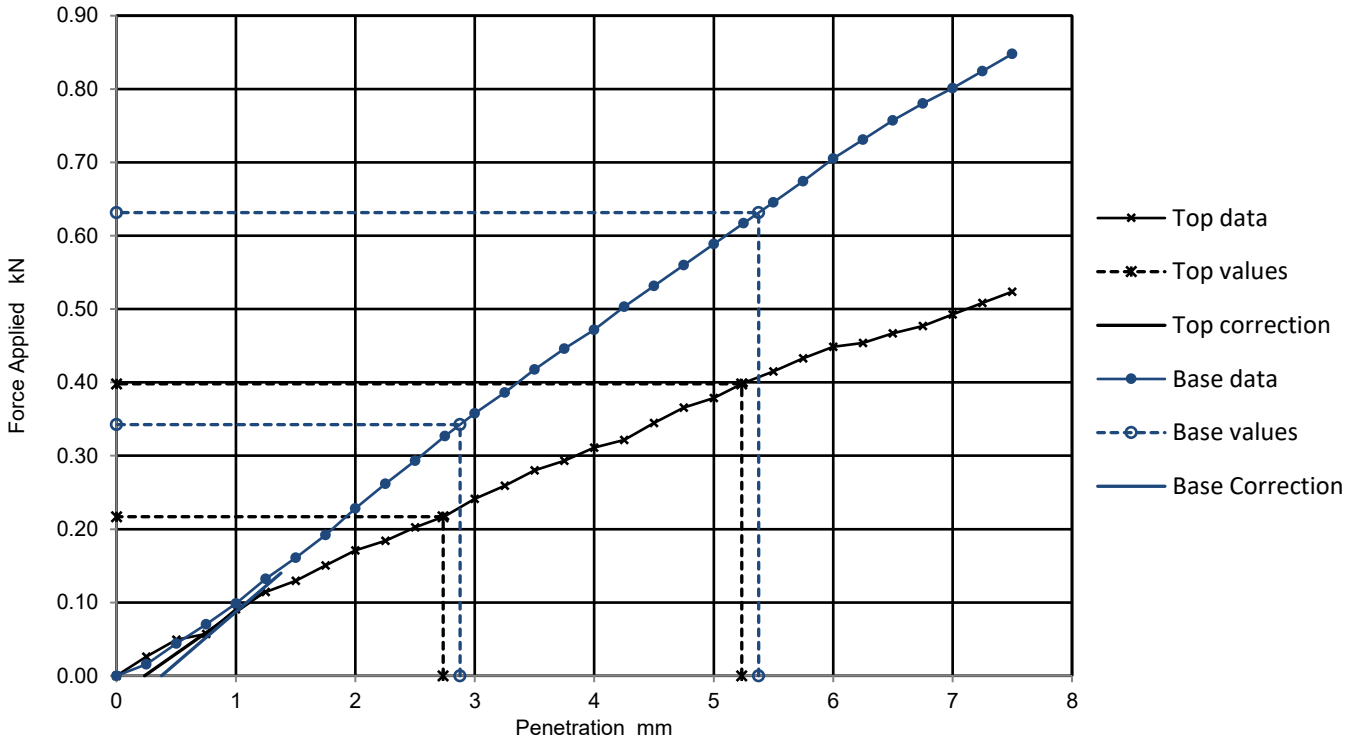
GQF-008-36 Issue 01 - Oct 22	**California Bearing Ratio (CBR)**			Job Ref	J291207
				Borehole/Pit No.	TP106
Project Name	Shaw Lane, Carlton			Sample No.	
Soil Description	Brown mottled dark grey slightly sandy slightly gravelly CLAY			Depth m	0.50
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description				KeyLAB ID	TTLP2024110753
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		23	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	1.96	Mg/m3	Surcharge applied	8	kg
	Dry density	1.62	Mg/m3		5	kPa
	Moisture content	21.3	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	Yes	1.6	2.0	2.0	N/A	20.7
BASE	Yes	2.6	3.2	3.2		21.9

Remarks

Date Printed	22/11/2024

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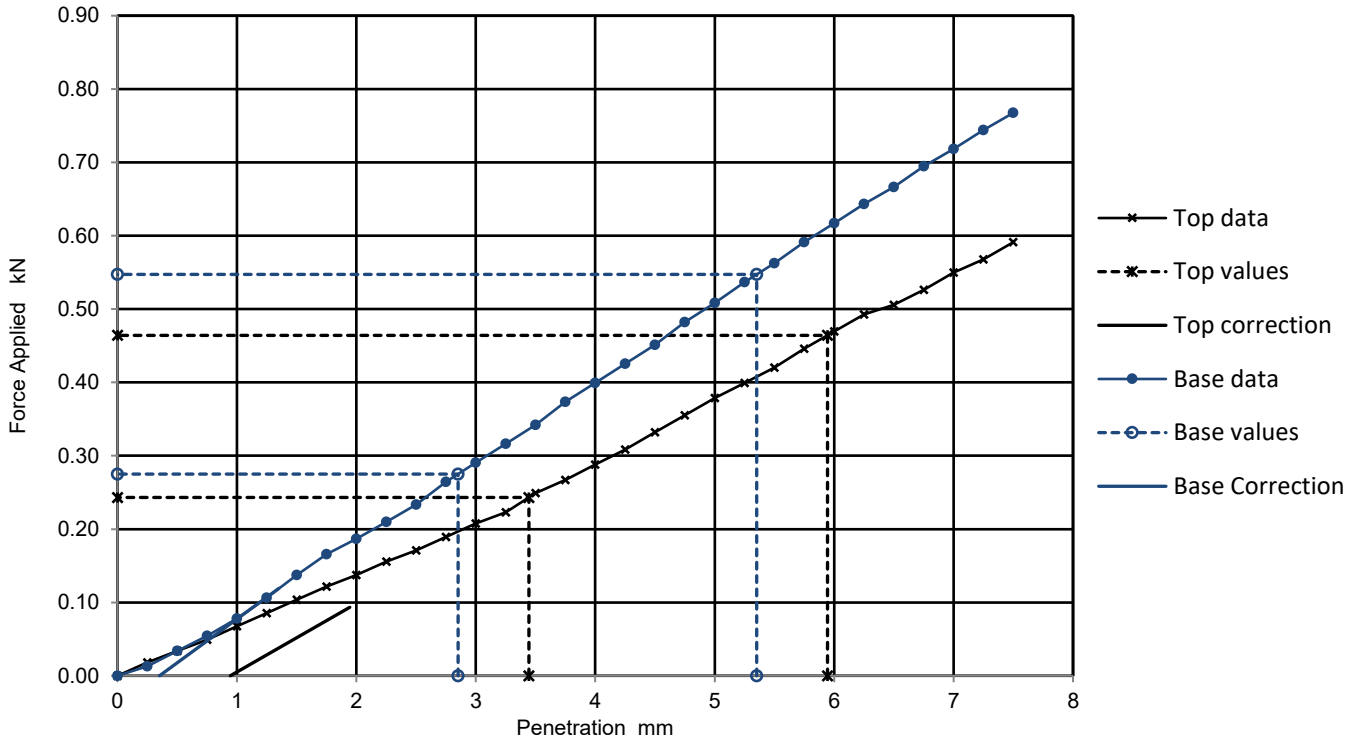
CBR

