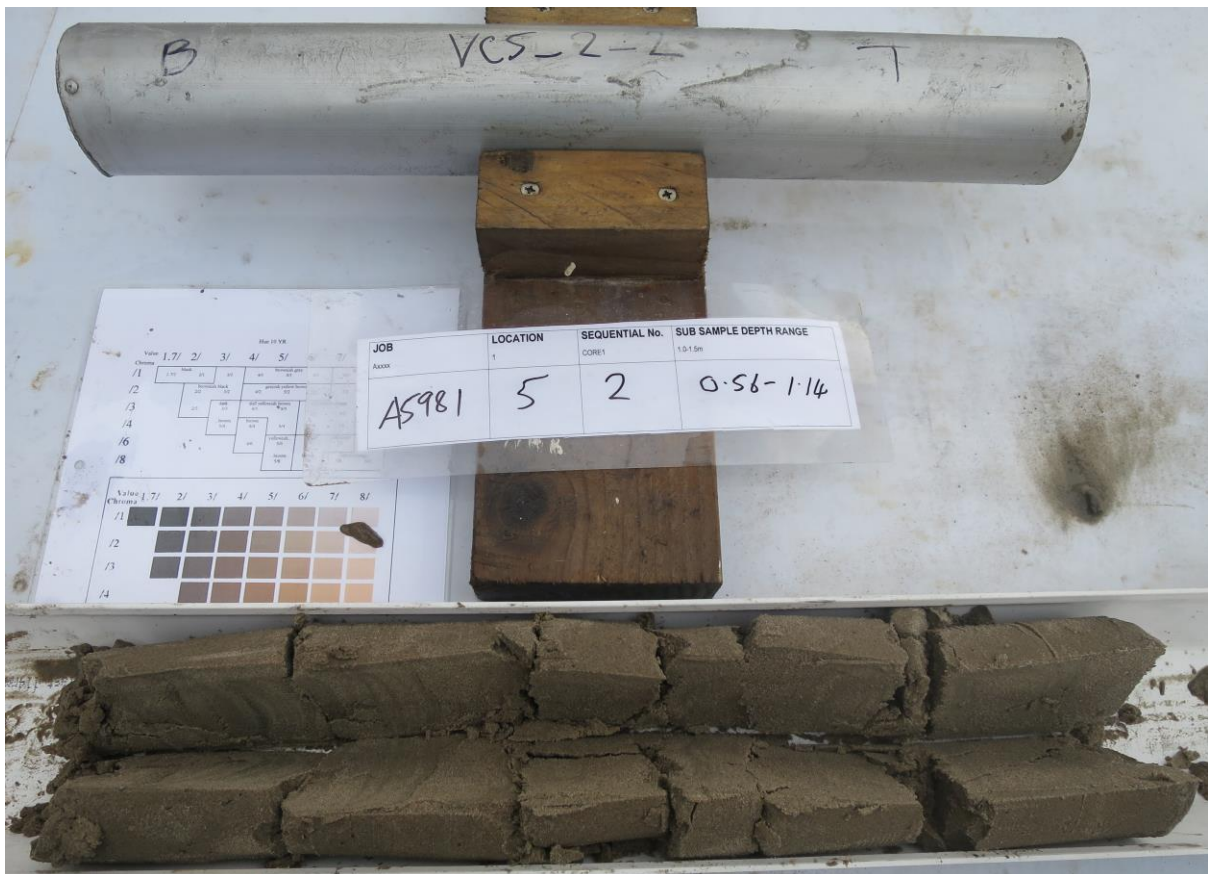


FIGURE 22 - VC5-2-2



**TABLE 22 - MARINE SCOTLAND REVISED ACTION LEVELS AGAINST DETECTED LEVELS IN VC6-2-1**

<b>Sample ID: VC6-2-1</b>				
<b>METALS</b>	<b>Action Level 1 (mg/Kg)</b>	<b>VC6-2-1 (mg/Kg)</b>	<b>Action Level 2 (mg/Kg)</b>	<b>VC6-2-1 (mg/Kg)</b>
Arsenic	20	2.9	70	2.9
Cadmium	0.4	0.1	4	0.1
Chromium	50	85.2	370	85.2
Copper	30	49.3	300	49.3
Mercury	0.25	< 0.01	1.5	< 0.01
Nickel	30	35.3	150	35.3
Lead	50	22.4	400	22.4
Zinc	130	112	600	112
Dibutyltin		< 0.005		< 0.005
Tributyltin	0.1	<0.002	0.5	<0.002

<b>POLYAROMATIC HYDROCARBONS</b>	<b>Action Level (µg/Kg)</b>	<b>VC6-2-1 (ng/g)</b>
Acenaphthene	100	< 1
Acenaphthylene	100	< 1
Anthracene	100	< 1
Fluorene	100	< 1
Naphthalene	100	< 1
Phenanthrene	100	1.0
Benzo[a]anthracene	100	< 1
Benzo[b]fluoranthene	100	< 1
Benzo[k]fluoranthene	100	< 1
Benzo[a]pyrene	100	< 1
Benzo[g,h,i]perylene	100	< 1
Dibenzo[a,h]anthracene	10	< 1
Chrysene	100	1.2
Fluoranthene	100	1.8
Pyrene	100	3.0
Indeno(1,2,3cd)pyrene	100	< 1

**PCB (mg/kg) AL1=0.02 AL2=0.18**

<b>PCB28</b>	<b>PCB52</b>	<b>PCB101</b>	<b>PCB118</b>	<b>PCB153</b>	<b>PCB138</b>	<b>PCB180</b>
<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061

TABLE 23 - DETECETD LEVELS IN VC6-2-1 LEACHATE

Sample ID: VC6-2-1		
	Units	VC6-2-1
pH	pH Units	7.5
Conductivity	uS/cm	5910
Chloride	mg/l	1930
Fluoride	mg/l	0.7
Total Sulphur (Dissolved)	mg/l	285
Barium (Dissolved)	mg/l	0.12
Nickel (Dissolved)	mg/l	0.001
Chromium (Dissolved)	mg/l	<0.001
Cadium (Dissolved)	mg/l	<0.0001
Copper (Dissolved)	mg/l	0.004
Lead (Dissolved)	mg/l	0.003
Zinc (Dissolved)	mg/l	0.053
Arsenic (Dissolved)	mg/l	0.002
Mercury (Dissolved)	mg/l	<0.0001
Selenium (Dissolved)	mg/l	0.008
Molybdenum (Dissolved)	mg/l	0.039
Antimony as Sb (Dissolved)	mg/l	0.001
Ammoniacal Nitrogen	mg/l	0.12
Chromium VI	mg/l	<0.01
Phenol Index	mg/l	<0.05
Total Dissolved solids	mg/l	4600
Aluminium (Dissolved)	mg/l	0.03
Ammonia (Free)	mg/l	<0.01
Dissolved Organic Carbon	mg/l	4.2

POLYAROMATIC HYDROCARBONS	VC6-2-1 Concentration (µg/l)
Naphthalene	0.038
Acenaphthylene	<0.010
Acenaphthene	<0.010
Fluorene	<0.010
Phenanthrene	0.013
Anthracene	<0.010
Fluoranthene	0.028
Pyrene	0.017
Benzo(a)anthracene	<0.010
Chrysene	<0.010
Benzo(b)fluoranthene	<0.010
Benzo(k)fluoranthene	<0.010
Benzo(a)pyrene	<0.010
Indeno(1,2,3-cd)pyrene	<0.010
Dibenzo(a,h)anthracene	<0.010
Benzo(g,h,i)perylene	<0.010
Total (USEPA16) PAHs	<0.216

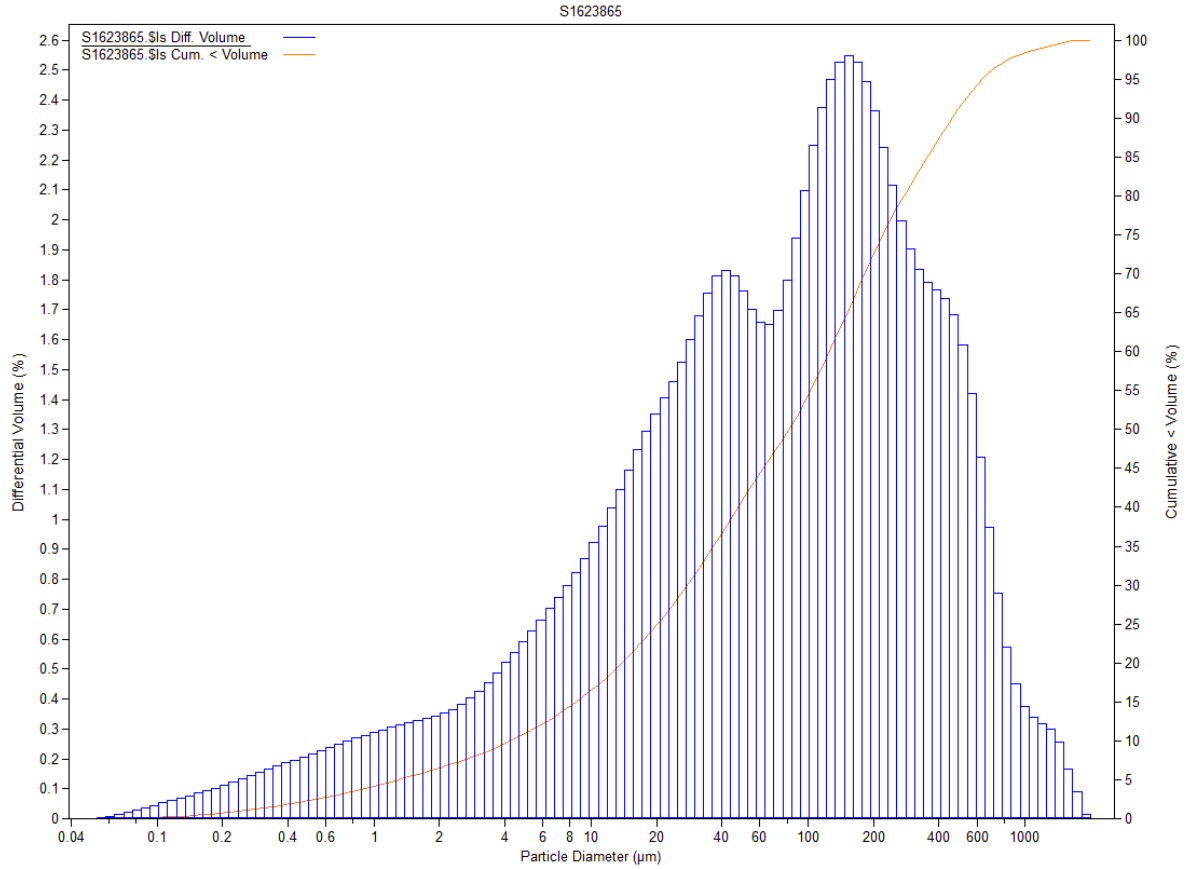


FIGURE 23 - VC6-2-1 PARTICLE SIZE ANALYSIS



FIGURE 24 - VC6-2-1

**TABLE 24 - MARINE SCOTLAND REVISED ACTION LEVELS AGAINST DETECTED LEVELS IN VC6-2-2**

<b>Sample ID: VC6-2-2</b>				
<b>METALS</b>	<b>Action Level 1 (mg/Kg)</b>	<b>VC6-2-2 (mg/Kg)</b>	<b>Action Level 2 (mg/Kg)</b>	<b>VC6-2-2 (mg/Kg)</b>
Arsenic	20	2	70	2
Cadmium	0.4	0.1	4	0.1
Chromium	50	65.2	370	65.2
Copper	30	35.1	300	35.1
Mercury	0.25	< 0.01	1.5	< 0.01
Nickel	30	33.1	150	33.1
Lead	50	15	400	15
Zinc	130	36.8	600	36.8
Dibutyltin		< 0.005		< 0.005
Tributyltin	0.1	< 0.002	0.5	< 0.002

<b>POLYAROMATIC HYDROCARBONS</b>	<b>Action Level (µg/Kg)</b>	<b>VC6-2-2 (ng/g)</b>
Acenaphthene	100	2.0
Acenaphthylene	100	< 1
Anthracene	100	4.1
Fluorene	100	1.5
Naphthalene	100	< 1
Phenanthrene	100	15.2
Benzo[a]anthracene	100	10.7
Benzo[b]fluoranthene	100	8.7
Benzo[k]fluoranthene	100	12.9
Benzo[a]pyrene	100	10.3
Benzo[g,h,i]perylene	100	6.3
Dibenzo[a,h]anthracene	10	1.2
Chrysene	100	12.9
Fluoranthene	100	26.5
Pyrene	100	25.1
Indeno(1,2,3cd)pyrene	100	7.5

PCB (mg/kg) AL1=0.02 AL2=0.18

<b>PCB28</b>	<b>PCB52</b>	<b>PCB101</b>	<b>PCB118</b>	<b>PCB153</b>	<b>PCB138</b>	<b>PCB180</b>
<0.0065	<0.0065	<0.0065	<0.0065	<0.0065	<0.0065	<0.0065

**TABLE 25 - DETECTED LEVELS IN VC6-2-2 LEACHATE**

<b>Sample ID: VC6-2-2</b>		
	Units	VC6-2-2
pH	pH Units	7.6
Conductivity	uS/cm	7560
Chloride	mg/l	2280
Fluoride	mg/l	0.5
Total Sulphur (Dissolved)	mg/l	494
Barium (Dissolved)	mg/l	0.18
Nickel (Dissolved)	mg/l	0.003
Chromium (Dissolved)	mg/l	<0.001
Cadium (Dissolved)	mg/l	<0.0001
Copper (Dissolved)	mg/l	0.004
Lead (Dissolved)	mg/l	0.004
Zinc (Dissolved)	mg/l	0.082
Arsenic (Dissolved)	mg/l	0.002
Mercury (Dissolved)	mg/l	<0.0001
Selenium (Dissolved)	mg/l	0.01
Molybdenum (Dissolved)	mg/l	0.032
Antimony as Sb (Dissolved)	mg/l	0.001
Ammoniacal Nitrogen	mg/l	0.11
Chromium VI	mg/l	<0.01
Phenol Index	mg/l	<0.05
Total Dissolved solids	mg/l	5700
Aluminium (Dissolved)	mg/l	0.03
Ammonia (Free)	mg/l	<0.01
Dissolved Organic Carbon	mg/l	6.1

<b>POLYAROMATIC HYDROCARBONS</b>	Concentrations (µg/l)
Naphthalene	0.041
Acenaphthylene	<0.010
Acenaphthene	0.011
Fluorene	<0.010
Phenanthrene	0.028
Anthracene	<0.010
Fluoranthene	<0.010
Pyrene	<0.010
Benzo(a)anthracene	<0.010
Chrysene	<0.010
Benzo(b)fluoranthene	<0.010
Benzo(k)fluoranthene	<0.010
Benzo(a)pyrene	<0.010
Indeno(1,2,3-cd)pyrene	<0.010
Dibenzo(a,h)anthracene	<0.010
Benzo(g,h,i)perylene	<0.010
Total (USEPA16) PAHs	<0.210

