Annex 7.2

South Humber Channel Marine Studies:

Water & Sediment Quality

(Institute of Estuarine and Coastal Studies University of Hull)

the
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Institute of Estuarine and Coastal Studies (IECS)

South Humber Channel Marine Studies: Water & Sediment Quality

Report to Yorkshire Forward

Institute of Estuarine and Coastal Studies
University of Hull

September 2010

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Report: ZBB752B-F-2010

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Client :Yorkshire Forward

Title: South Humber Channel Marine Studies: Water & Sediment Quality

September 2010

Reference No: **ZBB752B-F-2010**

For and on behalf of the Institute of Estuarine and Coastal Studies	
Approved by:	_____
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Position:	_____
Date:	_____

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1. INTRODUCTION

Yorkshire Forward is currently investigating the feasibility of commercial development in the Humber Estuary between the Humber Sea Terminal and Immingham Port (Figure 1).

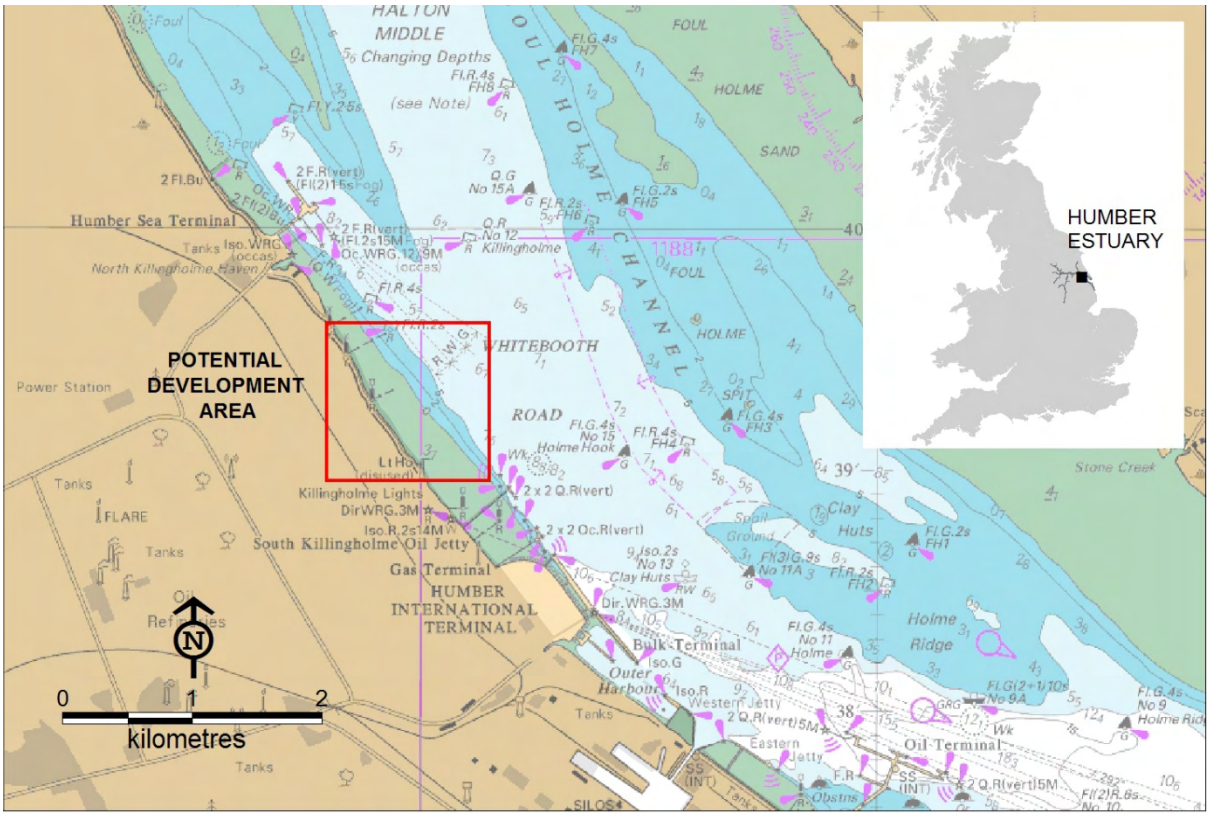


Figure 1: Potential development area in the Humber estuary.

The area has the potential to provide a suitable location for a variety of development types including a multi-user marine facility or a tidal power generator. In assessing the feasibility of any such development, a host of studies relating to the marine elements of the development are required which will then act as baseline data if the development is taken forward to the Environmental Impact Assessment (EIA) stage.

The Institute of Estuarine & Coastal Studies has been commissioned in association with Roger Tym & Partner, to undertake some of the components required. This report details the methodologies employed and presents the data obtained from the water and sediment quality surveys undertaken in May/June 2010. The aim of these surveys was to provide baseline data on the quality of the water and sediment within the area. This report presents the initial findings of these surveys, with no further discussion or analysis of the data.

2. METHODOLOGY

2.1 Water Quality

The water sampling was carried out on board the *Rebecca M*. A YSI multi-parameter water quality monitor (Sonde) was set to record data every second and was calibrated at zero by placing the sensor head just above the water. The Sonde was weighted and deployed over board while the vessel was stationary. Data relating to temperature, pressure, salinity, PH and conductivity were measured and logged on to the hand held display unit for retrieval at the end of the survey. Samples were taken throughout the day covering ebb, flood and slack tidal conditions.

2.2 Sediment Quality

2.2.1 PARTICLE SIZE ANALYSIS SAMPLE COLLECTION

A single PSA sample was collected from each of the 36 intertidal benthic sampling stations (Bailey *et al* 2010)[1]. Each station was accessed by hovercraft and located using a hand-held WAAS enabled Thales Mobile Mapper GPS. Each sample was collected using a clean plastic spoon to remove the top layer (2-3cm), of undisturbed sediment within two metres of the invertebrate core sample. The samples were stored in sealed plastic bags and labelled externally with information such as client, project, site, date and the analysis required. The sediment samples were placed in a cool box containing ice packs to maintain a constant low temperature (approximately 4-5°C). At the end of the day the PSA samples were transferred to the IECS laboratory where they were kept frozen until analysis.

A single PSA sample was also collected from each of the 30 pre-determined subtidal benthic sampling stations which were located by the DGPS on board the Water Guardian, an Environment Agency Survey Vessel. A $0.1m^2$ Hamon grab was lowered to the seabed and the resulting sample recovered (Plate 1). Due to the lack of inspection doors within the Hamon grab, the volume of the sample could not be assessed whilst the sample was retained within the grab. Therefore the collected sediment was removed to an underlying container prior to evaluation. Where the volume of retained material was less than 5 litres the sample was rejected.

[1] M. Bailey, C. Baulcomb, D. Burdon, O. Dawes, A. Leighton, W. Musk & T. Smith (2010). Humber Terminal Intertidal and Subtidal Benthic & Fish Surveys. Reference No. ZBB752

Plate 1: Recovery of the Hamon grab.

A single grab sample was taken at each station for macrofaunal and sediment analysis. Each acceptable sample was removed from the Hamon grab, placed into a clean fish box and photographed (Annex 2). A clean plastic scoop was then used to mix the sample and remove approximately 100g of sediment for PSA. The sample was then stored in a plastic bag, which was clearly labelled, and kept in a cool box until the end of the day, at which point it was transferred to IECS and kept frozen until analysis.

A complete survey log was maintained throughout both the intertidal and subtidal surveys detailing time, position, physical characteristics of the sediment, climatic conditions, biological surface features (e.g. tubes, casts, feeding pits, faecal mounds) and any other notable features. In addition, photographs of the intertidal sites and the subtidal samples were taken at each sampling location (Annex 1).

2.2.2 CONTAMINANT SAMPLE COLLECTION

2.2.2.1 Intertidal & subtidal samples

Sediment samples were also collected for contaminant analysis at six of the intertidal sampling stations and six of the subtidal sampling stations (Figures 3 & 4). Samples were collected using the same methods as described for PSA sample collection. Sample containers were supplied by Alcontrol and returned to the Alcontrol laboratory in cool boxes via courier for subsequent analysis.

2.2.2.2 Vibracore samples

As part of the Ground Investigation works Vinci Construction UK Ltd were commissioned by Yorkshire Forward to undertake a programme of vibracores (Vinci 2010)[2]. Vibracore stations were identified by Vinci construction of which IECS collected sediment samples from 21 of the proposed stations. The vibracore samples were collected in a six meter long clear

[2] Vinci 2010, Report on a Ground Investigation at South Humber Channel Marine Studies. Reference No. F15842.

plastic tube of 10cm diameter. Vinci cut the core into one meter sections for subsequent shear force testing. The sediment samples were therefore gathered from the cut ends of the one meter sections. The core was cut with a hack saw, then capped and taped to keep it fresh.

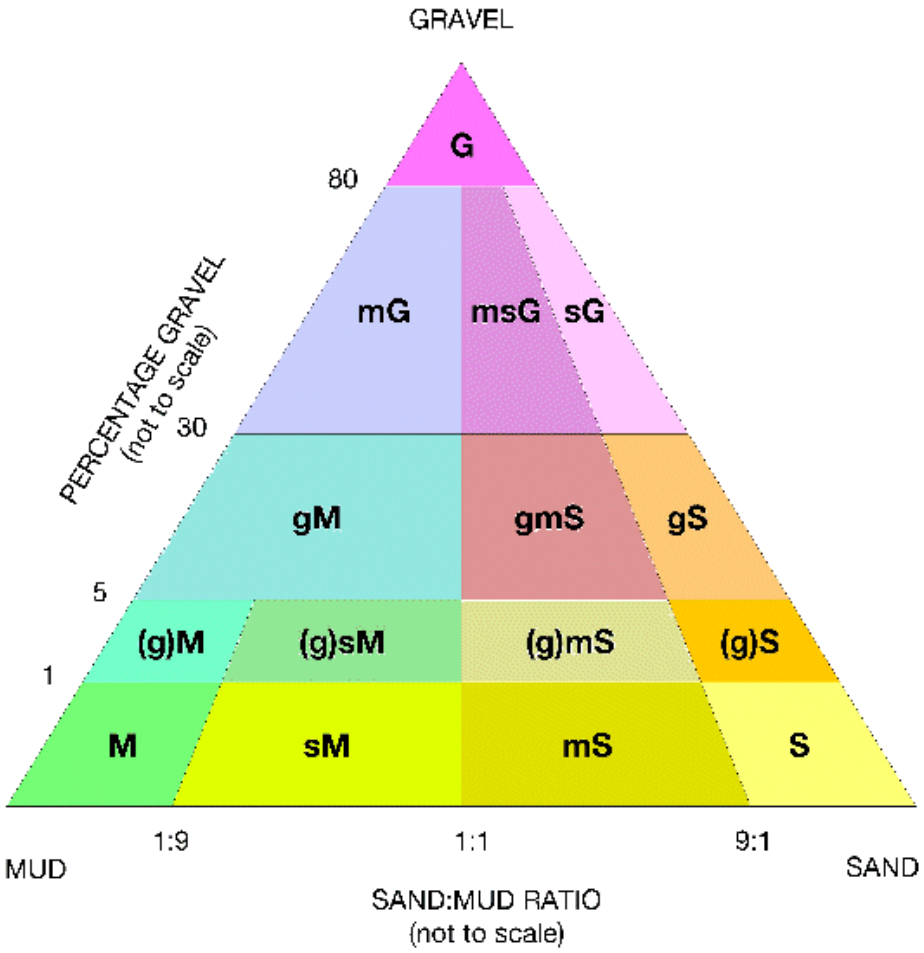
The sub samples were collected with a plastic scoop. Parts of the sample which had been in contact with the hacksaw blade were treated as potentially contaminated and were discarded.

A small amount from each of the cuts along the core was scooped out and placed in the contaminant containers supplied by Alcontrol. The containers were sealed, labelled and placed in a cold box until the end of each day when they were returned to IECS ready for transfer to Alcontrol.

2.2.3 LABORATORY ANALYSIS

2.2.3.1 Particle Size Analysis

The particle size analysis was carried out at IECS using a combination of dry sieving and laser particle size analysis. Prior to analysis, digital photographs were taken of all samples. The sediment samples were then split with one sub-sample being passed through a 1mm sieve to remove the larger size classes of sediment, which were subsequently discarded. The <1mm fraction of the sample was analysed using a Malvern Mastersizer 2000. The second sub-sample was oven dried (at 85°C) for 24 hours, weighed, then passed through a nest of sieves (8mm, 5.5mm, 4mm, 2mm, 1.4mm & 1mm). The residue in each sieve, including the <1mm fraction was then weighed. Data generated from these methods of analysis were merged and used to derive statistics such as mean grain size, bulk sediment classes (% silt, sand & gravel), skewness and sorting coefficient. The ratio of sand to silt was calculated and the percentage of gravel added in order to determine the sediment type according to Folk (1954) (Figure 2).



KEY

M	Mud	**sM**	Sandy mud	**(g)M**	Slightly gravelly mud
(g)sM	Slightly gravelly sandy mud	**gM**	Gravelly mud	**S**	Sand
mS	Muddy sand	**(g)S**	Slightly gravelly sand	**(g)mS**	Slightly gravelly muddy sand
gmS	Gravelly muddy sand	**gS**	Gravelly sand	**G**	Gravel
mG	Muddy gravel	**msG**	Muddy sandy gravel	**sG**	Sandy gravel

Figure 2. Folk Classification (British Geological Survey, 2004).

2.2.3.2 Contaminant Analysis

All sediment samples for subsequent contaminant analysis were couriered to UKAS accredited Alcontrol laboratories for analysis. Analysis methods and results are provided in Annex 4.

3. RESULTS

3.1 Water Quality

Table 1. Summary of water quality data

	Temperature C		Salinity ppt		pH	
Core ID	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
VC02	18.51	18.56	19.50	19.77	7.80	7.80
VC06	18.50	18.51	20.13	20.15	7.84	7.85
VC07	18.51	18.54	19.34	20.87	7.80	7.80
VC08	17.80	17.89	22.46	30.26	7.86	7.88
VC09	18.66	18.67	19.81	19.86	7.81	7.82
VC10	18.69	18.70	20.66	20.70	7.85	7.86
VC11	18.69	18.70	21.87	21.92	7.86	7.88
VC12	17.85	17.93	29.03	29.96	7.85	7.87
VC13	17.92	17.95	28.97	29.28	7.87	7.89
VC14	17.95	17.98	23.15	28.19	7.63	7.78
VC15	17.91	17.93	28.23	29.02	7.81	7.83
VC16	18.66	18.68	19.41	19.75	7.82	7.83
VC17	18.04	18.39	26.17	29.97	7.86	7.89
VC18	18.48	18.53	25.88	25.97	7.81	7.82
VC19	18.36	18.38	25.82	27.27	7.67	7.69
VC20	18.25	18.37	27.04	28.36	7.80	7.81
VC22	18.65	18.69	18.64	19.92	7.77	7.84
VC24	18.31	18.45	27.33	27.88	7.84	7.88
VC25	18.17	18.34	27.66	28.89	7.86	7.88
VC27	18.27	18.32	25.66	25.84	7.82	7.85
VC28	18.66	18.66	20.30	20.35	7.82	7.83
VC29	18.61	18.63	25.04	25.19	7.79	7.81
VC30	18.53	18.67	21.99	22.64	7.83	7.86

NB: Full water quality data is provided in Excel format on a CD at the back of the report.

The samples were all similar in chemistry, a small temperature band of 17.8 to 18.7 through the profile was observed with the higher temperature being at the surface as expected at this time of year.

Salinity is generally higher at depth becoming slightly lower at the surface. However, a reading taken at one location at a depth of 15.5m displayed a lower salinity in respect of the surrounding figures potentially suggesting outfall water flowing with a deep water current.

The pH readings were more variable ranging from 7.64 to 8.01 across the sample site. The mixing of the water and flow rate would influence these results greatly, as would the proximity of outfalls. The pH generally reduces slightly from the sea bed to the surface. Readings from each site remained relatively stable with a maximum pH range of 0.08. An average pH range of 0.02 was observed across the sample site profiles.

There are no specific patterns between the chemical characteristics of the water and the position of sample (distance from shore and depth) reflecting the considerable mixing of the water column found in the Humber. The positions closer to shore are heavily influenced by sediment disruption on the rising and lowering tide particularly during adverse weather conditions which in turn affects the chemical release from the sediment. With this considered, in addition to the presence of various outfalls along the test site, it is expected that the composition, movement and characteristics of chemical components in the area are likely to be changeable.

3.2 Sediment Quality

3.2.1 SAMPLE LOCATIONS

Figure 3 presents the intertidal survey sampling stations at which samples were collected for Particle Size Analysis (PSA) and a range of contaminants. The positions of the sampling stations are presented in Table 2.

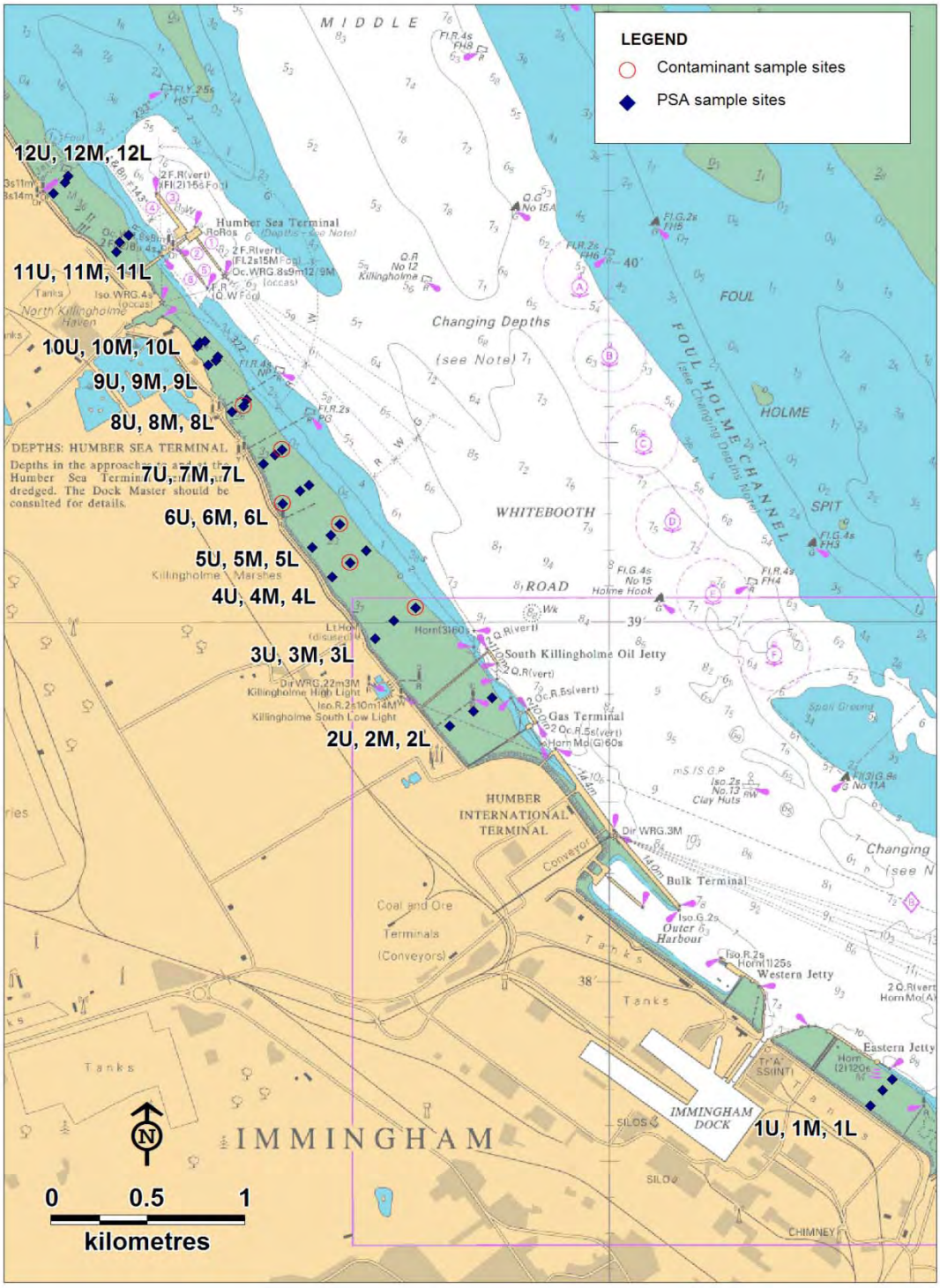


Figure 3 Intertidal survey sampling stations

NB: The locations and depths of the subtidal sampling stations are presented in Table 8.