GQF-008-36 Issue 01 - Oct 22	**California Bearing Ratio (CBR)**			Job Ref	J291207
				Borehole/Pit No.	TP111
Project Name	Shaw Lane, Carlton			Sample No.	
Soil Description	Dark brown mottled grey slightly gravelly sandy CLAY			Depth m	0.40
Specimen Reference		Specimen Depth	m	Sample Type	D
Specimen Description				KeyLAB ID	TTLP2024110755
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		40	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	1.94	Mg/m3	Surcharge applied	8	kg
	Dry density	1.60	Mg/m3		5	kPa
	Moisture content	21.6	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	Yes	1.8	2.3	2.3	2.5	22.2
BASE	Yes	2.1	2.7	2.7		20.8

Remarks

Date Printed	22/11/2024

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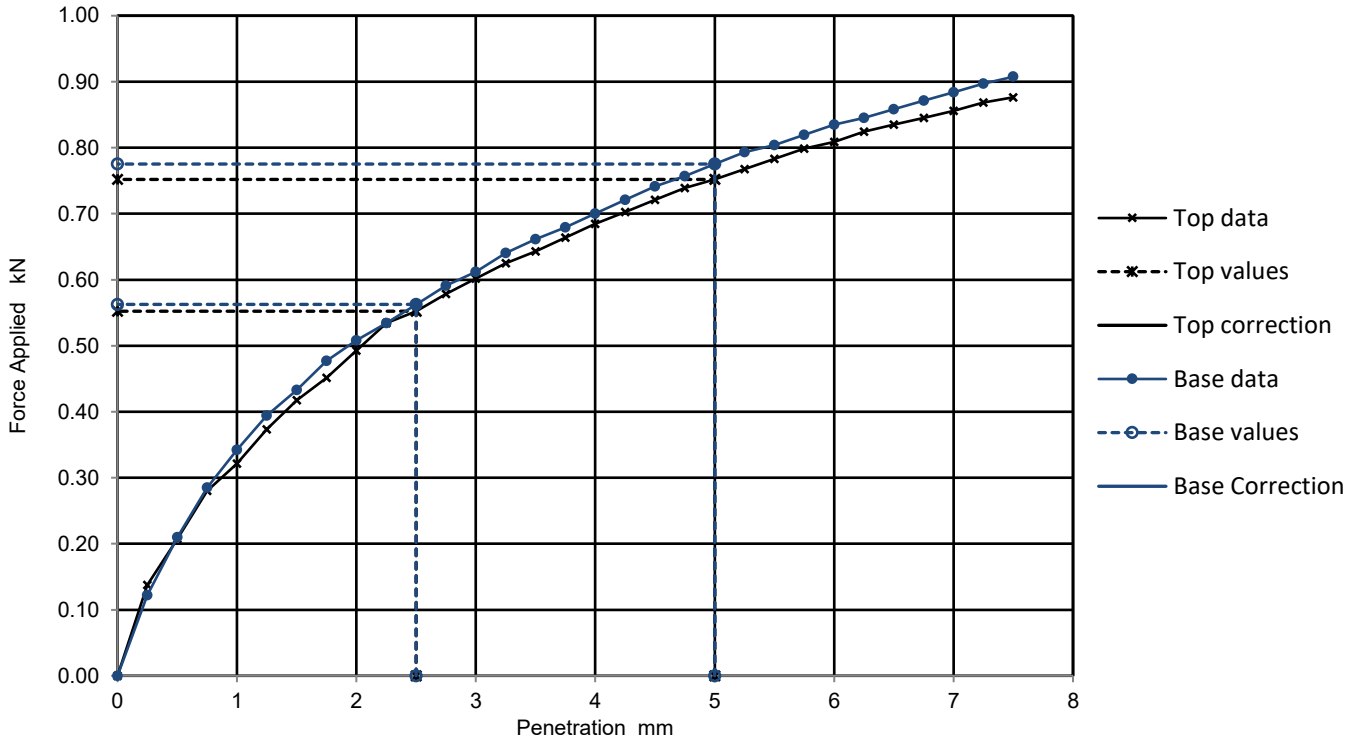
CBR

GQF-008-36 Issue 01 - Oct 22	**California Bearing Ratio (CBR)**			Job Ref	J291207
				Borehole/Pit No.	TP115
Project Name	Shaw Lane, Carlton			Sample No.	
Soil Description	Brown slightly sandy slightly gravelly CLAY			Depth m	0.50
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description				KeyLAB ID	TTLP2024110756
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		2	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	1.91	Mg/m3	Surcharge applied	8	kg
	Dry density	1.51	Mg/m3		5	kPa
	Moisture content	26.2	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	4.2	3.8	4.2	4.2	26.2
BASE	No	4.3	3.9	4.3		26.2