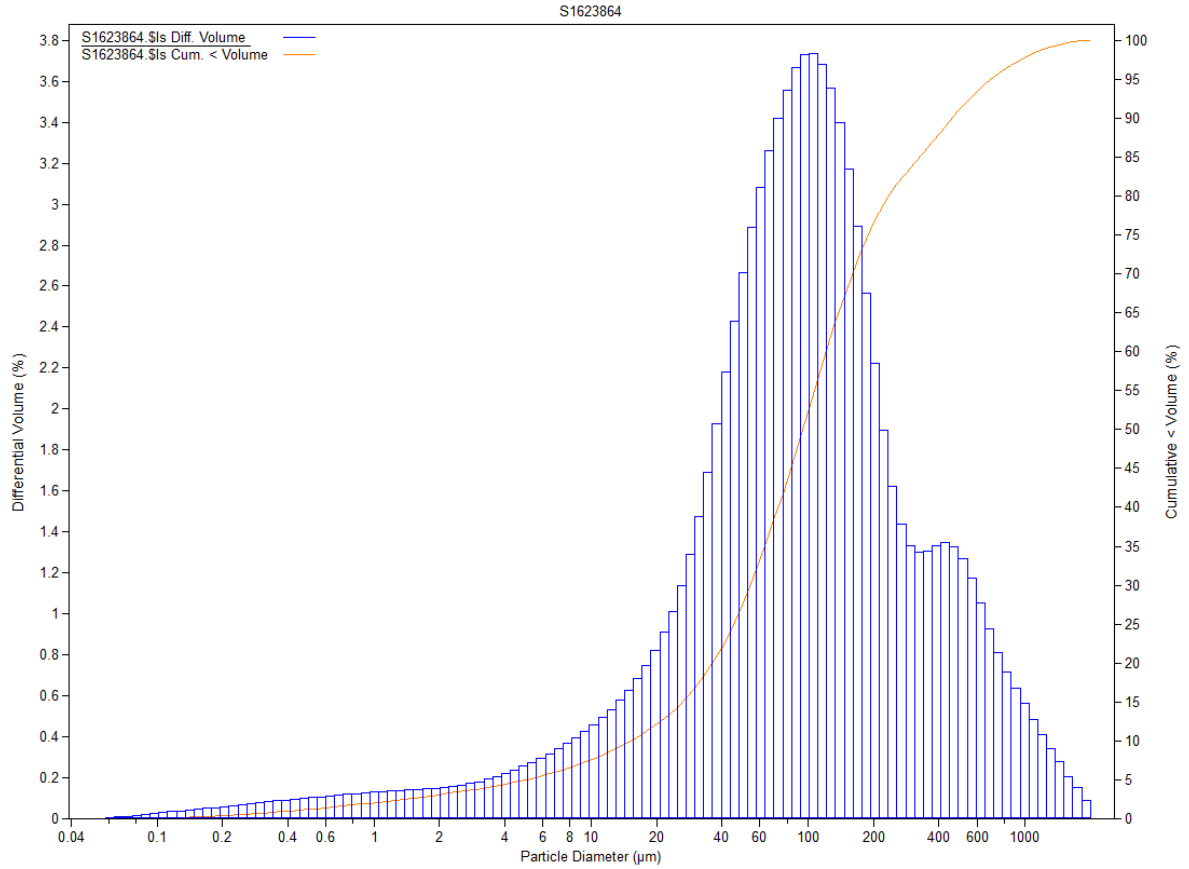


FIGURE 25 - VC6-2-2 PARTICLE SIZE ANALYSIS



FIGURE 26 - VC6-2-2

TABLE 26 - MARINE SCOTLAND REVISED ACTION LEVELS AGAINST DETECTED LEVELS IN VC6-2-3

Sample ID: VC6-2-3				
METALS	Action Level 1 (mg/Kg)	VC6-2-3 (mg/Kg)	Action Level 2 (mg/Kg)	VC6-2-3 (mg/Kg)
Arsenic	20	1.5	70	1.5
Cadmium	0.4	< 0.1	4	< 0.1
Chromium	50	74.2	370	74.2
Copper	30	44	300	44
Mercury	0.25	< 0.01	1.5	< 0.01
Nickel	30	33.6	150	33.6
Lead	50	18.6	400	18.6
Zinc	130	45.3	600	45.3
Dibutyltin		< 0.005		< 0.005
Tributyltin	0.1	< 0.002	0.5	< 0.002

POLYAROMATIC HYDROCARBONS	Action Level (µg/Kg)	VC6-2-3 (ng/g)
Acenaphthene	100	< 1
Acenaphthylene	100	< 1
Anthracene	100	< 1
Fluorene	100	< 1
Naphthalene	100	< 1
Phenanthrene	100	< 1
Benzo[a]anthracene	100	< 1
Benzo[b]fluoranthene	100	< 1
Benzo[k]fluoranthene	100	< 1
Benzo[a]pyrene	100	< 1
Benzo[g,h,i]perylene	100	< 1
Dibenzo[a,h]anthracene	10	< 1
Chrysene	100	< 1
Fluoranthene	100	< 1
Pyrene	100	< 1
Indeno(1,2,3cd)pyrene	100	< 1

PCB (mg/kg) AL1=0.02 AL2=0.18

PCB28	PCB52	PCB101	PCB118	PCB153	PCB138	PCB180
<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

TABLE 27 - DETECTED LEVELS IN VC6-2-3 LEACHATE

Sample ID: VC6-2-3		
	Units	VC6-2-3
pH	pH Units	7.2
Conductivity	uS/cm	6910
Chloride	mg/l	2290
Fluoride	mg/l	0.7
Total Sulphur (Dissolved)	mg/l	370
Barium (Dissolved)	mg/l	0.28
Nickel (Dissolved)	mg/l	0.009
Chromium (Dissolved)	mg/l	0.002
Cadium (Dissolved)	mg/l	0.0003
Copper (Dissolved)	mg/l	0.012
Lead (Dissolved)	mg/l	0.006
Zinc (Dissolved)	mg/l	0.175
Arsenic (Dissolved)	mg/l	0.003
Mercury (Dissolved)	mg/l	<0.0001
Selenium (Dissolved)	mg/l	0.009
Molybdenum (Dissolved)	mg/l	0.073
Antimony as Sb (Dissolved)	mg/l	0.002
Ammoniacal Nitrogen	mg/l	0.3
Chromium VI	mg/l	<0.01
Phenol Index	mg/l	<0.05
Total Dissolved solids	mg/l	5400
Aluminium (Dissolved)	mg/l	0.09
Ammonia (Free)	mg/l	<0.01
Dissolved Organic Carbon	mg/l	6.1

POLYAROMATIC HYDROCARBONS	VC6-2-3 Concentration (µg/l)
Naphthalene	<0.020
Acenaphthylene	<0.010
Acenaphthene	<0.010
Fluorene	<0.010
Phenanthrene	<0.010
Anthracene	<0.010
Fluoranthene	0.038
Pyrene	0.026
Benzo(a)anthracene	<0.010
Chrysene	<0.010
Benzo(b)fluoranthene	<0.010
Benzo(k)fluoranthene	<0.010
Benzo(a)pyrene	<0.010
Indeno(1,2,3-cd)pyrene	<0.010
Dibenzo(a,h)anthracene	<0.010
Benzo(g,h,i)perylene	<0.010
Total (USEPA16) PAHs	<0.214



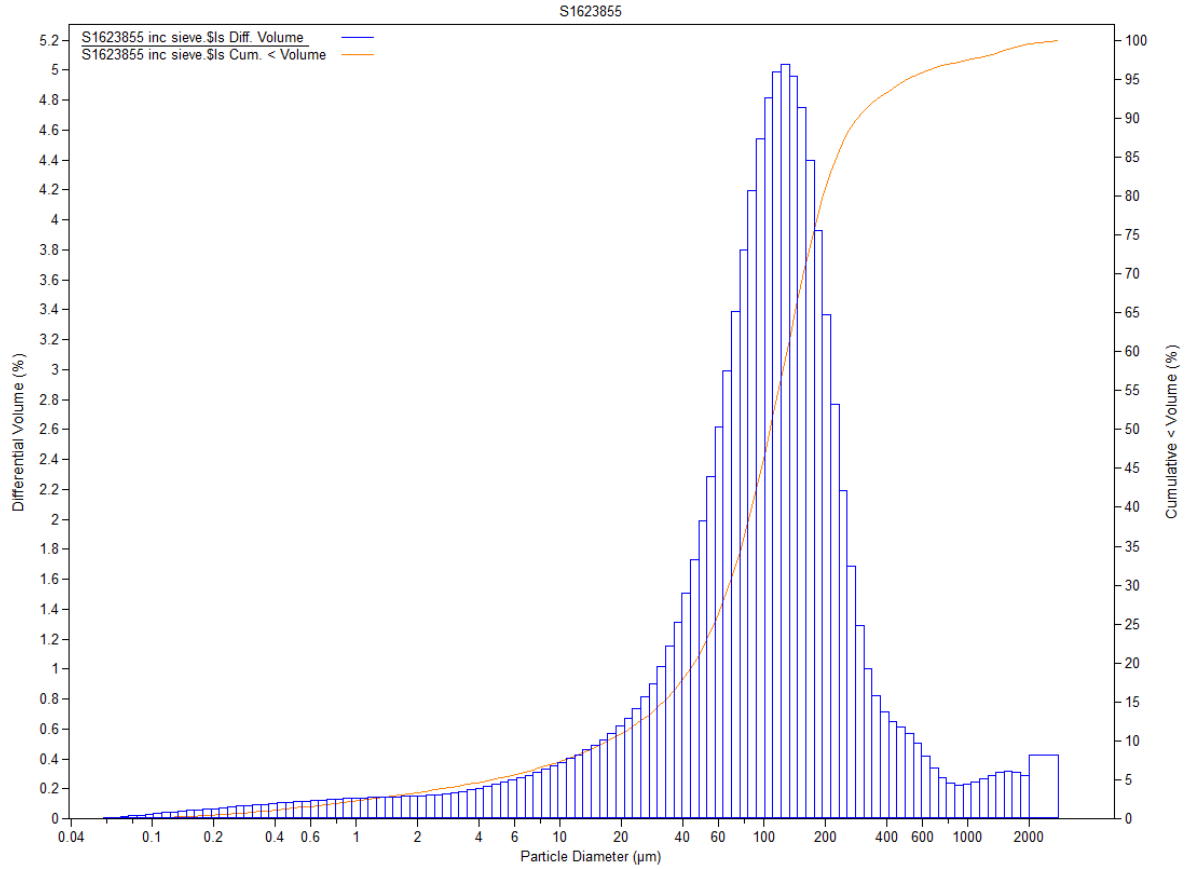


FIGURE 27 - VC6-2-3 PARTICLE SIZE ANALYSIS



FIGURE 28 - VC6-2-3

TABLE 28 - MARINE SCOTLAND REVISED ACTION LEVELS AGAINST DETECTED LEVELS IN VC7-1-1

Sample ID: VC7-1-1				
METALS	Action Level 1 (mg/Kg)	VC7-1-1 (mg/Kg)	Action Level 2 (mg/Kg)	VC7-1-1 (mg/Kg)
Arsenic	20	3.7	70	3.7
Cadmium	0.4	< 0.1	4	< 0.1
Chromium	50	58.5	370	58.5
Copper	30	6.8	300	6.8
Mercury	0.25	< 0.01	1.5	< 0.01
Nickel	30	22.3	150	22.3
Lead	50	13.6	400	13.6
Zinc	130	30.6	600	30.6
Dibutyltin		< 0.005		< 0.005
Tributyltin	0.1	< 0.002	500	< 0.002

POLYAROMATIC HYDROCARBONS	Action Level (µg/Kg)	VC7-1-1 (ng/g)
Acenaphthene	100	< 1
Acenaphthylene	100	< 1
Anthracene	100	< 1
Fluorene	100	< 1
Naphthalene	100	< 1
Phenanthrene	100	< 1
Benzo[a]anthracene	100	< 1
Benzo[b]fluoranthene	100	< 1
Benzo[k]fluoranthene	100	< 1
Benzo[a]pyrene	100	< 1
Benzo[g,h,i]perylene	100	< 1
Dibenzo[a,h]anthracene	10	< 1
Chrysene	100	< 1
Fluoranthene	100	< 1
Pyrene	100	< 1
Indeno(1,2,3cd)pyrene	100	< 1

PCB (mg/kg) AL1=0.02 AL2=0.18

PCB28	PCB52	PCB101	PCB118	PCB153	PCB138	PCB180
<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058

TABLE 29 - DETECTED LEVELS IN VC7-1-1 LEACHATE

Sample ID: VC7-1-1		
	Units	VC7-1-1
pH	pH Units	7.6
Conductivity	uS/cm	4380
Chloride	mg/l	1320
Fluoride	mg/l	0.7
Total Sulphur (Dissolved)	mg/l	209
Barium (Dissolved)	mg/l	0.15
Nickel (Dissolved)	mg/l	0.001
Chromium (Dissolved)	mg/l	<0.001
Cadium (Dissolved)	mg/l	0.0001
Copper (Dissolved)	mg/l	0.007
Lead (Dissolved)	mg/l	0.001
Zinc (Dissolved)	mg/l	0.039
Arsenic (Dissolved)	mg/l	0.013
Mercury (Dissolved)	mg/l	<0.0001
Selenium (Dissolved)	mg/l	0.005
Molybdenum (Dissolved)	mg/l	0.013
Antimony as Sb (Dissolved)	mg/l	0.001
Ammoniacal Nitrogen	mg/l	4.3
Chromium VI	mg/l	<0.01
Phenol Index	mg/l	<0.05
Total Dissolved solids	mg/l	3100
Aluminium (Dissolved)	mg/l	0.08
Ammonia (Free)	mg/l	0.06
Dissolved Organic Carbon	mg/l	4.6

POLYAROMATIC HYDROCARBONS	VC7-1-1 Concentration (µg/l)
Naphthalene	<0.020
Acenaphthylene	<0.010
Acenaphthene	0.014
Fluorene	<0.010
Phenanthrene	<0.010
Anthracene	<0.010
Fluoranthene	<0.010
Pyrene	0.011
Benzo(a)anthracene	<0.010
Chrysene	<0.010
Benzo(b)fluoranthene	<0.010
Benzo(k)fluoranthene	<0.010
Benzo(a)pyrene	<0.010
Indeno(1,2,3-cd)pyrene	<0.010
Dibenzo(a,h)anthracene	<0.010
Benzo(g,h,i)perylene	<0.010
Total (USEPA16) PAHs	<0.175

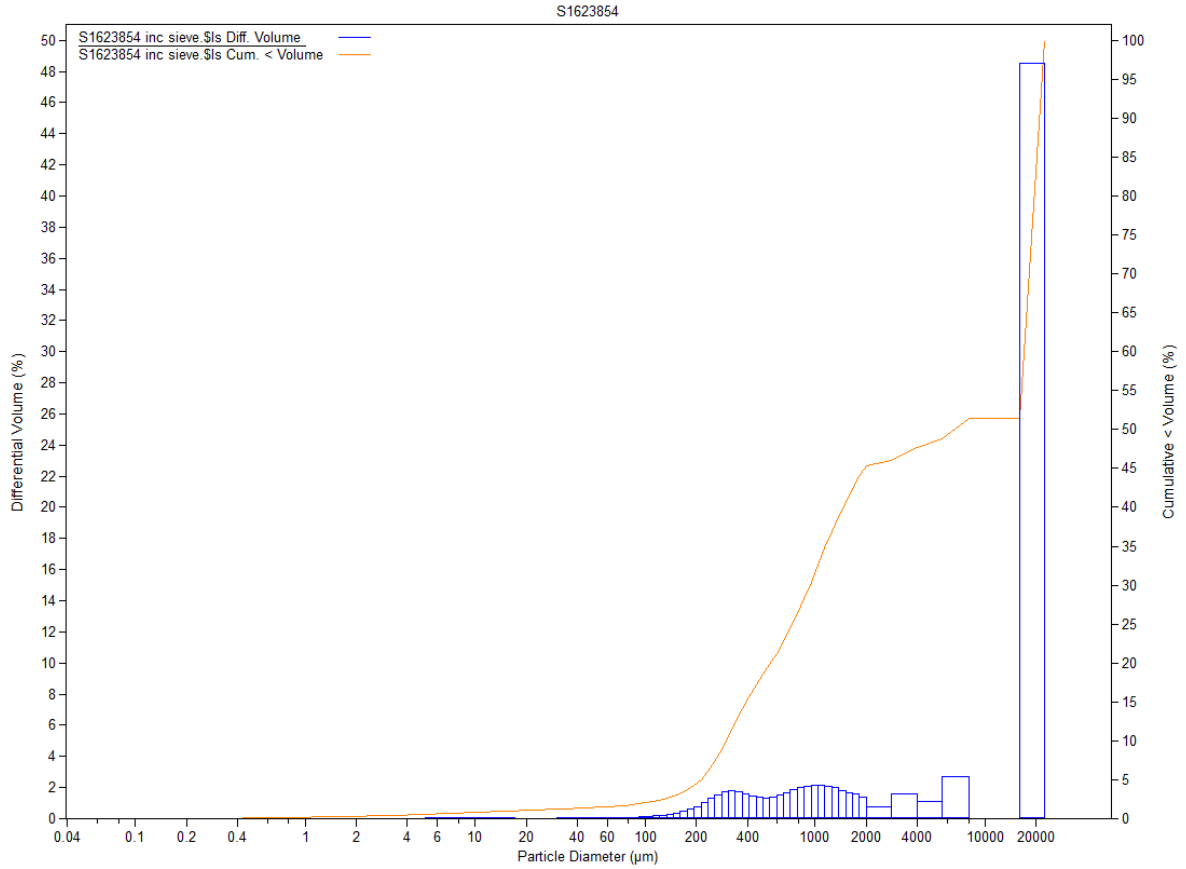


FIGURE 29 - VC7-1-1 PARTICLE SIZE ANALYSIS



FIGURE 30 - VC7-1-1

**TABLE 30 - MARINE SCOTLAND REVISED ACTION LEVELS AGAINST DETECTED LEVELS IN GRVC8**

<b>Sample ID: GRVC8</b>				
<b>METALS</b>	<b>Action Level 1 (mg/Kg)</b>	<b>GRVC8 (mg/Kg)</b>	<b>Action Level 2 (mg/Kg)</b>	<b>GRVC8 (mg/Kg)</b>
Arsenic	20	3	70	3
Cadmium	0.4	< 0.1	4	< 0.1
Chromium	50	51.9	370	51.9
Copper	30	25.7	300	25.7
Mercury	0.25	< 0.01	1.5	< 0.01
Nickel	30	34.2	150	34.2
Lead	50	17.7	400	17.7
Zinc	130	45.6	600	45.6
Dibutyltin		< 0.005		< 0.005
Tributyltin	0.1	< 0.002	0.5	< 0.002

