DRAIN IMPACT REPORT

FOR

KMK METALS RECYCLING LTD.
W0113-03

AT

CAPPINCUR INDUSTRIAL ESTATE,

DAINGEAN ROAD, TULLAMORE,

CO. OFFALY.
26th September 2011

This report is an investigation of the assimilative capacity of the receiving water (land drain along western site boundary) based on the actual flow measurement (using basic field data and survey) and water quality of the same land drain as determined from grab samples taken; up-stream and down stream of the KMK discharge points at CX and DX and also samples taken from CX and DX outlets on the same day.

Report prepared by;

ENVIROCO Management Ltd.
Bow House,
O'Moore Street
Tullamore
Tel : (057 93) 52200
Fax : (057 93) 52342
Website : www.enviroco.ie

The land drain flow as measured on 15th August 2011 = 0.0889m^3/s

The CX discharge flow as measured on 15th August 2011 = 0.000072 m^3/s

The DX discharge flow as measured on 15th August 2011 = 0.0000092 m^3/s

To calculate the existing chemical parameter loadings the following equation is used:

Existing loadings (kg) = flow x conc. of each parameter measured (mg/l) / 1000

Table 1.1 shows the baseline parameter loadings for the land drain- Upstream (US) of the discharge outlets (CX & DX)

Parameter	River Flow (m^3/s)	US Concentration measured (mg/l)	Existing loadings* (kg)
Total Suspended solids	0.0889	27	2.4×10^{-03}
Organic Carbon	0.0889	9.55	8.4×10^{-04}
Ammonical Nitrogen as NH3	0.0889	<0.2	Undetectable
COD unfiltered	0.0889	45.3	4.0×10^{-03}
Conductivity (mS/m3)	0.0889	0.637	5.66×10^{-02}
Aluminium	0.0889	$<2.9 \times 10^{-03}$	Undetectable
Arsenic	0.0889	3.16×10^{-03}	2.8×10^{-07}
Chromium	0.0889	9.99×10^{-03}	8.8×10^{-07}
Lead	0.0889	1.6×10^{-03}	1.4×10^{-07}
Nickel	0.0889	8.56×10^{-03}	7.6×10^{-07}
Zinc	0.0889	12.9×10^{-03}	1.1×10^{-06}
EPH Range >C10-C40	0.0889	146×10^{-03}	1.3×10^{-05}
Mineral Oil >C10 C40	0.0889	$<10 \times 10^{-03}$	Undetectable
Mercury	0.0889	$<0.01 \times 10^{-03}$	Undetectable
Chloride	0.0889	51.3	4.5×10^{-03}
Iron	0.0889	<0.019	Undetectable
pH (units)	0.0889	8.59	7.6×10^{-04}

*Figures based the calculated flow rate of the drain: 0.0889 m^3/s and using water quality analysis data taken upstream of the discharge points CX & DX on the drain. See Appendix 1 for analysis results

Table 1.2 shows the baseline parameter loadings for the land drain- Downstream (DS) of the discharge outlets (CX & DX)

Parameter	River Flow (m^3/s)	DS Concentration measured (mg/l)	Existing loadings* ($kg\ m^3$)
Total Suspended solids	0.0889	8	7.1×10^{-04}
Organic Carbon	0.0889	11	9.7×10^{-04}
Ammonical Nitrogen as NH3	0.0889	<0.2	Undetectable
COD unfiltered	0.0889	30.4	2.7×10^{-03}
Conductivity (mS/m3)	0.0889	0.482	4.2×10^{-02}
Aluminium	0.0889	$<2.9 \times 10^{-03}$	Undetectable
Arsenic	0.0889	3.5×10^{-03}	3.1×10^{-07}
Chromium	0.0889	9.78×10^{-03}	8.7×10^{-07}
Lead	0.0889	0.128×10^{-03}	1.1×10^{-07}
Nickel	0.0889	7.11×10^{-03}	6.3×10^{-07}
Zinc	0.0889	9.39×10^{-03}	8.3×10^{-07}
EPH Range >C10-C40	0.0889	$<46 \times 10^{-03}$	Undetectable
Mineral Oil >C10 C40	0.0889	$<10 \times 10^{-03}$	Undetectable
Mercury	0.0889	$<0.01 \times 10^{-03}$	Undetectable
Chloride	0.0889	16.8	1.5×10^{-03}
Iron	0.0889	0.0656	5.8×10^{-06}
pH (units)	0.0889	8.64	7.6×10^{-04}

*Figures based the calculated flow rate of the drain: $0.0889\ m^3/s$ and using water quality analysis data taken upstream of the discharge points CX & DX on the drain. See Appendix 1 for analysis results

Water quality analysis was carried out on water samples taken at;

- The discharge points CX and DX flowing into the land drain.
- Upstream of the discharge points CX and DX on the land drain.
- Down stream of the discharge points CX and DX on the land drain.

Please see map attached for reference.

Surface water monitoring locations for KMK Metals Recycling Ltd, Cappincur Ind Estate, Tullamore.