Remarks

Date Printed	22/11/2024

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7758

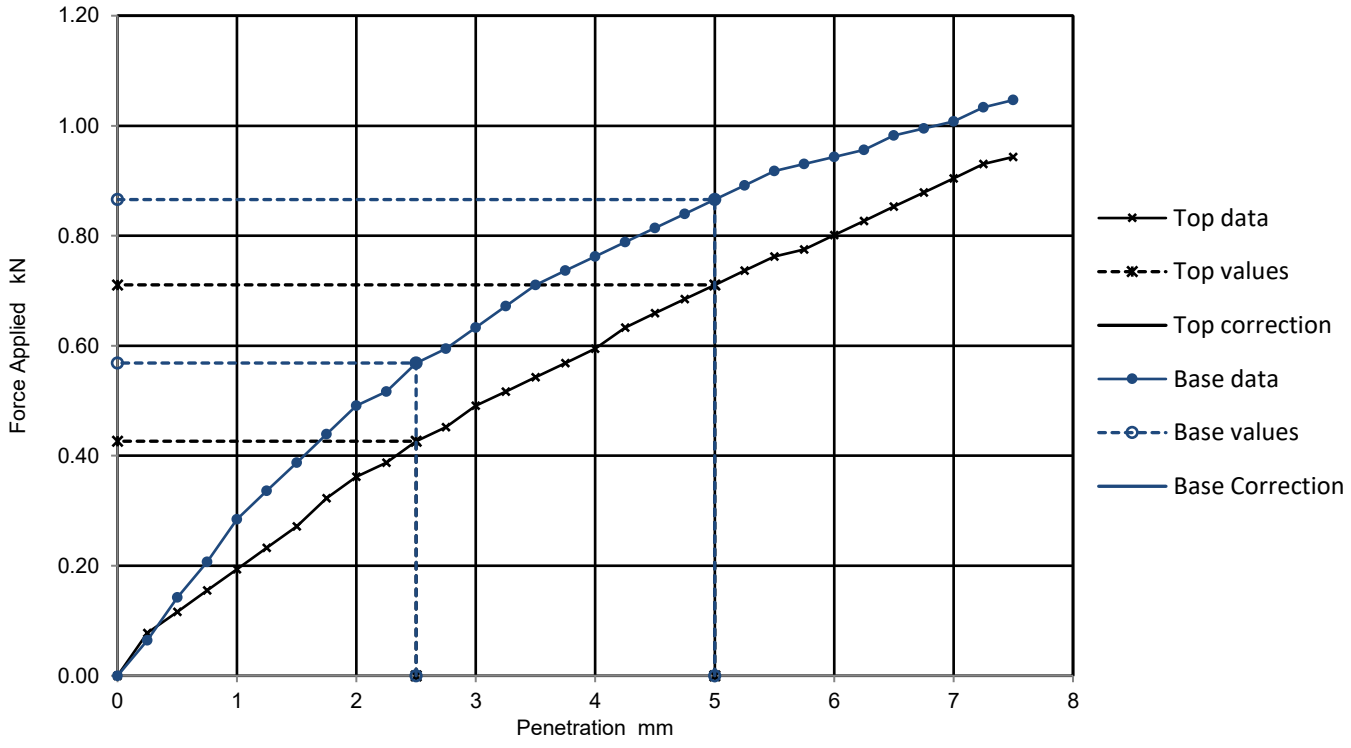
CBR

GQF-008-36 Issue 01 - Oct 22	**California Bearing Ratio (CBR)**			Job Ref	J291207
				Borehole/Pit No.	TP118
Project Name	Shaw Lane, Carlton			Sample No.	
Soil Description	Brown slightly sandy CLAY			Depth m	0.50
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description				KeyLAB ID	TTLP2024110759
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking	days
				Time to surface	days
				Amount of swell recorded	mm
Material retained on 20mm sieve removed		0	%	Dry density after soaking	Mg/m3
Initial Specimen details	Bulk density	2.02	Mg/m3	Surcharge applied	8 kg
	Dry density	1.65	Mg/m3		5 kPa
	Moisture content	22.6	%		

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	3.2	3.6	3.6	3.9	22.8
BASE	No	4.3	4.3	4.3		22.4

Remarks

Date Printed	22/11/2024

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CBR

GQF-008-48
Issue 01 - Oct 22

Summary of Classification Test Results

Project No.
J291207

Project Name
Shaw Lane, Carlton

Hole No.	Sample				Soil Description	Density bulk	Density dry	w	Passing 425µm	LL	PL	PI	Particle density	Remarks
	Ref	Top	Base	Type		Mg/m^3		%	%	%	%	%	Mg/m^3	
TP102		1.80		D	Multicoloured slightly sandy slightly gravelly CLAY			28	96	44	22	22		
TP105		1.40		D	Brown mottled grey slightly sandy CLAY			15	98	31	19	12		
TP110		1.00		D	Brown slightly sandy slightly gravelly CLAY			24	90	34	16	18		
TP115		1.50		D	Multicoloured slightly sandy slightly gravelly CLAY			38	100	53	30	23		
TP117		0.50		D	Multicoloured slightly sandy slightly gravelly CLAY			23	98	44	23	21		
WS103		0.50		ES	Multicoloured slightly sandy slightly gravelly CLAY			26	88	47	24	23		
WS105		1.50		D	Brown mottled grey slightly sandy CLAY			26	100	55	29	26		
WS109		1.50		D	Brown mottled grey slightly sandy slightly gravelly CLAY			25	96	50	26	24		
WS111		1.80		D	Brown mottled grey slightly sandy CLAY			20	100	42	20	22		
WS114		1.50		D	Multicoloured slightly sandy slightly gravelly CLAY			21	92	39	24	15		

All tests performed in accordance with BS1377:1990 unless specified otherwise

Date Printed 22/11/2024

Key

Density test
Linear measurement unless :
wd - water displacement
wi - immersion in water

Liquid Limit
4pt cone unless :
cas - Casagrande method
1pt - single point test

Particle density
sp - small pyknometer
gj - gas jar

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INDEX

APPENDIX F
Chemical Laboratory Test Results

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	24-36111-1
Initial Date of Issue:	15-Nov-2024
Re-Issue Details:	
Client	Sirius Geotechnical Ltd
Client Address:	Suite 10a Stone Cross Place Stone Cross Lane North Warrington WA3 2SH
Contact(s):	Jennifer Ford
Project	C10271

Quotation No.:		**Date Received:**	06-Nov-2024
Order No.:	24955/C10271/CP	**Date Instructed:**	06-Nov-2024
No. of Samples:	29		
Turnaround (Wkdays):	5	**Results Due:**	12-Nov-2024
Date Approved:	15-Nov-2024		

Approved By:



Details: David Smith, Technical Director

For details about application of accreditation to specific matrix types, please refer to the Table at the back of this report