<b>Polyaromatic Hydrocarbons</b>	<b>Action Level (µg/Kg)</b>	<b>GRVC8 (ng/g)</b>
Acenaphthene	100	< 1
Acenaphthylene	100	< 1
Anthracene	100	< 1
Fluorene	100	< 1
Naphthalene	100	< 1
Phenanthrene	100	< 1
Benzo[a]anthracene	100	< 1
Benzo[b]fluoranthene	100	< 1
Benzo[k]fluoranthene	100	< 1
Benzo[a]pyrene	100	< 1
Benzo[g,h,i]perylene	100	< 1
Dibenzo[a,h]anthracene	10	< 1
Chrysene	100	< 1
Fluoranthene	100	< 1
Pyrene	100	< 1
Indeno(1,2,3cd)pyrene	100	< 1

PCB (mg/kg) AL1=0.02 AL2=0.18

<b>PCB28</b>	<b>PCB52</b>	<b>PCB101</b>	<b>PCB118</b>	<b>PCB153</b>	<b>PCB138</b>	<b>PCB180</b>
0.0124	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

TABLE 31 - DETECETD LEVELS IN GRVC8 LEACHATE

Sample ID: GRVC8		
	Units	GRVC8
pH	pH Units	8
Conductivity	uS/cm	1560
Chloride	mg/l	321
Fluoride	mg/l	0.3
Total Sulphur (Dissolved)	mg/l	68.1
Barium (Dissolved)	mg/l	0.18
Nickel (Dissolved)	mg/l	0.004
Chromium (Dissolved)	mg/l	0.004
Cadium (Dissolved)	mg/l	0.0001
Copper (Dissolved)	mg/l	0.029
Lead (Dissolved)	mg/l	0.016
Zinc (Dissolved)	mg/l	0.117
Arsenic (Dissolved)	mg/l	0.03
Mercury (Dissolved)	mg/l	<0.0001
Selenium (Dissolved)	mg/l	0.001
Molybdenum (Dissolved)	mg/l	0.005
Antimony as Sb (Dissolved)	mg/l	0.001
Ammoniacal Nitrogen	mg/l	0.3
Chromium VI	mg/l	<0.01
Phenol Index	mg/l	<0.05
Total Dissolved solids	mg/l	1100
Aluminium (Dissolved)	mg/l	0.06
Ammonia (Free)	mg/l	0.01
Dissolved Organic Carbon	mg/l	33

POLYAROMATIC HYDROCARBONS	Grvc8 Concentration (µg/l)
Naphthalene	0.065
Acenaphthylene	<0.010
Acenaphthene	<0.010
Fluorene	<0.010
Phenanthrene	0.03
Anthracene	<0.010
Fluoranthene	0.025
Pyrene	0.018
Benzo(a)anthracene	<0.010
Chrysene	<0.010
Benzo(b)fluoranthene	<0.010
Benzo(k)fluoranthene	<0.010
Benzo(a)pyrene	<0.010
Indeno(1,2,3-cd)pyrene	<0.010
Dibenzo(a,h)anthracene	<0.010
Benzo(g,h,i)perylene	<0.010
Total (USEPA16) PAHs	<0.258

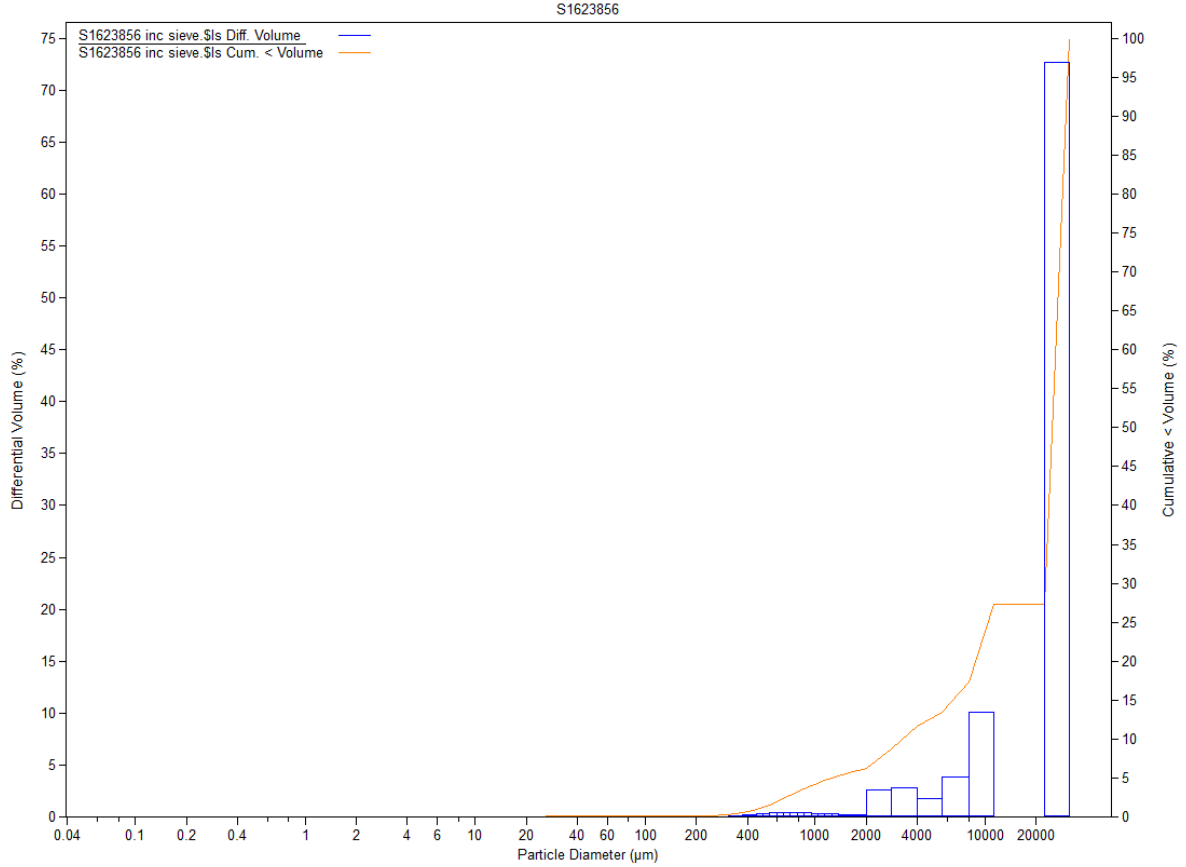


FIGURE 31 - GRVC8 PARTICLE SIZE ANALYSIS

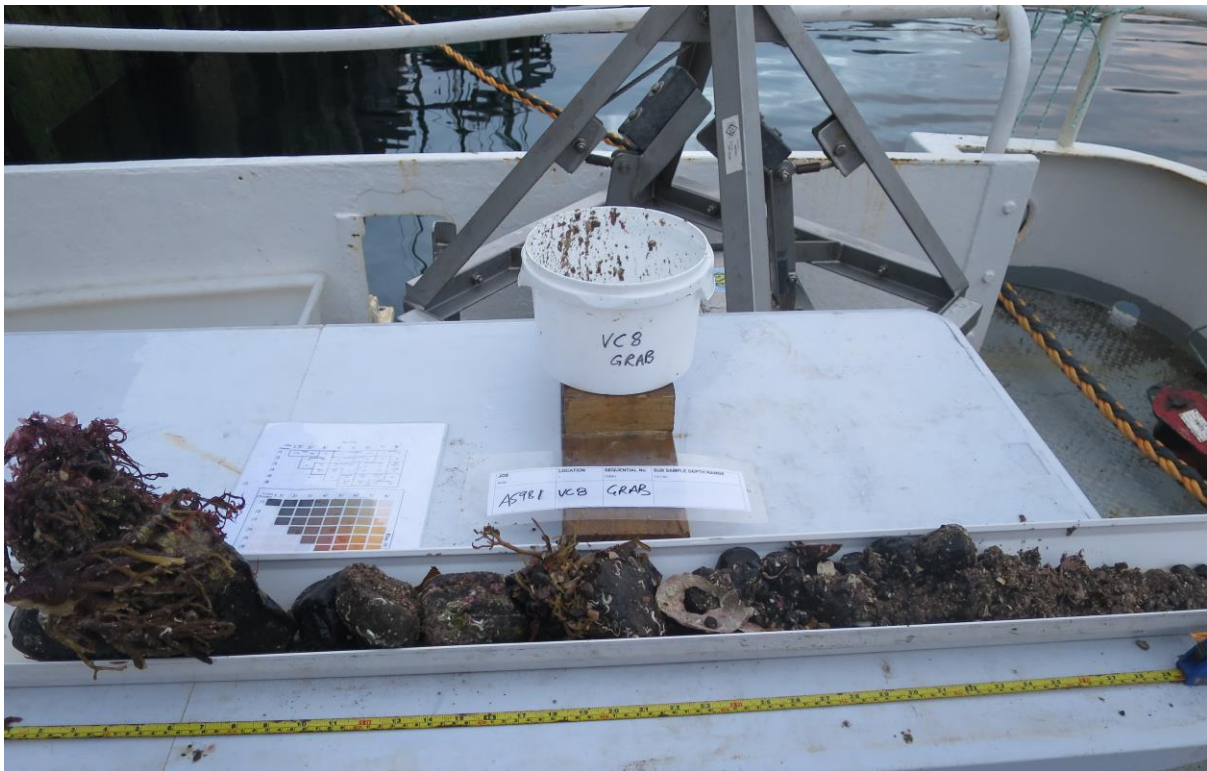


FIGURE 32 - GRVC8

TABLE 32 - MARINE SCOTLAND REVISED ACTION LEVELS AGAINST DETECTED LEVELS IN VC9-1-1

Sample ID: VC9-1-1				
METALS	Action Level 1 (mg/Kg)	VC9-1-1 (mg/Kg)	Action Level 2 (mg/Kg)	VC9-1-1 (mg/Kg)
Arsenic	20	3.4	70	3.4
Cadmium	0.4	0.1	4	0.1
Chromium	50	46.7	370	46.7
Copper	30	7.06	300	7.06
Mercury	0.25	0.01	1.5	0.01
Nickel	30	16.4	150	16.4
Lead	50	14.1	400	14.1
Zinc	130	28.1	600	28.1
Dibutyltin		< 0.005		< 0.005
Tributyltin	0.1	< 0.002	0.5	< 0.002

POLYAROMATIC HYDROCARBONS	Action Level (µg/Kg)	VC9-1-1 (ng/g)
Acenaphthene	100	< 1
Acenaphthylene	100	< 1
Anthracene	100	< 1
Fluorene	100	< 1
Naphthalene	100	< 1
Phenanthrene	100	< 1
Benzo[a]anthracene	100	< 1
Benzo[b]fluoranthene	100	< 1
Benzo[k]fluoranthene	100	< 1
Benzo[a]pyrene	100	< 1
Benzo[g,h,i]perylene	100	< 1
Dibenzo[a,h]anthracene	10	< 1
Chrysene	100	< 1
Fluoranthene	100	< 1
Pyrene	100	< 1
Indeno(1,2,3cd)pyrene	100	< 1

PCB (mg/kg) AL1=0.02 AL2=0.18

PCB28	PCB52	PCB101	PCB118	PCB153	PCB138	PCB180
<0.0068	<0.0068	<0.0068	<0.0068	<0.0068	<0.0068	<0.0068



**TABLE 33 - DETECTED LEVELS IN VC9-1-1 LEACHATE**

<b>Sample ID: VC9-1-1</b>		
	Units	VC9-1-1
pH	pH Units	7.9
Conductivity	uS/cm	5430
Chloride	mg/l	1690
Fluoride	mg/l	0.4
Total Sulphur (Dissolved)	mg/l	319
Barium (Dissolved)	mg/l	0.11
Nickel (Dissolved)	mg/l	0.002
Chromium (Dissolved)	mg/l	<0.001
Cadium (Dissolved)	mg/l	<0.0001
Copper (Dissolved)	mg/l	0.005
Lead (Dissolved)	mg/l	0.003
Zinc (Dissolved)	mg/l	0.054
Arsenic (Dissolved)	mg/l	0.019
Mercury (Dissolved)	mg/l	<0.0001
Selenium (Dissolved)	mg/l	0.008
Molybdenum (Dissolved)	mg/l	0.121
Antimony as Sb (Dissolved)	mg/l	0.005
Ammoniacal Nitrogen	mg/l	5.2
Chromium VI	mg/l	<0.01
Phenol Index	mg/l	<0.05
Total Dissolved solids	mg/l	4300
Aluminium (Dissolved)	mg/l	0.05
Ammonia (Free)	mg/l	0.15
Dissolved Organic Carbon	mg/l	6.4

<b>POLYAROMATIC HYDROCARBONS</b>	VC9-1-1 Concentration (µg/l)
Naphthalene	0.033
Acenaphthylene	<0.010
Acenaphthene	<0.010
Fluorene	<0.010
Phenanthrene	<0.010
Anthracene	<0.010
Fluoranthene	<0.010
Pyrene	<0.010
Benzo(a)anthracene	<0.010
Chrysene	<0.010
Benzo(b)fluoranthene	<0.010
Benzo(k)fluoranthene	<0.010
Benzo(a)pyrene	<0.010
Indeno(1,2,3-cd)pyrene	<0.010
Dibenzo(a,h)anthracene	<0.010
Benzo(g,h,i)perylene	<0.010
Total (USEPA16) PAHs	<0.183