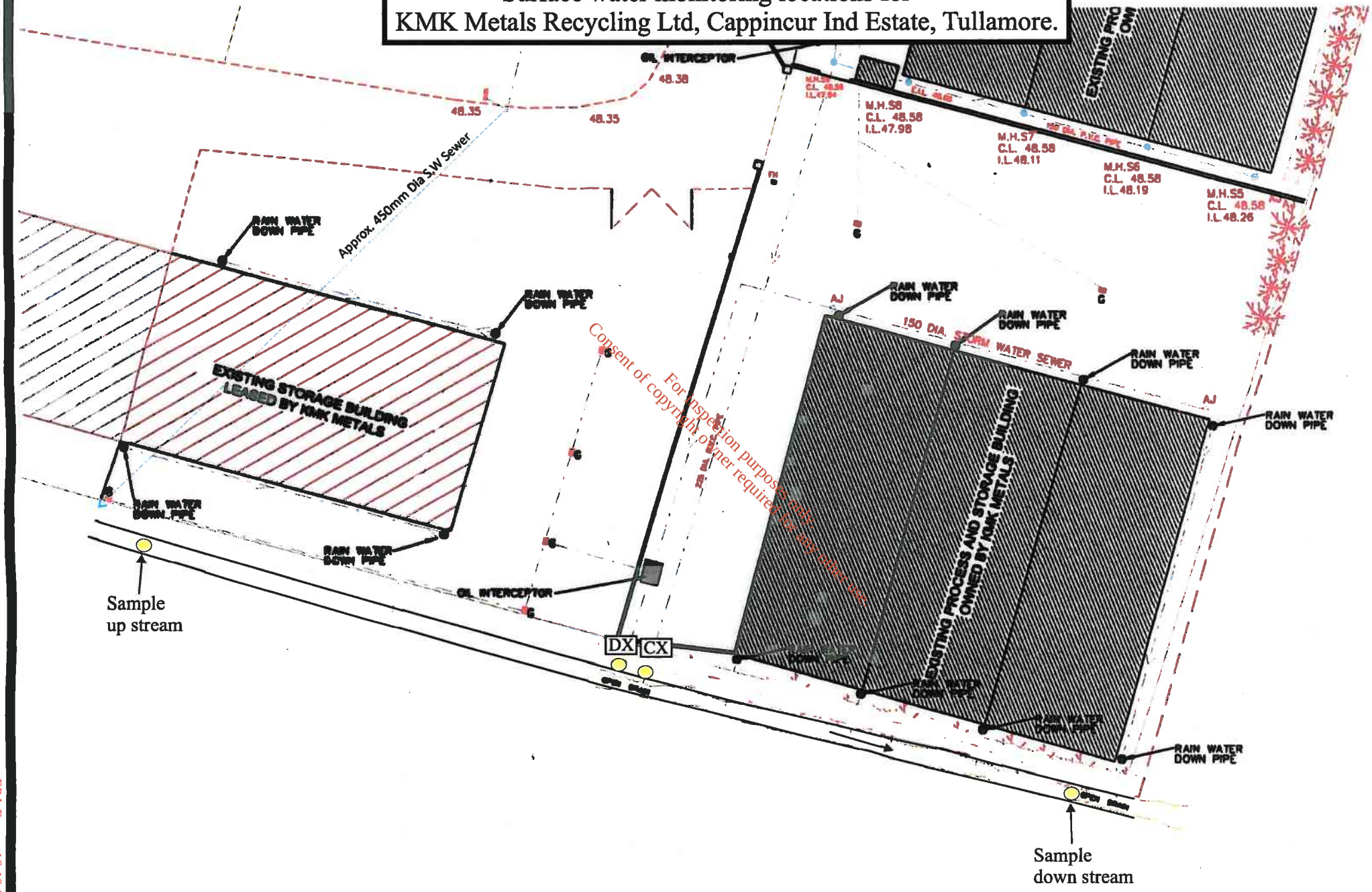


Table 1.3 shows the variation between upstream and downstream, including discharge values.

Table showing variation between upstream and downstream, including discharge values						
Parameter	**Units**	**US**	**CX**	**DX**	**DS**	**US-DS**
Suspended Solids	mg/l	27	6	46	8	**19.00**
Organic Carbon	mg/l	9.55	5.43	24.3	11	**-1.45**
Ammonical Nitrogen as NH3	mg/l	<0.2	4.72	2.11	<0.2	**0.00**
COD unfiltered	mg/l	45.3	20.4	103	30.4	**14.90**
Conductivity	mS/cm	0.637	0.627	0.85	0.482	**0.16**
Aluminium	µg/l	<2.9	<2.9	35.6	<2.9	**0.00**
Arsenic	µg/l	3.16	0.623	0.839	3.5	**-0.34**
Chromium	µg/l	9.99	5.52	5.61	9.78	**0.21**
Lead	µg/l	1.6	1.6	0.872	0.128	**1.47**
Nickel	µg/l	8.56	2.45	13	7.11	**1.45**
Zinc	µg/l	12.9	57.3	2.4	9.39	**3.51**
EPH Range >C10-C40	µg/l	146	114	741	<46	**>100**
Mineral Oil >C10 C40	µg/l	<10	<10	298	<10	**0.00**
Mercury	µg/l	<0.01	0.0101	<0.01	<0.01	**0.00**
Chloride	mg/l	51.3	49.1	173	16.8	**34.50**
Iron	mg/l	<0.019	<0.019	0.189	0.0656	**-0.05**
pH	pH units	8.59	8.42	8.55	8.64	**-0.05**

Negative values indicate where a parameter has increased downstream only.