Results - Soil

Project: C10271

Client: Sirius Geotechnical Ltd				**Chemtest Job No.:**		24-36111	24-36111	24-36111	24-36111	24-36111	24-36111	24-36111
Quotation No.:				**Chemtest Sample ID.:**		1891038	1891039	1891040	1891041	1891042	1891044	1891045
				Client Sample ID.:		TP101	TP101	TP102	TP102	TP104	TP106	TP107
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.20	0.50	0.50	1.40	0.20	3.80	0.20
				Date Sampled:		28-Oct-2024	28-Oct-2024	28-Oct-2024	28-Oct-2024	28-Oct-2024	28-Oct-2024	29-Oct-2024
				Asbestos Lab:		DURHAM			DURHAM			DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**							
ACM Type		U	2192		N/A	-			-			-
Asbestos Identification		U	2192		N/A	No Asbestos Detected			No Asbestos Detected			No Asbestos Detected
Moisture		N	2030	%	0.020	8.9	17	12	38	15	15	21
Soil Colour		N	2040		N/A	Brown	Brown	Brown		Brown	Grey	Brown
Other Material		N	2040		N/A	Stones, Roots and brick	Stones and Roots	Stones and Roots		Stones and Roots	None	Roots and Stones
Soil Texture		N	2040		N/A	Sand	Loam	Loam		Loam	Sand	Clay
pH at 20C		M	2010		4.0	8.1			6.8		7.8	7.5
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010	0.038			0.070		0.013	0.017
Calorific Value		N	2140	MJ/kg	0.10			< 0.10				
Sulphate (Total)		U	2430	%	0.010	0.12			0.45			0.13
Arsenic		M	2455	mg/kg	0.5	8.4			35			13
Cadmium		M	2455	mg/kg	0.10	0.24			0.66			0.59
Chromium		M	2455	mg/kg	0.5	51			27			28
Copper		M	2455	mg/kg	0.50	29			59			53
Mercury		M	2455	mg/kg	0.05	0.09			0.20			0.17
Nickel		M	2455	mg/kg	0.50	28			27			25
Lead		M	2455	mg/kg	0.50	42			140			120
Selenium		M	2455	mg/kg	0.25	0.68			2.5			1.5
Zinc		M	2455	mg/kg	0.50	76			100			130
Chromium (Hexavalent)		N	2490	mg/kg	0.50	< 0.50			< 0.50			< 0.50
Aliphatic VPH >C5-C6	HS_2D_AL	U	2780	mg/kg	0.05		< 0.05	< 0.05		< 0.05		
Aliphatic VPH >C6-C7	HS_2D_AL	U	2780	mg/kg	0.05		< 0.05	< 0.05		< 0.05		
Aliphatic VPH >C7-C8	HS_2D_AL	U	2780	mg/kg	0.05		< 0.05	< 0.05		< 0.05		
Aliphatic VPH >C6-C8 (Sum)	HS_2D_AL	N	2780	mg/kg	0.10		< 0.10	< 0.10		< 0.10		
Aliphatic VPH >C8-C10	HS_2D_AL	U	2780	mg/kg	0.05		< 0.05	< 0.05		< 0.05		
Total Aliphatic VPH >C5-C10	HS_2D_AL	U	2780	mg/kg	0.25		< 0.25	< 0.25		< 0.25		
Aliphatic EPH >C10-C12 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00		< 2.0	< 2.0		< 2.0		
Aliphatic EPH >C12-C16 MC	EH_2D_AL_#1	M	2690	mg/kg	1.00		1.1	< 1.0		1.4		
Aliphatic EPH >C16-C21 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00		6.9	< 2.0		3.1		
Aliphatic EPH >C21-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	3.00		36	8.5		5.7		
Aliphatic EPH >C35-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00		< 10	10		< 10		
Total Aliphatic EPH >C10-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	5.00		46	10		12		
Total Aliphatic EPH >C10-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00		46	21		12		
Aromatic VPH >C5-C7	HS_2D_AR	U	2780	mg/kg	0.05		< 0.05	< 0.05		< 0.05		
Aromatic VPH >C7-C8	HS_2D_AR	U	2780	mg/kg	0.05		< 0.05	< 0.05		< 0.05		
Aromatic VPH >C8-C10	HS_2D_AR	U	2780	mg/kg	0.05		< 0.05	< 0.05		< 0.05		
Total Aromatic VPH >C5-C10	HS_2D_AR	U	2780	mg/kg	0.25		< 0.25	< 0.25		< 0.25		

Results - Soil

Project: C10271

Client: Sirius Geotechnical Ltd				**Chemtest Job No.:**		24-36111	24-36111	24-36111	24-36111	24-36111	24-36111	24-36111
Quotation No.:				**Chemtest Sample ID.:**		1891038	1891039	1891040	1891041	1891042	1891044	1891045
				Client Sample ID.:		TP101	TP101	TP102	TP102	TP104	TP106	TP107
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.20	0.50	0.50	1.40	0.20	3.80	0.20
				Date Sampled:		28-Oct-2024	28-Oct-2024	28-Oct-2024	28-Oct-2024	28-Oct-2024	28-Oct-2024	29-Oct-2024
				Asbestos Lab:		DURHAM			DURHAM			DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**							
Aromatic EPH >C10-C12 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00		< 1.0	< 1.0		< 1.0		
Aromatic EPH >C12-C16 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00		< 1.0	< 1.0		< 1.0		
Aromatic EPH >C16-C21 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00		15	5.3		62		
Aromatic EPH >C21-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00		7.7	5.6		130		
Aromatic EPH >C35-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	1.00		5.7	19		71		
Total Aromatic EPH >C10-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	5.00		23	11		190		
Total Aromatic EPH >C10-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	10.00		28	30		260		
Total VPH >C5-C10	HS_2D_Total	U	2780	mg/kg	0.50		< 0.50	< 0.50		< 0.50		
Total EPH >C10-C35 MC	EH_2D_Total_#1	U	2690	mg/kg	10.00		68	22		210		
Total EPH >C10-C40 MC	EH_2D_Total_#1	N	2690	mg/kg	10.00		74	51		280		
Total Organic Carbon		M	2625	%	0.20	3.6			6.9			4.2
Naphthalene		M	2700	mg/kg	0.10	0.37			0.49			< 0.10
Acenaphthylene		M	2700	mg/kg	0.10	0.48			0.35			< 0.10
Acenaphthene		M	2700	mg/kg	0.10	0.35			0.78			< 0.10
Fluorene		M	2700	mg/kg	0.10	0.31			1.0			< 0.10
Phenanthrene		M	2700	mg/kg	0.10	3.9			7.9			0.40
Anthracene		M	2700	mg/kg	0.10	1.6			2.7			< 0.10
Fluoranthene		M	2700	mg/kg	0.10	13			12			0.97
Pyrene		M	2700	mg/kg	0.10	13			11			1.2
Benzo[a]anthracene		M	2700	mg/kg	0.10	8.3			4.9			0.68
Chrysene		M	2700	mg/kg	0.10	10			8.2			1.5
Benzo[b]fluoranthene		M	2700	mg/kg	0.10	14			5.3			1.2
Benzo[k]fluoranthene		M	2700	mg/kg	0.10	5.7			3.0			0.67
Benzo[a]pyrene		M	2700	mg/kg	0.10	11			4.6			0.50
Indeno(1,2,3-c,d)Pyrene		M	2700	mg/kg	0.10	7.5			3.1			0.36
Dibenz(a,h)Anthracene		M	2700	mg/kg	0.10	2.2			0.35			0.35
Benzo[g,h,i]perylene		M	2700	mg/kg	0.10	7.6			10			1.2
Total Of 16 PAH's		M	2700	mg/kg	2.0	99			76			9.0
Benzene		M	2760	µg/kg	1.0		< 1.0	< 1.0		< 1.0		
Toluene		M	2760	µg/kg	1.0		< 1.0	< 1.0		< 1.0		
Ethylbenzene		M	2760	µg/kg	1.0		< 1.0	< 1.0		< 1.0		
m & p-Xylene		M	2760	µg/kg	1.0		5.8	< 1.0		< 1.0		
o-Xylene		M	2760	µg/kg	1.0		2.8	< 1.0		< 1.0		
Methyl Tert-Butyl Ether		M	2760	µg/kg	1.0		< 1.0	< 1.0		< 1.0		
Demeton-O		N	2820	mg/kg	0.20		< 0.20			< 0.20		
Phorate		N	2820	mg/kg	0.20		< 0.20			< 0.20		
Demeton-S		N	2820	mg/kg	0.20		< 0.20			< 0.20		
Disulfoton		N	2820	mg/kg	0.20		< 0.20			< 0.20		
Fenthion		N	2820	mg/kg	0.20		< 0.20			< 0.20		