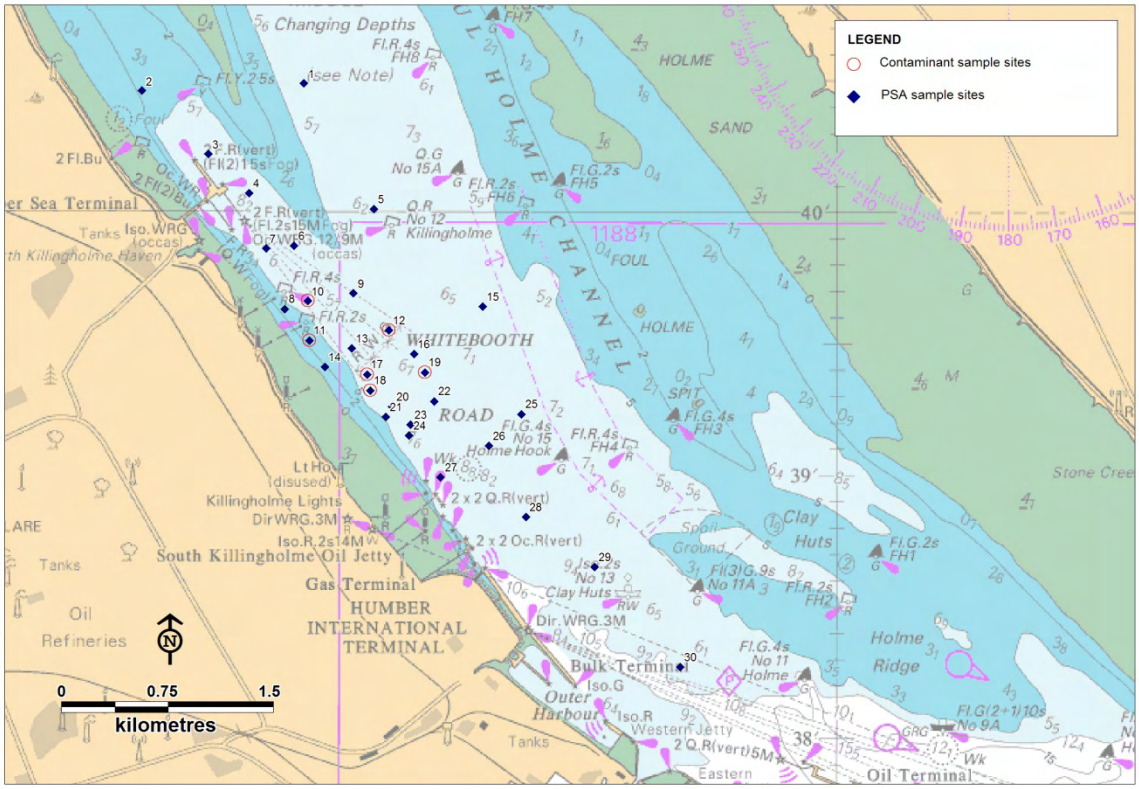


Figure 4: The location of the 30 subtidal sampling stations.

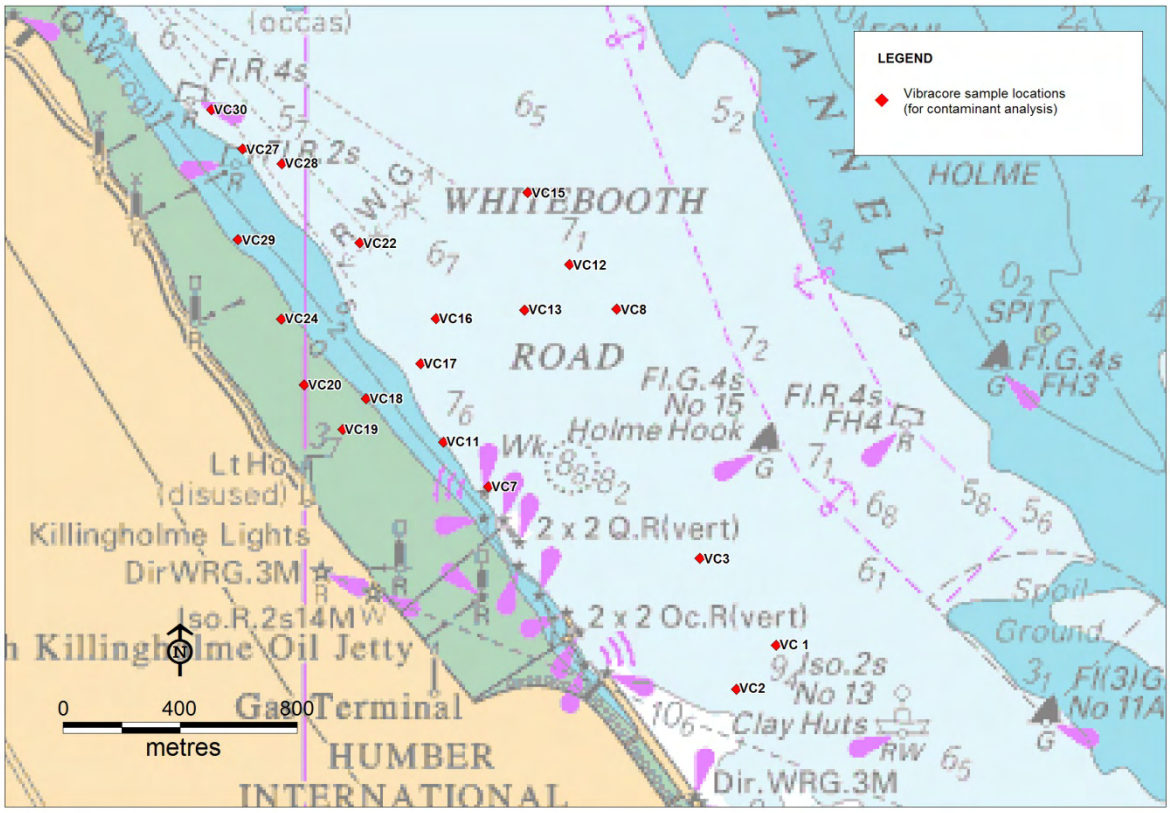


Figure 5. Vibracore sample locations

3.2.2 SURVEY LOGS

Table 2. Subtidal Survey Log

Station No.	Date	Time	Sea State	Attempt	Depth (m)	Position (WGS 84)		Description
						Lat	Long	
1	04/05/2010	11:36	Calm	1st	10.4	53.67483	0.22367	Muddy sand
2	04/05/2010	11:44	Calm	1st	7.9	53.67433	0.24100	Mud
3	04/05/2010	11:58	Calm	2nd	14.1	53.67033	0.23383	Mud
4	04/05/2010	12:05	Calm	1st	12.6	53.66783	0.22950	Muddy sand
5	04/05/2010	12:13	Calm	1st	12.6	53.66683	0.21617	Mud & clay
6	04/05/2010	12:18	Calm	1st	11.3	53.66450	0.22467	Muddy sand
7	04/05/2010	12:25	Calm	1st	11.5	53.66433	0.22767	Mud
8	04/05/2010	12:28	Calm	1st	7.7	53.66050	0.22567	Mud
9	04/05/2010	12:43	Calm	1st	12.2	53.66100	0.22317	Clay with surface layer of sand
10*	04/05/2010	12:40	Calm	1st	12.3	53.66150	0.21833	Sandy mud
11*	04/05/2010	13:40	Calm	1st	13.6	53.65917	0.21450	Sandy mud
12*	04/05/2010	12:50	Calm	1st	10.9	53.65800	0.21850	Medium sand
13	04/05/2010	13:07	Calm	1st	8.5	53.65850	0.22300	Muddy sand
14	04/05/2010	13:22	Calm	1st	7	53.65683	0.22133	Mud
15	04/05/2010	13:44	Calm	1st	11	53.65633	0.21683	Medium sand
16	04/05/2010	13:37	Calm	1st	12.8	53.65767	0.21183	Sand with compacted clay
17*	04/05/2010	13:28	Calm	1st	11.6	53.66067	0.20450	Muddy sand
18*	04/05/2010	14:20	Calm	3rd	10.6	53.65650	0.21067	Medium sand
19*	04/05/2010	13:56	Calm	1st	10.5	53.65433	0.21417	Muddy sand
20	04/05/2010	14:09	Calm	1st	10	53.65533	0.21650	Medium sand
21	04/05/2010	14:29	Calm	3rd	9.4	53.65367	0.21483	Muddy sand
22	04/05/2010	15:02	Calm	1st	10.2	53.65250	0.21233	Sand with compacted clay
23	04/05/2010	14:58	Calm	1st	10.9	53.65317	0.21217	Muddy sand with coal fragments
24	04/05/2010	14:53	Calm	3rd	11.3	53.65467	0.20967	Muddy sand with coal fragments
25	04/05/2010	15:14	Calm	2nd	11.2	53.65383	0.20033	Sandy mud
26	04/05/2010	15:18	Calm	1st	12.5	53.65183	0.20383	Sand with coal fragments
27	04/05/2010	15:29	Calm	1st	12.9	53.64983	0.20900	Sand with coal fragments
28	04/05/2010	15:36	Calm	2nd	12.1	53.64733	0.19983	Clay with a surface layer of sand
29	04/05/2010	15:44	Calm	1st	12.9	53.64417	0.19250	Clay with a surface layer of sand
30	04/05/2010	16:03	Calm	4th	11.6	53.63783	0.18333	Sand with shell & coal fragments

* Sample collected from contaminant analysis

Table 3. Positions of the intertidal sampling stations

Transect	Latitude	Longitude	Transect	Latitude	Longitude
Transect 1 Upper	53.62759000	-0.17963200	Transect 7 Upper	53.65738200	-0.22699400
Transect 1 Middle	53.62829200	-0.17871100	Transect 7 Middle	53.65780000	-0.22606400
Transect 1 Lower	53.62879600	-0.17791200	Transect 7 Lower	53.65804100	-0.22551400
Transect 2 Upper	53.64520300	-0.21247000	Transect 8 Upper	53.65980500	-0.22945900
Transect 2 Middle	53.64588100	-0.21060200	Transect 8 Middle	53.66007400	-0.22856000
Transect 2 Lower	53.64653500	-0.20916900	Transect 8 Lower	53.66035000	-0.22829600
Transect 3 Upper	53.64926400	-0.21828200	Transect 9 Upper	53.66196200	-0.23130500
Transect 3 Middle	53.65011100	-0.21679200	Transect 9 Middle	53.66218000	-0.23068800
Transect 3 Lower	53.65069400	-0.21513400	Transect 9 Lower	53.66234400	-0.23053600
Transect 4 Upper	53.65212600	-0.22162700	Transect 10 Upper	53.66283100	-0.23213700
Transect 4 Middle	53.65277000	-0.22021100	Transect 10 Middle	53.66300500	-0.23196800
Transect 4 Lower	53.65334900	-0.21897000	Transect 10 Lower	53.66307000	-0.23155300
Transect 5 Upper	53.65349300	-0.22316400	Transect 11 Upper	53.66721800	-0.23849100
Transect 5 Middle	53.65407700	-0.22174600	Transect 11 Middle	53.66765500	-0.23822700
Transect 5 Lower	53.65456000	-0.22101600	Transect 11 Lower	53.66797500	-0.23752500
Transect 6 Upper	53.65552300	-0.22549500	Transect 12 Upper	53.66994200	-0.24337800
Transect 6 Middle	53.65612700	-0.22414800	Transect 12 Middle	53.67043900	-0.24247300
Transect 6 Lower	53.65640200	-0.22344100	Transect 12 Lower	53.67071900	-0.24224300

Table 4. Site and sample descriptions from the intertidal survey (Friday 14th May 2010)

Transect	Time	Sediment type	Biological surface features	Weather	Diatoms present	Human activities
Transect 1 Upper	12:59:53	Mud	*Hediste* burrows and tracks. Evidence of feeding birds	Cloudy	Yes	No
Transect 1 Middle	13:04:25	Mud	Evidence of feeding birds	Cloudy/ Sunny intervals	Yes	No
Transect 1 Lower	13:08:16	Mud	Evidence of feeding birds	Cloudy/ Sunny intervals	Yes	No
Transect 2 Upper	13:25:16	Cracked mud-anoxic	*Hediste* burrows and tracks Evidence of feeding birds	Cloudy/ Sunny intervals	Yes but only in surface pools	No
Transect 2 Middle	12:14:55	Mud	Evidence of feeding birds	Sunny	Yes	No
Transect 2 Lower	12:26:55	Mud	Nothing visible	Cloudy/ Sunny intervals	No	No
Transect 3 Upper	14:28:25	Mud	Hediste burrows and tracks Evidence of feeding birds	Sunny	Yes	No
Transect 3 Middle	12:07:49	Mud	*Corophium* feeding on the surface	Sunny	Yes	No
Transect 3 Lower	13:31:35	Mud	Nothing	Sunny	Yes	No
Transect 4 Upper	14:34:54	Mud	*Corophium* feeding on the surface Evidence of feeding birds	Cloudy	Yes	No
Transect 4 Middle	12:05:08	Mud	*Corophium* feeding on the surface	Cloudy	No	No
Transect 4 Lower	13:37:19	Mud	Nothing	Cloudy	Yes	No
Transect 5 Upper	14:39:25	Mud	*Hediste* feeding holes and tracks Evidence of feeding birds	Sunny	Yes	No
Transect 5 Middle	11:57:15	Mud	*Corophium* feeding on the surface Evidence of feeding birds	Cloudy	No	No
Transect 5 Lower	13:41:43	Mud	Nothing	Sunny	No	No
Transect 6 Upper	14:43:26	Mud	*Hediste* feeding holes Evidence of feeding birds	Sunny	Yes	No
Transect 6 Middle	11:48:11	Mud	Nothing	Sunny	No	No

Transect	Time	Sediment type	Biological surface features	Weather	Diatoms present	Human activities
Transect 6 Lower	13:48:31	Mud	Nothing	Cloudy	No	No
Transect 7 Upper	14:52:29	Mud	Evidence of *Hediste/ Corophium* feeding Evidence of feeding birds	Sunny	Yes	No
Transect 7 Middle	11:42:27	Mud	Evidence of *Hediste/ Corophium* feeding	Sunny	Yes	No
Transect 7 Lower	13:52:05	Mud	Nothing	Cloudy	No	No
Transect 8 Upper	14:57:41	Mud	*Hediste* feeding holes and tracks	Sunny	Yes	No
Transect 8 Middle	11:34:54	Mud	*Corophium* feeding tracks	Sunny	Yes	No
Transect 8 Lower	13:58:29	Mud	*Macoma* burrow and feeding arrangement	Sunny	No	No
Transect 9 Upper	15:04:43	Mud	*Hediste* burrows and tracks/ *Corophium* feeding	Cloudy	Yes	No
Transect 9 Middle	11:29:04	Mud	*Corophium* feeding	Sunny	No	No
Transect 9 Lower	14:02:05	Mud	*Corophium* feeding	Sunny	Yes	No
Transect 10 Upper	15:09:53	Mud	Hediste burrows and tracks/ *Corophium* feeding	Cloudy	Yes	No
Transect 10 Middle	11:20:24	Mud	Nothing	Sunny	No	No
Transect 10 Lower	14:06:15	Mud	*Macoma* burrow and feeding arrangement	Sunny	Yes	No
Transect 11 Upper	15:20:23	Mud	*Hediste* feeding holes and tracks/ *Corophium* feeding	Cloudy	Yes	No
Transect 11 Middle	11:13:50	Mud	*Corophium* feeding/ possibly *Hediste*	Cloudy	Yes	No
Transect 11 Lower	14:11:29	Mud	Macoma burrow and feeding arrangement	Cloudy	No	No
Transect 12 Upper	15:27:26	Mud	*Hediste* feeding holes and tracks/ *Corophium* feeding Evidence of feeding birds	Cloudy	Yes	No
Transect 12 Middle	11:03:46	Mud	*Corophium* feeding	Cloudy	No	No
Transect 12 Lower	14:16:48	Mud	*Corophium* feeding	Sunny	No	No

Table 5. Vibracore survey log

Sample No.	Date	Time (UTC)	Position (WGS 84)	
			Northerly	Westerly
VC 1	15 July 2010	14:46	53 38.616	00 11.849
VC2	15 July 2010	15:10	53 38.6970	00 11.726
VC3	15 July 2010	14:30	53 38.767	00 12.110
VC6	15 July 2010			
VC7	15 July 2010	15:00	53 38.9870	000 12.6171
VC8	15 July 2010	09:06	53 39.314	000 12.222
VC11	14 July 2010	12:54	53 39.0688	000 12.7573
VC12	15 July 2010	08:38	53 39.3953	000 12.3680
VC13	15 July 2010	09:38	53 39.3112	000 12.5067
VC15	15 July 2010	07:57	53 39.5276	000 12.4988
VC16	14 July 2010	15:00	53 39. 2951	000 12.7809
VC17	14 July 2010	07:49	53 39.2126	000 13.8828
VC18	14 July 2010	10:20	53 39.1477	000 12.9976
VC19	14 July 2010	06:30	53 39.0911	000 13.0700
VC20	14 July 2010	07:07	53 39.1731	000 13.1888
VC22	14 July 2010	14:30	53 39.4343	000 13.0178
VC24	14 July 2010	09:22	53 39.2942	000 13.2604
VC27	14 July 2010	10:45	53 39.6063	000 13.3816
VC28	14 July 2010	08:25	53 39.5790	000 13.2606
VC29	14 July 2010	11:05	53 39.4393	000 13.3955
VC30	15 July 2010	13:15	53 39.6787	000 13.4782

NB: Position VC6 was not acquired due to time restraints.

3.2.3 PARTICLE SIZE ANALYSIS DATA

A summary of the particle size analysis data is provided in Tables 6 & 7, with full details provided in Gradistat format for each sample (Excel spreadsheet) on CD at the back for this report.

The Gradistat output provides the following parameters:

- mean and median grain size (in φ and µm) (measures of average and central tendency);
- sorting coefficient (the standard deviation or variability about the mean of the sample);
- skewness (degree of departure from a normal distribution in terms of asymmetry);
- Kurtosis (degree of departure from a normal distribution in terms of peakedness). This is indicative of the concentration of the particles relative to the mean;
- bulk sediment classes (% silt, sand and gravel).