Therefore the actual water quality up stream during the investigation event is of less quality than down stream of the KMK discharge points.

Tables 1.4 and 1.5 shows the actual loadings calculations being discharged from CX and DX outlet points.

Table 1.4 – loading impacts from CX

Parameter	Units	CX	Flow Rate m3/s	Loading Kg
Suspended Solids	mg/l	6	0.000072	4.3×10^{-07}
Organic Carbon	mg/l	5.43	0.000072	3.9×10^{-07}
Ammonical Nitrogen as NH3	mg/l	4.72	0.000072	3.4×10^{-07}
COD unfiltered	mg/l	20.4	0.000072	1.4×10^{-06}
Conductivity	mS/cm	0.627	0.000072	$4. \times 10^{-08}$
Aluminium	µg/l	<2.9	0.000072	Undetectable
Arsenic	µg/l	0.623	0.000072	4.4×10^{-11}
Chromium	µg/l	5.52	0.000072	3.9×10^{-10}
Lead	µg/l	1.6	0.000072	1.1×10^{-10}
Nickel	µg/l	2.45	0.000072	1.7×10^{-10}
Zinc	µg/l	57.3	0.000072	4.1×10^{-09}
EPH Range >C10-C40	µg/l	114	0.000072	8.2×10^{-06}
Mineral Oil >C10 C40	µg/l	<10	0.000072	Undetectable
Mercury	µg/l	0.0101	0.000072	7.2×10^{-10}
Chloride	mg/l	49.1	0.000072	3.5×10^{-06}
Iron	mg/l	<0.019	0.000072	Undetectable
pH	pH units	8.42	0.000072	6.0×10^{-07}

Table 1.5 – loading impacts from DX

Parameter	Units	DX	Flow Rates m3/s	Loading Kg
Suspended Solids	mg/l	46	0.00000092	4.2×10^{-08}
Organic Carbon	mg/l	24.3	0.00000092	2.2×10^{-08}
Ammonical Nitrogen as NH3	mg/l	2.11	0.00000092	1.9×10^{-09}
COD unfiltered	mg/l	103	0.00000092	9.5×10^{-08}
Conductivity	mS/cm	0.85	0.00000092	7.8×10^{-10}
Aluminium	µg/l	35.6	0.00000092	3.3×10^{-11}
Arsenic	µg/l	0.839	0.00000092	7.7×10^{-13}
Chromium	µg/l	5.61	0.00000092	5.2×10^{-12}
Lead	µg/l	0.872	0.00000092	8.1×10^{-13}
Nickel	µg/l	13	0.00000092	1.2×10^{-11}
Zinc	µg/l	2.4	0.00000092	2.2×10^{-12}
EPH Range >C10-C40	µg/l	741	0.00000092	6.8×10^{-10}
Mineral Oil >C10 C40	µg/l	298	0.00000092	2.7×10^{-10}
Mercury	µg/l	<0.01	0.00000092	Undetectable
Chloride	mg/l	173	0.00000092	1.6×10^{-7}
Iron	mg/l	0.189	0.00000092	1.7×10^{-10}
pH	pH units	8.55	0.00000092	7.9×10^{-9}

Table 1.6 shows the comparison between the existing loadings on the drain and the loadings from the discharges at CX and DX

Parameter	Existing loadings (kg) downstream of discharge points	Loading from CX discharge kg*	% increase in drain loading from CX	Loading from DX discharge kg*	% increase in drain loading from DX
Total Suspended solids	7.1×10^{-04}	4.3×10^{-07}	0.06	4.2×10^{-08}	0.006
Organic Carbon	9.7×10^{-04}	3.9×10^{-07}	0.04	2.2×10^{-08}	0.002
Ammonical Nitrogen as NH3	Undetectable	3.4×10^{-07}	-	1.9×10^{-09}	-
COD unfiltered	2.7×10^{-03}	1.4×10^{-06}	0.05	9.5×10^{-08}	0.003
Conductivity (mS/m3)	4.2×10^{-02}	$4. \times 10^{-08}$	Negligible	7.8×10^{-10}	Negligible
Aluminium	Undetectable	Undetectable	-	3.3×10^{-11}	Undetectable
Arsenic	3.1×10^{-07}	4.4×10^{-11}	0.01	7.7×10^{-13}	0.0002
Chromium	8.7×10^{-07}	3.9×10^{-10}	0.04	5.2×10^{-12}	0.0006
Lead	1.1×10^{-07}	1.1×10^{-10}	0.1	8.1×10^{-13}	0.0007
Nickel	6.3×10^{-07}	1.7×10^{-10}	0.03	1.2×10^{-11}	Negligible
Zinc	8.3×10^{-07}	4.1×10^{-09}	0.5	2.2×10^{-12}	0.0002
EPH Range >C10-C40	Undetectable	8.2×10^{-06}	Negligible	6.8×10^{-10}	Undetectable
Mineral Oil >C10 C40	Undetectable	Undetectable	Negligible	2.7×10^{-10}	Undetectable
Mercury	Undetectable	7.2×10^{-10}	Negligible	Undetectable	Undetectable
Chloride	1.5×10^{-03}	3.5×10^{-06}	0.23	1.6×10^{-7}	0.01
Iron	5.8×10^{-06}	Undetectable	Negligible	1.7×10^{-10}	0.003
pH (units)	7.6×10^{-04}	6.0×10^{-07}	0.08	7.9×10^{-9}	0.001