Results - Soil

Project: C10271

Client: Sirius Geotechnical Ltd				**Chemtest Job No.:**		24-36111	24-36111	24-36111	24-36111	24-36111	24-36111	24-36111
Quotation No.:				**Chemtest Sample ID.:**		1891038	1891039	1891040	1891041	1891042	1891044	1891045
				Client Sample ID.:		TP101	TP101	TP102	TP102	TP104	TP106	TP107
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.20	0.50	0.50	1.40	0.20	3.80	0.20
				Date Sampled:		28-Oct-2024	28-Oct-2024	28-Oct-2024	28-Oct-2024	28-Oct-2024	28-Oct-2024	29-Oct-2024
				Asbestos Lab:		DURHAM			DURHAM			DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**							
Trichloronate		N	2820	mg/kg	0.20		< 0.20			< 0.20		
Prothiofos		N	2820	mg/kg	0.20		< 0.20			< 0.20		
Fensulphothion		N	2820	mg/kg	0.20		< 0.20			< 0.20		
Sulprofos		N	2820	mg/kg	0.20		< 0.20			< 0.20		
Azinphos-Methyl		N	2820	mg/kg	0.20		< 0.20			< 0.20		
Coumaphos		N	2820	mg/kg	0.20		< 0.20			< 0.20		
Alpha-HCH		N	2840	mg/kg	0.20		< 0.20			< 0.20		
Gamma-HCH (Lindane)		N	2840	mg/kg	0.20		< 0.20			< 0.20		
Beta-HCH		N	2840	mg/kg	0.20		< 0.20			< 0.20		
Delta-HCH		N	2840	mg/kg	0.20		< 0.20			< 0.20		
Heptachlor		N	2840	mg/kg	0.20		< 0.20			< 0.20		
Aldrin		N	2840	mg/kg	0.20		< 0.20			< 0.20		
Heptachlor Epoxide		N	2840	mg/kg	0.20		< 0.20			< 0.20		
Gamma-Chlordane		N	2840	mg/kg	0.20		< 0.20			< 0.20		
Alpha-Chlordane		N	2840	mg/kg	0.20		< 0.20			< 0.20		
Endosulfan I		N	2840	mg/kg	0.20		< 0.20			< 0.20		
4,4-DDE		N	2840	mg/kg	0.20		< 0.20			< 0.20		
Dieldrin		N	2840	mg/kg	0.20		< 0.20			< 0.20		
Endrin		N	2840	mg/kg	0.20		< 0.20			< 0.20		
4,4-DDD		N	2840	mg/kg	0.20		< 0.20			< 0.20		
Endosulfan II		N	2840	mg/kg	0.20		< 0.20			< 0.20		
Endrin Aldehyde		N	2840	mg/kg	0.20		< 0.20			< 0.20		
4,4-DDT		N	2840	mg/kg	0.20		< 0.20			< 0.20		
Endosulfan Sulphate		N	2840	mg/kg	0.20		< 0.20			< 0.20		
Methoxychlor		N	2840	mg/kg	0.20		< 0.20			< 0.20		
Endrin Ketone		N	2840	mg/kg	0.20		< 0.20			< 0.20		
Total Phenols		M	2920	mg/kg	0.10	< 0.10			< 0.10			< 0.10

Results - Soil

Project: C10271

Client: Sirius Geotechnical Ltd				**Chemtest Job No.:**		24-36111	24-36111	24-36111	24-36111	24-36111	24-36111	24-36111
Quotation No.:				**Chemtest Sample ID.:**		1891046	1891047	1891048	1891049	1891050	1891051	1891052
				Client Sample ID.:		TP108	TP109	TP109	TP111	TP113	TP114	TP115
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.50	0.20	0.50	0.20	1.60	0.20	0.20
				Date Sampled:		29-Oct-2024	29-Oct-2024	29-Oct-2024	29-Oct-2024	29-Oct-2024	29-Oct-2024	29-Oct-2024
				Asbestos Lab:			DURHAM		DURHAM		DURHAM	
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**							
ACM Type		U	2192		N/A		-		-		-	
Asbestos Identification		U	2192		N/A		No Asbestos Detected		No Asbestos Detected		No Asbestos Detected	
Moisture		N	2030	%	0.020	16	22	16	14	18	21	25
Soil Colour		N	2040		N/A	Brown	Brown	Brown	Brown	Grey	Brown	Brown
Other Material		N	2040		N/A	None	Stones	None	Stones, Roots and brick	None	Roots	Stones and Roots
Soil Texture		N	2040		N/A	Clay	Clay	Clay	Loam	Clay	Clay	Clay
pH at 20C		M	2010		4.0		7.3	7.9	7.8	7.2	7.7	
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010		< 0.010	< 0.010	< 0.010	0.038	< 0.010	
Calorific Value		N	2140	MJ/kg	0.10	0.52						1.5
Sulphate (Total)		U	2430	%	0.010		0.12		0.14		0.090	
Arsenic		M	2455	mg/kg	0.5		14		11		11	
Cadmium		M	2455	mg/kg	0.10		0.41		0.50		0.54	
Chromium		M	2455	mg/kg	0.5		27		100		20	
Copper		M	2455	mg/kg	0.50		39		78		49	
Mercury		M	2455	mg/kg	0.05		0.10		0.14		0.09	
Nickel		M	2455	mg/kg	0.50		22		23		27	
Lead		M	2455	mg/kg	0.50		54		110		39	
Selenium		M	2455	mg/kg	0.25		1.1		0.87		1.0	
Zinc		M	2455	mg/kg	0.50		110		170		97	
Chromium (Hexavalent)		N	2490	mg/kg	0.50		< 0.50		< 0.50		< 0.50	
Aliphatic VPH >C5-C6	HS_2D_AL	U	2780	mg/kg	0.05							
Aliphatic VPH >C6-C7	HS_2D_AL	U	2780	mg/kg	0.05							
Aliphatic VPH >C7-C8	HS_2D_AL	U	2780	mg/kg	0.05							
Aliphatic VPH >C6-C8 (Sum)	HS_2D_AL	N	2780	mg/kg	0.10							
Aliphatic VPH >C8-C10	HS_2D_AL	U	2780	mg/kg	0.05							
Total Aliphatic VPH >C5-C10	HS_2D_AL	U	2780	mg/kg	0.25							
Aliphatic EPH >C10-C12 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00							
Aliphatic EPH >C12-C16 MC	EH_2D_AL_#1	M	2690	mg/kg	1.00							
Aliphatic EPH >C16-C21 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00							
Aliphatic EPH >C21-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	3.00							
Aliphatic EPH >C35-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00							
Total Aliphatic EPH >C10-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	5.00							
Total Aliphatic EPH >C10-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00							
Aromatic VPH >C5-C7	HS_2D_AR	U	2780	mg/kg	0.05							
Aromatic VPH >C7-C8	HS_2D_AR	U	2780	mg/kg	0.05							
Aromatic VPH >C8-C10	HS_2D_AR	U	2780	mg/kg	0.05							
Total Aromatic VPH >C5-C10	HS_2D_AR	U	2780	mg/kg	0.25							