(analysis is usually based on logarithmic Folk and Ward graphical measures (relating to φ))

Particle sizes in the summary tables below are presented as phi (φ) values, according to the Wentworth Scale, and that an increasing value of phi indicates a decrease in particle size.

The Wentworth scale combines numerical intervals with rational definitions of particle size (e.g. fine, sand, coarse silt etc). It is geometric, based on a dimension of 1 mm and a ratio of 2 and conversion between mm and phi is achieved as follows (Bale & Kenny, 2005)[3]:

$$\varphi = -\frac{\log_{10} mm}{\log_{10} 2}$$

Full details of the classifications for sorting, skewness and kurtosis can be found in Blott & Pye (2001)[4].

Table 6. Summary of PSA results from subtidal surface samples

Station No.	Mean φ	Mean µm	% Gravel	% Sand	% Mud	Sediment name	Textural group
1	2.492	177.8	0.0%	95.9%	4.1%	Moderately Sorted Fine Sand	Sand
2	5.849	17.35	0.0%	21.2%	78.8%	Very Fine Sandy Medium Silt	Sandy Mud
3	4.907	33.34	0.0%	43.5%	56.5%	Very Fine Sandy Medium Silt	Sandy Mud
4	3.797	71.95	0.0%	70.9%	29.1%	Very Coarse Silty Fine Sand	Muddy Sand
5	6.236	13.26	0.0%	14.4%	85.6%	Very Fine Sandy Fine Silt	Sandy Mud
6	2.944	130.0	0.0%	77.5%	22.5%	Fine Silty Medium Sand	Muddy Sand
7	4.274	51.68	0.0%	60.4%	39.6%	Very Coarse Silty Very Fine Sand	Muddy Sand
8	5.910	16.64	0.0%	18.8%	81.2%	Very Fine Sandy Fine Silt	Sandy Mud
9	5.770	18.33	0.0%	20.3%	79.7%	Very Fine Sandy Fine Silt	Sandy Mud
10	5.014	30.96	0.0%	41.0%	59.0%	Very Fine Sandy Fine Silt	Sandy Mud
11	6.056	15.03	0.0%	15.0%	85.0%	Very Fine Sandy Fine Silt	Sandy Mud
12	1.879	271.8	1.6%	83.8%	14.6%	Slightly Very Fine Gravelly Fine Silty Medium Sand	Slightly Gravelly Muddy Sand
13	3.305	101.2	0.0%	70.5%	29.5%	Fine Silty Medium Sand	Muddy Sand
14	6.071	14.88	0.0%	14.2%	85.8%	Very Fine Sandy Fine Silt	Sandy Mud
15	3.181	110.3	0.2%	71.1%	28.7%	Slightly Very Fine Gravelly Fine Silty Medium Sand	Slightly Gravelly Muddy Sand
16	3.366	97.02	2.2%	60.5%	37.3%	Slightly Very Fine Gravelly Fine Silty Medium Sand	Slightly Gravelly Muddy Sand
17	4.474	44.99	0.7%	44.5%	54.9%	Slightly Very Fine Gravelly Medium Sandy Medium Silt	Slightly Gravelly Sandy Mud
18	3.405	94.39	0.0%	69.9%	30.1%	Fine Silty Medium Sand	Muddy Sand
19	2.909	133.2	3.0%	69.6%	27.3%	Slightly Very Fine Gravelly Fine Silty Medium Sand	Slightly Gravelly Muddy Sand
20	3.296	101.8	0.9%	68.2%	30.9%	Slightly Very Fine Gravelly Fine Silty Medium Sand	Slightly Gravelly Muddy Sand
21	3.734	75.15	0.0%	59.8%	40.2%	Fine Silty Medium Sand	Muddy Sand
22	2.681	155.9	0.5%	78.7%	20.8%	Slightly Very Fine Gravelly Fine Silty Medium Sand	Slightly Gravelly Muddy Sand
23	3.122	114.9	2.9%	65.0%	32.0%	Slightly Very Fine Gravelly Very Coarse Silty Medium Sand	Slightly Gravelly Muddy Sand
24	2.315	201.0	0.0%	83.6%	16.4%	Fine Silty Medium Sand	Muddy Sand
25	4.969	31.92	0.0%	43.2%	56.8%	Very Fine Sandy Very Coarse Silt	Sandy Mud
26	2.490	177.9	6.7%	72.2%	21.1%	Very Fine Gravelly Fine Silty Medium Sand	Gravelly Muddy Sand
27	3.671	78.50	7.6%	52.3%	40.1%	Medium Gravelly Fine Silty Medium Sand	Gravelly Muddy Sand
28	4.338	49.45	0.0%	47.5%	52.5%	Medium Sandy Very Coarse Silt	Sandy Mud
29	0.220	858.5	46.7%	31.0%	22.3%	Fine Silty Sandy Coarse Gravel	Muddy Sandy Gravel
30	0.162	893.7	22.7%	70.6%	6.7%	Fine Gravelly Coarse Sand	Gravelly Sand

[3] Bale, A.J. & Kenny, A.J. 2005. Sediment analysis and seabed characterisation. In Eleftheriou, A. & McIntyre, A (Eds). Methods for the study of marine benthos (3rd edition). pp 43-86.

[4] Blott, S.J. & Pye, K. 2001. Gradistat: A grain size distribution and statistics package for the analysis of unconsolidated sediments. Earth Surface Processes and Landforms. 26: 1237-1248.

Table 7. Summary of PSA results from intertidal surface samples

Transect	Shore position	Mean φ	Mean µm	% Gravel	% Sand	% Mud	Sediment name	Textural group
1	Upper	5.880	16.98	0.0%	14.5%	85.5%	Very Fine Sandy Very Coarse Silt	Sandy Mud
1	Middle	6.255	13.10	0.0%	10.5%	89.5%	Very Fine Sandy Fine Silt	Sandy Mud
1	Lower	5.772	18.31	0.0%	19.0%	81.0%	Very Fine Sandy Very Coarse Silt	Sandy Mud
2	Upper	6.379	12.02	0.0%	7.5%	92.5%	Medium Silt	Mud
2	Middle	6.326	12.47	0.0%	6.9%	93.1%	Medium Silt	Mud
2	Lower	4.617	40.74	0.0%	48.5%	51.5%	Very Fine Sandy Very Coarse Silt	Sandy Mud
3	Upper	6.774	9.139	0.0%	4.5%	95.5%	Fine Silt	Mud
3	Middle	5.461	22.70	0.0%	20.6%	79.4%	Very Fine Sandy Very Coarse Silt	Sandy Mud
3	Lower	5.893	16.83	0.0%	14.5%	85.5%	Very Fine Sandy Coarse Silt	Sandy Mud
4	Upper	6.616	10.20	0.0%	5.5%	94.5%	Medium Silt	Mud
4	Middle	5.864	17.17	0.0%	15.5%	84.5%	Very Fine Sandy Very Coarse Silt	Sandy Mud
4	Lower	5.908	16.65	0.0%	12.4%	87.6%	Very Fine Sandy Coarse Silt	Sandy Mud
5	Upper	6.416	11.71	0.0%	7.5%	92.5%	Medium Silt	Mud
5	Middle	5.847	17.38	0.0%	16.0%	84.0%	Very Fine Sandy Very Coarse Silt	Sandy Mud
5	Lower	5.839	17.47	0.0%	17.3%	82.7%	Very Fine Sandy Very Coarse Silt	Sandy Mud
6	Upper	6.654	9.930	0.0%	5.2%	94.8%	Medium Silt	Mud
6	Middle	5.608	20.51	0.0%	20.3%	79.7%	Very Fine Sandy Very Coarse Silt	Sandy Mud
6	Lower	5.618	20.36	0.0%	23.8%	76.2%	Very Fine Sandy Very Coarse Silt	Sandy Mud
7	Upper	6.122	14.36	0.0%	8.4%	91.6%	Coarse Silt	Mud
7	Middle	4.828	35.22	0.0%	42.4%	57.6%	Very Fine Sandy Very Coarse Silt	Sandy Mud
7	Lower	5.878	17.01	0.0%	16.8%	83.2%	Very Fine Sandy Medium Silt	Sandy Mud
8	Upper	6.459	11.37	0.0%	6.9%	93.1%	Medium Silt	Mud
8	Middle	5.605	20.54	0.0%	19.9%	80.1%	Very Fine Sandy Very Coarse Silt	Sandy Mud
8	Lower	6.050	15.09	0.0%	11.5%	88.5%	Very Fine Sandy Coarse Silt	Sandy Mud
9	Upper	6.249	13.15	0.0%	8.7%	91.3%	Medium Silt	Mud
9	Middle	5.764	18.41	0.0%	17.3%	82.7%	Very Fine Sandy Very Coarse Silt	Sandy Mud
9	Lower	6.148	14.10	0.0%	10.4%	89.6%	Very Fine Sandy Coarse Silt	Sandy Mud
10	Upper	6.120	14.37	0.0%	13.3%	86.7%	Very Fine Sandy Fine Silt	Sandy Mud
10	Middle	6.087	14.71	0.0%	13.3%	86.7%	Very Fine Sandy Medium Silt	Sandy Mud
10	Lower	5.133	28.49	0.0%	29.3%	70.7%	Very Fine Sandy Very Coarse Silt	Sandy Mud
11	Upper	5.541	21.48	0.0%	19.3%	80.7%	Very Fine Sandy Very Coarse Silt	Sandy Mud
11	Middle	5.158	28.00	0.0%	29.8%	70.2%	Very Fine Sandy Very Coarse Silt	Sandy Mud
11	Lower	6.041	15.19	0.0%	12.6%	87.4%	Very Fine Sandy Coarse Silt	Sandy Mud
12	Upper	6.687	9.708	0.0%	6.7%	93.3%	Fine Silt	Mud
12	Middle	5.397	23.73	0.0%	23.2%	76.8%	Very Fine Sandy Very Coarse Silt	Sandy Mud
12	Lower	5.879	16.99	0.0%	14.1%	85.9%	Very Fine Sandy Very Coarse Silt	Sandy Mud

3.2.4 CONTAMINANT ANALYSIS DATA

Full details of analytical findings have been provided by Alcontrol and can be found in Annex 4. Table 8 gives a brief summary of contaminant readings.

Table 8. Summary of contaminant data from subtidal surface samples (collected via Hamon grab), intertidal surface samples (collected via hovercraft) and subtidal subsurface samples (collected via Vibracore)

		Intertidal (Surface)		Subtidal (Surface)		Subtidal (Vibracore)	
Component	**Unit**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
TPH/Oils and Greases	mg/kg	<10	121	40.2	145		
PCB congener 28	µg/kg	<3	<3	<3	<3	<3	<3
PCB congener 52	µg/kg	<3	<3	<3	<3	<3	<3
PCB congener 77	µg/kg					<3	<3
PCB congener 81	µg/kg					<3	<3
PCB congener 101	µg/kg	<3	<3	<3	<3	<3	<3
PCB congener 105	µg/kg					<3	<3
PCB congener 114	µg/kg					<3	<3
PCB congener 118	µg/kg	<3	<3	<3	<3	<3	<3
PCB congener 123	µg/kg					<3	<3
PCB congener 126	µg/kg					<3	<3
PCB congener 138	µg/kg	<3	<3	<3	<3	<3	<3
PCB congener 153	µg/kg	<3	<3	<3	<3	<3	<3
PCB congener 156	µg/kg					<3	<3
PCB congener 157	µg/kg					<3	<3
PCB congener 167	µg/kg					<3	<3
PCB congener 169	µg/kg					<3	<3
PCB congener 180	µg/kg	<3	<3	<3	<3	<3	<3
PCB congener 189	µg/kg					<3	<3
PCB's Total WHO 12	µg/kg					<3	<3
PCBs, Total ICES 7	µg/kg	<3	<3	<3	<3	<3	<3
Arsenic	mg/kg	13.8	18.9	14.3	29.6	3.38	30.9
Cadmium	mg/kg	0.296	0.533	0.185	0.44	0.141	0.469
Chromium	mg/kg	31.6	45.7	10.7	35.4	4	42.5
Copper	mg/kg	23.5	31.4	7	49.9	3.16	26.6
Lead	mg/kg	35.4	54.6	26.7	57.7	2.34	48.8
Mercury	mg/kg	<0.14	<0.14	<0.14	0.177	<0.14	<0.14
Nickel	mg/kg	22.1	32.4	10.2	19	4.13	28.4
Selenium	mg/kg					<1	1.1
Zinc	mg/kg	112	145	66.7	115	13.1	131
Naphthalene-d8 % recovery**	%	88.3	101	108	111	88.6	110
Acenaphthene-d10 % recovery**	%	88.4	103	107	111	88.3	107
Phenanthrene-d10 % recovery**	%	87.4	102	102	110	79	109
Chrysene-d12 % recovery**	%	83.8	99.2	97.2	108	73.7	101
Perylene-d12 % recovery**	%	82.1	98.1	104	117	76	107
Naphthalene	µg/kg	150	237	52.6	177	<9	112
Acenaphthylene	µg/kg	19.9	28.3	<12	27.5	<12	43.6
Acenaphthene	µg/kg	29.8	50.9	18.5	41.4	<8	54.8
Fluorene	µg/kg	46.7	72.4	25.4	72.4	<10	75
Phenanthrene	µg/kg	251	406	127	264	<15	287
Anthracene	µg/kg	62	111	38.5	95.2	<16	127
Fluoranthene	µg/kg	304	507	165	377	<17	433
Pyrene	µg/kg	291	464	162	347	<15	375
Benz(a)anthracene	µg/kg	169	282	90	268	<14	237
Chrysene	µg/kg	152	243	79.4	189	<10	186
Benzo(b)fluoranthene	µg/kg	251	377	136	296	<15	353
Benzo(k)fluoranthene	µg/kg	95.5	139	52	119	<14	113
Benzo(a)pyrene	µg/kg	167	258	118	278	<15	250
Indeno(1,2,3-cd)pyrene	µg/kg	109	154	59.5	148	<18	142
Dibenzo(a,h)anthracene	µg/kg	<23	48.6	<23	43.32	<23	45.7
Benzo(g,h,i)perylene	µg/kg	166	229	77.5	205	<24	213
Polyaromatic hydrocarbons, Total USEPA 16	µg/kg	2260	3590	1230	2860	<118	2980

Table 8 (Continued). Summary of contaminant data

		Intertidal (Surface)		Subtidal (Surface)		Subtidal (Vibracore)	
Component	**Unit**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
GRO >C5-C12	µg/kg					<44	848
Benzene	µg/kg					<10	<20
Ethylbenzene	µg/kg					<3	35.7
Toluene	µg/kg					<2	13.8
m,p-Xylene	µg/kg					<6	33.4
o-Xylene	µg/kg					<3	20.7
m,p,o-Xylene	µg/kg					<10	54.1
BTEX, Total	µg/kg					<10	104
Methyl tertiary butyl ether (MTBE)	µg/kg					<5	<10
Tributyl tin*	mg/kg					<0.02	<0.02
Triphenyl tin*	mg/kg					<0.05	<0.05
Dibutyl tin*	mg/kg					<0.02	<0.02
Tetrabutyl tin*	mg/kg					<0.02	<0.02

4. SUMMARY

A review of the water and sediment quality data is not included within the scope of the work for this project. However, in order to assess water and sediment quality in the Humber estuary, IECS would recommend comparing the results documented in this report with water and sediment quality standards such as the EA EQS for water and the Canadian sediment quality guidelines (ISQG) for sediments.

ANNEX 1. INTERTIDAL BENTHIC SURVEY PHOTOS

Transect 1 – view from the lower shore

Transect 1 Upper

Transect 1 Middle

Transect 1 Lower

Transect 2 – view from the lower shore

Transect 2 Upper

Transect 2 Middle

Transect 2 Lower

Transect 3 – view from the lower shore

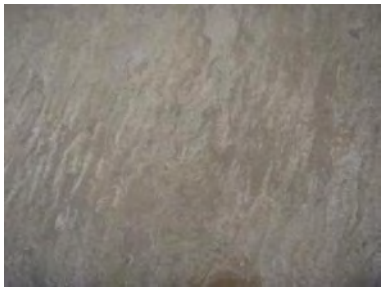
Transect 3 Upper

Transect 3 Middle

Transect 3 Lower

Transect 4 – view from the lower shore

Transect 4 Upper



Transect 4 Middle

Transect 4 Lower

Transect 5 – view from the lower shore

Transect 5 Upper

Transect 5 Middle

Transect 5 Lower

Transect 6 – view from the lower shore

Transect 6 Upper

Transect 6 Middle

Transect 6 Lower

Transect 7 – view from the lower shore

Transect 7 Upper

Transect 7 Middle

Transect 7 Lower

Transect 8 – view from the lower shore

Transect 8 Upper

Transect 8 Middle

Transect 8 Lower

Transect 9 – view from the lower shore

Transect 9 Upper

Transect 9 Middle

Transect 9 Lower

Transect 10 – view from the lower shore

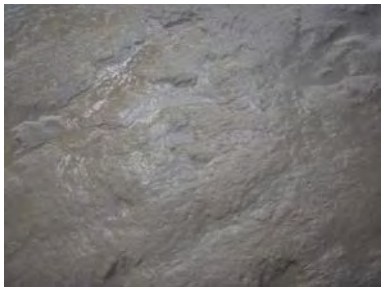
Transect 10 Upper

Transect 10 Middle

Transect 10 Lower

Transect 11 – view from the lower shore

Transect 11 Upper



Transect 11 Middle

Transect 11 Lower

Transect 12 – view from the middle shore

Transect 12 Upper

Transect 12 Middle

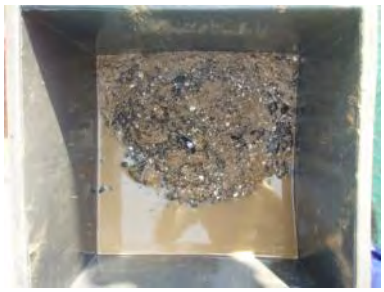
No photo taken

Transect 12 Lower

ANNEX 2. SUBTIDAL BENTHIC SAMPLE PHOTOS

		
Subtidal Sample 1	**Subtidal Sample 2**	**Subtidal Sample 3**
		
Subtidal Sample 4	**Subtidal Sample 5**	**Subtidal Sample 6**
		
Subtidal Sample 7	**Subtidal Sample 8**	**Subtidal Sample 9**
		
Subtidal Sample 10	**Subtidal Sample 11**	**Subtidal Sample 12**

		
Subtidal Sample 13	**Subtidal Sample 14**	**Subtidal Sample 15**
		
Subtidal Sample 16	**Subtidal Sample 17**	**Subtidal Sample 18**
		
Subtidal Sample 19	**Subtidal Sample 20**	**Subtidal Sample 21**
		
Subtidal Sample 22	**Subtidal Sample 23**	**Subtidal Sample 24**

		
Subtidal Sample 25	**Subtidal Sample 26**	**Subtidal Sample 27**
		
Subtidal Sample 28	**Subtidal Sample 29**	**Subtidal Sample 30**

ANNEX 3. PARTICLE SIZE ANALYSIS RESULTS

INTERTIDAL

Aperture (microns)	Class Weight Retained (g or %) in Different Samples																	
Sample Identity:	**1u**	**1m**	**1l**	**2u**	**2m**	**2l**	**3u**	**3m**	**3l**	**4u**	**4m**	**4l**	**5u**	**5m**	**5l**	**6u**	**6m**	**6l**
Analyst:	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS
Date:	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010
Initial Sample Weight:	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
45000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0.113382	0	0	0	0	0.006597	0	0
1000	0	0	0	0	0	0.008956	0	0	0	0	0.262998	0	0	0.08217	0	0.078631	0	0
500	0	0.01122	0	0	0	0.867127	0	0	0.031828	0	0.68312	0	0	0.607682	0	0.46586	0.177716	0
250	0.950998	0.801493	0.4594	0.738962	0.241677	1.169764	0.098365	0	0.513475	0.588695	0.271031	0.395068	0.582637	0.716892	0.466192	0.493989	0.86785	0.835128
125	2.131753	1.462967	3.140578	1.43667	0.578394	11.677096	1.288263	2.215765	2.097949	1.06254	1.642927	1.502291	1.237188	1.995068	2.796963	0.627207	3.183335	4.67239
63	11.154628	8.065898	15.169353	5.160529	5.903622	34.511934	3.060043	18.10329	11.629182	3.764317	12.260074	10.318279	5.562053	12.376579	13.786917	3.45992	15.816796	18.050578
31	21.942686	15.435182	19.902088	13.051615	14.892717	23.59049	8.54624	27.601916	19.596158	10.144481	20.524756	20.167368	13.344037	20.511457	18.718554	10.446753	22.571821	19.851982
16	19.857209	17.581533	15.842356	19.844462	19.377008	7.069044	17.158252	17.890654	19.007569	18.504676	18.05803	20.660343	19.014279	18.102581	16.429757	18.628985	17.088987	13.385734
8	14.698406	19.220643	15.94866	21.848438	21.721362	6.75091	23.372571	11.863415	17.938237	23.707265	16.651976	18.645103	20.964255	16.286883	17.931748	22.530963	14.494154	14.39696
4	14.30008	19.73171	15.987445	20.683299	21.213902	7.388787	24.284699	11.651784	16.243292	23.086742	16.194194	16.339024	20.752973	15.847712	17.362299	22.542192	14.052099	15.366958
2	11.023352	13.669213	10.565437	13.679908	13.065962	5.170805	17.125283	8.101842	10.102499	15.014497	10.441151	9.65416	14.332887	10.505342	10.219956	15.914994	9.172135	10.344207
1	3.695819	3.933966	2.925702	3.545193	2.956111	1.723484	4.976834	2.424295	2.760806	4.060592	2.823663	2.276201	4.126313	2.900749	2.254127	4.707831	2.509365	3.01113
0.49	0.245069	0.086175	0.058981	0.010924	0.049245	0.071603	0.08945	0.147039	0.079005	0.066195	0.072698	0.042163	0.083378	0.066885	0.033487	0.096078	0.065742	0.084933