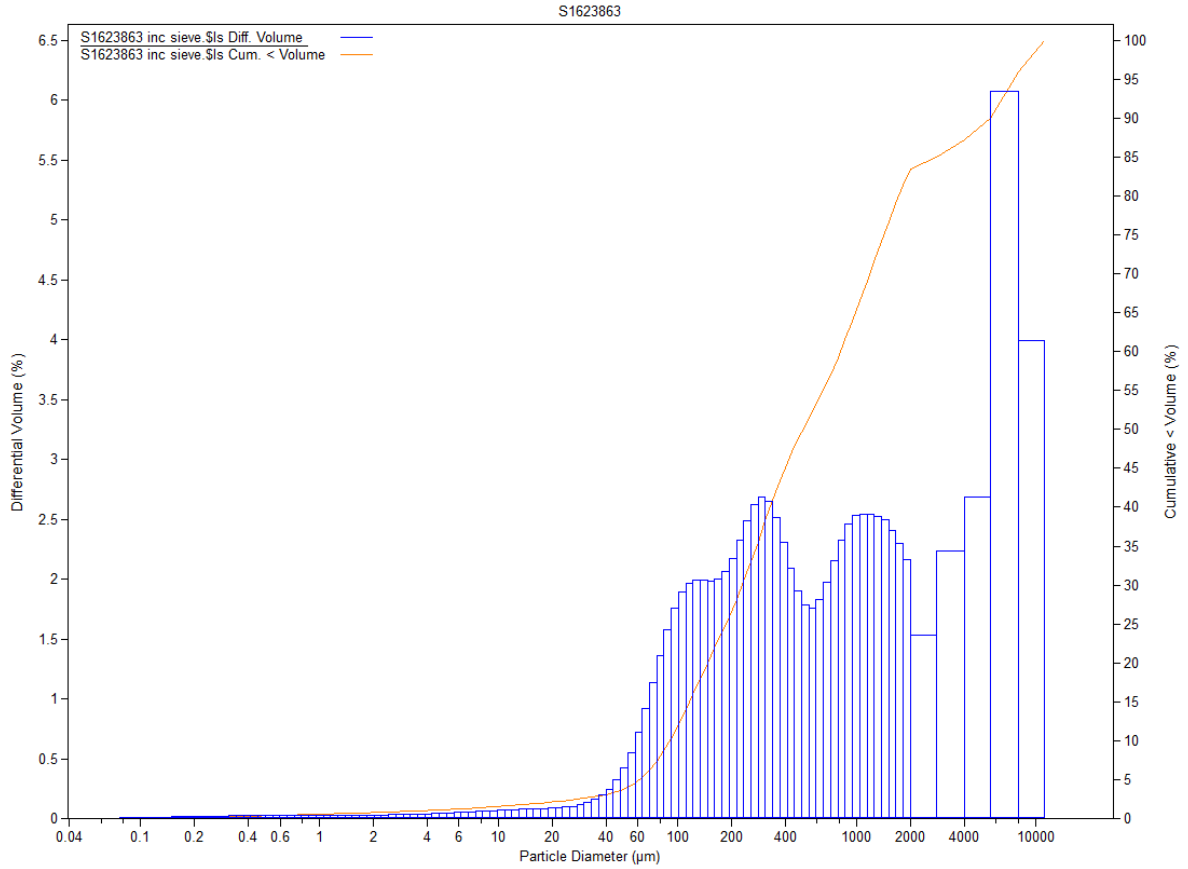


FIGURE 33 – V9-1-1 PARTICLE SIZE ANALYSIS



FIGURE 34 - VC9-1-1

TABLE 34 - MARINE SCOTLAND REVISED ACTION LEVELS AGAINST DETECTED LEVELS IN VC10

Sample ID: VC10				
METALS	Action Level 1 (mg/Kg)	VC10 (mg/Kg)	Action Level 2 (mg/Kg)	VC10 (mg/Kg)
Arsenic	20	2.9	70	2.9
Cadmium	0.4	< 0.1	4	< 0.1
Chromium	50	67.4	370	67.4
Copper	30	14.7	300	14.7
Mercury	0.25	< 0.01	1.5	< 0.01
Nickel	30	30.3	150	30.3
Lead	50	12.8	400	12.8
Zinc	130	46.4	600	46.4
Dibutyltin		< 0.005		< 0.005
Tributyltin	0.1	< 0.002	0.5	< 0.002

POLYAROMATIC HYDROCARBONS	Action Level (µg/Kg)	VC10 (ng/g)
Acenaphthene	100	< 1
Acenaphthylene	100	< 1
Anthracene	100	< 1
Fluorene	100	< 1
Naphthalene	100	< 1
Phenanthrene	100	< 1
Benzo[a]anthracene	100	< 1
Benzo[b]fluoranthene	100	< 1
Benzo[k]fluoranthene	100	< 1
Benzo[a]pyrene	100	< 1
Benzo[g,h,i]perylene	100	< 1
Dibenzo[a,h]anthracene	10	< 1
Chrysene	100	< 1
Fluoranthene	100	< 1
Pyrene	100	< 1
Indeno(1,2,3cd)pyrene	100	< 1

PCB (mg/kg) AL1=0.02 AL2=0.18

PCB28	PCB52	PCB101	PCB118	PCB153	PCB138	PCB180
<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062

**TABLE 35 - DETECTED LEVELS IN VC10 LEACHATE**

<b>Sample ID: VC10</b>		
	Units	VC10
pH	pH Units	7.8
Conductivity	uS/cm	4360
Chloride	mg/l	1150
Fluoride	mg/l	0.7
Total Sulphur (Dissolved)	mg/l	199
Barium (Dissolved)	mg/l	0.15
Nickel (Dissolved)	mg/l	0.002
Chromium (Dissolved)	mg/l	<0.001
Cadium (Dissolved)	mg/l	<0.0001
Copper (Dissolved)	mg/l	0.018
Lead (Dissolved)	mg/l	0.005
Zinc (Dissolved)	mg/l	0.087
Arsenic (Dissolved)	mg/l	0.017
Mercury (Dissolved)	mg/l	<0.0001
Selenium (Dissolved)	mg/l	0.006
Molybdenum (Dissolved)	mg/l	0.007
Antimony as Sb (Dissolved)	mg/l	0.001
Ammoniacal Nitrogen	mg/l	6.4
Chromium VI	mg/l	<0.01
Phenol Index	mg/l	0.12
Total Dissolved solids	mg/l	2900
Aluminium (Dissolved)	mg/l	0.03
Ammonia (Free)	mg/l	0.16
Dissolved Organic Carbon	mg/l	11

<b>POLYAROMATIC HYDROCARBONS</b>	VC10 Concentration (µg/l)
Naphthalene	<0.020
Acenaphthylene	<0.010
Acenaphthene	0.014
Fluorene	0.012
Phenanthrene	0.015
Anthracene	<0.010
Fluoranthene	0.02
Pyrene	0.016
Benzo(a)anthracene	<0.010
Chrysene	<0.010
Benzo(b)fluoranthene	<0.010
Benzo(k)fluoranthene	<0.010
Benzo(a)pyrene	<0.010
Indeno(1,2,3-cd)pyrene	<0.010
Dibenzo(a,h)anthracene	<0.010
Benzo(g,h,i)perylene	<0.010
Total (USEPA16) PAHs	<0.197

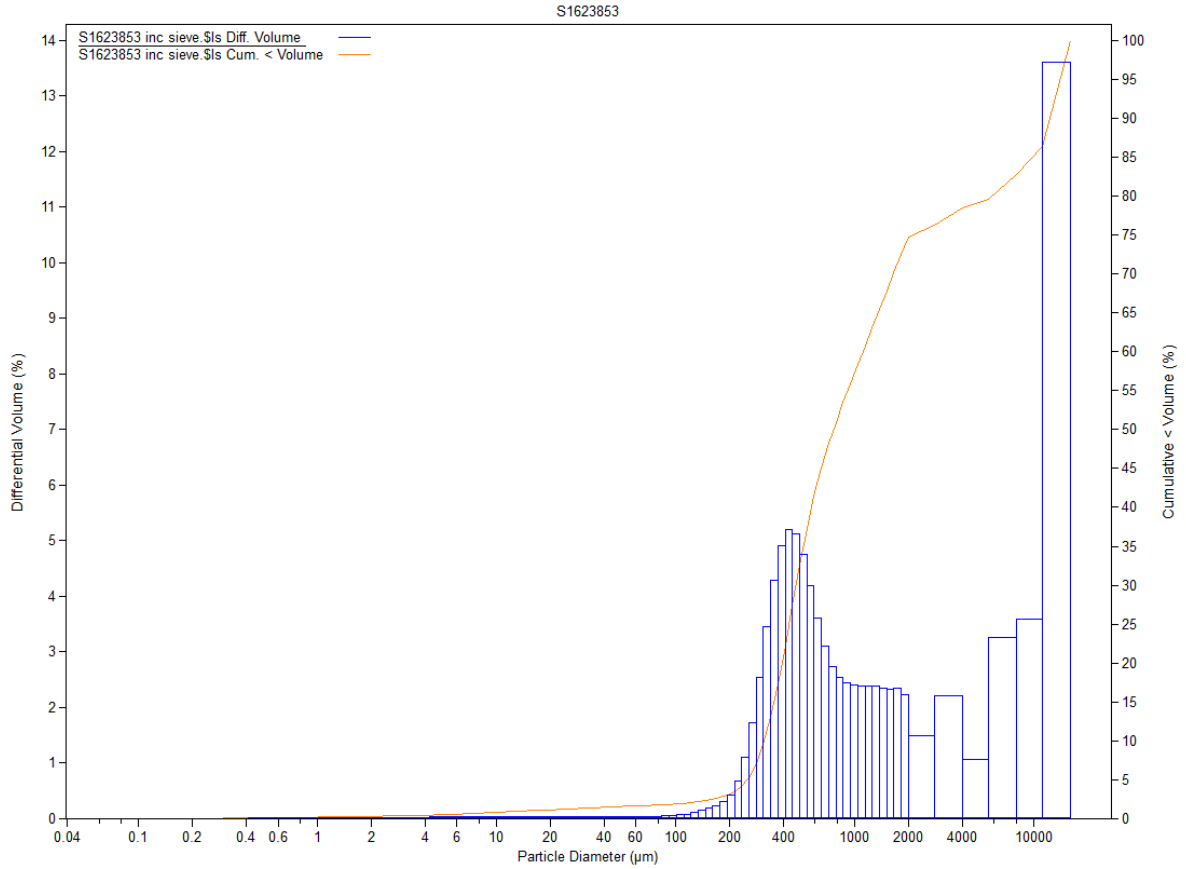


FIGURE 35 - VC10 PARTICLE SIZE ANALYSIS



FIGURE 36 - VC10

TABLE 36 - MARINE SCOTLAND REVISED ACTION LEVELS AGAINST DETECTED LEVELS IN VC11-1

Sample ID: VC11-1				
METALS	Action Level 1 (mg/Kg)	VC11-1 (mg/Kg)	Action Level 2 (mg/Kg)	VC11-1 (mg/Kg)
Arsenic	20	2.8	70	2.8
Cadmium	0.4	0.1	4	0.1
Chromium	50	33	370	33
Copper	30	15.2	300	15.2
Mercury	0.25	< 0.01	1.5	< 0.01
Nickel	30	15.3	150	15.3
Lead	50	17.8	400	17.8
Zinc	130	91.5	600	91.5
Dibutyltin		< 0.005		< 0.005
Tributyltin	0.1	< 0.002	0.5	< 0.002

POLYAROMATIC HYDROCARBONS	Action Level (µg/Kg)	VC11-1 (ng/g)
Acenaphthene	100	1.2
Acenaphthylene	100	< 1
Anthracene	100	< 1
Fluorene	100	< 1
Naphthalene	100	< 1
Phenanthrene	100	6.8
Benzo[a]anthracene	100	2.4
Benzo[b]fluoranthene	100	2.5
Benzo[k]fluoranthene	100	3.6
Benzo[a]pyrene	100	2.2
Benzo[g,h,i]perylene	100	1.8
Dibenzo[a,h]anthracene	10	< 1
Chrysene	100	3.4
Fluoranthene	100	7.4
Pyrene	100	6.1
Indeno(1,2,3cd)pyrene	100	2.3

PCB (mg/kg) AL1=0.02 AL2=0.18

PCB28	PCB52	PCB101	PCB118	PCB153	PCB138	PCB180
<0.0064	<0.0064	<0.0064	<0.0064	<0.0064	<0.0064	<0.0064

**TABLE 37 - DETECETD LEVELS IN VC11-1 LEACHATE**

<b>Sample ID: VC11-1</b>		
	Units	VC11-1
pH	pH Units	7.8
Conductivity	uS/cm	7660
Chloride	mg/l	2340
Fluoride	mg/l	0.6
Total Sulphur (Dissolved)	mg/l	464
Barium (Dissolved)	mg/l	0.32
Nickel (Dissolved)	mg/l	0.002
Chromium (Dissolved)	mg/l	<0.001
Cadium (Dissolved)	mg/l	0.0002
Copper (Dissolved)	mg/l	0.006
Lead (Dissolved)	mg/l	0.003
Zinc (Dissolved)	mg/l	0.077
Arsenic (Dissolved)	mg/l	0.01
Mercury (Dissolved)	mg/l	<0.0001
Selenium (Dissolved)	mg/l	0.013
Molybdenum (Dissolved)	mg/l	0.051
Antimony as Sb (Dissolved)	mg/l	0.002
Ammoniacal Nitrogen	mg/l	3.2
Chromium VI	mg/l	<0.01
Phenol Index	mg/l	<0.05
Total Dissolved solids	mg/l	6000
Aluminium (Dissolved)	mg/l	0.03
Ammonia (Free)	mg/l	0.08
Dissolved Organic Carbon	mg/l	12

<b>POLYAROMATIC HYDROCARBONS</b>	VC11-1 Concentration (µg/l)
Naphthalene	<0.020
Acenaphthylene	<0.010
Acenaphthene	<0.010
Fluorene	<0.010
Phenanthrene	<0.010
Anthracene	<0.010
Fluoranthene	0.015
Pyrene	0.01
Benzo(a)anthracene	<0.010
Chrysene	<0.010
Benzo(b)fluoranthene	<0.010
Benzo(k)fluoranthene	<0.010
Benzo(a)pyrene	<0.010
Indeno(1,2,3-cd)pyrene	<0.010
Dibenzo(a,h)anthracene	<0.010
Benzo(g,h,i)perylene	<0.010
Total (USEPA16) PAHs	<0.175