Results - Soil

Project: C10271

Client: Sirius Geotechnical Ltd				**Chemtest Job No.:**		24-36111	24-36111	24-36111	24-36111	24-36111	24-36111	24-36111
Quotation No.:				**Chemtest Sample ID.:**		1891046	1891047	1891048	1891049	1891050	1891051	1891052
				Client Sample ID.:		TP108	TP109	TP109	TP111	TP113	TP114	TP115
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.50	0.20	0.50	0.20	1.60	0.20	0.20
				Date Sampled:		29-Oct-2024	29-Oct-2024	29-Oct-2024	29-Oct-2024	29-Oct-2024	29-Oct-2024	29-Oct-2024
				Asbestos Lab:			DURHAM		DURHAM		DURHAM	
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**							
Aromatic EPH >C10-C12 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00							
Aromatic EPH >C12-C16 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00							
Aromatic EPH >C16-C21 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00							
Aromatic EPH >C21-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00							
Aromatic EPH >C35-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	1.00							
Total Aromatic EPH >C10-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	5.00							
Total Aromatic EPH >C10-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	10.00							
Total VPH >C5-C10	HS_2D_Total	U	2780	mg/kg	0.50							
Total EPH >C10-C35 MC	EH_2D_Total_#1	U	2690	mg/kg	10.00							
Total EPH >C10-C40 MC	EH_2D_Total_#1	N	2690	mg/kg	10.00							
Total Organic Carbon		M	2625	%	0.20		2.7		4.1		2.7	
Naphthalene		M	2700	mg/kg	0.10		< 0.10		0.63		< 0.10	
Acenaphthylene		M	2700	mg/kg	0.10		< 0.10		0.45		< 0.10	
Acenaphthene		M	2700	mg/kg	0.10		< 0.10		0.45		< 0.10	
Fluorene		M	2700	mg/kg	0.10		< 0.10		0.44		< 0.10	
Phenanthrene		M	2700	mg/kg	0.10		0.19		4.0		< 0.10	
Anthracene		M	2700	mg/kg	0.10		0.10		1.3		< 0.10	
Fluoranthene		M	2700	mg/kg	0.10		0.88		9.3		0.25	
Pyrene		M	2700	mg/kg	0.10		0.24		9.9		0.49	
Benzo[a]anthracene		M	2700	mg/kg	0.10		0.22		4.9		0.10	
Chrysene		M	2700	mg/kg	0.10		1.3		5.4		0.64	
Benzo[b]fluoranthene		M	2700	mg/kg	0.10		< 0.10		7.5		< 0.10	
Benzo[k]fluoranthene		M	2700	mg/kg	0.10		< 0.10		3.1		< 0.10	
Benzo[a]pyrene		M	2700	mg/kg	0.10		< 0.10		6.2		< 0.10	
Indeno(1,2,3-c,d)Pyrene		M	2700	mg/kg	0.10		< 0.10		3.5		< 0.10	
Dibenz(a,h)Anthracene		M	2700	mg/kg	0.10		< 0.10		1.2		< 0.10	
Benzo[g,h,i]perylene		M	2700	mg/kg	0.10		< 0.10		3.7		< 0.10	
Total Of 16 PAH's		M	2700	mg/kg	2.0		2.9		62		< 2.0	
Benzene		M	2760	µg/kg	1.0							
Toluene		M	2760	µg/kg	1.0							
Ethylbenzene		M	2760	µg/kg	1.0							
m & p-Xylene		M	2760	µg/kg	1.0							
o-Xylene		M	2760	µg/kg	1.0							
Methyl Tert-Butyl Ether		M	2760	µg/kg	1.0							
Demeton-O		N	2820	mg/kg	0.20							< 0.20
Phorate		N	2820	mg/kg	0.20							< 0.20
Demeton-S		N	2820	mg/kg	0.20							< 0.20
Disulfoton		N	2820	mg/kg	0.20							< 0.20
Fenthion		N	2820	mg/kg	0.20							< 0.20

Results - Soil

Project: C10271

Client: Sirius Geotechnical Ltd				**Chemtest Job No.:**		24-36111	24-36111	24-36111	24-36111	24-36111	24-36111	24-36111
Quotation No.:				**Chemtest Sample ID.:**		1891046	1891047	1891048	1891049	1891050	1891051	1891052
				Client Sample ID.:		TP108	TP109	TP109	TP111	TP113	TP114	TP115
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.50	0.20	0.50	0.20	1.60	0.20	0.20
				Date Sampled:		29-Oct-2024	29-Oct-2024	29-Oct-2024	29-Oct-2024	29-Oct-2024	29-Oct-2024	29-Oct-2024
				Asbestos Lab:			DURHAM		DURHAM		DURHAM	
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**							
Trichloronate		N	2820	mg/kg	0.20							< 0.20
Prothiofos		N	2820	mg/kg	0.20							< 0.20
Fensulphothion		N	2820	mg/kg	0.20							< 0.20
Sulprofos		N	2820	mg/kg	0.20							< 0.20
Azinphos-Methyl		N	2820	mg/kg	0.20							< 0.20
Coumaphos		N	2820	mg/kg	0.20							< 0.20
Alpha-HCH		N	2840	mg/kg	0.20							< 0.20
Gamma-HCH (Lindane)		N	2840	mg/kg	0.20							< 0.20
Beta-HCH		N	2840	mg/kg	0.20							< 0.20
Delta-HCH		N	2840	mg/kg	0.20							< 0.20
Heptachlor		N	2840	mg/kg	0.20							< 0.20
Aldrin		N	2840	mg/kg	0.20							< 0.20
Heptachlor Epoxide		N	2840	mg/kg	0.20							< 0.20
Gamma-Chlordane		N	2840	mg/kg	0.20							< 0.20
Alpha-Chlordane		N	2840	mg/kg	0.20							< 0.20
Endosulfan I		N	2840	mg/kg	0.20							< 0.20
4,4-DDE		N	2840	mg/kg	0.20							< 0.20
Dieldrin		N	2840	mg/kg	0.20							< 0.20
Endrin		N	2840	mg/kg	0.20							< 0.20
4,4-DDD		N	2840	mg/kg	0.20							< 0.20
Endosulfan II		N	2840	mg/kg	0.20							< 0.20
Endrin Aldehyde		N	2840	mg/kg	0.20							< 0.20
4,4-DDT		N	2840	mg/kg	0.20							< 0.20
Endosulfan Sulphate		N	2840	mg/kg	0.20							< 0.20
Methoxychlor		N	2840	mg/kg	0.20							< 0.20
Endrin Ketone		N	2840	mg/kg	0.20							< 0.20
Total Phenols		M	2920	mg/kg	0.10		< 0.10		< 0.10		< 0.10	