7u	**7m**	**7l**	**8u**	**8m**	**8l**	**9u**	**9m**	**9l**	**10u**	**10m**	**10l**	**11u**	**11m**	**11l**	**12u**	**12m**	**12l**
IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS
25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010
100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0.063685	0	0	0.088269	0	0	0.006856	0	0	0.128139	0	0	0	0	0.227182	0.056968	0
0	0.243993	0	0	0.184886	0	0	0.074924	0	0	0.313043	0	0	0	0	0.414946	0.261603	0
0	1.794967	0	0.053158	0.810231	0	0	0.524381	0	0.573372	0.869208	0	0	0.355596	0	0.895832	1.434417	0
0.273512	2.011509	0.206666	0.569328	1.001986	0.596967	0.231448	0.984083	0.21833	1.17694	1.04572	0	0.340475	1.005353	0.101665	0.771114	2.056241	0.127804
0.634181	9.160605	2.656881	1.175669	2.770033	1.679431	1.406942	2.520227	1.103092	2.109812	2.133152	4.083761	2.18229	4.740231	1.883093	0.908039	3.51567	2.113787
7.268875	28.845179	13.713148	4.963434	14.766698	9.03039	6.920683	12.928799	8.852359	9.234826	8.643896	24.89581	16.466962	23.391799	10.412756	3.387553	15.578915	11.640624
19.027889	23.507736	18.500882	12.451246	22.75864	18.031971	15.080101	20.901983	17.564026	16.458643	15.269087	29.824694	27.109543	27.689768	17.429717	9.256789	24.382048	21.034603
21.727904	9.352153	16.079991	19.157115	17.64367	19.540059	19.238306	18.015572	18.425487	17.112472	17.819565	13.941903	18.337042	13.796323	18.767675	17.180294	17.96641	19.722537
18.503694	8.210661	18.105627	21.933433	14.508626	18.928389	21.230483	16.229459	18.812226	17.811938	19.793805	8.859422	11.928295	9.525853	19.135895	22.172735	12.641894	16.455517
17.127007	8.802538	17.887507	21.306347	13.915731	17.902204	20.164835	15.427312	19.410964	18.56456	18.769702	9.529817	12.064035	10.146238	17.7111	23.040877	11.758977	15.404346
11.862253	6.055873	10.496686	14.297363	9.025904	11.362023	12.542521	9.746052	12.690884	13.063739	11.984581	6.595095	8.725245	7.047933	11.300886	16.694033	7.940193	10.492924
3.472555	1.884408	2.305892	4.00991	2.459932	2.861844	3.133739	2.574663	2.878803	3.813427	3.230102	2.096072	2.674748	2.171732	3.165548	4.979847	2.332427	2.929587
0.10213	0.066693	0.04672	0.082997	0.065394	0.066722	0.050942	0.065689	0.043829	0.080271	0	0.173426	0.171365	0.129174	0.091665	0.070759	0.074237	0.078271

SUBTIDAL

Aperture (microns)	Class Weight Retained (g or %) in Different Samples														
Sample Identity:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Analyst:	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS
Date:	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010
Initial Sample Weight:	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
45000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8000	0	0	0	0	0	0	0	0	0	0	0	0.582158361	0	0	0
5600	0	0	0	0	0	0	0	0	0	0	0	0.117777703	0	0	0.049823128
4000	0	0	0	0	0	0	0	0	0	0	0	0.15815863	0	0	0.019929251
2800	0	0	0	0	0	0	0	0	0	0	0	0.346602955	0	0	0.079717005
2000	0	0	0	0	0	0	0	0	0	0	0	0.393714036	0	0	0.054805441
1400	0	0.044136	0.058393	0.064883	0	0	0	0	0	0	0	0.662920214	0	0	0.099646256
1000	0	0.096396	0.175287	0.105327	0	0	0.179093	0	0	0	0	0.646094828	0	0	0.129540133
500	0.528955	0.573316	1.294497	0.997591	0.137306	9.232617	1.086542	0	0.440555	0.014731	0.005061	11.24810859	6.584049	0.006731	9.579408211
250	24.521372	1.178187	5.603442	11.752946	1.794688	40.2094	6.785281	0.438823	5.710897	5.85952	0.587401	53.82060863	40.956232	0.566454	45.88783809
125	51.979995	6.12085	15.905231	30.173954	4.068262	23.776288	24.629005	4.276907	4.775161	16.414812	2.932952	17.09014834	21.251026	2.475658	14.2861256
63	18.871949	13.024084	20.298743	27.695621	8.244357	4.197207	27.575246	13.905376	9.212751	18.528956	11.347799	0.257229296	1.67245	10.963505	1.035224169
31	0.332875	13.446775	10.927907	9.04682	12.309163	4.244972	10.952669	15.753229	14.989939	12.125408	15.534175	2.828731925	5.130332	16.683104	4.751791159
16	1.019287	14.765869	9.099777	3.759254	15.329585	3.557439	5.867168	14.586378	15.511771	10.024743	16.052574	2.19530289	4.649342	16.721031	4.494825853
8	1.007445	17.658629	12.969898	5.270059	18.55633	5.143685	7.583267	17.472577	17.582978	11.989333	18.688245	3.294368488	6.224446	17.831976	6.147983858
4	0.829742	17.676738	13.125568	5.646804	20.505944	5.608914	8.108418	18.779669	18.064119	13.010032	19.163766	3.70422828	7.418528	18.422309	7.248141341
2	0.794507	11.929484	8.387109	4.211449	14.821086	3.32593	5.668338	12.133109	11.285008	9.288498	12.505163	2.192802756	4.999313	12.754253	4.903271691
1	0.113873	3.405128	2.154148	1.275292	4.171787	0.703548	1.564973	2.641662	2.426821	2.687449	3.137169	0.461044084	1.114282	3.522778	1.231928819
0.49	0	0.080408	0	0	0.061492	0	0	0.01227	0	0.056518	0.045695	0	0	0.052201	0

16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS	IECS
25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010	25/06/2010
100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	1.815491863	0	0	32.371484	1.423097975
0	0	0	0	0	0	0	0	0	0	0.772336317	1.408770734	0	0	4.894530757
0.504615866	0	0	0.612717627	0	0	0	0.180472839	0	0	0.596805336	1.706998409	0	1.745877789	2.20832807
0.281646065	0.063122117	0	0.078457745	0.162571587	0	0	0.09474824	0	0	0.702123925	0.693024313	0	0	3.406172372
0.312940072	0.097110949	0	0.777105283	0.195824866	0	0.173466556	0.415087529	0	0	0.817472855	0.954328562	0	3.467507274	3.753526167
0.508527617	0.179655256	0	0.848090862	0.232772954	0	0.1561199	0.866269626	0	0	1.108352767	1.459895478	0	4.413191077	3.58721738
0.571115631	0.335032775	0	0.706119704	0.288195086	0	0.166527893	1.389640859	0	0	0.862609393	1.36616678	0	4.655674103	3.469327607
0.786261931	0.776887594	0	0.806993948	0.694624053	0	0.346933111	2.107020393	0	0.163001	0.845056295	1.351965462	0	5.674102813	3.846153846
0.837114693	0.815731974	0	0.515579466	0.661370774	0	0.381626422	1.669373759	0	0.42018	0.747260463	0.880481709	0.056238	6.086323957	3.709317502
13.5890554	6.147132248	4.844998	17.02680892	10.1627566	6.818321	8.940020432	13.80791216	10.587158	0.945023	16.33417595	5.842004509	8.42318	5.501523364	31.05438067
30.62981798	22.09314956	36.655844	37.64030288	34.95518122	30.046884	58.91668076	28.05804665	54.010266	2.035446	36.31660571	22.99272272	17.467075	7.987474948	28.069391
10.14990285	10.00878018	25.07328	10.83208916	16.41751443	17.231581	9.811896408	10.92494963	18.393943	15.085388	13.62945314	14.2074676	8.607903	2.637641906	2.49607418
4.431058752	4.532534357	3.270788	2.759449492	5.225321582	5.633155	0.289793966	8.355480991	0.576015	24.450249	4.255372081	6.912343288	12.779258	3.08112366	1.407511928
6.350593991	8.589175164	5.466175	5.246093404	6.193603114	7.903294	3.835669145	7.659849936	3.491286	13.378942	4.189475803	7.256428773	13.324424	3.981605888	1.781409837
6.08515696	10.2702409	4.920498	4.217493848	4.670869953	6.673845	3.634268231	4.662422765	2.57742	9.103465	3.348025376	6.585445801	8.997381	3.872266318	1.148668501
8.609228366	13.10193434	6.214235	6.121090019	6.296666598	8.120368	4.814888218	6.364926598	3.588214	11.140666	4.913459033	8.18271843	9.711188	4.77080181	1.561177723
9.215799715	13.04890861	7.360455	6.706324991	7.334314098	9.335778	4.963964879	7.222608765	3.931238	12.093699	5.052728243	9.368630709	10.916063	5.244029706	1.34138627
5.785152598	7.998714737	4.933881	4.152295229	5.114597261	6.462495	2.932292731	4.904611744	2.333935	8.686863	3.031398618	6.787761872	7.689811	3.603482264	0.709901961
1.352011512	1.941889237	1.259846	0.952987422	1.393815817	1.774279	0.635851346	1.316577522	0.510525	2.446496	0.661796819	1.99480503	2.027479	0.905889127	0.132426251
0	0	0	0	0	0	0	0	0	0.050582	0	0.04803982	0	0	0

ANNEX 4. ALCONTROL CONTAMINANT REPORTS

ALcontrol Laboratories

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: mkt@alcontrol.com
Website: www.alcontrol.com

University of Hull
Department of Geography
University of Hull
Cottingham Road
Hull
South Yorkshire
HU6 7RX

Attention: Krysia Mazik

CERTIFICATE OF ANALYSIS

Date:	26 May 2010		
Customer:	H_UNIHULL_HUL-2		
Sample Delivery Group (SDG):	100518-51	**Report No.:**	85015
Your Reference:			
Location:	Humber Terminal		

We received 6 samples on Tuesday May 18, 2010 and 6 of these samples were scheduled for analysis which was completed on Wednesday May 26, 2010. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Asbestos testing - we are not accredited for screening soil samples for asbestos fibres. We are only accredited to identify asbestos fibres in bulk material (ACM).

Approved By:

Iain Swinton

Operations Director - Land UK & Ireland

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
1291

GROUP

Validated

ALcontrol Laboratories Analytical Services

SDG:	100518-51	**Customer:**	University of Hull
Job:	H_UNIHULL_HUL-2	**Attention:**	Krysia Mazik
Client Reference:		**Order No.:**	
Location:	Humber Terminal	**Report No:**	85015

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Sampled Date
1560223	3L 1		
1560242	4M 1		
1560247	5L 1		
1560257	6U 1		
1560263	7L 1		
1560273	8M 1		

Only received samples which have had analysis scheduled will be shown on the following pages.

Validated

ALcontrol Laboratories Analytical Services

SDG:	100518-51	**Customer:**	University of Hull
Job:	H_UNIHULL_HUL-2	**Attention:**	Krysia Mazik
Client Reference:		**Order No.:**	
Location:	Humber Terminal	**Report No:**	85015

SOLID

Results Legend

X Test

N No Determination Possible

		Lab Sample No(s)	1560223	1560242	1560247	1560257	1560263	1560273	Total
		Customer Sample Ref.	3L	4M	5L	6U	7L	8M	
		Depth (m)							
		Container	250g Amber Jar	250g Amber Jar	250g Amber Jar	250g Amber Jar	250g Amber Jar	250g Amber Jar	
Metals by iCap-OES (Soil)	Arsenic		X	X	X	X	X	X	06
	Cadmium		X	X	X	X	X	X	06
	Chromium		X	X	X	X	X	X	06
	Copper		X	X	X	X	X	X	06
	Lead		X	X	X	X	X	X	06
	Mercury		X	X	X	X	X	X	06
	Nickel		X	X	X	X	X	X	06
	Zinc		X	X	X	X	X	X	06
PAH by GCMS	All		X	X	X	X	X	X	06
PCBs by GCMS	All		X	X	X	X	X	X	06
Sample description	All		X	X	X	X	X	X	06
TPH	All		X	X	X	X	X	X	06

Validated

ALcontrol Laboratories Analytical Services

SDG:	100518-51	**Customer:**	University of Hull
Job:	H_UNIHULL_HUL-2	**Attention:**	Krysia Mazik
Client Reference:		**Order No.:**	
Location:	Humber Terminal	**Report No:**	85015

Sample Descriptions

Grain Sizes:
<0.063mm very fine,
0.063mm - 0.1mm fine,
0.1mm - 2mm medium,
2mm - 10mm coarse,
>10mm very coarse

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Grain size	Inclusions
1560223	3L		Light Brown	Clay	<0.063 mm	None
1560242	4M		Light Brown	Clay	<0.063 mm	None
1560247	5L		Light Brown	Clay	<0.063 mm	None
1560257	6U		Dark Brown	Clay	<0.063 mm	None
1560263	7L		Light Brown	Clay	<0.063 mm	None
1560273	8M		Light Brown	Clay	<0.063 mm	None

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Validated

ALcontrol Laboratories Analytical Services

SDG:	100518-51	**Customer:**	University of Hull
Job:	H_UNIHULL_HUL-2	**Attention:**	Krysia Mazik
Client Reference:		**Order No.:**	
Location:	Humber Terminal	**Report No:**	85015

Test Completion dates

SDG reference: 100518-51

Lab Sample No(s)	1560223	1560242	1560247	1560257	1560263	1560273
Customer Sample Ref.	3L	4M	5L	6U	7L	8M
Depth						
Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
Metals by iCap-OES (Soil)	21/05/2010	21/05/2010	21/05/2010	21/05/2010	21/05/2010	21/05/2010
PAH by GCMS	20/05/2010	20/05/2010	20/05/2010	20/05/2010	20/05/2010	26/05/2010
PCBs by GCMS	25/05/2010	25/05/2010	25/05/2010	25/05/2010	25/05/2010	25/05/2010
Sample description	19/05/2010	19/05/2010	19/05/2010	19/05/2010	19/05/2010	19/05/2010
TPH	21/05/2010	21/05/2010	21/05/2010	21/05/2010	21/05/2010	21/05/2010

Validated

ALcontrol Laboratories Analytical Services

SDG: 100518-51
Job: H_UNIHULL_HUL-2
Client Reference:
Location: Humber Terminal

Customer: University of Hull
Attention: Krysia Mazik
Order No.:
Report No: 85015

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample Ref.	3L	4M	5L	6U	7L	8M
			Depth (m)						
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
			Date Sampled	18/05/2010	18/05/2010	18/05/2010	18/05/2010	18/05/2010	18/05/2010
			Date Received	100518-51	100518-51	100518-51	100518-51	100518-51	100518-51
			SDG Ref	1560223	1560242	1560247	1560257	1560263	1560273
			Lab Sample No.(s)						
TPH/Oils and Greases	<10 mg/kg	TM087		121	24.8	73	69.1	86	<10
PCB congener 28	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 52	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 101	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 118	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 138	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 153	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 180	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCBs, Total ICES 7	<3 µg/kg	TM168		<3	<3	<3	<3	<3	<3
Arsenic	<0.6 mg/kg	TM181		15.5 M	13.8 M	15.9 M	18.9 M	17.9 M	14.6 M
Cadmium	<0.02 mg/kg	TM181		0.533 M	0.296 M	0.386 M	0.325 M	0.39 M	0.312 M
Chromium	<0.9 mg/kg	TM181		45.7 M	32.7 M	35.6 M	43 M	41.2 M	31.6 M
Copper	<1.4 mg/kg	TM181		31.4 M	23.5 M	24 M	27.4 M	27.1 M	24.5 M
Lead	<0.7 mg/kg	TM181		47.5 M	35.4 M	42.8 M	54.6 M	49.1 M	38.6 M
Mercury	<0.14 mg/kg	TM181		<0.14 M	<0.14 M	<0.14 M	<0.14 M	<0.14 M	<0.14 M
Nickel	<0.2 mg/kg	TM181		32.4 M	23.5 M	23.9 M	29.3 M	27 M	22.1 M
Zinc	<1.9 mg/kg	TM181		128 M	108 M	121 M	145 M	139 M	112 M

Validated

ALcontrol Laboratories Analytical Services

SDG:	100518-51	**Customer:**	University of Hull
Job:	H_UNIHULL_HUL-2	**Attention:**	Krysia Mazik
Client Reference:		**Order No.:**	
Location:	Humber Terminal	**Report No:**	85015