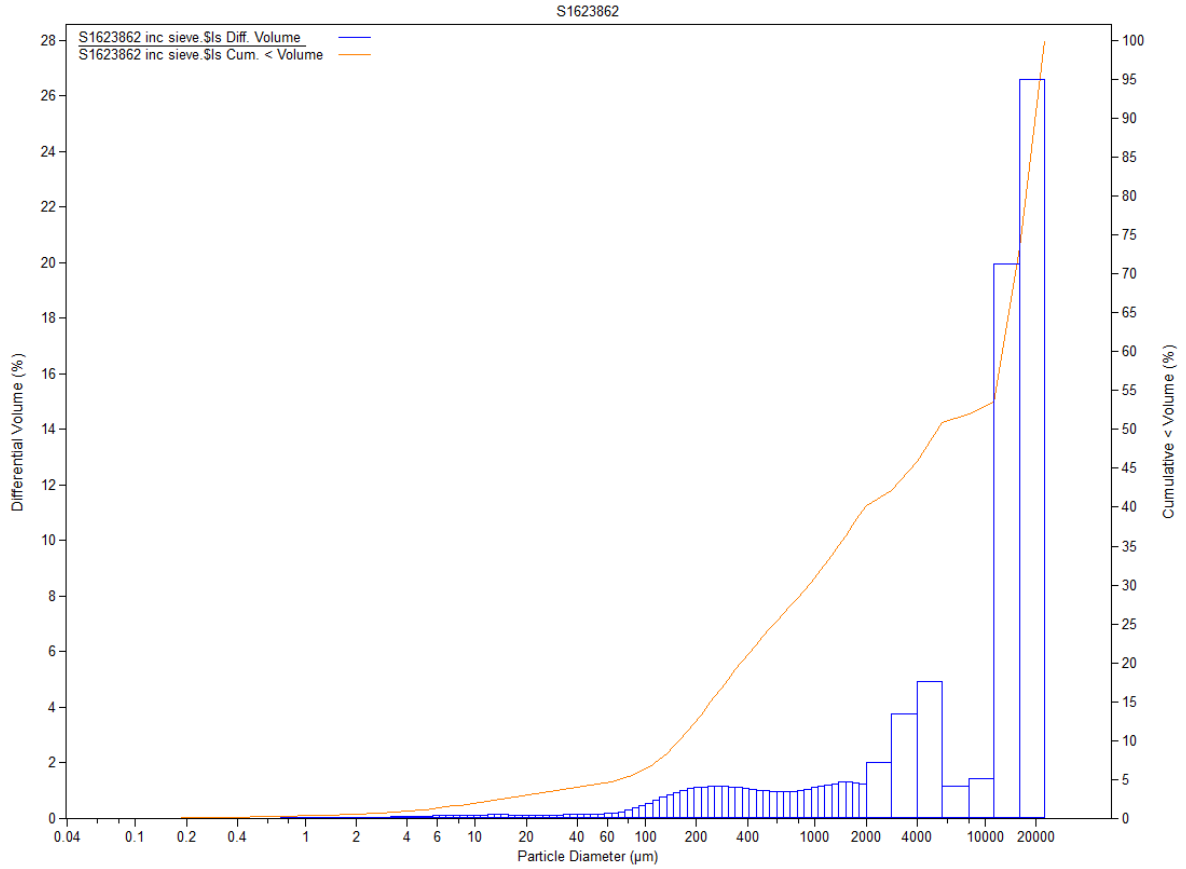


FIGURE 37 - VC11-1 PARTICLE SIZE ANALYSIS

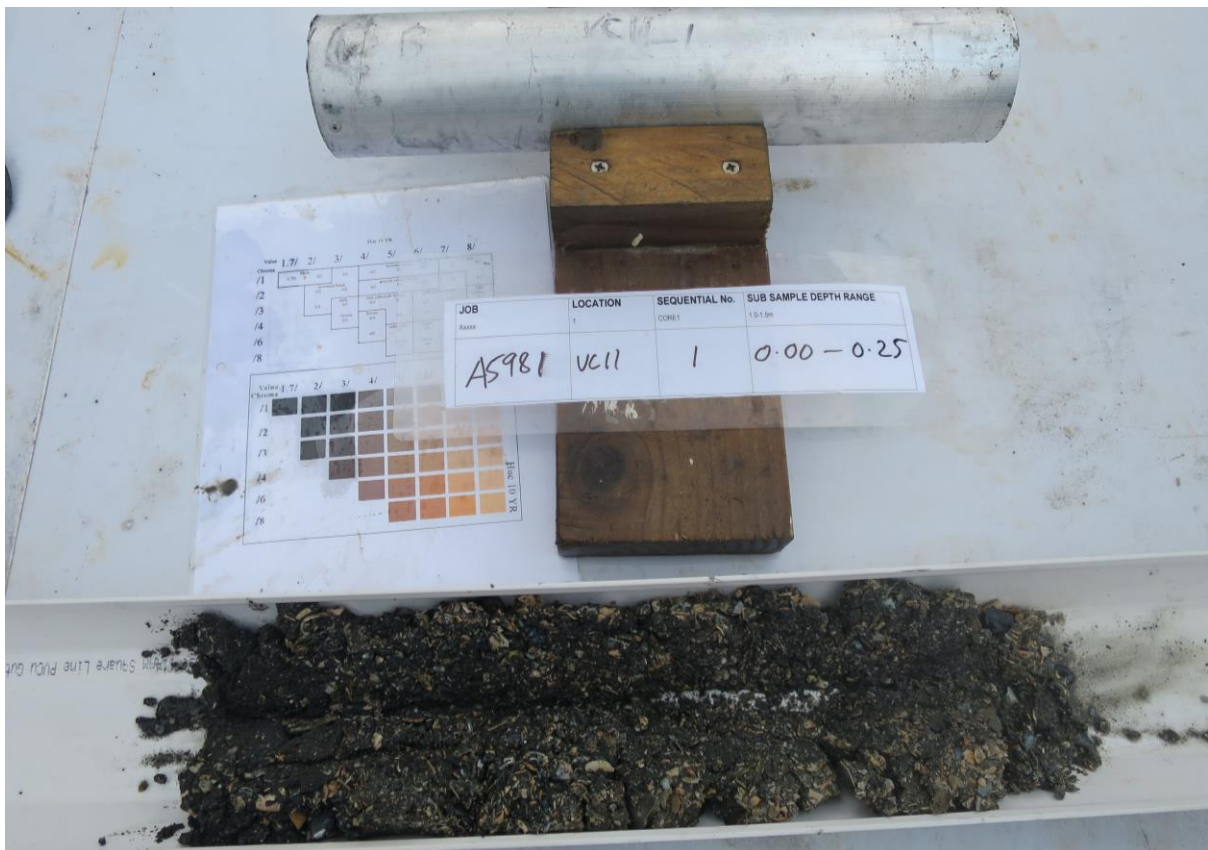


FIGURE 38 - VC11-1



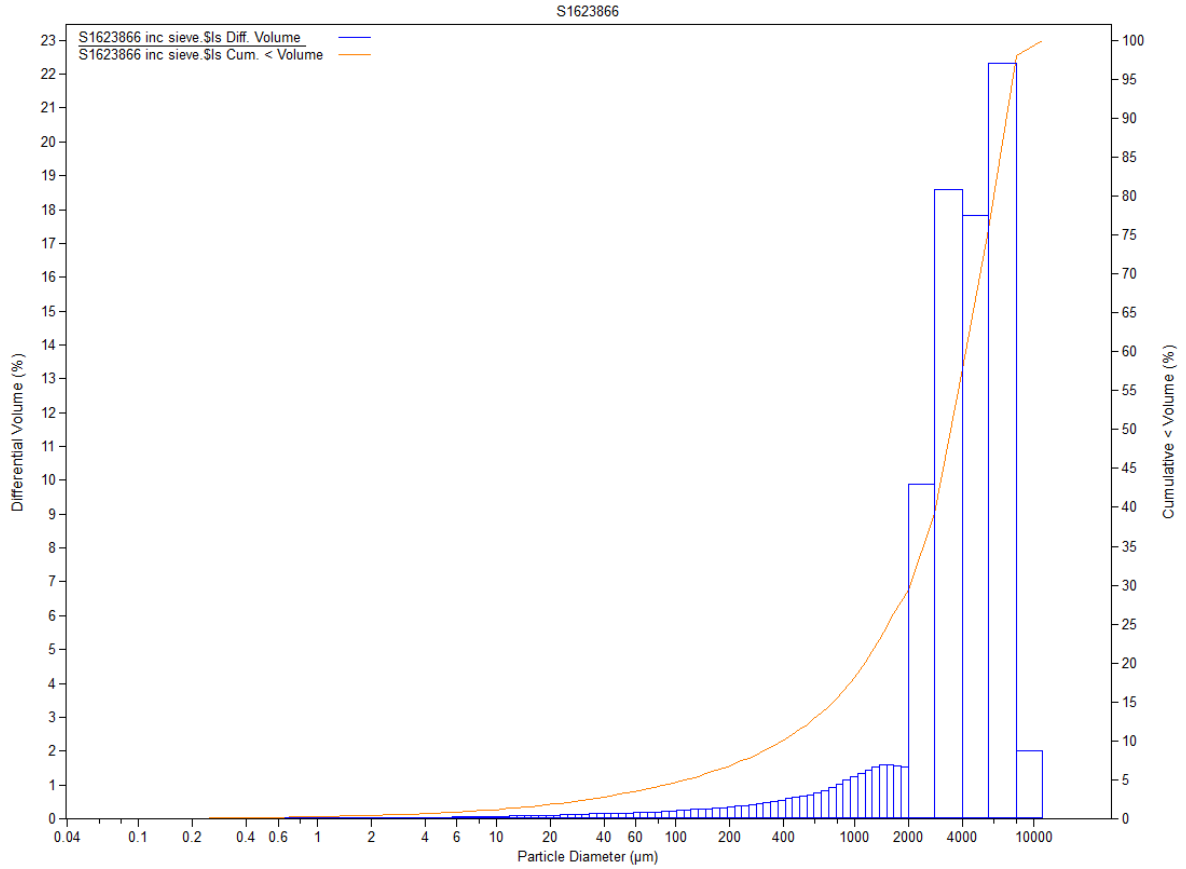


FIGURE 39 - G1 PARTICLE SIZE ANALYSIS



FIGURE 40 - G1

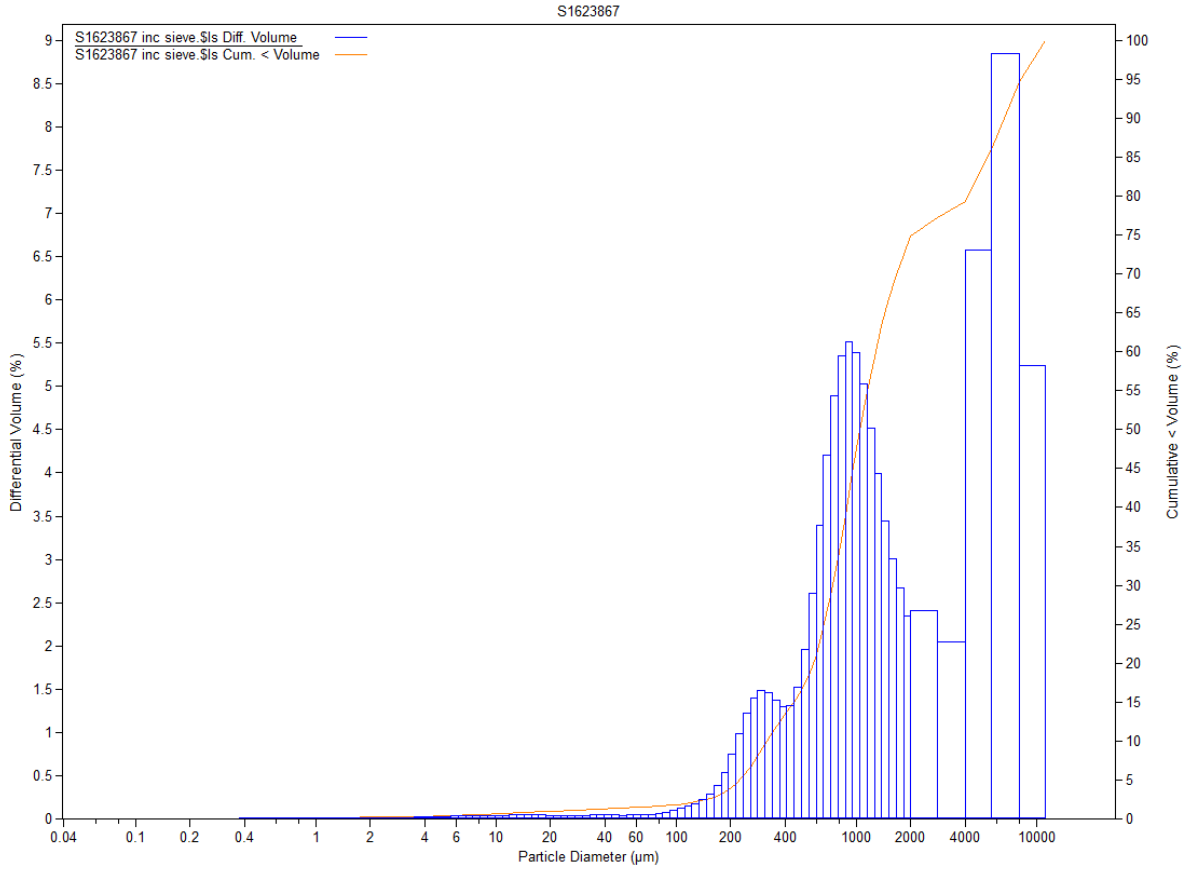


FIGURE 41 - G2 PARTICLE SIZE ANALYSIS

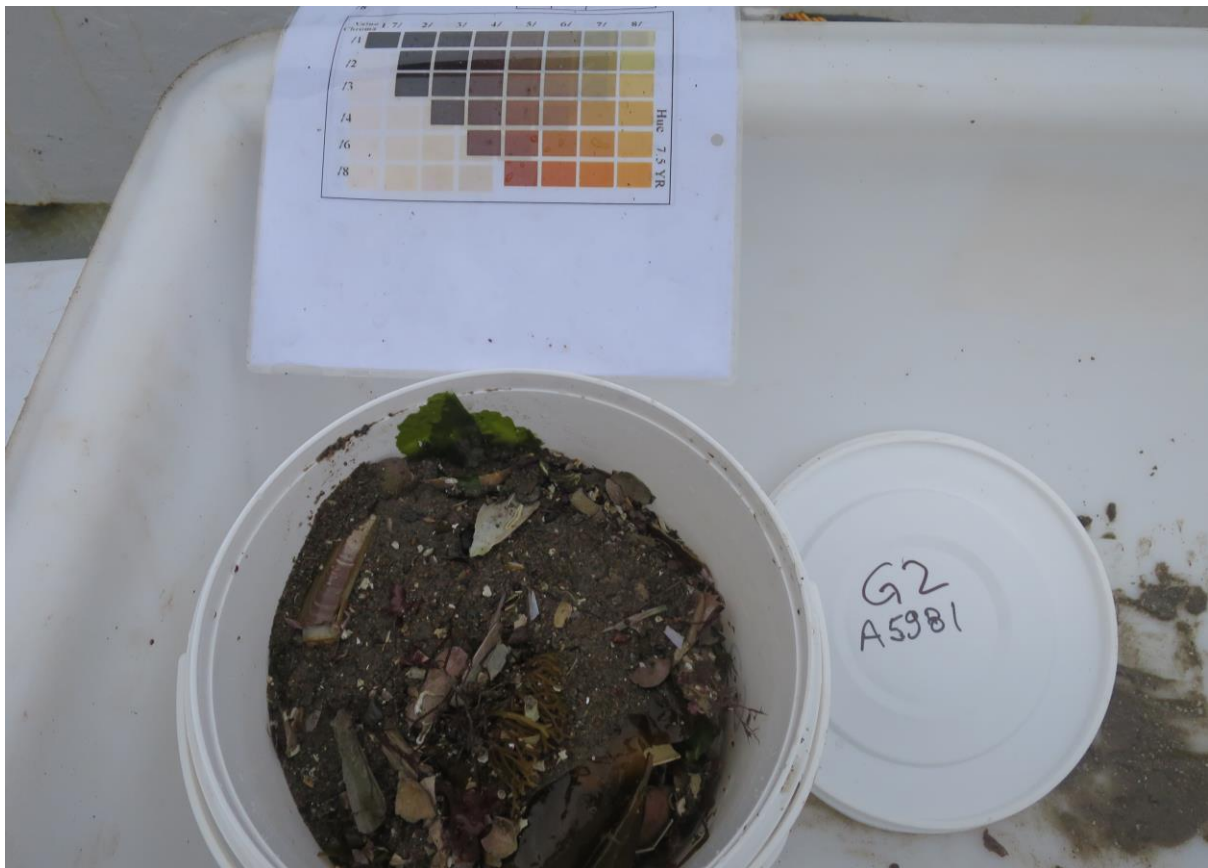


FIGURE 42 - G2

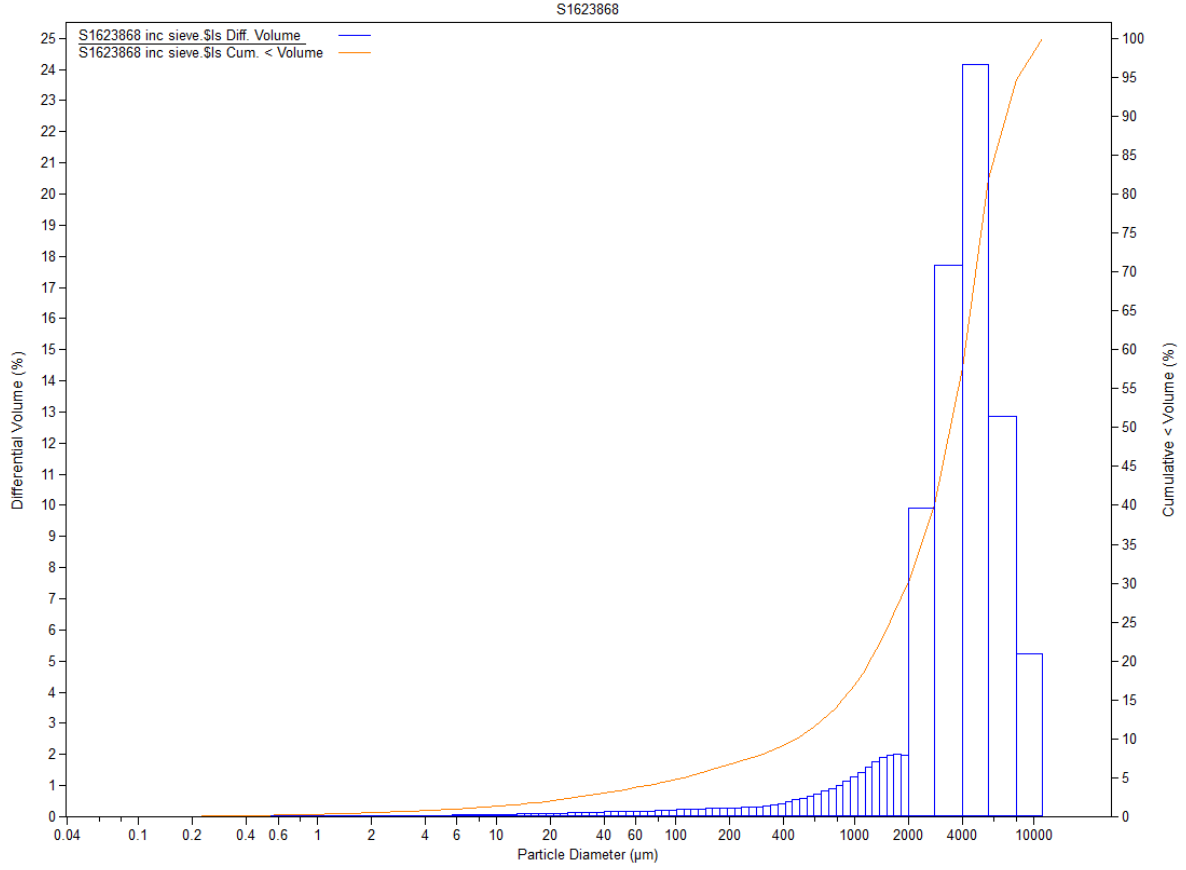


FIGURE 43 - G3 PARTICLE SIZE ANALYSIS



FIGURE 44 - G3

TABLE 38 - MARINE SCOTLAND REVISED ACTION LEVELS AGAINST DETECTED LEVELS IN G4

Sample ID: G4				
METALS	Action Level 1 (mg/Kg)	G4 (mg/Kg)	Action Level 2 (mg/Kg)	G4 (mg/Kg)
Arsenic	20	4.4	70	4.4
Cadmium	0.4	0.1	4	0.1
Chromium	50	40.2	370	40.2
Copper	30	8.9	300	8.9
Mercury	0.25	0.01	1.5	0.01
Nickel	30	17.9	150	17.9
Lead	50	14	400	14
Zinc	130	26.6	600	26.6
Dibutyltin		< 0.005		< 0.005
Tributyltin	0.1	< 0.002	0.5	< 0.002