* Figures based on 6,221 l/day being discharged from CX and 79.5 l/day being discharged from DX to the land drain on that day and using water quality analysis data taken at the discharge point.

See Appendix 1 for laboratory analysis results.

Discussion:

From the above results in tables 1.1, 1.2 and 1.3 we can see that there is little to no reduction in the water quality of the land drain downstream of the discharge points CX and DX. In fact the quality appears to improve somewhat downstream of the KMK discharge for most parameters (see table 1.3 for comparison purposes). This is due to the following reasons;

- The quality of the discharges at CX and DX are controlled and treated by the facility interceptor units. There interceptors are maintained and operated correctly.
- All clean roof rain water run-off from the buildings (apart from buildings A,B & C which are flowing to CX outlet) are being discharged to the land drain directly. Please refer to the enclosed Map 1 showing roof rainwater discharge points to the land drain. This clean water is diluting any possible contamination within the drain body. Similarly the clean roof rain water run-off from buildings A, B & C are diluting down the contamination in the CX outlet.
- The volume and flow of water being discharged from KMK via CX and DX discharges is controlled and partially attenuated by the additional sampling/holding chamber at the outlets but also more influenced by climatic rainfall. It should be noted that the sampling and flow monitoring event was between 2pm and 4pm on 15-08-11. The rain fall during this time period was approximately 0.2mm (see chart 1 below) and this is below the average daily rainfall for August which is 2.4mm (see monthly chart 2 below).
- Table 1.6 shows the comparison between the existing loadings on the drain and the loadings from the discharges at CX and DX. The percent increase in loadings from CX and DX is also represented in the shaded columns. As can be seen, the impact from the CX and DX discharges is quite negligible in terms of increases in all parameters on that day.
- Furthermore, taking into consideration the average daily rainfall for August i.e. 2.4mm, this would increase the flows and also the loadings from CX and DX by virtue of an increase in volume being discharged from the outlets. This also is not considered as a significant impact to the drain due to the fact that an increase in rainfall also equates to an increase in clean roof water run-off

being discharged to the land drain and KMK have considerably increased the roof areas on-site in the past few years.

Chart 1 – showing rainfall versus time for 15-08-11.