PAH by GCMS

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample Ref.	3L	4M	5L	6U	7L	8M
			Depth (m)						
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
			Date Sampled	18/05/2010	18/05/2010	18/05/2010	18/05/2010	18/05/2010	18/05/2010
			Date Received	100518-51	100518-51	100518-51	100518-51	100518-51	100518-51
			SDG Ref	1560223	1560242	1560247	1560257	1560263	1560273
			Lab Sample No.(s)						
Naphthalene-d8 % recovery**	%	TM218		90.1	91.9	88.3	101	92.5	97.1
Acenaphthene-d10 % recovery**	%	TM218		90.2	92.5	88.4	103	93.4	98.3
Phenanthrene-d10 % recovery**	%	TM218		90.1	92.4	87.4	102	93.1	98.4
Chrysene-d12 % recovery**	%	TM218		86.7	89	83.8	99.2	89.3	95.3
Perylene-d12 % recovery**	%	TM218		83.7	87.2	82.1	98.1	88.6	94.8
Naphthalene	<9 µg/kg	TM218		182 M	168 M	150 M	189 M	202 M	237 M
Acenaphthylene	<12 µg/kg	TM218		21.6 M	26.4 M	19.9 M	22.4 M	27.8 M	28.3 M
Acenaphthene	<8 µg/kg	TM218		37.5 M	45.6 M	29.8 M	38.1 M	45 M	50.9 M
Fluorene	<10 µg/kg	TM218		55.7 M	58.8 M	46.7 M	59.5 M	65.9 M	72.4 M
Phenanthrene	<15 µg/kg	TM218		293 M	329 M	251 M	309 M	343 M	406 M
Anthracene	<16 µg/kg	TM218		78 M	86.6 M	62 M	82.6 M	104 M	111 M
Fluoranthene	<17 µg/kg	TM218		355 M	402 M	304 M	384 M	438 M	507 M
Pyrene	<15 µg/kg	TM218		343 M	372 M	291 M	375 M	410 M	464 M
Benz(a)anthracene	<14 µg/kg	TM218		194 M	217 M	169 M	225 M	257 M	282 M
Chrysene	<10 µg/kg	TM218		172 M	193 M	152 M	187 M	215 M	243 M
Benzo(b)fluoranthene	<15 µg/kg	TM218		300 M	319 M	251 M	325 M	363 M	377 M
Benzo(k)fluoranthene	<14 µg/kg	TM218		113 M	101 M	95.5 M	119 M	129 M	139 M
Benzo(a)pyrene	<15 µg/kg	TM218		193 M	201 M	167 M	217 M	258 M	256 M
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218		129 M	125 M	109 M	141 M	154 M	146 M
Dibenzo(a,h)anthracene	<23 µg/kg	TM218		<23 M	41.6 M	<23 M	42.4 M	46 M	48.6 M
Benzo(g,h,i)perylene	<24 µg/kg	TM218		199 M	191 M	166 M	220 M	229 M	220 M
Polyaromatic hydrocarbons, Total USEPA 16	<118 µg/kg	TM218		2670 M	2880 M	2260 M	2940 M	3290 M	3590 M

Table of Results - Appendix

SDG Number : 100518-51 **Client :** University of Hull **Client Ref :**

REPORT KEY

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10-7

NDP	No Determination Possible	#	ISO 17025 Accredited	*	Subcontracted Test	M	MCERTS Accredited
NFD	No Fibres Detected	PFD	Possible Fibres Detected	»	Result previously reported (Incremental reports only)	EC	Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control

Method No	Reference	Description	Wet/Dry Sample [1]
PM001		Preparation of Samples for Metals Analysis	Dry
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material	Wet
TM087	Modified: US EPA Method 8440	Measurement of Total Petroleum Hydrocarbons in soil or water samples by infra-red spectrophotometry	Wet
TM168	EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils	Dry
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES	Dry
TM218	Microwave extraction – EPA method 3546	Microwave extraction - EPA method 3546	Wet

[1] Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

APPENDIX

APPENDIX

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA Leach tests, flash point, ammonium as NH_4 by the BRE method, VOC TICS, SVOC TICS, TOF-MS SCAN/SEARCH and TOF-MS TICS.
2. Samples will be run in duplicate upon request, but an additional charge may be incurred.
3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for both soil jars, tubs and volatile jars. All waters and vials will be discarded 10 days after the analysis is completed (e-mailed). All material removed during an asbestos containing material screen and analysed for the presence of asbestos will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.
4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.
5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.
6. When requested, the individual sub sample scheduled will be screened in house for the presence of large asbestos containing material fragments/pieces. If no asbestos containing material is found this will be reported as 'no asbestos containing material detected'. If asbestos containing material is detected it will be removed and analysed by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If asbestos containing material is present no further analysis will be undertaken. At no point is the fibre content of the soil sample determined.
7. If no separate volatile sample is supplied by the client, the integrity of the data may be compromised if the laboratory is required to create a sub-sample from the bulk sample – similarly, if a headspace or sediment is present in the volatile sample. This will be flagged up as an invalid VOC on the test schedule or recorded on the log sheet.
8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.
9. NDP – No determination possible due to insufficient/unsuitable sample.
10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals – total metals must be requested separately.
11. A table containing the date of analysis for each parameter is not routinely included with the report, but is available upon request.
12. Results relate only to the items tested
13. **Surrogate recoveries** – Most of our organic methods include surrogates, the recovery of which is monitored and reported. For EPH, MO, PAH, GRO and VOCs on soils the result is not surrogate corrected, but a percentage recovery is quoted. Acceptable limits for most organic methods are 70 – 130 %.
14. **Product analyses** – Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.
15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethyphenol, 3,5 Dimethylphenol).
16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 14).
17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.
18. Our MCERTS accreditation for PAHs by GCMS applies to all product types apart from Kerosene, where naphthalene only is not accredited.
19. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.
19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.
20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.
21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.
22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials – whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.
23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C4 – C10 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

LIQUID MATRICES EXTRACTION SUMMARY

ANALYSIS	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
PAH MS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC MS
EPH	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
EPH CWG	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
MINERAL OIL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
PCB 7 CONGENERS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC MS
PCB TOTAL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GS MS
SVOC	DCM	LIQUID/LIQUID SHAKE	GC MS
FREE SULPHUR	DCM	SOLID PHASE EXTRACTION	HPLC
PEST OCP/OPP	DCM	LIQUID/LIQUID SHAKE	GC MS
TRIAZINE HERBS	DCM	LIQUID/LIQUID SHAKE	GC MS
PHENOLS MS	DCM	SOLID PHASE EXTRACTION	GC MS
TPH by INFRA RED (IR)	TCE	LIQUID/LIQUID EXTRACTION	HPLC
MINERAL OIL by IR	TCE	LIQUID/LIQUID EXTRACTION	HPLC
GLYCOLS	NONE	DIRECT INJECTION	GC FID

SOLID MATRICES EXTRACTION SUMMARY

ANALYSIS	D/C OR WET	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
Solvent Extractable Matter	D&C	DCM	SOXTHERM	GRAVIMETRIC
Cyclohexane Ext. Matter	D&C	CYCLOHEXANE	SOXTHERM	GRAVIMETRIC
Thin Layer Chromatography	D&C	DCM	SOXTHERM	IATROSCAN
Elemental Sulphur	D&C	DCM	SOXTHERM	HPLC
Phenols by GCMS	WET	DCM	SOXTHERM	GC-MS
Herbicides	D&C	HEXANE:ACETONE	SOXTHERM	GC-MS
Pesticides	D&C	HEXANE:ACETONE	SOXTHERM	GC-MS
EPH (DRO)	D&C	HEXANE:ACETONE	END OVER END	GC-FID
EPH (Min oil)	D&C	HEXANE:ACETONE	END OVER END	GC-FID
EPH (Cleaned up)	D&C	HEXANE:ACETONE	END OVER END	GC-FID
EPH CWG by GC	D&C	HEXANE:ACETONE	END OVER END	GC-FID
PCB tot / PCB con	D&C	HEXANE:ACETONE	END OVER END	GC-MS
Polyaromatic Hydrocarbons (MS)	WET	HEXANE:ACETONE	Microwave TM218.	GC-MS
C8-C40 (C6-C40)EZ Flash	WET	HEXANE:ACETONE	SHAKER	GC-EZ
Polyaromatic Hydrocarbons Rapid GC	WET	HEXANE:ACETONE	SHAKER	GC-EZ
Semi Volatile Organic Compounds	WET	DCM:ACETONE	SONICATE	GC-MS

Identification of Asbestos in Bulk Materials

The results for asbestos identification for soil samples are obtained from possible Asbestos Containing Material, removed during the 'Screening of soils for Asbestos Containing Materials', which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Visual Estimation Of Fibre Content.

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: -

Trace – Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in MDHS 100.

The identification of asbestos containing materials falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

ALcontrol Laboratories

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University of Hull
Department of Geography
University of Hull
Cottingham Road
Hull
South Yorkshire
HU6 7RX

Attention: Ann Leighton

CERTIFICATE OF ANALYSIS

Date:	03 June 2010		
Customer:	H_UNIHULL_HUL-3		
Sample Delivery Group (SDG):	100526-21	**Report No.:**	85842
Your Reference:			
Location:	HUMBER TERMINAL		

We received 6 samples on Wednesday May 26, 2010 and 6 of these samples were scheduled for analysis which was completed on Thursday June 03, 2010. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Asbestos testing - we are not accredited for screening soil samples for asbestos fibres. We are only accredited to identify asbestos fibres in bulk material (ACM).

Approved By:

Iain Swinton

Operations Director - Land UK & Ireland

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
1291

Validated

ALcontrol Laboratories Analytical Services

SDG:	100526-21	**Customer:**	University of Hull
Job:	H_UNIHULL_HUL-3	**Attention:**	Ann Leighton
Client Reference:		**Order No.:**	FJ021299
Location:	HUMBER TERMINAL	**Report No:**	85842

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Sampled Date
1598241	10 SUB 1		04/05/2010
1598224	11 SUB 1		04/05/2010
1597971	12 SUB 1		04/05/2010
1597960	17 SUB 1		04/05/2010
1597940	18 SUB 1		04/05/2010
1597919	19 SUB 1		04/05/2010

Only received samples which have had analysis scheduled will be shown on the following pages.

Validated

ALcontrol Laboratories Analytical Services

SDG:	100526-21	**Customer:**	University of Hull
Job:	H_UNIHULL_HUL-3	**Attention:**	Ann Leighton
Client Reference:		**Order No.:**	FJ021299
Location:	HUMBER TERMINAL	**Report No:**	85842

SOLID

Results Legend

X Test

N No Determination Possible

		Lab Sample No(s)	1597919	1597940	1597960	1597971	1598224	1598241	Total
		Customer Sample Ref.	19 SUB	18 SUB	17 SUB	12 SUB	11 SUB	10 SUB	
		Depth (m)							
		Container	250g Amber Jar	250g Amber Jar	250g Amber Jar	250g Amber Jar	250g Amber Jar	250g Amber Jar	
Metals by iCap-OES (Soil)	Arsenic		X	X	X	X	X	X	0 6
	Cadmium		X	X	X	X	X	X	0 6
	Chromium		X	X	X	X	X	X	0 6
	Copper		X	X	X	X	X	X	0 6
	Lead		X	X	X	X	X	X	0 6
	Mercury		X	X	X	X	X	X	0 6
	Nickel		X	X	X	X	X	X	0 6
	Zinc		X	X	X	X	X	X	0 6
PAH by GCMS	All		X	X	X	X	X	X	0 6
PCBs by GCMS	All		X	X	X	X	X	X	0 6
Sample description	All		X	X	X	X	X	X	0 6
TPH	All		X	X	X	X	X	X	0 6

Validated

ALcontrol Laboratories Analytical Services

SDG:	100526-21	**Customer:**	University of Hull
Job:	H_UNIHULL_HUL-3	**Attention:**	Ann Leighton
Client Reference:		**Order No.:**	FJ021299
Location:	HUMBER TERMINAL	**Report No:**	85842

Sample Descriptions

Grain Sizes:
<0.063mm very fine,
0.063mm - 0.1mm fine,
0.1mm - 2mm medium,
2mm - 10mm coarse,
>10mm very coarse

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Grain size	Inclusions
1597919	19 SUB		Light Brown	Sand	0.1 - 2 mm	Stones
1597940	18 SUB		Light Brown	Sandy Silt Loam	0.1 - 2 mm	N/A
1597960	17 SUB		Light Brown	Sandy Silt Loam	0.1 - 2 mm	N/A
1597971	12 SUB		Dark Brown	Sandy Silt Loam	0.1 - 2 mm	N/A
1598224	11 SUB		Light Brown	Silt Loam	0.063 - 0.1 mm	N/A
1598241	10 SUB		Light Brown	Sandy Silt Loam	0.1 - 2 mm	N/A

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Validated

ALcontrol Laboratories Analytical Services

SDG:	100526-21	**Customer:**	University of Hull
Job:	H_UNIHULL_HUL-3	**Attention:**	Ann Leighton
Client Reference:		**Order No.:**	FJ021299
Location:	HUMBER TERMINAL	**Report No:**	85842

Test Completion dates

SDG reference: 100526-21

Lab Sample No(s)	1597919	1597940	1597960	1597971	1598224	1598241
Customer Sample Ref.	19 SUB	18 SUB	17 SUB	12 SUB	11 SUB	10 SUB
Depth						
Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
Metals by iCap-OES (Soil)	02/06/2010	02/06/2010	02/06/2010	01/06/2010	02/06/2010	02/06/2010
PAH by GCMS	27/05/2010	27/05/2010	27/05/2010	27/05/2010	27/05/2010	27/05/2010
PCBs by GCMS	01/06/2010	01/06/2010	01/06/2010	01/06/2010	01/06/2010	01/06/2010
Sample description	26/05/2010	26/05/2010	26/05/2010	26/05/2010	26/05/2010	26/05/2010
TPH	27/05/2010	27/05/2010	27/05/2010	27/05/2010	27/05/2010	27/05/2010

Validated

ALcontrol Laboratories Analytical Services

SDG: 100526-21
Job: H_UNIHULL_HUL-3
Client Reference:
Location: HUMBER TERMINAL

Customer: University of Hull
Attention: Ann Leighton
Order No.: FJ021299
Report No: 85842

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample Ref.	10 SUB	11 SUB	12 SUB	17 SUB	18 SUB	19 SUB
			Depth (m)						
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
			Date Sampled	04/05/2010	04/05/2010	04/05/2010	04/05/2010	04/05/2010	04/05/2010
			Date Received	26/05/2010	26/05/2010	26/05/2010	26/05/2010	26/05/2010	26/05/2010
			SDG Ref	100526-21	100526-21	100526-21	100526-21	100526-21	100526-21
			Lab Sample No.(s)	1598241	1598224	1597971	1597960	1597940	1597919
TPH/Oils and Greases	<10 mg/kg	TM087		78.8	136	145	40.2	67.8	56.9
PCB congener 28	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 52	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 101	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 118	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 138	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 153	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 180	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCBs, Total ICES 7	<3 µg/kg	TM168		<3	<3	<3	<3	<3	<3
Arsenic	<0.6 mg/kg	TM181		15.3 M	14.3 M	29.1 M	21.4 M	21 M	29.6 M
Cadmium	<0.02 mg/kg	TM181		0.288 M	0.44 M	0.338 M	0.323 M	0.267 M	0.185 M
Chromium	<0.9 mg/kg	TM181		25.4 M	25.7 M	35.4 M	25.2 M	21.4 M	10.7 M
Copper	<1.4 mg/kg	TM181		16.6 M	15.3 M	22.8 M	16.2 M	49.9 M	7 M
Lead	<0.7 mg/kg	TM181		40.4 M	26.7 M	52.3 M	37.5 M	57.7 M	30.6 M
Mercury	<0.14 mg/kg	TM181		<0.14 M	0.177 M	<0.14 M	<0.14 M	<0.14 M	<0.14 M
Nickel	<0.2 mg/kg	TM181		17.1 M	19 M	18.6 M	17.2 M	15 M	10.2 M
Zinc	<1.9 mg/kg	TM181		90.2 M	110 M	115 M	102 M	91.2 M	66.7 M

Validated

ALcontrol Laboratories Analytical Services

SDG:	100526-21	**Customer:**	University of Hull
Job:	H_UNIHULL_HUL-3	**Attention:**	Ann Leighton
Client Reference:		**Order No.:**	FJ021299
Location:	HUMBER TERMINAL	**Report No:**	85842

PAH by GCMS

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample Ref.	Depth (m)	Sample Type	Date Sampled	Date Received	SDG Ref	Lab Sample No.(s)
			10 SUB		Soil/Solid	04/05/2010	26/05/2010	100526-21	1598241
			11 SUB		Soil/Solid	04/05/2010	26/05/2010	100526-21	1598224
			12 SUB		Soil/Solid	04/05/2010	26/05/2010	100526-21	1597971
			17 SUB		Soil/Solid	04/05/2010	26/05/2010	100526-21	1597960
			18 SUB		Soil/Solid	04/05/2010	26/05/2010	100526-21	1597940
			19 SUB		Soil/Solid	04/05/2010	26/05/2010	100526-21	1597919
Naphthalene-d8 % recovery**	%	TM218	111		110		108		109		109		109	
Acenaphthene-d10 % recovery**	%	TM218	111		111		109		107		110		110	
Phenanthrene-d10 % recovery**	%	TM218	109		110		109		102		110		110	
Chrysene-d12 % recovery**	%	TM218	105		107		106		97.2		108		108	
Perylene-d12 % recovery**	%	TM218	111		114		113		104		117		116	
Naphthalene	<9 µg/kg	TM218	106	M	143	M	177	M	106	M	68.3	M	52.6	M
Acenaphthylene	<12 µg/kg	TM218	23.8	M	22	M	27.5	M	14.6	M	12.2	M	<12	M
Acenaphthene	<8 µg/kg	TM218	30.7	M	27.9	M	41.4	M	22.6	M	22.9	M	18.5	M
Fluorene	<10 µg/kg	TM218	42.4	M	49	M	72.4	M	33.4	M	39.1	M	25.4	M
Phenanthrene	<15 µg/kg	TM218	250	M	242	M	264	M	168	M	161	M	127	M
Anthracene	<16 µg/kg	TM218	68.6	M	66.7	M	95.2	M	49.3	M	38.5	M	39.6	M
Fluoranthene	<17 µg/kg	TM218	361	M	299	M	377	M	196	M	165	M	182	M
Pyrene	<15 µg/kg	TM218	329	M	291	M	347	M	187	M	162	M	171	M
Benz(a)anthracene	<14 µg/kg	TM218	268	M	201	M	236	M	115	M	118	M	90	M
Chrysene	<10 µg/kg	TM218	189	M	155	M	151	M	86.6	M	83.1	M	79.4	M
Benzo(b)fluoranthene	<15 µg/kg	TM218	296	M	262	M	292	M	164	M	148	M	136	M
Benzo(k)fluoranthene	<14 µg/kg	TM218	119	M	106	M	114	M	61.3	M	59.9	M	52	M
Benzo(a)pyrene	<15 µg/kg	TM218	278	M	222	M	265	M	144	M	120	M	118	M
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218	145	M	124	M	148	M	77.8	M	63.5	M	59.5	M
Dibenzo(a,h)anthracene	<23 µg/kg	TM218	43.3	M	38.7	M	42.1	M	<23	M	<23	M	<23	M
Benzo(g,h,i)perylene	<24 µg/kg	TM218	181	M	175	M	205	M	105	M	87	M	77.5	M
Polyaromatic hydrocarbons, Total USEPA 16	<118 µg/kg	TM218	2730	M	2430	M	2860	M	1530	M	1350	M	1230	M

Table of Results - Appendix

SDG Number : 100526-21 **Client :** University of Hull **Client Ref :**

REPORT KEY

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10-7

NDP	No Determination Possible	#	ISO 17025 Accredited	*	Subcontracted Test	M	MCERTS Accredited
NFD	No Fibres Detected	PFD	Possible Fibres Detected	»	Result previously reported (Incremental reports only)	EC	Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control