POLYAROMATIC HYDROCARBONS	Action Levels (µg/Kg)	G4 (ng/g)
Acenaphthene	100	< 1
Acenaphthylene	100	< 1
Anthracene	100	< 1
Fluorene	100	1.2
Naphthalene	100	< 1
Phenanthrene	100	5.3
Benzo[a]anthracene	100	1.4
Benzo[b]fluoranthene	100	1.7
Benzo[k]fluoranthene	100	2.7
Benzo[a]pyrene	100	1.6
Benzo[g,h,i]perylene	100	1.6
Dibenzo[a,h]anthracene	10	< 1
Chrysene	100	3.3
Fluoranthene	100	5.8
Pyrene	100	4.7
Indeno(1,2,3cd)pyrene	100	1.5

PCB (mg/kg) AL1=0.02 AL2=0.18

PCB28	PCB52	PCB101	PCB118	PCB153	PCB138	PCB180
<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006

TABLE 39 - DETECTED LEVELS IN G4 LEACHATE

<b>Sample ID: G4</b>		
	Units	G4
pH	pH Units	7.3
Conductivity	uS/cm	6620
Chloride	mg/l	2050
Fluoride	mg/l	0.6
Total Sulphur (Dissolved)	mg/l	289
Barium (Dissolved)	mg/l	0.25
Nickel (Dissolved)	mg/l	0.002
Chromium (Dissolved)	mg/l	<0.001
Cadium (Dissolved)	mg/l	0.0002
Copper (Dissolved)	mg/l	0.021
Lead (Dissolved)	mg/l	0.002
Zinc (Dissolved)	mg/l	0.091
Arsenic (Dissolved)	mg/l	0.027
Mercury (Dissolved)	mg/l	<0.0001
Selenium (Dissolved)	mg/l	0.004
Molybdenum (Dissolved)	mg/l	0.008
Antimony as Sb (Dissolved)	mg/l	0.001
Ammoniacal Nitrogen	mg/l	1.7
Chromium VI	mg/l	<0.01
Phenol Index	mg/l	<0.05
Total Dissolved solids	mg/l	4600
Aluminium (Dissolved)	mg/l	0.21
Ammonia (Free)	mg/l	0.01
Dissolved Organic Carbon	mg/l	7

<b>POLYAROMATIC HYDROCARBONS</b>	<b>G4 Concentration (µg/l)</b>
Naphthalene	<0.020
Acenaphthylene	<0.010
Acenaphthene	<0.010
Fluorene	<0.010
Phenanthrene	<0.010
Anthracene	<0.010
Fluoranthene	0.051
Pyrene	0.027
Benzo(a)anthracene	0.016
Chrysene	0.01
Benzo(b)fluoranthene	<0.010
Benzo(k)fluoranthene	<0.010
Benzo(a)pyrene	<0.010
Indeno(1,2,3-cd)pyrene	<0.010
Dibenzo(a,h)anthracene	<0.010
Benzo(g,h,i)perylene	<0.010
Total (USEPA16) PAHs	<0.234