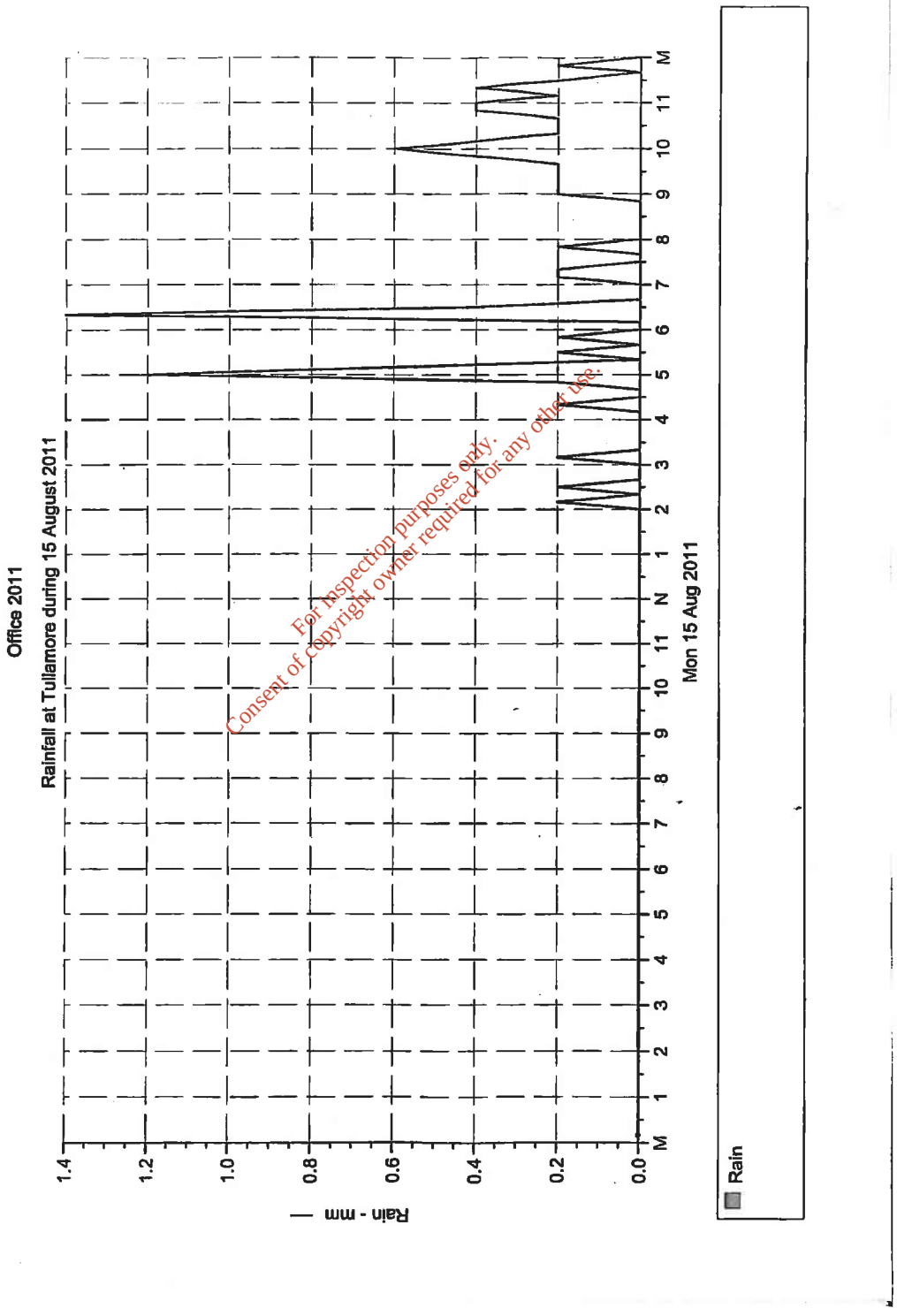
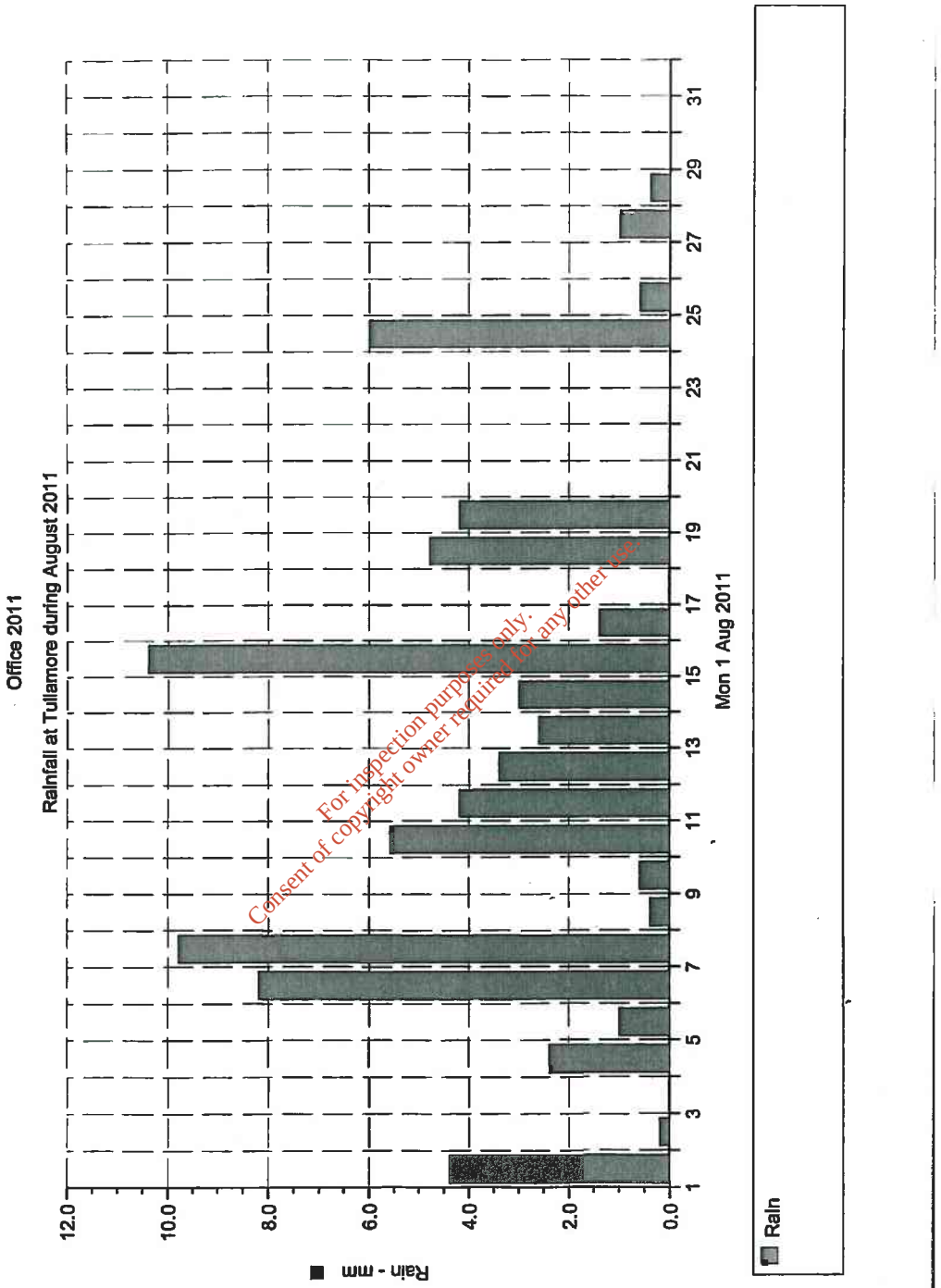


Chart 2 – showing rainfall versus days for August 2011.