Method No	Reference	Description	Wet/Dry Sample [1]
PM001		Preparation of Samples for Metals Analysis	Dry
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material	Wet
TM087	Modified: US EPA Method 8440	Measurement of Total Petroleum Hydrocarbons in soil or water samples by infra-red spectrophotometry	Wet
TM168	EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils	Dry
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES	Dry
TM218	Microwave extraction – EPA method 3546	Microwave extraction - EPA method 3546	Wet

[1] Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

APPENDIX

APPENDIX

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA Leach tests, flash point, ammonium as NH_4 by the BRE method, VOC TICS, SVOC TICS, TOF-MS SCAN/SEARCH and TOF-MS TICS.
2. Samples will be run in duplicate upon request, but an additional charge may be incurred.
3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for both soil jars, tubs and volatile jars. All waters and vials will be discarded 10 days after the analysis is completed (e-mailed). All material removed during an asbestos containing material screen and analysed for the presence of asbestos will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.
4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.
5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.
6. When requested, the individual sub sample scheduled will be screened in house for the presence of large asbestos containing material fragments/pieces. If no asbestos containing material is found this will be reported as 'no asbestos containing material detected'. If asbestos containing material is detected it will be removed and analysed by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If asbestos containing material is present no further analysis will be undertaken. At no point is the fibre content of the soil sample determined.
7. If no separate volatile sample is supplied by the client, the integrity of the data may be compromised if the laboratory is required to create a sub-sample from the bulk sample – similarly, if a headspace or sediment is present in the volatile sample. This will be flagged up as an invalid VOC on the test schedule or recorded on the log sheet.
8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.
9. NDP – No determination possible due to insufficient/unsuitable sample.
10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals – total metals must be requested separately.
11. A table containing the date of analysis for each parameter is not routinely included with the report, but is available upon request.
12. Results relate only to the items tested
13. **Surrogate recoveries** – Most of our organic methods include surrogates, the recovery of which is monitored and reported. For EPH, MO, PAH, GRO and VOCs on soils the result is not surrogate corrected, but a percentage recovery is quoted. Acceptable limits for most organic methods are 70 – 130 %.
14. **Product analyses** – Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.
15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethyphenol, 3,5 Dimethylphenol).
16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 14).
17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.
18. Our MCERTS accreditation for PAHs by GCMS applies to all product types apart from Kerosene, where naphthalene only is not accredited.
19. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.
19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.
20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.
21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.
22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials – whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.
23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C4 – C10 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

LIQUID MATRICES EXTRACTION SUMMARY

ANALYSIS	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
PAH MS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC MS
EPH	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
EPH CWG	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
MINERAL OIL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
PCB 7 CONGENERS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC MS
PCB TOTAL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GS MS
SVOC	DCM	LIQUID/LIQUID SHAKE	GC MS
FREE SULPHUR	DCM	SOLID PHASE EXTRACTION	HPLC
PEST OCP/OPP	DCM	LIQUID/LIQUID SHAKE	GC MS
TRIAZINE HERBS	DCM	LIQUID/LIQUID SHAKE	GC MS
PHENOLS MS	DCM	SOLID PHASE EXTRACTION	GC MS
TPH by INFRA RED (IR)	TCE	LIQUID/LIQUID EXTRACTION	HPLC
MINERAL OIL by IR	TCE	LIQUID/LIQUID EXTRACTION	HPLC
GLYCOLS	NONE	DIRECT INJECTION	GC FID

SOLID MATRICES EXTRACTION SUMMARY

ANALYSIS	D/C OR WET	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
Solvent Extractable Matter	D&C	DCM	SOXTHERM	GRAVIMETRIC
Cyclohexane Ext. Matter	D&C	CYCLOHEXANE	SOXTHERM	GRAVIMETRIC
Thin Layer Chromatography	D&C	DCM	SOXTHERM	IATROSCAN
Elemental Sulphur	D&C	DCM	SOXTHERM	HPLC
Phenols by GCMS	WET	DCM	SOXTHERM	GC-MS
Herbicides	D&C	HEXANE:ACETONE	SOXTHERM	GC-MS
Pesticides	D&C	HEXANE:ACETONE	SOXTHERM	GC-MS
EPH (DRO)	D&C	HEXANE:ACETONE	END OVER END	GC-FID
EPH (Min oil)	D&C	HEXANE:ACETONE	END OVER END	GC-FID
EPH (Cleaned up)	D&C	HEXANE:ACETONE	END OVER END	GC-FID
EPH CWG by GC	D&C	HEXANE:ACETONE	END OVER END	GC-FID
PCB tot / PCB con	D&C	HEXANE:ACETONE	END OVER END	GC-MS
Polyaromatic Hydrocarbons (MS)	WET	HEXANE:ACETONE	Microwave TM218.	GC-MS
C8-C40 (C6-C40)EZ Flash	WET	HEXANE:ACETONE	SHAKER	GC-EZ
Polyaromatic Hydrocarbons Rapid GC	WET	HEXANE:ACETONE	SHAKER	GC-EZ
Semi Volatile Organic Compounds	WET	DCM:ACETONE	SONICATE	GC-MS

Identification of Asbestos in Bulk Materials

The results for asbestos identification for soil samples are obtained from possible Asbestos Containing Material, removed during the 'Screening of soils for Asbestos Containing Materials', which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Visual Estimation Of Fibre Content.

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: -

Trace – Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in MDHS 100.

The identification of asbestos containing materials falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

ALcontrol Laboratories

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HU6 7RX

Attention: Ann Leighton

CERTIFICATE OF ANALYSIS

Date:	03 August 2010		
Customer:	H_UNIHULL_HUL-4		
Sample Delivery Group (SDG):	100720-24	**Report No.:**	92334
Your Reference:			
Location:	YF HUMBER		

We received 21 samples on Tuesday July 20, 2010 and 21 of these samples were scheduled for analysis which was completed on Tuesday August 03, 2010. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Asbestos testing - we are not accredited for screening soil samples for asbestos fibres. We are only accredited to identify asbestos fibres in bulk material (ACM).

Approved By:

Iain Swinton

Operations Director - Land UK & Ireland

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
1291

GROUP

Validated

ALcontrol Laboratories Analytical Services

SDG:	100720-24	**Customer:**	University of Hull
Job:	H_UNIHULL_HUL-4	**Attention:**	Ann Leighton
Client Reference:		**Order No.:**	FJ021830
Location:	YF HUMBER	**Report No:**	92334

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Sampled Date
1843974	VC1	3.10	15/07/2010
1843969	VC11	2.20	14/07/2010
1844029	VC12	4.30	15/07/2010
1844051	VC13	3.80	15/07/2010
1843904	VC15	2.60	15/07/2010
1843910	VC16	3.40	14/07/2010
1843957	VC17	4.00	14/07/2010
1843924	VC18	5.20	14/07/2010
1844015	VC19	3.30 - 3.60	14/07/2010
1843983	VC2	6.00	15/07/2010
1843933	VC20	3.38	14/07/2010
1843913	VC22	3.60	14/07/2010
1844091	VC24	3.60	14/07/2010
1843989	VC27	4.90	15/07/2010
1844088	VC28	4.30	14/07/2010
1844129	VC29	2.90	14/07/2010
1844044	VC3		15/07/2010
1844121	VC30	3.00	15/07/2010
1844061	VC6	5.30	15/07/2010
1843995	VC7		14/07/2010
1843971	VC8	4.70	15/07/2010

Only received samples which have had analysis scheduled will be shown on the following pages.

Validated

ALcontrol Laboratories Analytical Services

SDG:	100720-24	**Customer:**	University of Hull
Job:	H_UNIHULL_HUL-4	**Attention:**	Ann Leighton
Client Reference:		**Order No.:**	FJ021830
Location:	YF HUMBER	**Report No:**	92334

SOLID

Results Legend

X Test

N No Determination Possible

		Lab Sample No(s)	1843904	1843910	1843913	1843924	1843933	1843957	1843969	1843971	1843974	1843983	1843989	1843995	1844015	1844029	1844044	1844051	1844061	1844088	1844091	1844121	1844129	Total
		Customer Sample Ref.	VC15	VC16	VC22	VC18	VC20	VC17	VC11	VC8	VC1	VC2	VC27	VC7	VC19	VC12	VC3	VC13	VC6	VC28	VC24	VC30	VC29	
		Depth (m)	2.60	3.40	3.60	5.20	3.38	4.00	2.20	4.70	3.10	6.00	4.90		3.30 - 3.60	4.30		3.80	5.30	4.30	3.60	3.00	2.90	
		Container	250g Amber Jar	250g Amber Jar	250g Amber Jar	250g Amber Jar	250g Amber Jar	250g Amber Jar	250g Amber Jar	250g Amber Jar	250g Amber Jar	250g Amber Jar	250g Amber Jar	250g Amber Jar	250g Amber Jar	250g Amber Jar	250g Amber Jar	250g Amber Jar	250g Amber Jar	250g Amber Jar	250g Amber Jar	250g Amber Jar	250g Amber Jar	
GRO BTEX MTBE GC (S)		All	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0 21
Metals by iCap-OES (Soil)		Arsenic	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0 21
		Cadmium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0 21
		Chromium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0 21
		Copper	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0 21
		Lead	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0 21
		Mercury	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0 21
		Nickel	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0 21
		Selenium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0 21
		Zinc	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0 21
Organotins on soils*		All	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0 21
PAH by GCMS		All	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0 21
PCBs by GCMS		All	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0 21
Sample description		All	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0 21

Validated

ALcontrol Laboratories Analytical Services

SDG:	100720-24	**Customer:**	University of Hull
Job:	H_UNIHULL_HUL-4	**Attention:**	Ann Leighton
Client Reference:		**Order No.:**	FJ021830
Location:	YF HUMBER	**Report No:**	92334

Sample Descriptions

Grain Sizes:
<0.063mm very fine,
0.063mm - 0.1mm fine,
0.1mm - 2mm medium,
2mm - 10mm coarse,
>10mm very coarse

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Grain size	Inclusions
1843904	VC15	2.60	Dark Brown	Sand	0.1 - 2 mm	Stones
1843910	VC16	3.40	Dark Brown	Clay	<0.063 mm	N/A
1843913	VC22	3.60	Dark Brown	Clay Loam	0.063 - 0.1 mm	N/A
1843924	VC18	5.20	Dark Brown	Clay	<0.063 mm	Stones
1843933	VC20	3.38	Dark Brown	Clay Loam	0.063 - 0.1 mm	N/A
1843957	VC17	4.00	Dark Brown	Clay Loam	0.063 - 0.1 mm	Stones
1843969	VC11	2.20	Dark Brown	Clay	<0.063 mm	Stones
1843971	VC8	4.70	Dark Brown	Sand	0.1 - 2 mm	N/A
1843974	VC1	3.10	Light Brown	Sand	0.1 - 2 mm	Stones
1843983	VC2	6.00	Grey	Sandy Clay	0.1 - 2 mm	Stones
1843989	VC27	4.90	Dark Brown	Clay Loam	0.063 - 0.1 mm	N/A
1843995	VC7		Dark Brown	Silt Loam	0.063 - 0.1 mm	None
1844015	VC19	3.30 - 3.60	Dark Brown	Sandy Clay Loam	0.1 - 2 mm	Stones
1844029	VC12	4.30	Dark Brown	Sand	0.1 - 2 mm	None
1844044	VC3		Dark Brown	Clay	<0.063 mm	N/A
1844051	VC13	3.80	Dark Brown	Sand	0.1 - 2 mm	N/A
1844061	VC6	5.30	Dark Brown	Sand	0.1 - 2 mm	N/A
1844088	VC28	4.30	Dark Brown	Clay	<0.063 mm	Stones
1844091	VC24	3.60	Dark Brown	Silty Clay Loam	0.063 - 0.1 mm	N/A
1844121	VC30	3.00	Dark Brown	Silty Clay	<0.063 mm	Stones
1844129	VC29	2.90	Dark Brown	Clay	<0.063 mm	Stones

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Validated

ALcontrol Laboratories Analytical Services

SDG:	100720-24	**Customer:**	University of Hull
Job:	H_UNIHULL_HUL-4	**Attention:**	Ann Leighton
Client Reference:		**Order No.:**	FJ021830
Location:	YF HUMBER	**Report No:**	92334

Test Completion dates

SDG reference: 100720-24

Lab Sample No(s)	1843904	1843910	1843913	1843924	1843933	1843957	1843969	1843971	1843974	1843983	1843989	1843995
Customer Sample Ref.	VC15	VC16	VC22	VC18	VC20	VC17	VC11	VC8	VC1	VC2	VC27	VC7
Depth	2.60	3.40	3.60	5.20	3.38	4.00	2.20	4.70	3.10	6.00	4.90	
Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
GRO by GC-FID (S)	26/07/2010	26/07/2010	26/07/2010	26/07/2010	28/07/2010	28/07/2010	26/07/2010	28/07/2010	28/07/2010	28/07/2010	28/07/2010	26/07/2010
Metals by iCap-OES (Soil)	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010
Organotins on soils*	03/08/2010	03/08/2010	03/08/2010	03/08/2010	03/08/2010	03/08/2010	03/08/2010	03/08/2010	03/08/2010	03/08/2010	03/08/2010	03/08/2010
PAH by GCMS	23/07/2010	23/07/2010	23/07/2010	23/07/2010	23/07/2010	23/07/2010	23/07/2010	23/07/2010	23/07/2010	23/07/2010	23/07/2010	23/07/2010
PCBs by GCMS	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010
Sample description	23/07/2010	23/07/2010	22/07/2010	23/07/2010	22/07/2010	22/07/2010	23/07/2010	22/07/2010	22/07/2010	22/07/2010	22/07/2010	23/07/2010

1844015	1844029	1844044	1844051	1844061	1844088	1844091	1844121	1844129
VC19	VC12	VC3	VC13	VC6	VC28	VC24	VC30	VC29
3.30 - 3.60	4.30		3.80	5.30	4.30	3.60	3.00	2.90
SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
28/07/2010	26/07/2010	26/07/2010	28/07/2010	28/07/2010	28/07/2010	28/07/2010	28/07/2010	28/07/2010
26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010
03/08/2010	03/08/2010	03/08/2010	03/08/2010	03/08/2010	03/08/2010	03/08/2010	03/08/2010	03/08/2010
23/07/2010	23/07/2010	23/07/2010	23/07/2010	23/07/2010	23/07/2010	23/07/2010	23/07/2010	23/07/2010
26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010
22/07/2010	23/07/2010	23/07/2010	22/07/2010	22/07/2010	22/07/2010	22/07/2010	22/07/2010	22/07/2010

Validated

ALcontrol Laboratories Analytical Services

SDG: 100720-24
Job: H_UNIHULL_HUL-4
Client Reference:
Location: YF HUMBER

Customer: University of Hull
Attention: Ann Leighton
Order No.: FJ021830
Report No: 92334

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample Ref.	VC1	VC11	VC12	VC13	VC15	VC16
			Depth (m)	3.10	2.20	4.30	3.80	2.60	3.40
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
			Date Sampled	15/07/2010	14/07/2010	15/07/2010	15/07/2010	15/07/2010	14/07/2010
			Date Received	20/07/2010	20/07/2010	20/07/2010	20/07/2010	20/07/2010	20/07/2010
			SDG Ref	100720-24	100720-24	100720-24	100720-24	100720-24	100720-24
			Lab Sample No.(s)	1843974	1843969	1844029	1844051	1843904	1843910
PCB congener 118	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 81	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 77	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 123	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 114	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 105	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 126	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 167	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 156	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 157	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 169	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 189	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCBs, Total WHO 12	<3 µg/kg	TM168		<3	<3	<3	<3	<3	<3
Arsenic	<0.6 mg/kg	TM181		3.38 M	9.07 M	13.9 M	20.2 M	30.9 M	5.27 M
Cadmium	<0.02 mg/kg	TM181		0.141 M	0.273 M	0.231 M	0.285 M	0.469 M	0.277 M
Chromium	<0.9 mg/kg	TM181		4 M	17.3 M	13.2 M	18.4 M	25.5 M	11.8 M
Copper	<1.4 mg/kg	TM181		3.16 M	12.1 M	8.61 M	11 M	18.2 M	10.3 M
Lead	<0.7 mg/kg	TM181		2.34 M	9.9 M	29.4 M	27.8 M	42.1 M	6.84 M
Mercury	<0.14 mg/kg	TM181		<0.14 M	<0.14 M	<0.14 M	<0.14 M	<0.14 M	<0.14 M
Nickel	<0.2 mg/kg	TM181		4.13 M	19.5 M	8.43 M	10.5 M	14.6 M	14.1 M
Selenium	<1 mg/kg	TM181		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Zinc	<1.9 mg/kg	TM181		13.1 M	43.5 M	63.9 M	80.7 M	107 M	35.9 M

Validated

ALcontrol Laboratories Analytical Services

SDG: 100720-24
Job: H_UNIHULL_HUL-4
Client Reference:
Location: YF HUMBER

Customer: University of Hull
Attention: Ann Leighton
Order No.: FJ021830
Report No: 92334

GRO BTEX MTBE GC (S)

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample Ref.	VC1	VC11	VC12	VC13	VC15	VC16
			Depth (m)	3.10	2.20	4.30	3.80	2.60	3.40
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
			Date Sampled	15/07/2010	14/07/2010	15/07/2010	15/07/2010	15/07/2010	14/07/2010
			Date Received	20/07/2010	20/07/2010	20/07/2010	20/07/2010	20/07/2010	20/07/2010
			SDG Ref	100720-24	100720-24	100720-24	100720-24	100720-24	100720-24
			Lab Sample No.(s)	1843974	1843969	1844029	1844051	1843904	1843910
GRO >C5-C12	<44 µg/kg	TM089		<44	<44	<44	154	<44	<88
Benzene	<10 µg/kg	TM089		<10 M	<10 M	<10 M	<10 M	<10 M	<20 M
Ethylbenzene	<3 µg/kg	TM089		<3 M	<3 M	<3 M	<3 M	<3 M	<6 M
Toluene	<2 µg/kg	TM089		<2 M	<2 M	<2 M	<2 M	<2 M	<4 M
m,p-Xylene	<6 µg/kg	TM089		<6 M	<6 M	<6 M	<6 M	<6 M	<12 M
o-Xylene	<3 µg/kg	TM089		<3 M	<3 M	<3 M	<3 M	<3 M	<6 M
m,p,o-Xylene	<10 µg/kg	TM089		<10 M	<10 M	<10 M	<10 M	<10 M	<20 M
BTEX, Total	<10 µg/kg	TM089		<10 M	<10 M	<10 M	<10 M	<10 M	<20 M
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089		<5 #	<5 #	<5 #	<5 #	<5 #	<10 #

Validated

ALcontrol Laboratories Analytical Services

SDG:	100720-24	**Customer:**	University of Hull
Job:	H_UNIHULL_HUL-4	**Attention:**	Ann Leighton
Client Reference:		**Order No.:**	FJ021830
Location:	YF HUMBER	**Report No:**	92334

Organotins on soils*

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample Ref.	VC1	VC11	VC12	VC13	VC15	VC16
			Depth (m)	3.10	2.20	4.30	3.80	2.60	3.40
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
			Date Sampled	15/07/2010	14/07/2010	15/07/2010	15/07/2010	15/07/2010	14/07/2010
			Date Received	20/07/2010	20/07/2010	20/07/2010	20/07/2010	20/07/2010	20/07/2010
			SDG Ref	100720-24	100720-24	100720-24	100720-24	100720-24	100720-24
			Lab Sample No.(s)	1843974	1843969	1844029	1844051	1843904	1843910
Tributyl tin*	<0.02 mg/kg	SUB		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Triphenyl tin*	<0.05 mg/kg	SUB		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibutyl tin*	<0.02 mg/kg	SUB		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Tetrabutyl tin*	<0.02 mg/kg	SUB		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Validated