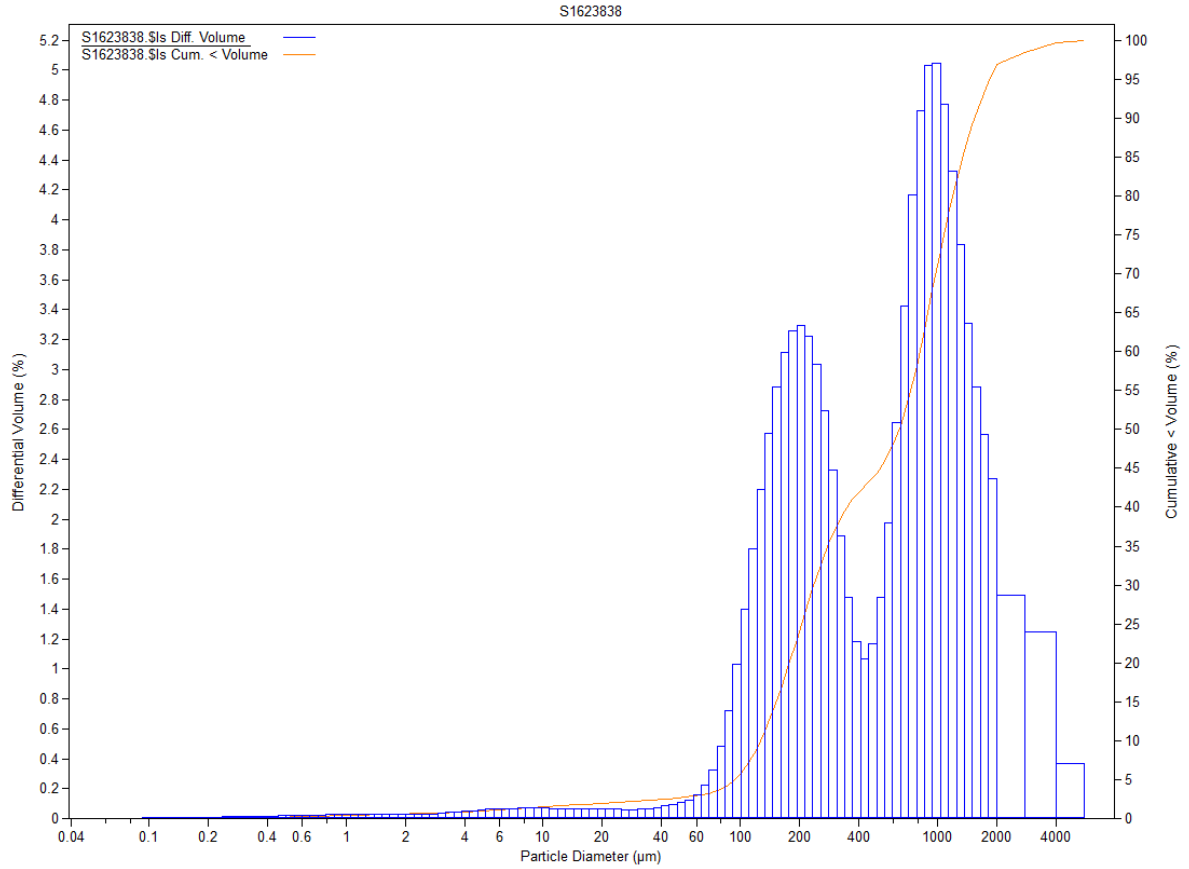


FIGURE 45 - G4 PARTICLE SIZE ANALYSIS

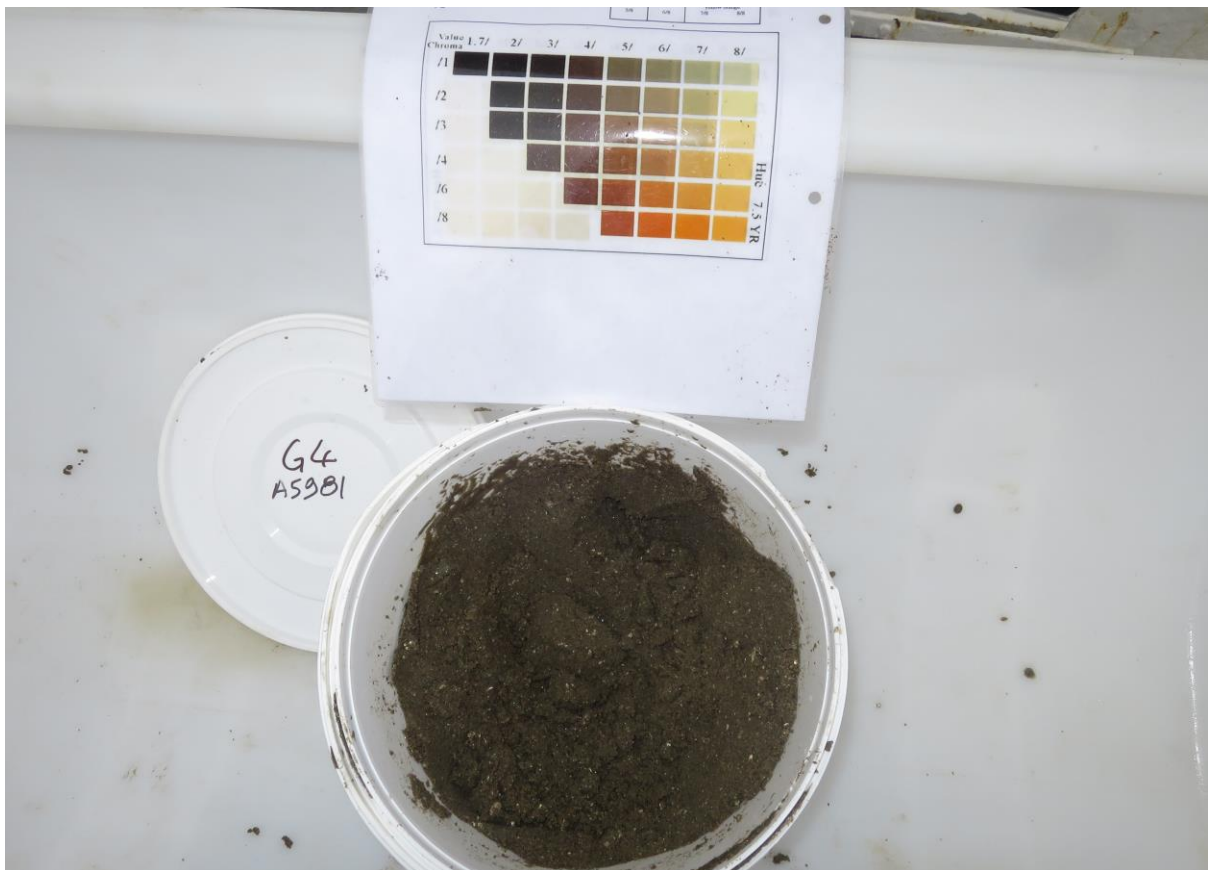


FIGURE 46 - G4

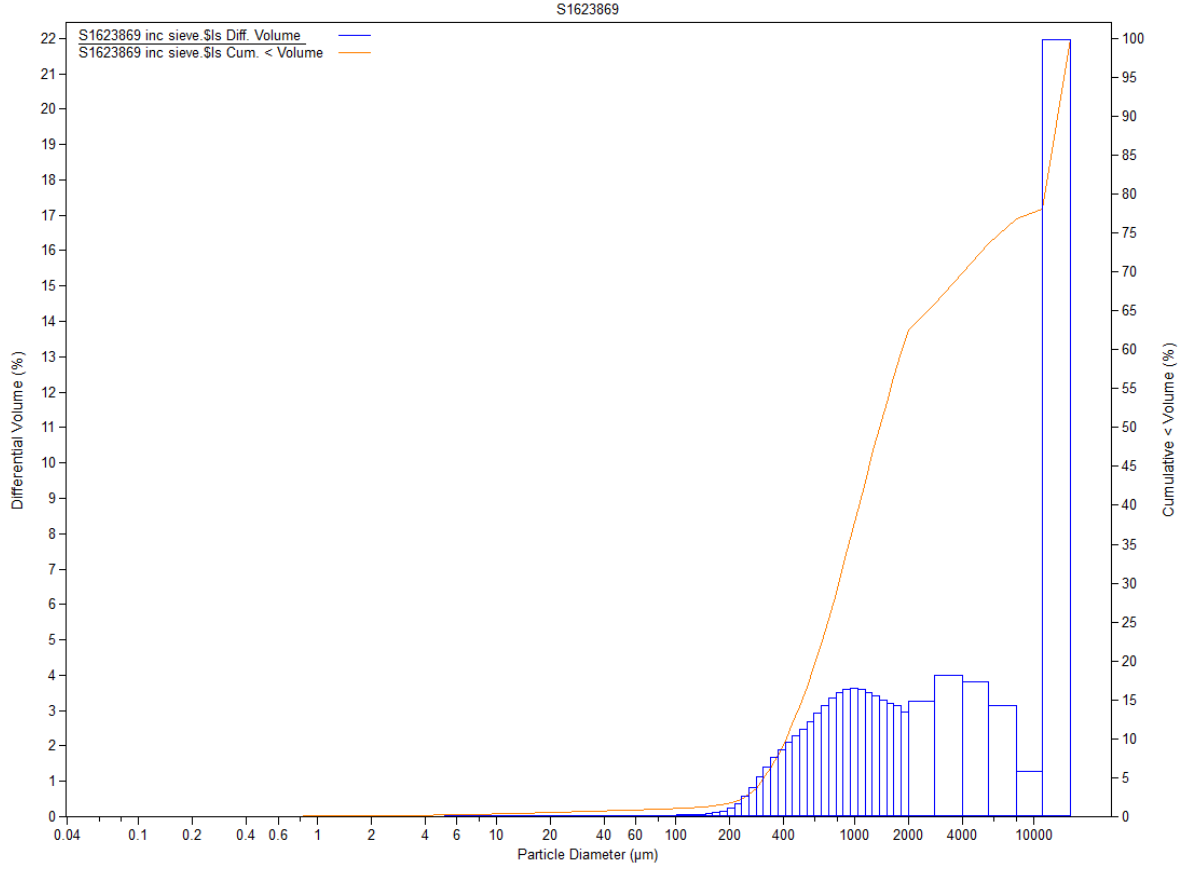


FIGURE 47 - G5 PARTICLE SIZE ANALYSIS

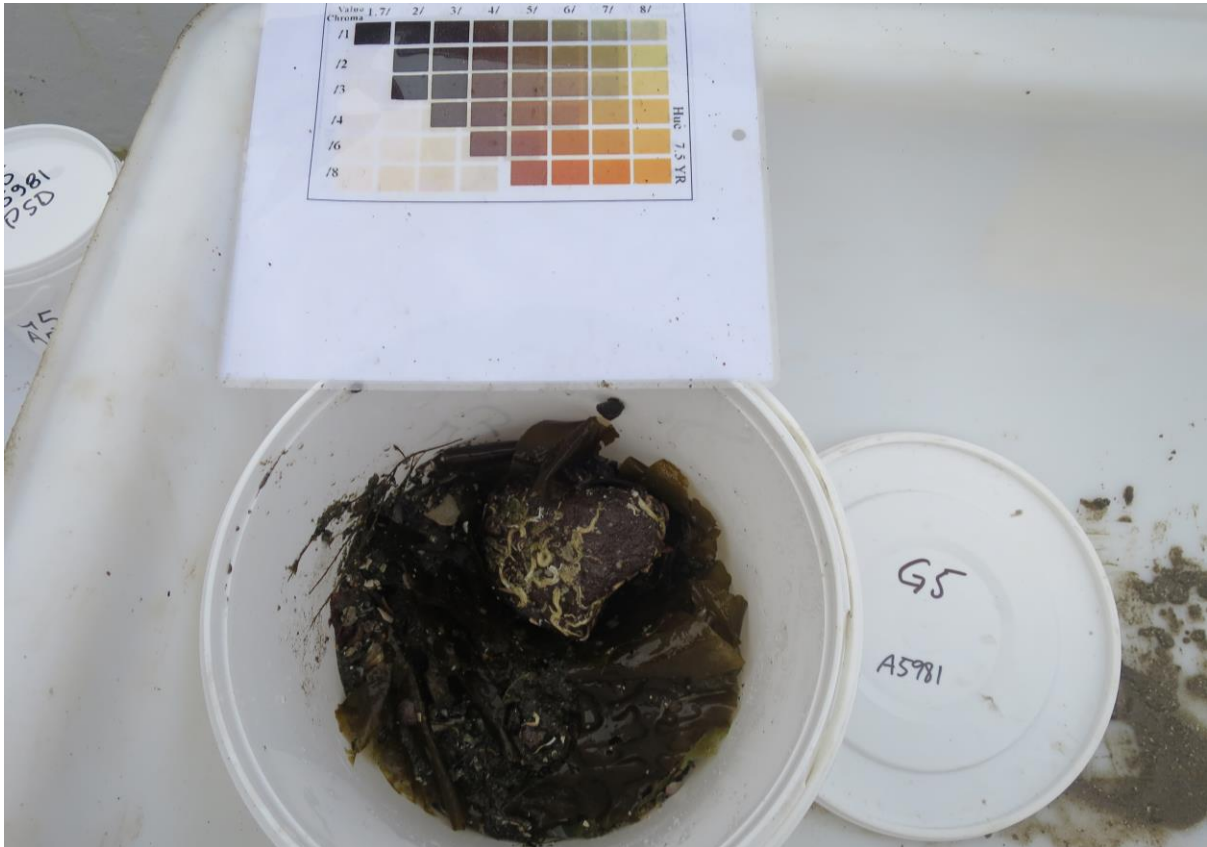


FIGURE 48 - G5

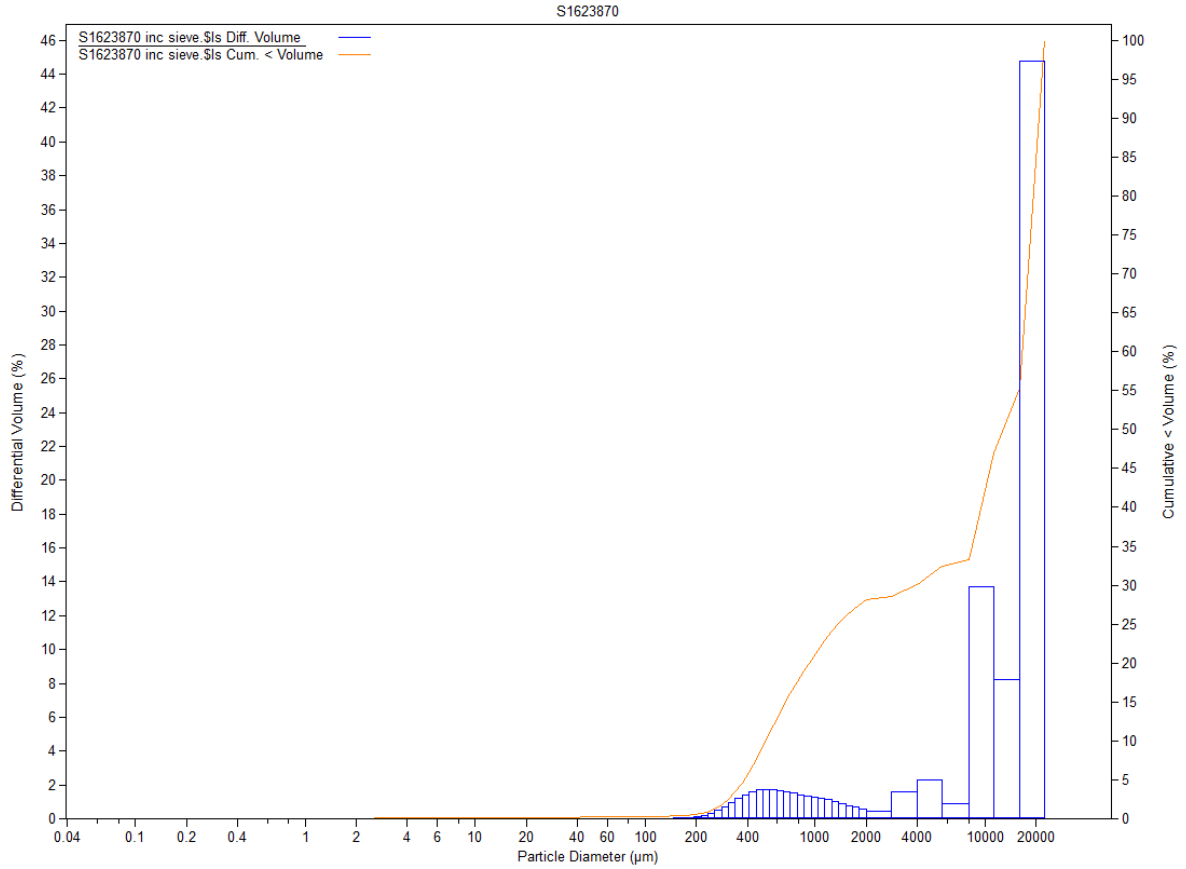


FIGURE 49 - G6 PARTICLE SIZE ANALYSIS



FIGURE 50 - G6



TABLE 40 - MARINE SCOTLAND REVISED ACTION LEVELS AGAINST DETECTED LEVELS IN G7

Sample ID: G7				
METALS	Action Level 1 (mg/Kg)	G7 (mg/Kg)	Action Level 2 (mg/Kg)	G7 (mg/Kg)
Arsenic	20	2.8	70	2.8
Cadmium	0.4	< 0.1	4	< 0.1
Chromium	50	56	370	56
Copper	30	13.5	300	13.5
Mercury	0.25	<0.01	1.5	<0.01
Nickel	30	19.5	150	19.5
Lead	50	14.2	400	14.2
Zinc	130	34	600	34
Dibutyltin		< 0.005		< 0.005
Tributyltin	0.1	< 0.002	0.5	< 0.002

POLYAROMATIC HYDROCARBONS	Action Level (µg/Kg)	ng/g
Acenaphthene	100	< 1
Acenaphthylene	100	< 1
Anthracene	100	< 1
Fluorene	100	< 1
Naphthalene	100	< 1
Phenanthrene	100	< 1
Benzo[a]anthracene	100	< 1
Benzo[b]fluoranthene	100	< 1
Benzo[k]fluoranthene	100	< 1
Benzo[a]pyrene	100	< 1
Benzo[g,h,i]perylene	100	< 1
Dibenzo[a,h]anthracene	10	< 1
Chrysene	100	< 1
Fluoranthene	100	< 1
Pyrene	100	< 1
Indeno(1,2,3cd)pyrene	100	< 1

PCB (mg/kg) AL1=0.02 AL2=0.18

PCB28	PCB52	PCB101	PCB118	PCB153	PCB138	PCB180
<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062

TABLE 41 - DETECTED LEVELS IN G7 LEACHATE

<b>Sample ID: G7</b>		
	Units	G7
pH	pH Units	8.2
Conductivity	uS/cm	5740
Chloride	mg/l	1990
Fluoride	mg/l	0.6
Total Sulphur (Dissolved)	mg/l	133
Barium (Dissolved)	mg/l	0.38
Nickel (Dissolved)	mg/l	0.004
Chromium (Dissolved)	mg/l	0.001
Cadium (Dissolved)	mg/l	<0.0001
Copper (Dissolved)	mg/l	0.011
Lead (Dissolved)	mg/l	0.002
Zinc (Dissolved)	mg/l	0.103
Arsenic (Dissolved)	mg/l	0.063
Mercury (Dissolved)	mg/l	<0.0001
Selenium (Dissolved)	mg/l	0.004
Molybdenum (Dissolved)	mg/l	0.01
Antimony as Sb (Dissolved)	mg/l	0.004
Ammoniacal Nitrogen	mg/l	1
Chromium VI	mg/l	<0.01
Phenol Index	mg/l	0.05
Total Dissolved solids	mg/l	4400
Aluminium (Dissolved)	mg/l	0.17
Ammonia (Free)	mg/l	0.05
Dissolved Organic Carbon	mg/l	22

<b>POLYAROMATIC HYDROCARBONS</b>	Concentrations (ug/l)
Naphthalene	<0.020
Acenaphthylene	<0.010
Acenaphthene	<0.010
Fluorene	<0.010
Phenanthrene	0.016
Anthracene	<0.010
Fluoranthene	<0.010
Pyrene	<0.010
Benzo(a)anthracene	<0.010
Chrysene	<0.010
Benzo(b)fluoranthene	<0.010
Benzo(k)fluoranthene	<0.010
Benzo(a)pyrene	<0.010
Indeno(1,2,3-cd)pyrene	<0.010
Dibenzo(a,h)anthracene	<0.010
Benzo(g,h,i)perylene	<0.010
Total (USEPA16) PAHs	<0.176

