

Environmental Statement

Appendix E

Sediment Quality Data



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Date: 2 December, 2005

Report on the Analysis of Sediment taken from Eastside Development Gibraltar. Job 2005-189

For

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Report Ref: GP507

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Sample Details:	
<i>Date Samples received:</i> 11/11/05	<i>Date Analysis completed:</i> 02/12/05
<i>Customer Order No:</i> 292.10001	<i>Job No(s):</i> 2005-3511C

Sample Information:	
Lab Code	Customer Code
844556	MM2
844557	MM3
844558	MM4
844559	MM5
844560	MM6
844561	MM7
844562	MM8
844563	MM9
844564	MM10
844565	MM11
844566	MM12
844567	MM13

Analysis of Sediment taken from Eastside Development Gibraltar. Job 2005-189

Sample Preparation

Samples for polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), tributyltin, and metals analysis were freeze dried and sieved to <2mm.

Samples for gasoline range organic compounds (GRO), phenols and pH analysis were used as received.

Samples for total organic carbon were freeze dried and finely milled.

Analytical procedures

Gasoline range organic compounds (GRO) were determined by static headspace GC-MS and quantified using a series of external standards.

Tributyltin compounds were determined after extraction and pentylation, and quantified by reference to an internal standard using GC-MS (SIR) (in-house method compiled from Morabito et al, 1995).

Polycyclic aromatic hydrocarbons (PAHs) were determined after solvent extraction, clean-up by solid phase extraction chromatography and analysis using GC-MS (SIR). PAHs were quantified using a series of seven deuterated PAHs as internal standards.

Polychlorinated biphenyls (PCBs) were determined after extraction and clean-up of the extracts using solid phase chromatography. Analysis was carried out using GC-ECD and PCBs were quantified using an internal standard.

Phenols were determined after solvent extraction and analysis using GC-MS (SIR). Phenols were quantified using an internal standard.

Heavy metals were determined using ICP-MS after acid digestion.

Organic carbon was determined by acidification to remove inorganic carbon followed by a Dumas combustion technique to determine the organic carbon content

pH was determined by pH meter

RESULTS

The results are presented in the following Tables

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Verified by:	Date: 02-Dec -05
A Smith, BSc, PhD, CChem, FRSC (Manager MAS)	

Table 1 - Heavy Metals

Sample identity	Lab code	Concentration (mg/kg DM)							
		As	Cd	Cr	Cu	Hg	Ni	Pb	Zn
MM2	844556	8.956	0.016	33.312	3.938	<0.005	72.787	4.830	18.013
MM3	844557	8.374	0.015	29.867	4.063	<0.005	67.291	7.300	18.025
MM4	844558	8.605	0.015	35.142	4.018	0.042	78.875	6.226	18.746
MM5	844559	9.057	0.015	33.984	5.685	<0.005	90.567	7.928	23.382
MM6	844560	10.072	0.018	33.574	4.440	<0.005	79.727	7.250	20.491
MM7	844561	9.141	0.019	32.311	6.344	<0.005	66.890	10.482	24.951
MM8	844562	9.252	0.016	27.012	4.076	<0.005	51.287	9.576	21.633
MM9	844563	9.088	0.035	22.334	23.890	<0.005	46.478	39.806	71.072
MM10	844564	11.642	0.027	40.474	4.325	0.019	83.134	6.213	24.386
MM11	844565	12.017	0.019	47.047	3.770	0.008	85.276	6.368	22.975
MM12	844566	10.241	0.020	31.898	3.953	0.016	66.490	8.551	21.323
MM13	844567	9.629	0.051	24.521	10.088	0.015	46.592	17.447	42.741

Table 2 – Gasoline Range Organic Compounds (GRO), Total Organic Carbon (TOC)

Sample identity	Lab code	GRO (mg/kg DM)	TOC (%w/w)
MM2	844556	<0.1	0.22
MM3	844557	<0.1	0.12
MM4	844558	<0.1	0.12
MM5	844559	<0.1	0.11
MM6	844560	<0.1	0.15
MM7	844561	<0.1	0.09
MM8	844562	<0.1	0.11
MM9	844563	<0.1	0.07
MM10	844564	4.7	0.15
MM11	844565	<0.1	0.13
MM12	844566	<0.1	0.09
MM13	844567	<0.1	0.08

Table 3 – EPA 16 Polycyclic Aromatic Hydrocarbons plus Dibenzothiophene (PAHs)

Sample identity	Concentration ($\mu\text{g}/\text{kg DM}$)											
	MM2	MM3	MM4	MM5	MM6	MM7	MM8	MM9	MM10	MM11	MM12	MM13
Lab code	844556	844557	844558	844559	844560	844561	844562	844563	844564	844565	844566	844567
Naphthalene	<1	<1	<1	1	<1	<1	6	<1	<1	<1	<1	<1
Acenaphthylene	<1	<1	<1	1	<1	1	2	2	<1	<1	3	1
Acenaphthene	<1	<1	<1	2	1	1	<1	1	<1	<1	<1	2
Fluorene	<1	<1	1	20	1	1	1	1	1	1	2	1
Dibenzothiophene	<1	1	1	41	2	1	1	2	<1	<1	2	1
Phenanthrene	1	11	7	72	12	6	13	24	1	3	20	15
Anthracene	<1	1	3	1	4	1	3	6	<1	<1	5	5
Fluoranthene	1	18	20	26	35	14	36	57	1	2	65	39
Pyrene	1	11	17	21	26	13	30	50	1	3	45	31
Benz[a]anthracene	1	5	9	12	14	9	22	36	1	1	38	22
Chrysene	1	5	8	24	12	8	19	31	1	1	32	18
Benzo(b)fluoranthrene	<1	4	6	11	7	6	14	21	1	<1	19	9
Benzo(k)fluoranthrene	<1	5	6	12	7	7	18	27	1	<1	23	11
Benzo(a)pyrene	1	5	8	13	9	8	20	31	1	1	25	12
Indeno(1,2,3-cd)pyrene	1	3	5	8	5	5	12	17	<1	<1	11	6
Dibenzo(a,h)anthracene	1	1	1	2	1	1	2	3	<1	<1	3	1
Benzo(g,h,l)perylene	1	3	5	8	5	5	11	15	<1	<1	10	6
Total EPA 16 PAH + dibenzothiophene	9	73	97	275	141	87	210	324	9	12	303	180

Table 5 – pH, Total Cyanide, Tributyltin

Sample identity	Lab code	pH	Total cyanide (mg/kg DM)	Tributyltin ($\mu\text{g/kg DM}$)
MM2	844556	8.58	<2.0	<0.001
MM3	844557	8.72	<2.0	<0.001
MM4	844558	8.71	<2.0	<0.001
MM5	844559	8.62	<2.0	<0.001
MM6	844560	8.34	<2.0	<0.001
MM7	844561	8.62	<2.0	<0.001
MM8	844562	8.74	<2.0	<0.001
MM9	844563	8.74	<2.0	<0.001
MM10	844564	8.52	<2.0	<0.001
MM11	844565	8.56	<2.0	<0.001
MM12	844566	8.57	<2.0	<0.001
MM13	844567	8.74	<2.0	<0.001