ALcontrol Laboratories Analytical Services

SDG:	100720-24	**Customer:**	University of Hull
Job:	H_UNIHULL_HUL-4	**Attention:**	Ann Leighton
Client Reference:		**Order No.:**	FJ021830
Location:	YF HUMBER	**Report No:**	92334

PAH by GCMS

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample Ref.	VC1	VC11	VC12	VC13	VC15	VC16
			Depth (m)	3.10	2.20	4.30	3.80	2.60	3.40
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
			Date Sampled	15/07/2010	14/07/2010	15/07/2010	15/07/2010	15/07/2010	14/07/2010
			Date Received	20/07/2010	20/07/2010	20/07/2010	20/07/2010	20/07/2010	20/07/2010
			SDG Ref	100720-24	100720-24	100720-24	100720-24	100720-24	100720-24
			Lab Sample No.(s)	1843974	1843969	1844029	1844051	1843904	1843910
Naphthalene-d8 % recovery**	%	TM218		97.8	103	105	97.6	110	102
Acenaphthene-d10 % recovery**	%	TM218		95.4	98.5	102	95.7	107	98.4
Phenanthrene-d10 % recovery**	%	TM218		92.1	98.8	102	91.9	109	98.8
Chrysene-d12 % recovery**	%	TM218		86.6	84.2	88.5	86.4	97.7	84.7
Perylene-d12 % recovery**	%	TM218		87	88.2	95.8	86.8	107	90.1
Naphthalene	<9 µg/kg	TM218		<9 M	<9 M	22.3 M	<9 M	111 M	33.4 M
Acenaphthylene	<12 µg/kg	TM218		<12 M	<12 M	<12 M	<12 M	26.9 M	<12 M
Acenaphthene	<8 µg/kg	TM218		<8 M	<8 M	<8 M	<8 M	52.6 M	<8 M
Fluorene	<10 µg/kg	TM218		<10 M	<10 M	<10 M	<10 M	60 M	<10 M
Phenanthrene	<15 µg/kg	TM218		<15 M	34.7 M	37.3 M	<15 M	280 M	48.2 M
Anthracene	<16 µg/kg	TM218		<16 M	<16 M	22.6 M	<16 M	107 M	<16 M
Fluoranthene	<17 µg/kg	TM218		<17 M	<17 M	69.6 M	<17 M	410 M	<17 M
Pyrene	<15 µg/kg	TM218		<15 M	<15 M	66.7 M	<15 M	375 M	<15 M
Benz(a)anthracene	<14 µg/kg	TM218		<14 M	<14 M	37.3 M	<14 M	197 M	<14 M
Chrysene	<10 µg/kg	TM218		<10 M	<10 M	34.9 M	<10 M	162 M	<10 M
Benzo(b)fluoranthene	<15 µg/kg	TM218		<15 M	<15 M	45.2 M	<15 M	251 M	<15 M
Benzo(k)fluoranthene	<14 µg/kg	TM218		<14 M	<14 M	20.2 M	<14 M	99.4 M	<14 M
Benzo(a)pyrene	<15 µg/kg	TM218		<15 M	<15 M	39.8 M	<15 M	217 M	<15 M
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218		<18 M	<18 M	28.4 M	<18 M	122 M	<18 M
Dibenzo(a,h)anthracene	<23 µg/kg	TM218		<23 M	<23 M	<23 M	<23 M	35.2 M	<23 M
Benzo(g,h,i)perylene	<24 µg/kg	TM218		<24 M	<24 M	37.5 M	<24 M	169 M	<24 M
Polyaromatic hydrocarbons, Total USEPA 16	<118 µg/kg	TM218		<118 M	<118 M	462 M	<118 M	2670 M	<118 M

Validated

ALcontrol Laboratories Analytical Services

SDG: 100720-24
Job: H_UNIHULL_HUL-4
Client Reference:
Location: YF HUMBER

Customer: University of Hull
Attention: Ann Leighton
Order No.: FJ021830
Report No: 92334

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample Ref.	VC17	VC18	VC19	VC2	VC20	VC22
			Depth (m)	4.00	5.20	3.30 - 3.60	6.00	3.38	3.60
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
			Date Sampled	14/07/2010	14/07/2010	14/07/2010	15/07/2010	14/07/2010	14/07/2010
			Date Received	20/07/2010	20/07/2010	20/07/2010	20/07/2010	20/07/2010	20/07/2010
			SDG Ref	100720-24	100720-24	100720-24	100720-24	100720-24	100720-24
			Lab Sample No.(s)	1843957	1843924	1844015	1843983	1843933	1843913
PCB congener 118	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 81	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 77	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 123	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 114	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 105	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 126	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 167	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 156	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 157	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 169	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 189	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCBs, Total WHO 12	<3 µg/kg	TM168		<3	<3	<3	<3	<3	<3
Arsenic	<0.6 mg/kg	TM181		9.25 M	7.59 M	12.3 M	13.8 M	12.5 M	3.96 M
Cadmium	<0.02 mg/kg	TM181		0.309 M	0.295 M	0.361 M	0.157 M	0.4 M	0.29 M
Chromium	<0.9 mg/kg	TM181		18.5 M	20.7 M	20.7 M	10.3 M	29.5 M	12.3 M
Copper	<1.4 mg/kg	TM181		23.3 M	13.5 M	15.4 M	4.61 M	19.4 M	10.5 M
Lead	<0.7 mg/kg	TM181		11.4 M	9.6 M	12.1 M	5.11 M	22 M	7.62 M
Mercury	<0.14 mg/kg	TM181		<0.14 M	<0.14 M	<0.14 M	<0.14 M	<0.14 M	<0.14 M
Nickel	<0.2 mg/kg	TM181		20.6 M	22.4 M	22.5 M	8.35 M	28.4 M	15 M
Selenium	<1 mg/kg	TM181		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Zinc	<1.9 mg/kg	TM181		46 M	46.2 M	57.4 M	22.2 M	84.7 M	39.1 M

Validated

ALcontrol Laboratories Analytical Services

SDG:	100720-24	**Customer:**	University of Hull
Job:	H_UNIHULL_HUL-4	**Attention:**	Ann Leighton
Client Reference:		**Order No.:**	FJ021830
Location:	YF HUMBER	**Report No:**	92334

GRO BTEX MTBE GC (S)

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample Ref.	VC17	VC18	VC19	VC2	VC20	VC22
			Depth (m)	4.00	5.20	3.30 - 3.60	6.00	3.38	3.60
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
			Date Sampled	14/07/2010	14/07/2010	14/07/2010	15/07/2010	14/07/2010	14/07/2010
			Date Received	20/07/2010	20/07/2010	20/07/2010	20/07/2010	20/07/2010	20/07/2010
			SDG Ref	100720-24	100720-24	100720-24	100720-24	100720-24	100720-24
			Lab Sample No.(s)	1843957	1843924	1844015	1843983	1843933	1843913
GRO >C5-C12	<44 µg/kg	TM089		81.7	<44	62	<44	130	<44
Benzene	<10 µg/kg	TM089		<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
Ethylbenzene	<3 µg/kg	TM089		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
Toluene	<2 µg/kg	TM089		<2 M	<2 M	<2 M	<2 M	<2 M	<2 M
m,p-Xylene	<6 µg/kg	TM089		<6 M	<6 M	<6 M	<6 M	<6 M	<6 M
o-Xylene	<3 µg/kg	TM089		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
m,p,o-Xylene	<10 µg/kg	TM089		<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
BTEX, Total	<10 µg/kg	TM089		<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089		<5 #	<5 #	<5 #	<5 #	<5 #	<5 #

Validated

ALcontrol Laboratories Analytical Services

SDG:	100720-24	**Customer:**	University of Hull
Job:	H_UNIHULL_HUL-4	**Attention:**	Ann Leighton
Client Reference:		**Order No.:**	FJ021830
Location:	YF HUMBER	**Report No:**	92334

Organotins on soils*

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample Ref.	VC17	VC18	VC19	VC2	VC20	VC22
			Depth (m)	4.00	5.20	3.30 - 3.60	6.00	3.38	3.60
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
			Date Sampled	14/07/2010	14/07/2010	14/07/2010	15/07/2010	14/07/2010	14/07/2010
			Date Received	20/07/2010	20/07/2010	20/07/2010	20/07/2010	20/07/2010	20/07/2010
			SDG Ref	100720-24	100720-24	100720-24	100720-24	100720-24	100720-24
			Lab Sample No.(s)	1843957	1843924	1844015	1843983	1843933	1843913
Tributyl tin*	<0.02 mg/kg	SUB		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Triphenyl tin*	<0.05 mg/kg	SUB		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibutyl tin*	<0.02 mg/kg	SUB		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Tetrabutyl tin*	<0.02 mg/kg	SUB		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Validated

ALcontrol Laboratories Analytical Services

SDG:	100720-24	**Customer:**	University of Hull
Job:	H_UNIHULL_HUL-4	**Attention:**	Ann Leighton
Client Reference:		**Order No.:**	FJ021830
Location:	YF HUMBER	**Report No:**	92334

PAH by GCMS

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample Ref.	VC17	VC18	VC19	VC2	VC20	VC22
			Depth (m)	4.00	5.20	3.30 - 3.60	6.00	3.38	3.60
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
			Date Sampled	14/07/2010	14/07/2010	14/07/2010	15/07/2010	14/07/2010	14/07/2010
			Date Received	20/07/2010	20/07/2010	20/07/2010	20/07/2010	20/07/2010	20/07/2010
			SDG Ref	100720-24	100720-24	100720-24	100720-24	100720-24	100720-24
			Lab Sample No.(s)	1843957	1843924	1844015	1843983	1843933	1843913
Naphthalene-d8 % recovery**	%	TM218		93.5	102	92	88.6	105	103
Acenaphthene-d10 % recovery**	%	TM218		91.5	97.6	88.3	84.6	104	103
Phenanthrene-d10 % recovery**	%	TM218		89.8	97.9	84.9	79	102	104
Chrysene-d12 % recovery**	%	TM218		87.1	83.8	81.9	73.7	101	92.9
Perylene-d12 % recovery**	%	TM218		82.1	87.6	77.2	76	97.3	105
Naphthalene	<9 µg/kg	TM218		11.4 M	<9 M	<9 M	<9 M	112 M	<9 M
Acenaphthylene	<12 µg/kg	TM218		<12 M	<12 M	<12 M	<12 M	21.3 M	<12 M
Acenaphthene	<8 µg/kg	TM218		<8 M	<8 M	<8 M	<8 M	28.3 M	<8 M
Fluorene	<10 µg/kg	TM218		<10 M	<10 M	<10 M	<10 M	45.1 M	<10 M
Phenanthrene	<15 µg/kg	TM218		32.1 M	<15 M	34.4 M	<15 M	203 M	<15 M
Anthracene	<16 µg/kg	TM218		<16 M	<16 M	<16 M	<16 M	62.3 M	<16 M
Fluoranthene	<17 µg/kg	TM218		<17 M	<17 M	65.6 M	<17 M	263 M	<17 M
Pyrene	<15 µg/kg	TM218		22.1 M	<15 M	61 M	<15 M	252 M	<15 M
Benz(a)anthracene	<14 µg/kg	TM218		18.8 M	<14 M	46.1 M	<14 M	157 M	<14 M
Chrysene	<10 µg/kg	TM218		14.5 M	<10 M	35.6 M	<10 M	123 M	<10 M
Benzo(b)fluoranthene	<15 µg/kg	TM218		20.5 M	<15 M	48.8 M	<15 M	232 M	<15 M
Benzo(k)fluoranthene	<14 µg/kg	TM218		<14 M	<14 M	16.7 M	<14 M	80.6 M	<14 M
Benzo(a)pyrene	<15 µg/kg	TM218		<15 M	<15 M	31.7 M	<15 M	158 M	<15 M
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218		<18 M	<18 M	<18 M	<18 M	97.9 M	<18 M
Dibenzo(a,h)anthracene	<23 µg/kg	TM218		<23 M	<23 M	<23 M	<23 M	33.1 M	<23 M
Benzo(g,h,i)perylene	<24 µg/kg	TM218		<24 M	<24 M	<24 M	<24 M	163 M	<24 M
Polyaromatic hydrocarbons, Total USEPA 16	<118 µg/kg	TM218		120 M	<118 M	340 M	<118 M	2030 M	<118 M

Validated

ALcontrol Laboratories Analytical Services

SDG:	100720-24	**Customer:**	University of Hull
Job:	H_UNIHULL_HUL-4	**Attention:**	Ann Leighton
Client Reference:		**Order No.:**	FJ021830
Location:	YF HUMBER	**Report No:**	92334

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample Ref.	VC24	VC27	VC28	VC29	VC3	VC30
			Depth (m)	3.60	4.90	4.30	2.90		3.00
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
			Date Sampled	14/07/2010	15/07/2010	14/07/2010	14/07/2010	15/07/2010	15/07/2010
			Date Received	20/07/2010	20/07/2010	20/07/2010	20/07/2010	20/07/2010	20/07/2010
			SDG Ref	100720-24	100720-24	100720-24	100720-24	100720-24	100720-24
			Lab Sample No.(s)	1844091	1843989	1844088	1844129	1844044	1844121
PCB congener 118	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 81	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 77	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 123	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 114	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 105	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 126	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 167	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 156	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 157	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 169	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 189	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCBs, Total WHO 12	<3 µg/kg	TM168		<3	<3	<3	<3	<3	<3
Arsenic	<0.6 mg/kg	TM181		18.4 M	6.43 M	6 M	8.99 M	6.65 M	7.42 M
Cadmium	<0.02 mg/kg	TM181		0.441 M	0.294 M	0.25 M	0.297 M	0.296 M	0.266 M
Chromium	<0.9 mg/kg	TM181		34.7 M	16.2 M	16.4 M	19.6 M	20.6 M	21.7 M
Copper	<1.4 mg/kg	TM181		24.2 M	10.3 M	11.3 M	14.4 M	13.2 M	13.8 M
Lead	<0.7 mg/kg	TM181		33.2 M	7.68 M	8.23 M	11.2 M	11.2 M	13.6 M
Mercury	<0.14 mg/kg	TM181		<0.14 M	<0.14 M	<0.14 M	<0.14 M	<0.14 M	<0.14 M
Nickel	<0.2 mg/kg	TM181		25.5 M	16.4 M	17.7 M	22 M	20.8 M	20.8 M
Selenium	<1 mg/kg	TM181		1.04 #	<1 #	<1 #	<1 #	<1 #	<1 #
Zinc	<1.9 mg/kg	TM181		106 M	39.5 M	42.7 M	51.3 M	48.5 M	51.1 M

Validated

ALcontrol Laboratories Analytical Services

SDG: 100720-24
Job: H_UNIHULL_HUL-4
Client Reference:
Location: YF HUMBER

Customer: University of Hull
Attention: Ann Leighton
Order No.: FJ021830
Report No: 92334

GRO BTEX MTBE GC (S)

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Customer Sample Ref.	VC24	VC27	VC28	VC29	VC3	VC30
Depth (m)	3.60	4.90	4.30	2.90		3.00
Sample Type	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
Date Sampled	14/07/2010	15/07/2010	14/07/2010	14/07/2010	15/07/2010	15/07/2010
Date Received	20/07/2010	20/07/2010	20/07/2010	20/07/2010	20/07/2010	20/07/2010
SDG Ref	100720-24	100720-24	100720-24	100720-24	100720-24	100720-24
Lab Sample No.(s)	1844091	1843989	1844088	1844129	1844044	1844121

Component	LOD/Units	Method											
GRO >C5-C12	<44 µg/kg	TM089	162		108		128		848		<44		92.8	
Benzene	<10 µg/kg	TM089	<10	M	<10	M	<10	M	<10	M	<10	M	<10	M
Ethylbenzene	<3 µg/kg	TM089	<3	M	<3	M	<3	M	35.7	M	<3	M	<3	M
Toluene	<2 µg/kg	TM089	<2	M	<2	M	<2	M	13.8	M	<2	M	<2	M
m,p-Xylene	<6 µg/kg	TM089	<6	M	<6	M	<6	M	33.4	M	<6	M	<6	M
o-Xylene	<3 µg/kg	TM089	<3	M	<3	M	<3	M	20.7	M	<3	M	<3	M
m,p,o-Xylene	<10 µg/kg	TM089	<10	M	<10	M	<10	M	54.1	M	<10	M	<10	M
BTEX, Total	<10 µg/kg	TM089	<10	M	<10	M	<10	M	104	M	<10	M	<10	M
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089	<5	#	<5	#	<5	#	<5	#	<5	#	<5	#

Validated

ALcontrol Laboratories Analytical Services

SDG:	100720-24	**Customer:**	University of Hull
Job:	H_UNIHULL_HUL-4	**Attention:**	Ann Leighton
Client Reference:		**Order No.:**	FJ021830
Location:	YF HUMBER	**Report No:**	92334

Organotins on soils*

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample Ref.	VC24	VC27	VC28	VC29	VC3	VC30
			Depth (m)	3.60	4.90	4.30	2.90		3.00
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
			Date Sampled	14/07/2010	15/07/2010	14/07/2010	14/07/2010	15/07/2010	15/07/2010
			Date Received	20/07/2010	20/07/2010	20/07/2010	20/07/2010	20/07/2010	20/07/2010
			SDG Ref	100720-24	100720-24	100720-24	100720-24	100720-24	100720-24
			Lab Sample No.(s)	1844091	1843989	1844088	1844129	1844044	1844121
Tributyl tin*	<0.02 mg/kg	SUB		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Triphenyl tin*	<0.05 mg/kg	SUB		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibutyl tin*	<0.02 mg/kg	SUB		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Tetrabutyl tin*	<0.02 mg/kg	SUB		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

ALcontrol Laboratories Analytical Services

SDG:	100720-24	**Customer:**	University of Hull
Job:	H_UNIHULL_HUL-4	**Attention:**	Ann Leighton
Client Reference:		**Order No.:**	FJ021830
Location:	YF HUMBER	**Report No:**	92334