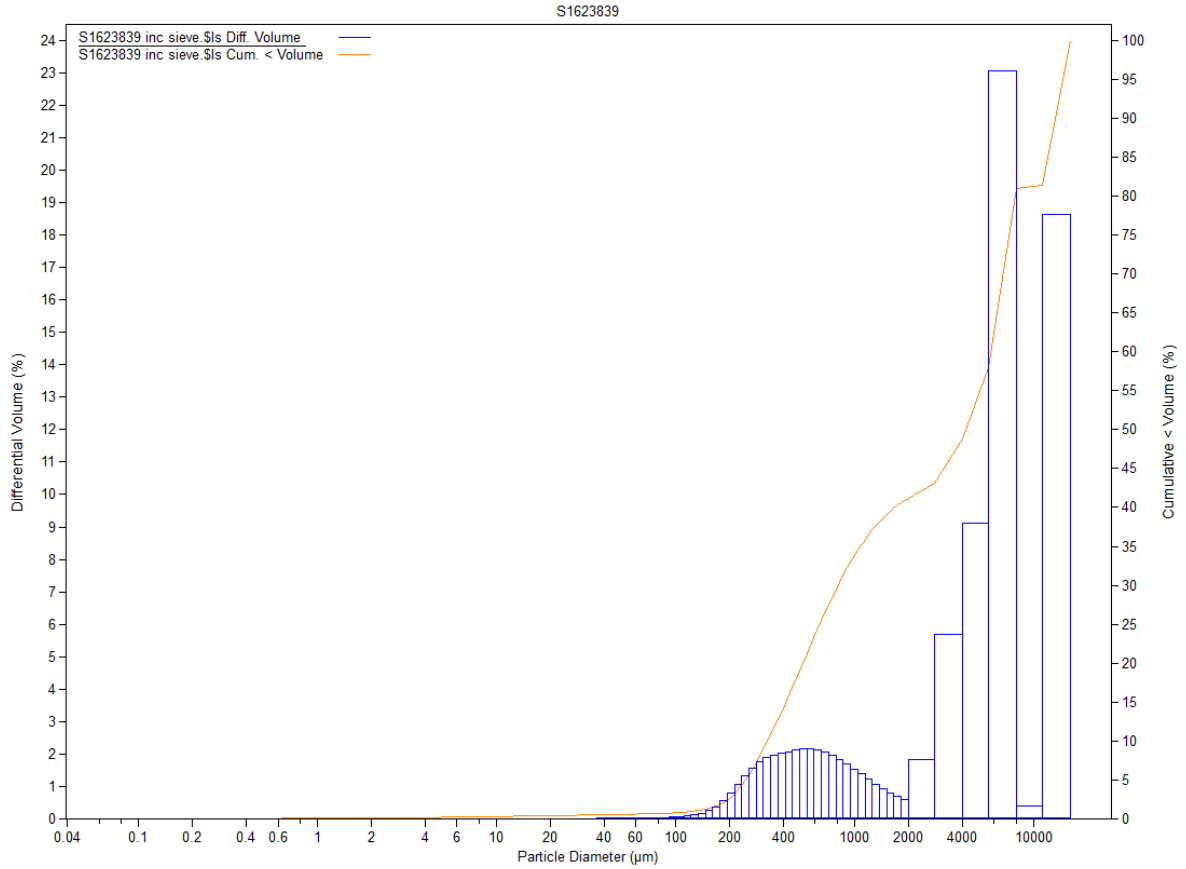


FIGURE 51 - G7 PARTICLE SIZE ANALYSIS

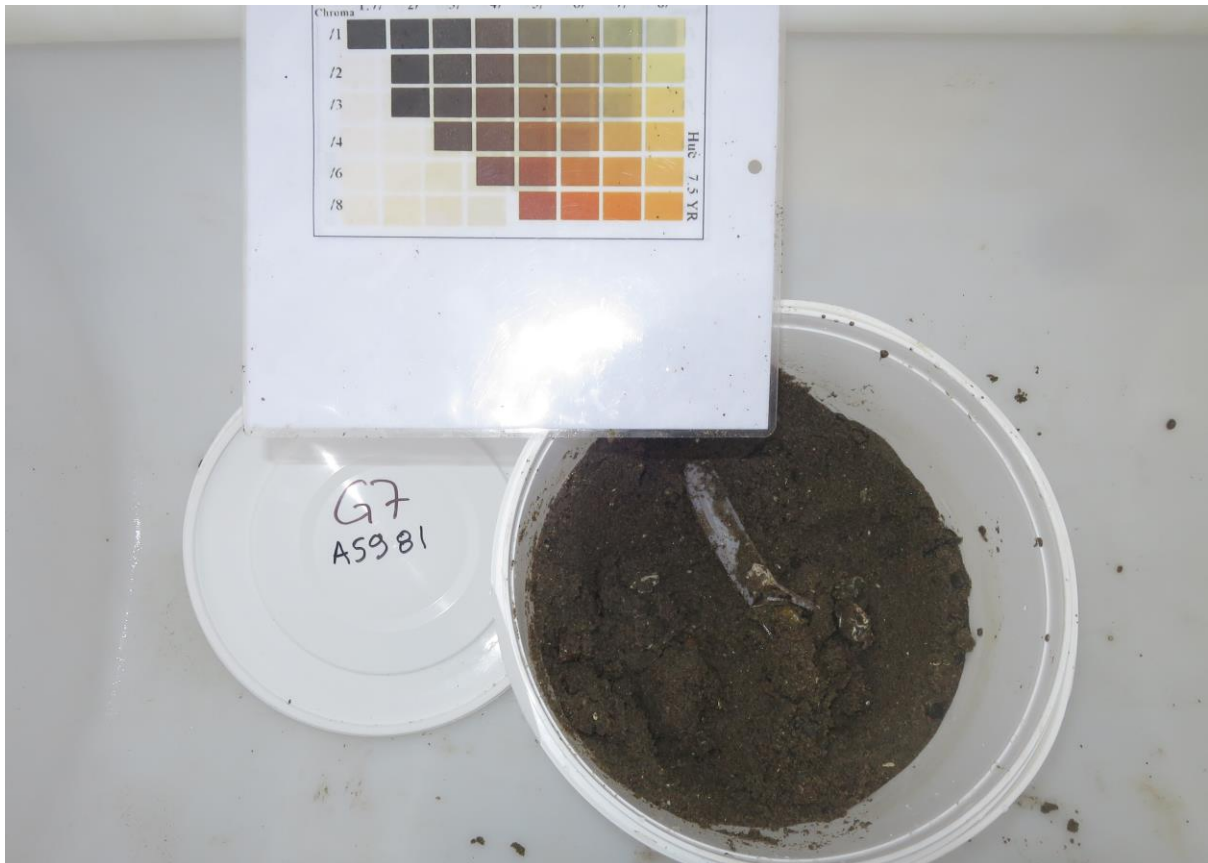


FIGURE 52 - G7

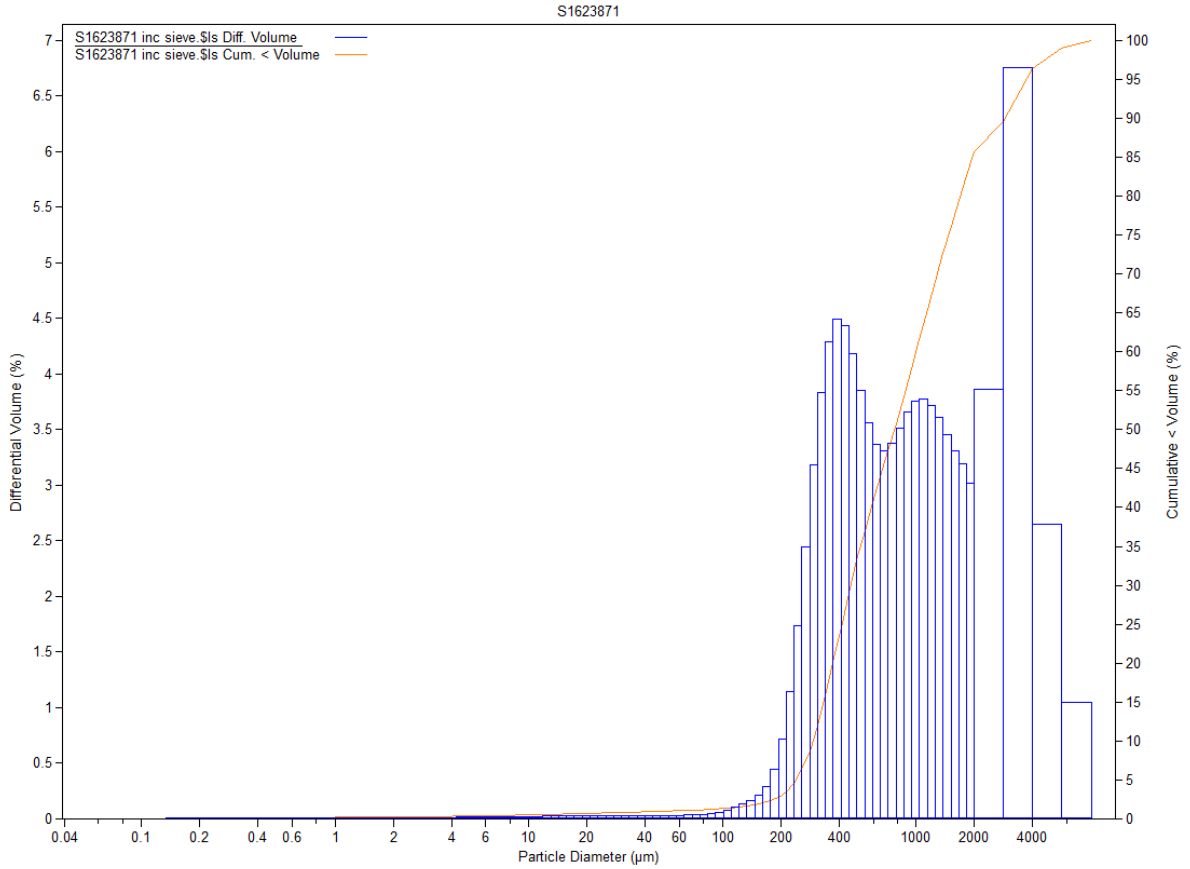


FIGURE 53 - G9 PARTICLE SIZE ANALYSIS



FIGURE 54 - G9

TABLE 42 - MARINE SCOTLAND REVISED ACTION LEVELS AGAINST DETECTED LEVELS IN G11

Sample ID: G11				
METALS	Action Level 1 (mg/Kg)	G11 (mg/Kg)	Action Level 2 (mg/Kg)	G11 (mg/Kg)
Arsenic	20	3.4	70	3.4
Cadmium	0.4	0.1	4	0.1
Chromium	50	68.2	370	68.2
Copper	30	18	300	18
Mercury	0.25	< 0.01	1.5	< 0.01
Nickel	30	29.5	150	29.5
Lead	50	26	400	26
Zinc	130	43.3	600	43.3
Dibutyltin		< 0.005		< 0.005
Tributyltin	0.1	< 0.002	0.5	< 0.002

POLYAROMATIC HYDROCARBONS	Action Level (µg/Kg)	G11 (ng/g)
Acenaphthene	100	< 1
Acenaphthylene	100	< 1
Anthracene	100	< 1
Fluorene	100	< 1
Naphthalene	100	< 1
Phenanthrene	100	< 1
Benzo[a]anthracene	100	< 1
Benzo[b]fluoranthene	100	< 1
Benzo[k]fluoranthene	100	< 1
Benzo[a]pyrene	100	< 1
Benzo[g,h,i]perylene	100	< 1
Dibenzo[a,h]anthracene	10	< 1
Chrysene	100	< 1
Fluoranthene	100	< 1
Pyrene	100	< 1
Indeno(1,2,3cd)pyrene	100	< 1

PCB (mg/kg) AL1=0.02 AL2=0.18

PCB28	PCB52	PCB101	PCB118	PCB153	PCB138	PCB180
<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

**TABLE 43 - DETECTED LEVELS IN G11 LEACHATE**

<b>Sample ID: G11</b>		
	Units	G11
pH	pH Units	7.9
Conductivity	uS/cm	6350
Chloride	mg/l	2130
Fluoride	mg/l	0.4
Total Sulphur (Dissolved)	mg/l	275
Barium (Dissolved)	mg/l	0.13
Nickel (Dissolved)	mg/l	0.001
Chromium (Dissolved)	mg/l	0.001
Cadium (Dissolved)	mg/l	<0.0001
Copper (Dissolved)	mg/l	0.006
Lead (Dissolved)	mg/l	0.003
Zinc (Dissolved)	mg/l	0.065
Arsenic (Dissolved)	mg/l	0.006
Mercury (Dissolved)	mg/l	<0.0001
Selenium (Dissolved)	mg/l	0.008
Molybdenum (Dissolved)	mg/l	0.008
Antimony as Sb (Dissolved)	mg/l	<0.001
Ammoniacal Nitrogen	mg/l	4.5
Chromium VI	mg/l	<0.01
Phenol Index	mg/l	<0.05
Total Dissolved solids	mg/l	5100
Aluminium (Dissolved)	mg/l	0.04
Ammonia (Free)	mg/l	0.13
Dissolved Organic Carbon	mg/l	5.1

<b>POLYAROMATIC HYDROCARBONS</b>	<b>Concentrations (ug/l)</b>
Naphthalene	0.057
Acenaphthylene	<0.010
Acenaphthene	<0.010
Fluorene	<0.010
Phenanthrene	0.019
Anthracene	<0.010
Fluoranthene	0.013
Pyrene	<0.010
Benzo(a)anthracene	<0.010
Chrysene	<0.010
Benzo(b)fluoranthene	<0.010
Benzo(k)fluoranthene	<0.010
Benzo(a)pyrene	<0.010
Indeno(1,2,3-cd)pyrene	<0.010
Dibenzo(a,h)anthracene	<0.010
Benzo(g,h,i)perylene	<0.010
Total (USEPA16) PAHs	<0.219

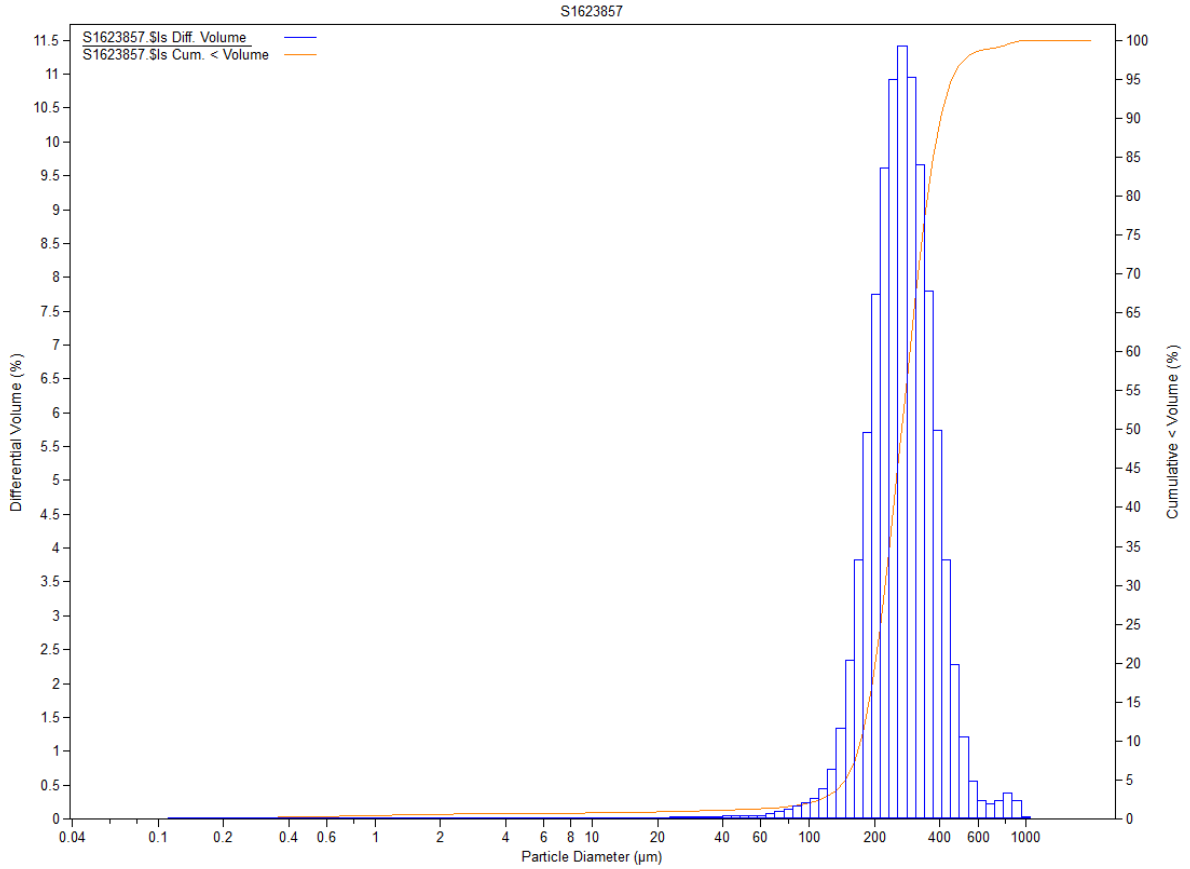


FIGURE 55 - G11 PARTICLE SIZE ANALYSIS

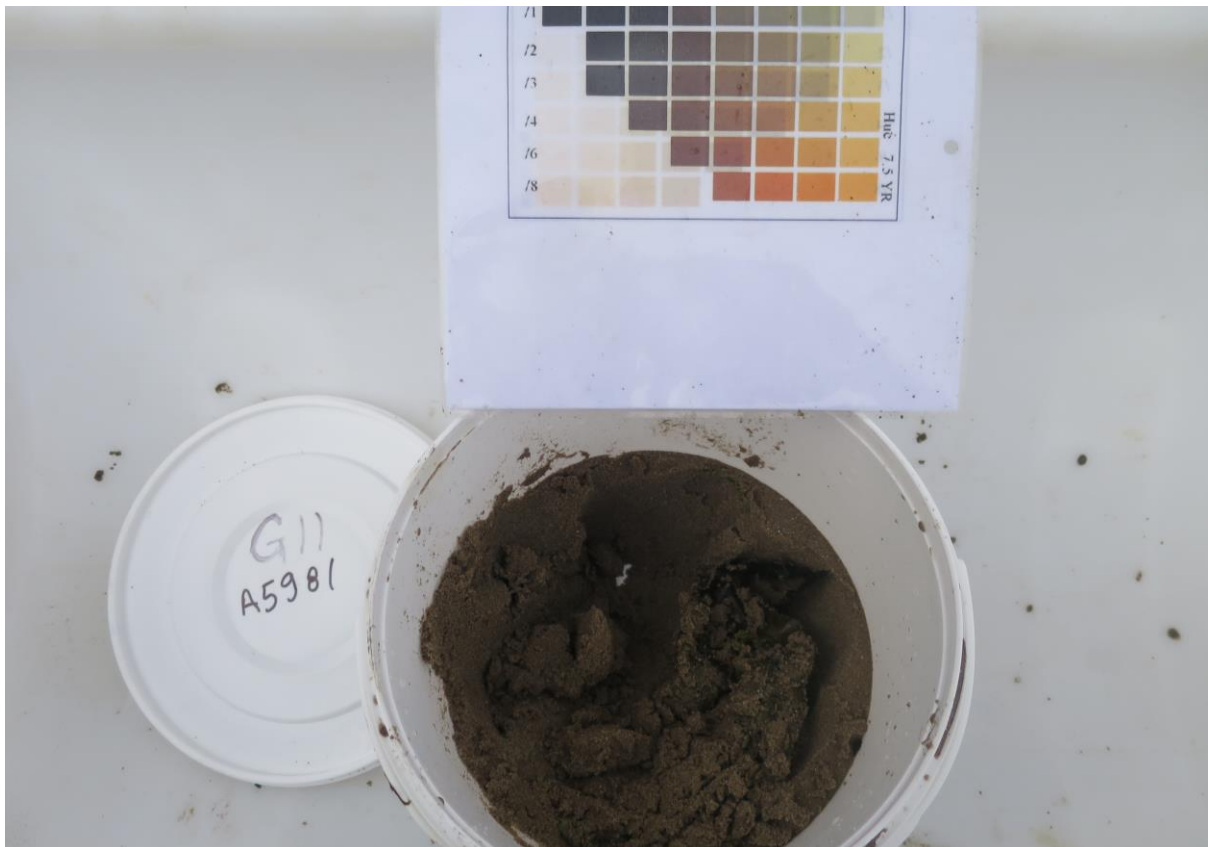


FIGURE 56 - G11

## 7. Survey Vessel

ALHS' 16.5m survey vessel Vigilance was mobilised for the sampling operation. The vessel is MCA Cat II coded for work up to 60nm offshore and is well equipped with a crane and 'A frame' to carry out the sampling operations as well as a trawl winch to recover samples.

On-board freezers are used to store and maintain the samples in good condition as prior to despatch to the laboratory for analysis.



FIGURE 57 - ALHS' MCA CAT II VESSEL: VIGILANCE

## 8. Personnel

The following personnel were involved in the survey:

Name	Position
Colin Thomson	Project Management, Party Chief
Nicol McCallum	Sampler / Surveyor
Andrew McCormick	Vessel Skipper / Engineer / Sampler
Paul McCormick	Deck Hand

All staff have marine survey experience, and adhered to Health & Safety instructions, including the wearing of life jackets at all times. The client provided an induction prior to commencement of the work, to enable personnel to work within the Marine Base unescorted.



**Annex A**  
Standard Disclaimer

A5981

1. All client-supplied data is taken on trust as being accurate and correct, and the subcontractor cannot be held responsible for the quality and accuracy of that data set.
2. Geophysical interpretation of bathymetry and sonar is based on an informed opinion of the supplied data, and is subject to inherent errors out with the control of the interpretational hydrographer or geophysicist, which include but are not limited to GPS positioning errors, navigation busts, data quality, assumed speed velocity sediment profiles in the absence of Geotechnical data, sub bottom profile pulse width, and induced scaling errors therein associated with seismic signature. Seabed geomorphology and sub-seabed geology should be further investigated by visual or intrusive methods.
3. The limits of this survey are defined by the data set; out with the survey limits are not covered at any level by the subcontractor.
4. The data is accurate at the time of data acquisition, the subcontractor cannot be held responsible for environmental changes, and the client by accepting this report accepts that the environment of the seabed is subject to continuous change, that items of debris, hard contacts etc. may move, appear, be relocated or removed, thickness of surficial sediment change out with the knowledge of the subcontractor and they will not be held responsible for such actions at any level.