On conclusion, examination of the loadings from the CX and DX discharges to the land drain indicates that there is no significant effect on the quality of the drain as a result of these discharges from KMK.

APPENDIX 1

LABORATORY TEST CERTIFICATES.

ALcontrol Laboratories

Unit 18A
Rosemount Business Park
Ballycoolin
Dublin 11
Tel : (0035) 3188 29893

Enviroco Management Ltd
Bow House
O Moore Street
Tullamore
Co. Offaly

Attention: Kenneth Goodwin

CERTIFICATE OF ANALYSIS

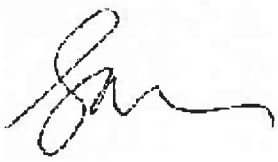
Date:	31 August 2011
Customer:	D_ENVMAN_TAM
Sample Delivery Group (SDG):	110816-70
Your Reference:	71139 / 71119
Location:	KMK
Report No:	147656

We received 4 samples on Tuesday August 16, 2011 and 4 of these samples were scheduled for analysis which was completed on Wednesday August 31, 2011. 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.

Approved By:



Sonia McWhan
Operations Manager

SDG:	110816-70	**Location:**	KMK	**Order Number:**	71171
Job:	D_ENVMAN_TAM-35	**Customer:**	Enviroco Management Ltd	**Report Number:**	147656
Client Reference:	71139 / 71119	**Attention:**	Kenneth Goodwin	**Superseded Report:**	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
4114009	CX			15/08/2011
4114012	DS			15/08/2011
4114010	DX			15/08/2011
4114011	US			15/08/2011

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

ALcontrol Laboratories

CERTIFICATE OF ANALYSIS

Validated

SDG:	110816-70	**Location:**	KMK	**Order Number:**	71171
Job:	D_ENVMAN_TAM-35	**Customer:**	Enviroco Management Ltd	**Report Number:**	147656
Client Reference:	71139 / 71119	**Attention:**	Kenneth Goodwin	**Superseded Report:**	

LIQUID

Results Legend

X Test

N No Determination Possible

			Lab Sample No(s)	4114009	4114012	4114010	4114011
			Customer Sample Reference	CX	DS	DX	US
			AGS Reference				
			Depth (m)				
			Container	1l glass bottle (D) / PLAS BOT (D)	1l glass bottle (D) / PLAS BOT (D)	1l glass bottle (D) / PLAS BOT (D)	1l glass bottle (D) / PLAS BOT (D)
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 4		X	X	X	X
Anions by Kone (w)	All	NDPs: 0 Tests: 4		X	X	X	X
COD Unfiltered	All	NDPs: 0 Tests: 4		X	X	X	X
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 4		X	X	X	X
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 4		X	X	X	X
EPH (DRO) (C10-C40) Aqueous (W)	All	NDPs: 0 Tests: 4		X	X	X	X
Mercury Dissolved	All	NDPs: 0 Tests: 4		X	X	X	X
Metals by ICap-OES Dissolved (W)	All	NDPs: 0 Tests: 4		X	X	X	X
Mineral Oil C10-40 Aqueous (W)	All	NDPs: 0 Tests: 4		X	X	X	X
pH Value	All	NDPs: 0 Tests: 4		X	X	X	X
Suspended Solids	All	NDPs: 0 Tests: 4		X	X	X	X
Total Organic and Inorganic Carbon	All	NDPs: 0 Tests: 4		X	X	X	X

ALcontrol Laboratories

Validated

CERTIFICATE OF ANALYSIS

SDG:	110816-70	**Location:**	KMK	**Order Number:**	71171
Job:	D_ENVMAN_TAM-35	**Customer:**	Enviroco Management Ltd	**Report Number:**	147656
Client Reference:	71139 / 71119	**Attention:**	Kenneth Goodwin	**Superseded Report:**	

Results Legend

- # ISO17025 accredited.
- M mCERTS accredited.
- § Deviating sample.
- 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 individual compounds within samples aren't corrected for the recovery
- (F) Trigger breach confirmed