PAH by GCMS

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample Ref.	VC24	VC27	VC28	VC29	VC3	VC30
			Depth (m)	3.60	4.90	4.30	2.90		3.00
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
			Date Sampled	14/07/2010	15/07/2010	14/07/2010	14/07/2010	15/07/2010	15/07/2010
			Date Received	20/07/2010	20/07/2010	20/07/2010	20/07/2010	20/07/2010	20/07/2010
			SDG Ref	100720-24	100720-24	100720-24	100720-24	100720-24	100720-24
			Lab Sample No.(s)	1844091	1843989	1844088	1844129	1844044	1844121
Naphthalene-d8 % recovery**	%	TM218		105	100	94.3	94.3	101	98.7
Acenaphthene-d10 % recovery**	%	TM218		104	98.9	91.5	90.5	97.3	96.6
Phenanthrene-d10 % recovery**	%	TM218		103	102	88.2	86.7	97.9	92.8
Chrysene-d12 % recovery**	%	TM218		103	86.1	82.6	81.3	84.8	89.4
Perylene-d12 % recovery**	%	TM218		101	94.4	83.1	82	92.6	93.5
Naphthalene	<9 µg/kg	TM218		156 M	41.8 M	16.7 M	12.8 M	24.9 M	162 M
Acenaphthylene	<12 µg/kg	TM218		43.6 M	<12 M	<12 M	<12 M	<12 M	26.5 M
Acenaphthene	<8 µg/kg	TM218		42 M	<8 M	<8 M	<8 M	<8 M	35.9 M
Fluorene	<10 µg/kg	TM218		61.3 M	<10 M	<10 M	<10 M	<10 M	62.3 M
Phenanthrene	<15 µg/kg	TM218		256 M	68.8 M	27.1 M	22.9 M	52.9 M	279 M
Anthracene	<16 µg/kg	TM218		106 M	<16 M	<16 M	<16 M	<16 M	86.9 M
Fluoranthene	<17 µg/kg	TM218		396 M	21.8 M	<17 M	<17 M	36.4 M	383 M
Pyrene	<15 µg/kg	TM218		359 M	26.8 M	<15 M	<15 M	40.8 M	337 M
Benz(a)anthracene	<14 µg/kg	TM218		237 M	<14 M	<14 M	<14 M	<14 M	224 M
Chrysene	<10 µg/kg	TM218		170 M	<10 M	<10 M	<10 M	20.5 M	180 M
Benzo(b)fluoranthene	<15 µg/kg	TM218		353 M	18 M	<15 M	<15 M	33.8 M	345 M
Benzo(k)fluoranthene	<14 µg/kg	TM218		108 M	<14 M	<14 M	<14 M	<14 M	113 M
Benzo(a)pyrene	<15 µg/kg	TM218		249 M	<15 M	<15 M	<15 M	21.9 M	248 M
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218		142 M	<18 M	<18 M	<18 M	<18 M	143 M
Dibenzo(a,h)anthracene	<23 µg/kg	TM218		43.1 M	<23 M	<23 M	<23 M	<23 M	45.7 M
Benzo(g,h,i)perylene	<24 µg/kg	TM218		210 M	29.2 M	<24 M	<24 M	35.5 M	213 M
Polyaromatic hydrocarbons, Total USEPA 16	<118 µg/kg	TM218		2930 M	206 M	<118 M	<118 M	267 M	2880 M

Validated

ALcontrol Laboratories Analytical Services

SDG:	100720-24	**Customer:**	University of Hull
Job:	H_UNIHULL_HUL-4	**Attention:**	Ann Leighton
Client Reference:		**Order No.:**	FJ021830
Location:	YF HUMBER	**Report No:**	92334

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample Ref.	VC6	VC7	VC8
			Depth (m)	5.30		4.70
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid
			Date Sampled	15/07/2010	14/07/2010	15/07/2010
			Date Received	20/07/2010	20/07/2010	20/07/2010
			SDG Ref	100720-24	100720-24	100720-24
			Lab Sample No.(s)	1844061	1843995	1843971
PCB congener 118	<3 µg/kg	TM168		<3 M	<3 M	<3 M
PCB congener 81	<3 µg/kg	TM168		<3 M	<3 M	<3 M
PCB congener 77	<3 µg/kg	TM168		<3 M	<3 M	<3 M
PCB congener 123	<3 µg/kg	TM168		<3 M	<3 M	<3 M
PCB congener 114	<3 µg/kg	TM168		<3 M	<3 M	<3 M
PCB congener 105	<3 µg/kg	TM168		<3 M	<3 M	<3 M
PCB congener 126	<3 µg/kg	TM168		<3 M	<3 M	<3 M
PCB congener 167	<3 µg/kg	TM168		<3 M	<3 M	<3 M
PCB congener 156	<3 µg/kg	TM168		<3 M	<3 M	<3 M
PCB congener 157	<3 µg/kg	TM168		<3 M	<3 M	<3 M
PCB congener 169	<3 µg/kg	TM168		<3 M	<3 M	<3 M
PCB congener 189	<3 µg/kg	TM168		<3 M	<3 M	<3 M
PCBs, Total WHO 12	<3 µg/kg	TM168		<3	<3	<3
Arsenic	<0.6 mg/kg	TM181		24.9 M	18.9 M	13.6 M
Cadmium	<0.02 mg/kg	TM181		0.453 M	0.469 M	0.27 M
Chromium	<0.9 mg/kg	TM181		31.6 M	42.5 M	16.8 M
Copper	<1.4 mg/kg	TM181		24.2 M	26.6 M	13.9 M
Lead	<0.7 mg/kg	TM181		44.7 M	48.8 M	35.2 M
Mercury	<0.14 mg/kg	TM181		<0.14 M	<0.14 M	<0.14 M
Nickel	<0.2 mg/kg	TM181		17.4 M	24.8 M	11 M
Selenium	<1 mg/kg	TM181		<1 #	1.1 #	<1 #
Zinc	<1.9 mg/kg	TM181		121 M	131 M	77.5 M

SDG:	100720-24	**Customer:**	University of Hull
Job:	H_UNIHULL_HUL-4	**Attention:**	Ann Leighton
Client Reference:		**Order No.:**	FJ021830
Location:	YF HUMBER	**Report No:**	92334

GRO BTEX MTBE GC (S)

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample Ref.	VC6	VC7	VC8
			Depth (m)	5.30		4.70
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid
			Date Sampled	15/07/2010	14/07/2010	15/07/2010
			Date Received	20/07/2010	20/07/2010	20/07/2010
			SDG Ref	100720-24	100720-24	100720-24
			Lab Sample No.(s)	1844061	1843995	1843971
GRO >C5-C12	<44 µg/kg	TM089		291	<44	97.5
Benzene	<10 µg/kg	TM089		<10 M	<10 M	<10 M
Ethylbenzene	<3 µg/kg	TM089		<3 M	<3 M	<3 M
Toluene	<2 µg/kg	TM089		<2 M	<2 M	<2 M
m,p-Xylene	<6 µg/kg	TM089		<6 M	<6 M	<6 M
o-Xylene	<3 µg/kg	TM089		<3 M	<3 M	<3 M
m,p,o-Xylene	<10 µg/kg	TM089		<10 M	<10 M	<10 M
BTEX, Total	<10 µg/kg	TM089		<10 M	<10 M	<10 M
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089		<5 #	<5 #	<5 #

Validated

ALcontrol Laboratories Analytical Services

SDG:	100720-24	**Customer:**	University of Hull
Job:	H_UNIHULL_HUL-4	**Attention:**	Ann Leighton
Client Reference:		**Order No.:**	FJ021830
Location:	YF HUMBER	**Report No:**	92334

Organotins on soils*

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Customer Sample Ref.	VC6	VC7	VC8
Depth (m)	5.30		4.70
Sample Type	Soil/Solid	Soil/Solid	Soil/Solid
Date Sampled	15/07/2010	14/07/2010	15/07/2010
Date Received	20/07/2010	20/07/2010	20/07/2010
SDG Ref	100720-24	100720-24	100720-24
Lab Sample No.(s)	1844061	1843995	1843971

Component	LOD/Units	Method						
Tributyl tin*	<0.02 mg/kg	SUB	<0.02	<0.02	<0.02			
Triphenyl tin*	<0.05 mg/kg	SUB	<0.05	<0.05	<0.05			
Dibutyl tin*	<0.02 mg/kg	SUB	<0.02	<0.02	<0.02			
Tetrabutyl tin*	<0.02 mg/kg	SUB	<0.02	<0.02	<0.02			

ALcontrol Laboratories Analytical Services

SDG:	100720-24	**Customer:**	University of Hull
Job:	H_UNIHULL_HUL-4	**Attention:**	Ann Leighton
Client Reference:		**Order No.:**	FJ021830
Location:	YF HUMBER	**Report No:**	92334

PAH by GCMS

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample Ref.	VC6	VC7	VC8
			Depth (m)	5.30		4.70
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid
			Date Sampled	15/07/2010	14/07/2010	15/07/2010
			Date Received	20/07/2010	20/07/2010	20/07/2010
			SDG Ref	100720-24	100720-24	100720-24
			Lab Sample No.(s)	1844061	1843995	1843971
Naphthalene-d8 % recovery**	%	TM218		101	107	103
Acenaphthene-d10 % recovery**	%	TM218		99.1	105	102
Phenanthrene-d10 % recovery**	%	TM218		96.5	106	101
Chrysene-d12 % recovery**	%	TM218		93.6	93.8	100
Perylene-d12 % recovery**	%	TM218		96	103	96.1
Naphthalene	<9 µg/kg	TM218		133 M	162 M	62.6 M
Acenaphthylene	<12 µg/kg	TM218		32.9 M	33.6 M	23.9 M
Acenaphthene	<8 µg/kg	TM218		54.8 M	42.6 M	36.9 M
Fluorene	<10 µg/kg	TM218		75 M	66.9 M	41.9 M
Phenanthrene	<15 µg/kg	TM218		270 M	287 M	202 M
Anthracene	<16 µg/kg	TM218		127 M	94.6 M	82.3 M
Fluoranthene	<17 µg/kg	TM218		433 M	340 M	334 M
Pyrene	<15 µg/kg	TM218		372 M	302 M	363 M
Benz(a)anthracene	<14 µg/kg	TM218		215 M	195 M	164 M
Chrysene	<10 µg/kg	TM218		186 M	169 M	117 M
Benzo(b)fluoranthene	<15 µg/kg	TM218		341 M	283 M	247 M
Benzo(k)fluoranthene	<14 µg/kg	TM218		104 M	104 M	98.5 M
Benzo(a)pyrene	<15 µg/kg	TM218		250 M	218 M	190 M
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218		142 M	131 M	102 M
Dibenzo(a,h)anthracene	<23 µg/kg	TM218		44.1 M	40.2 M	<23 M
Benzo(g,h,i)perylene	<24 µg/kg	TM218		204 M	191 M	145 M
Polyaromatic hydrocarbons, Total USEPA 16	<118 µg/kg	TM218		2980 M	2660 M	2210 M

Table of Results - Appendix

SDG Number : 100720-24 **Client :** University of Hull **Client Ref :**

REPORT KEY

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10-7

NDP	No Determination Possible	#	ISO 17025 Accredited	*	Subcontracted Test	M	MCERTS Accredited
NFD	No Fibres Detected	PFD	Possible Fibres Detected	»	Result previously reported (Incremental reports only)	EC	Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control

Method No	Reference	Description	Wet/Dry Sample [1]
PM001		Preparation of Samples for Metals Analysis	Dry
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material	Wet
SUB		Subcontracted Test	Wet
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)	
TM168	EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils	Dry
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES	Dry
TM218	Microwave extraction – EPA method 3546	Microwave extraction - EPA method 3546	Wet

[1] Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

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Analytical Report

ALcontrol Hawarden
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Manor Road (off Manor Lane)
Hawarden, Deeside
Flintshire, CH5 3US

Report No:	10-18705/1
Date Received:	23/07/2010
Date Tested:	29/07/2010 to 02/08/2010
Date Issued:	02/08/2010
Page:	1 of 7

For the attention of: Scott Idiens

By email

21 soil samples received from ALcontrol Hawarden (O/N: 149859; Project: 100720-24) in 100ml amber glass jars were analysed as shown below. Analytical methods employed are available on request. Results are reported on an as received basis unless otherwise specified.

Laboratory reference			173119 1855233	173120 1855243	173121 1855244
dibutyltin	*[1002-53-5]*	mg/kg Sn	< 0.02	< 0.02	< 0.02
tetrabutyltin	*[1461-25-2]*	mg/kg Sn	< 0.02	< 0.02	< 0.02
tributyltin	*[56573-85-4]*	mg/kg Sn	< 0.02	< 0.02	< 0.02
triphenyltin	*[668-34-8]*	mg/kg Sn	< 0.05	< 0.05	< 0.05

Laboratory reference			173122 1855246	173123 1855247	173124 1855250
dibutyltin	*[1002-53-5]*	mg/kg Sn	< 0.02	< 0.02	< 0.02
tetrabutyltin	*[1461-25-2]*	mg/kg Sn	< 0.02	< 0.02	< 0.02
tributyltin	*[56573-85-4]*	mg/kg Sn	< 0.02	< 0.02	< 0.02
triphenyltin	*[668-34-8]*	mg/kg Sn	< 0.05	< 0.05	< 0.05

Laboratory reference			173125 1855258	173126 1855259	173127 1855260
dibutyltin	*[1002-53-5]*	mg/kg Sn	< 0.02	< 0.02	< 0.02
tetrabutyltin	*[1461-25-2]*	mg/kg Sn	< 0.02	< 0.02	< 0.02
tributyltin	*[56573-85-4]*	mg/kg Sn	< 0.02	< 0.02	< 0.02
triphenyltin	*[668-34-8]*	mg/kg Sn	< 0.05	< 0.05	< 0.05

Laboratory reference			173128 1855268	173129 1855273	173130 1855276
dibutyltin	*[1002-53-5]*	mg/kg Sn	< 0.02	< 0.02	< 0.02
tetrabutyltin	*[1461-25-2]*	mg/kg Sn	< 0.02	< 0.02	< 0.02
tributyltin	*[56573-85-4]*	mg/kg Sn	< 0.02	< 0.02	< 0.02
triphenyltin	*[668-34-8]*	mg/kg Sn	< 0.05	< 0.05	< 0.05

Laboratory reference			173131 1855279	173132 1855283	173133 1855287
dibutyltin	*[1002-53-5]*	mg/kg Sn	< 0.02	< 0.02	< 0.02
tetrabutyltin	*[1461-25-2]*	mg/kg Sn	< 0.02	< 0.02	< 0.02
tributyltin	*[56573-85-4]*	mg/kg Sn	< 0.02	< 0.02	< 0.02
triphenyltin	*[668-34-8]*	mg/kg Sn	< 0.05	< 0.05	< 0.05

Laboratory reference			173134 1855294	173135 1855302	173136 1855323
dibutyltin	*[1002-53-5]*	mg/kg Sn	< 0.02	< 0.02	< 0.02
tetrabutyltin	*[1461-25-2]*	mg/kg Sn	< 0.02	< 0.02	< 0.02
tributyltin	*[56573-85-4]*	mg/kg Sn	< 0.02	< 0.02	< 0.02
triphenyltin	*[668-34-8]*	mg/kg Sn	< 0.05	< 0.05	< 0.05

Laboratory reference			173137 1855338	173138 1855351	173139 1855376
dibutyltin	*[1002-53-5]*	mg/kg Sn	< 0.02	< 0.02	< 0.02
tetrabutyltin	*[1461-25-2]*	mg/kg Sn	< 0.02	< 0.02	< 0.02
tributyltin	*[56573-85-4]*	mg/kg Sn	< 0.02	< 0.02	< 0.02
triphenyltin	*[668-34-8]*	mg/kg Sn	< 0.05	< 0.05	< 0.05

Robin T R Macdonald
Operational Director

APPENDIX

APPENDIX

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA Leach tests, flash point, ammonium as NH_4 by the BRE method, VOC TICS, SVOC TICS, TOF-MS SCAN/SEARCH and TOF-MS TICS.
2. Samples will be run in duplicate upon request, but an additional charge may be incurred.
3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for both soil jars, tubs and volatile jars. All waters and vials will be discarded 10 days after the analysis is completed (e-mailed). All material removed during an asbestos containing material screen and analysed for the presence of asbestos will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.
4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.
5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.
6. When requested, the individual sub sample scheduled will be screened in house for the presence of large asbestos containing material fragments/pieces. If no asbestos containing material is found this will be reported as 'no asbestos containing material detected'. If asbestos containing material is detected it will be removed and analysed by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If asbestos containing material is present no further analysis will be undertaken. At no point is the fibre content of the soil sample determined.
7. If no separate volatile sample is supplied by the client, the integrity of the data may be compromised if the laboratory is required to create a sub-sample from the bulk sample – similarly, if a headspace or sediment is present in the volatile sample. This will be flagged up as an invalid VOC on the test schedule or recorded on the log sheet.
8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.
9. NDP – No determination possible due to insufficient/unsuitable sample.
10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals – total metals must be requested separately.
11. A table containing the date of analysis for each parameter is not routinely included with the report, but is available upon request.
12. Results relate only to the items tested
13. **Surrogate recoveries** – Most of our organic methods include surrogates, the recovery of which is monitored and reported. For EPH, MO, PAH, GRO and VOCs on soils the result is not surrogate corrected, but a percentage recovery is quoted. Acceptable limits for most organic methods are 70 – 130 %.
14. **Product analyses** – Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.
15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethyphenol, 3,5 Dimethylphenol).
16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 14).
17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.
18. Our MCERTS accreditation for PAHs by GCMS applies to all product types apart from Kerosene, where naphthalene only is not accredited.
19. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.
19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.
20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.
21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.
22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials – whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.
23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C4 – C10 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

LIQUID MATRICES EXTRACTION SUMMARY

ANALYSIS	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
PAH MS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC MS
EPH	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
EPH CWG	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
MINERAL OIL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
PCB 7 CONGENERS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC MS
PCB TOTAL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GS MS
SVOC	DCM	LIQUID/LIQUID SHAKE	GC MS
FREE SULPHUR	DCM	SOLID PHASE EXTRACTION	HPLC
PEST OCP/OPP	DCM	LIQUID/LIQUID SHAKE	GC MS
TRIAZINE HERBS	DCM	LIQUID/LIQUID SHAKE	GC MS
PHENOLS MS	DCM	SOLID PHASE EXTRACTION	GC MS
TPH by INFRA RED (IR)	TCE	LIQUID/LIQUID EXTRACTION	HPLC
MINERAL OIL by IR	TCE	LIQUID/LIQUID EXTRACTION	HPLC
GLYCOLS	NONE	DIRECT INJECTION	GC FID

SOLID MATRICES EXTRACTION SUMMARY

ANALYSIS	D/C OR WET	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
Solvent Extractable Matter	D&C	DCM	SOXTHERM	GRAVIMETRIC
Cyclohexane Ext. Matter	D&C	CYCLOHEXANE	SOXTHERM	GRAVIMETRIC
Thin Layer Chromatography	D&C	DCM	SOXTHERM	IATROSCAN
Elemental Sulphur	D&C	DCM	SOXTHERM	HPLC
Phenols by GCMS	WET	DCM	SOXTHERM	GC-MS
Herbicides	D&C	HEXANE:ACETONE	SOXTHERM	GC-MS
Pesticides	D&C	HEXANE:ACETONE	SOXTHERM	GC-MS
EPH (DRO)	D&C	HEXANE:ACETONE	END OVER END	GC-FID
EPH (Min oil)	D&C	HEXANE:ACETONE	END OVER END	GC-FID
EPH (Cleaned up)	D&C	HEXANE:ACETONE	END OVER END	GC-FID
EPH CWG by GC	D&C	HEXANE:ACETONE	END OVER END	GC-FID
PCB tot / PCB con	D&C	HEXANE:ACETONE	END OVER END	GC-MS
Polyaromatic Hydrocarbons (MS)	WET	HEXANE:ACETONE	Microwave TM218.	GC-MS
C8-C40 (C6-C40)EZ Flash	WET	HEXANE:ACETONE	SHAKER	GC-EZ
Polyaromatic Hydrocarbons Rapid GC	WET	HEXANE:ACETONE	SHAKER	GC-EZ
Semi Volatile Organic Compounds	WET	DCM:ACETONE	SONICATE	GC-MS

Identification of Asbestos in Bulk Materials

The results for asbestos identification for soil samples are obtained from possible Asbestos Containing Material, removed during the 'Screening of soils for Asbestos Containing Materials', which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Visual Estimation Of Fibre Content.

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: -

Trace – Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in MDHS 100.

The identification of asbestos containing materials falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-