Results - Soil

Project: C10271

Client: Sirius Geotechnical Ltd				**Chemtest Job No.:**		24-36111	24-36111	24-36111	24-36111	24-36111	24-36111	24-36111
Quotation No.:				**Chemtest Sample ID.:**		1891053	1891054	1891055	1891056	1891057	1891058	1891059
				Client Sample ID.:		TP116	TP117	WS102	WS104	WS104	WS106	WS107
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.50	0.20	1.00	0.20	0.90	1.50	0.20
				Date Sampled:		29-Oct-2024	30-Oct-2024	31-Oct-2024	31-Oct-2024	31-Oct-2024	31-Oct-2024	31-Oct-2024
				Asbestos Lab:		DURHAM	DURHAM		DURHAM			DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**							
ACM Type		U	2192		N/A	-	-		-			-
Asbestos Identification		U	2192		N/A	No Asbestos Detected	No Asbestos Detected		No Asbestos Detected			No Asbestos Detected
Moisture		N	2030	%	0.020	14	23	13	21	15	24	13
Soil Colour		N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material		N	2040		N/A	Stones	Stones and Roots	None	Roots	None	Stones	Stones and Roots
Soil Texture		N	2040		N/A	Clay	Clay	Clay	Clay	Clay	Clay	Clay
pH at 20C		M	2010		4.0	6.1	7.5	8.0	8.3	8.3	7.3	8.4
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010	0.041	< 0.010	0.020	< 0.010	0.050	0.023	0.014
Calorific Value		N	2140	MJ/kg	0.10							
Sulphate (Total)		U	2430	%	0.010	0.12	0.067		0.11			0.094
Arsenic		M	2455	mg/kg	0.5	34	12		18			7.7
Cadmium		M	2455	mg/kg	0.10	< 0.10	0.38		0.62			0.38
Chromium		M	2455	mg/kg	0.5	27	13		31			39
Copper		M	2455	mg/kg	0.50	27	29		70			34
Mercury		M	2455	mg/kg	0.05	0.05	0.09		0.16			0.07
Nickel		M	2455	mg/kg	0.50	21	17		33			19
Lead		M	2455	mg/kg	0.50	23	28		66			54
Selenium		M	2455	mg/kg	0.25	0.72	0.72		1.4			0.69
Zinc		M	2455	mg/kg	0.50	56	70		140			96
Chromium (Hexavalent)		N	2490	mg/kg	0.50	< 0.50	< 0.50		< 0.50			< 0.50
Aliphatic VPH >C5-C6	HS_2D_AL	U	2780	mg/kg	0.05							
Aliphatic VPH >C6-C7	HS_2D_AL	U	2780	mg/kg	0.05							
Aliphatic VPH >C7-C8	HS_2D_AL	U	2780	mg/kg	0.05							
Aliphatic VPH >C6-C8 (Sum)	HS_2D_AL	N	2780	mg/kg	0.10							
Aliphatic VPH >C8-C10	HS_2D_AL	U	2780	mg/kg	0.05							
Total Aliphatic VPH >C5-C10	HS_2D_AL	U	2780	mg/kg	0.25							
Aliphatic EPH >C10-C12 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00							
Aliphatic EPH >C12-C16 MC	EH_2D_AL_#1	M	2690	mg/kg	1.00							
Aliphatic EPH >C16-C21 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00							
Aliphatic EPH >C21-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	3.00							
Aliphatic EPH >C35-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00							
Total Aliphatic EPH >C10-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	5.00							
Total Aliphatic EPH >C10-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00							
Aromatic VPH >C5-C7	HS_2D_AR	U	2780	mg/kg	0.05							
Aromatic VPH >C7-C8	HS_2D_AR	U	2780	mg/kg	0.05							
Aromatic VPH >C8-C10	HS_2D_AR	U	2780	mg/kg	0.05							
Total Aromatic VPH >C5-C10	HS_2D_AR	U	2780	mg/kg	0.25							

Results - Soil

Project: C10271

Client: Sirius Geotechnical Ltd				**Chemtest Job No.:**		24-36111	24-36111	24-36111	24-36111	24-36111	24-36111	24-36111
Quotation No.:				**Chemtest Sample ID.:**		1891053	1891054	1891055	1891056	1891057	1891058	1891059
				Client Sample ID.:		TP116	TP117	WS102	WS104	WS104	WS106	WS107
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.50	0.20	1.00	0.20	0.90	1.50	0.20
				Date Sampled:		29-Oct-2024	30-Oct-2024	31-Oct-2024	31-Oct-2024	31-Oct-2024	31-Oct-2024	31-Oct-2024
				Asbestos Lab:		DURHAM	DURHAM		DURHAM			DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**							
Aromatic EPH >C10-C12 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00							
Aromatic EPH >C12-C16 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00							
Aromatic EPH >C16-C21 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00							
Aromatic EPH >C21-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00							
Aromatic EPH >C35-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	1.00							
Total Aromatic EPH >C10-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	5.00							
Total Aromatic EPH >C10-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	10.00							
Total VPH >C5-C10	HS_2D_Total	U	2780	mg/kg	0.50							
Total EPH >C10-C35 MC	EH_2D_Total_#1	U	2690	mg/kg	10.00							
Total EPH >C10-C40 MC	EH_2D_Total_#1	N	2690	mg/kg	10.00							
Total Organic Carbon		M	2625	%	0.20	1.0	2.9		3.6			4.7
Naphthalene		M	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10			0.48
Acenaphthylene		M	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10			0.60
Acenaphthene		M	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10			0.94
Fluorene		M	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10			0.68
Phenanthrene		M	2700	mg/kg	0.10	< 0.10	< 0.10		0.57			7.3
Anthracene		M	2700	mg/kg	0.10	< 0.10	< 0.10		0.19			2.0
Fluoranthene		M	2700	mg/kg	0.10	< 0.10	0.45		1.0			14
Pyrene		M	2700	mg/kg	0.10	< 0.10	0.22		1.1			14
Benzo[a]anthracene		M	2700	mg/kg	0.10	< 0.10	< 0.10		0.56			7.0
Chrysene		M	2700	mg/kg	0.10	< 0.10	< 0.10		1.9			9.3
Benzo[b]fluoranthene		M	2700	mg/kg	0.10	< 0.10	< 0.10		0.44			9.9
Benzo[k]fluoranthene		M	2700	mg/kg	0.10	< 0.10	< 0.10		0.17			4.0
Benzo[a]pyrene		M	2700	mg/kg	0.10	< 0.10	< 0.10		0.52			7.0
Indeno(1,2,3-c,d)Pyrene		M	2700	mg/kg	0.10	< 0.10	< 0.10		0.32			4.5
Dibenz(a,h)Anthracene		M	2700	mg/kg	0.10	< 0.10	< 0.10		0.27			1.3
Benzo[g,h,i]perylene		M	2700	mg/kg	0.10	< 0.10	< 0.10		0.79			4.9
Total Of 16 PAH's		M	2700	mg/kg	2.0	< 2.0	< 2.0		7.8			88
Benzene		M	2760	µg/kg	1.0							
Toluene		M	2760	µg/kg	1.0							
Ethylbenzene		M	2760	µg/kg	1.0							
m & p-Xylene		M	2760	µg/kg	1.0							
o-Xylene		M	2760	µg/kg	1.0							
Methyl Tert-Butyl Ether		M	2760	µg/kg	1.0							
Demeton-O		N	2820	mg/kg	0.20							
Phorate		N	2820	mg/kg	0.20							
Demeton-S		N	2820	mg/kg	0.20							
Disulfoton		N	2820	mg/kg	0.20							
Fenthion		N	2820	mg/kg	0.20							