Component	LOD/Units	Method	Customer Sample R	CX	DS	DX	US		
			Depth (m)	-	-	-	-		
			Sample Type	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)		
			Date Sampled	15/08/2011	15/08/2011	15/08/2011	15/08/2011		
			Date Received	16/08/2011	16/08/2011	16/08/2011	16/08/2011		
			SDG Ref	110816-70	110816-70	110816-70	110816-70		
			Lab Sample No.(s)	4114009	4114012	4114010	4114011		
			AGS Reference						
Suspended solids, Total	<2 mg/l	TM022		6 § #	8 § #	46 § #	27 § #		
Organic Carbon, Total	<3 mg/l	TM090		5.43 § #	11 § #	24.3 #	9.55 § #		
Ammoniacal Nitrogen as NH3	<0.2 mg/l	TM099		4.72 #	<0.2 #	2.11 #	<0.2 #		
COD, unfiltered	<7 mg/l	TM107		20.4 #	30.4 #	103 #	45.3 #		
Conductivity @ 20 deg.C	<0.005 mS/cm	TM120		0.627 #	0.482 #	0.85 #	0.637 #		
Aluminium (diss.filt)	<2.9 µg/l	TM152		<2.9 #	<2.9 #	35.6 #	<2.9 #		
Arsenic (diss.filt)	<0.12 µg/l	TM152		0.623 #	3.5 #	0.839 #	3.16 #		
Chromium (diss.filt)	<0.22 µg/l	TM152		5.52 #	9.78 #	5.61 #	9.99 #		
Lead (diss.filt)	<0.02 µg/l	TM152		1.6 #	0.128 #	0.872 #	1.6 #		
Nickel (diss.filt)	<0.15 µg/l	TM152		2.45 #	7.11 #	13 #	8.56 #		
Zinc (diss.filt)	<0.41 µg/l	TM152		57.3 #	9.39 #	2.4 #	12.9 #		
EPH Range >C10 - C40 (aq)	<46 µg/l	TM172		114 § #	<46 § #	741 § #	146 § #		
Mineral oil >C10 C40 (aq)	<10 µg/l	TM172		<10 §	<10 §	298 §	<10 §		
Mercury (diss.filt)	<0.01 µg/l	TM183		0.0101 #	<0.01 #	<0.01 #	<0.01 #		
Chloride	<2 mg/l	TM184		49.1 #	16.8 #	173 #	51.3 #		
Iron (diss.filt)	<0.019 mg/l	TM228		<0.019 #	0.0656 #	0.189 #	<0.019 #		
pH	<1 pH Units	TM256		8.42 #	8.64 #	8.55 #	8.59 #		

15:57:12 31/08/2011

SDG:	110816-70	**Location:**	KMK	**Order Number:**	71171
Job:	D_ENVMAN_TAM-35	**Customer:**	Enviroco Management Ltd	**Report Number:**	147656
Client Reference:	71139 / 71119	**Attention:**	Kenneth Goodwin	**Superseded Report:**	

Notification of Deviating Samples

Sample Number	Customer Sample Ref.	Depth (m)	Matrix	Test Name	Component Name	Comment
4120540	DX		LIQUID	EPH (DRO) (C10-C40) Aqueous (W	EPH Range >C10 - C40 (aq)	Sample holding time exceeded
4120540	DX		LIQUID	Mineral Oil C10-40 Aqueous (W)	Mineral oil >C10 C40 (aq)	Sample holding time exceeded
4121369	CX		LIQUID	EPH (DRO) (C10-C40) Aqueous (W	EPH Range >C10 - C40 (aq)	Sample holding time exceeded
4121369	CX		LIQUID	Mineral Oil C10-40 Aqueous (W)	Mineral oil >C10 C40 (aq)	Sample holding time exceeded
4121417	CX		LIQUID	Total Organic and Inorganic Carbon	Organic Carbon, Total	Sample holding time exceeded
4121425	DS		LIQUID	EPH (DRO) (C10-C40) Aqueous (W	EPH Range >C10 - C40 (aq)	Sample holding time exceeded
4121425	DS		LIQUID	Mineral Oil C10-40 Aqueous (W)	Mineral oil >C10 C40 (aq)	Sample holding time exceeded
4121434	DS		LIQUID	Total Organic and Inorganic Carbon	Organic Carbon, Total	Sample holding time exceeded
4121437	US		LIQUID	EPH (DRO) (C10-C40) Aqueous (W	EPH Range >C10 - C40 (aq)	Sample holding time exceeded
4121437	US		LIQUID	Mineral Oil C10-40 Aqueous (W)	Mineral oil >C10 C40 (aq)	Sample holding time exceeded
4121444	US		LIQUID	Total Organic and Inorganic Carbon	Organic Carbon, Total	Sample holding time exceeded
4122080	DX		LIQUID	Suspended Solids	Suspended solids, Total	Sample holding time exceeded
4123170	US		LIQUID	Suspended Solids	Suspended solids, Total	Sample holding time exceeded
4123205	CX		LIQUID	Suspended Solids	Suspended solids, Total	Sample holding time exceeded
4149261	DS		LIQUID	Suspended Solids	Suspended solids, Total	Sample holding time exceeded

Note : Test results may be compromised

SDG:	110816-70	Location:	KMK	Order Number:	71171
Job:	D_ENVMAN_TAM-35	Customer:	Enviroco Management Ltd	Report Number:	147656
Client Reference:	71139 / 71119	Attention:	Kenneth Goodwin	Superseded Report:	

Table of Results - Appendix

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]	Surrogate Corrected
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters		
TM061	Method for the Determination of EPH,Massachusetts Dept.of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)		
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water		
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser		
TM107	ISO 6060-1989	Determination of Chemical Oxygen Demand using COD Dr Lange Kit		
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter		
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS		
TM172	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	EPH in Waters		
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry		
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers		
TM228	US EPA Method 6010B	Determination of Major Cations in Water by iCap 6500 Duo ICP-OES		
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4.	Determination of pH in Water and Leachate using the GLpH pH Meter		

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

SDG:	110816-70	**Location:**	KMK	**Order Number:**	71171
Job:	D_ENVMAN_TAM-35	**Customer:**	Enviroco Management Ltd	**Report Number:**	147656
Client Reference:	71139 / 71119	**Attention:**	Kenneth Goodwin	**Superseded Report:**	

Test Completion Dates

Lab Sample No(s)	4114009	4114012	4114010	4114011
Customer Sample Ref.	CX	DS	DX	US
AGS Ref.				
Depth				
Type	LIQUID	LIQUID	LIQUID	LIQUID
Ammoniacal Nitrogen	22-Aug-2011	25-Aug-2011	25-Aug-2011	23-Aug-2011
Anions by Kone (w)	23-Aug-2011	22-Aug-2011	23-Aug-2011	23-Aug-2011
COD Unfiltered	21-Aug-2011	22-Aug-2011	21-Aug-2011	21-Aug-2011
Conductivity (at 20 deg.C)	30-Aug-2011	25-Aug-2011	30-Aug-2011	30-Aug-2011
Dissolved Metals by ICP-MS	18-Aug-2011	24-Aug-2011	18-Aug-2011	18-Aug-2011
EPH (DRO) (C10-C40) Aqueous (W)	30-Aug-2011	30-Aug-2011	30-Aug-2011	30-Aug-2011
Mercury Dissolved	18-Aug-2011	18-Aug-2011	18-Aug-2011	18-Aug-2011
Metals by ICap-OES Dissolved (W)	19-Aug-2011	23-Aug-2011	18-Aug-2011	19-Aug-2011
Mineral Oil C10-40 Aqueous (W)	31-Aug-2011	31-Aug-2011	31-Aug-2011	31-Aug-2011
pH Value	18-Aug-2011	23-Aug-2011	18-Aug-2011	18-Aug-2011
Suspended Solids	25-Aug-2011	25-Aug-2011	25-Aug-2011	25-Aug-2011
Total Organic and Inorganic Carbon	24-Aug-2011	24-Aug-2011	24-Aug-2011	24-Aug-2011

SDG:	110816-70	**Location:**	KMK	**Order Number:**	71171
Job:	D_ENVMAN_TAM-35	**Customer:**	Enviroco Management Ltd	**Report Number:**	147656
Client Reference:	71139 / 71119	**Attention:**	Kenneth Goodwin	**Superseded Report:**	

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 NH4 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. Results relate only to the items tested.

12. LODs for wet tests reported on a dry weight basis are not corrected for moisture content.

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 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. 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 effected 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 themajor 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.

SOLID MATRICES EXTRACTION SUMMARY

ANALYSIS	D/C OR WET	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
SOLVENTEXTRACTABLE MATTER	D&C	DCM	SOXTHERM	GRAVIMETRIC
CYCLOHEXANE EXT. MATTER	D&C	CYCLOHEXANE	SOXTHERM	GRAVIMETRIC
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-FD
EPH (MIN OIL)	D&C	HEXANE/ACETONE	END OVER END	GC-FD
EPH (CLEANED UP)	D&C	HEXANE/ACETONE	END OVER END	GC-FD
EPH CWG BY GC	D&C	HEXANE/ACETONE	END OVER END	GC-FD
PCB TOT/PCB CON	D&C	HEXANE/ACETONE	END OVER END	GC-MS
POLYAROMATIC HYDROCARBONS (MS)	WET	HEXANE/ACETONE	MICROWAVE TM218.	GC-MS
C8-C10 (C8-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

LIQUID MATRICES EXTRACTION SUMMARY

ANALYSIS	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
PAH MS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GCMS
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)	GCMS
PCB TOTAL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GCMS
SVOC	DCM	LIQUID/LIQUID SHAKE	GCMS
FREE SULPHUR	DCM	SOLID PHASE EXTRACTION	HPLC
PEST OCP/OPP	DCM	LIQUID/LIQUID SHAKE	GCMS
TRIAZINE HERBS	DCM	LIQUID/LIQUID SHAKE	GCMS
PHENOLS MS	DCM	SOLID PHASE EXTRACTION	GCMS
TPH by INFRARED (IR)	TCE	LIQUID/LIQUID SHAKE	HPLC
MINERAL OIL by IR	TCE	LIQUID/LIQUID SHAKE	HPLC
GLYCOLS	NONE	DIRECT INJECTION	GCMS

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials or those identified as potentially asbestos containing during sample description 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).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has 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).

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

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 HSG 264.

The identification of asbestos containing materials and soils 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.