Results - Soil

Project: C10271

Client: Sirius Geotechnical Ltd				**Chemtest Job No.:**		24-36111	24-36111	24-36111	24-36111	24-36111	24-36111	24-36111
Quotation No.:				**Chemtest Sample ID.:**		1891053	1891054	1891055	1891056	1891057	1891058	1891059
				Client Sample ID.:		TP116	TP117	WS102	WS104	WS104	WS106	WS107
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.50	0.20	1.00	0.20	0.90	1.50	0.20
				Date Sampled:		29-Oct-2024	30-Oct-2024	31-Oct-2024	31-Oct-2024	31-Oct-2024	31-Oct-2024	31-Oct-2024
				Asbestos Lab:		DURHAM	DURHAM		DURHAM			DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**							
Trichloronate		N	2820	mg/kg	0.20							
Prothiofos		N	2820	mg/kg	0.20							
Fensulphothion		N	2820	mg/kg	0.20							
Sulprofos		N	2820	mg/kg	0.20							
Azinphos-Methyl		N	2820	mg/kg	0.20							
Coumaphos		N	2820	mg/kg	0.20							
Alpha-HCH		N	2840	mg/kg	0.20							
Gamma-HCH (Lindane)		N	2840	mg/kg	0.20							
Beta-HCH		N	2840	mg/kg	0.20							
Delta-HCH		N	2840	mg/kg	0.20							
Heptachlor		N	2840	mg/kg	0.20							
Aldrin		N	2840	mg/kg	0.20							
Heptachlor Epoxide		N	2840	mg/kg	0.20							
Gamma-Chlordane		N	2840	mg/kg	0.20							
Alpha-Chlordane		N	2840	mg/kg	0.20							
Endosulfan I		N	2840	mg/kg	0.20							
4,4-DDE		N	2840	mg/kg	0.20							
Dieldrin		N	2840	mg/kg	0.20							
Endrin		N	2840	mg/kg	0.20							
4,4-DDD		N	2840	mg/kg	0.20							
Endosulfan II		N	2840	mg/kg	0.20							
Endrin Aldehyde		N	2840	mg/kg	0.20							
4,4-DDT		N	2840	mg/kg	0.20							
Endosulfan Sulphate		N	2840	mg/kg	0.20							
Methoxychlor		N	2840	mg/kg	0.20							
Endrin Ketone		N	2840	mg/kg	0.20							
Total Phenols		M	2920	mg/kg	0.10	< 0.10	< 0.10		< 0.10			< 0.10

Results - Soil

Project: C10271

Client: Sirius Geotechnical Ltd				**Chemtest Job No.:**		24-36111	24-36111	24-36111	24-36111	24-36111	24-36111	24-36111
Quotation No.:				**Chemtest Sample ID.:**		1891060	1891061	1891062	1891063	1891064	1891065	1891066
				Client Sample ID.:		WS107	WS107	WS109	WS111	WS112	WS112	WS113
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.60	1.50	0.50	0.50	0.20	0.90	0.40
				Date Sampled:		31-Oct-2024	31-Oct-2024	01-Nov-2024	01-Nov-2024	01-Nov-2024	01-Nov-2024	01-Nov-2024
				Asbestos Lab:		DURHAM		DURHAM	DURHAM			DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**							
ACM Type		U	2192		N/A	-		-	-			-
Asbestos Identification		U	2192		N/A	No Asbestos Detected		No Asbestos Detected	No Asbestos Detected			No Asbestos Detected
Moisture		N	2030	%	0.020	9.7	17	8.0	10	16	17	9.1
Soil Colour		N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material		N	2040		N/A	Stones	None	Stones	Stones	Stones and Roots	Stones	Stones
Soil Texture		N	2040		N/A	Loam	Clay	Sand	Loam	Clay	Clay	Loam
pH at 20C		M	2010		4.0	9.0	8.0	8.6	8.7		8.2	8.6
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010	0.020	0.057	0.031	0.095		0.025	0.046
Calorific Value		N	2140	MJ/kg	0.10							
Sulphate (Total)		U	2430	%	0.010	0.099		0.24	0.16			0.17
Arsenic		M	2455	mg/kg	0.5	8.5		9.5	7.7			14
Cadmium		M	2455	mg/kg	0.10	0.33		0.22	0.41			1.2
Chromium		M	2455	mg/kg	0.5	58		23	22			58
Copper		M	2455	mg/kg	0.50	23		24	20			53
Mercury		M	2455	mg/kg	0.05	0.06		0.06	0.06			0.12
Nickel		M	2455	mg/kg	0.50	15		29	15			31
Lead		M	2455	mg/kg	0.50	39		41	33			71
Selenium		M	2455	mg/kg	0.25	0.52		1.6	0.82			1.1
Zinc		M	2455	mg/kg	0.50	66		72	99			140
Chromium (Hexavalent)		N	2490	mg/kg	0.50	< 0.50		< 0.50	< 0.50			< 0.50
Aliphatic VPH >C5-C6	HS_2D_AL	U	2780	mg/kg	0.05					< 0.05		
Aliphatic VPH >C6-C7	HS_2D_AL	U	2780	mg/kg	0.05					< 0.05		
Aliphatic VPH >C7-C8	HS_2D_AL	U	2780	mg/kg	0.05					< 0.05		
Aliphatic VPH >C6-C8 (Sum)	HS_2D_AL	N	2780	mg/kg	0.10					< 0.10		
Aliphatic VPH >C8-C10	HS_2D_AL	U	2780	mg/kg	0.05					< 0.05		
Total Aliphatic VPH >C5-C10	HS_2D_AL	U	2780	mg/kg	0.25					< 0.25		
Aliphatic EPH >C10-C12 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00					< 2.0		
Aliphatic EPH >C12-C16 MC	EH_2D_AL_#1	M	2690	mg/kg	1.00					3.2		
Aliphatic EPH >C16-C21 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00					4.1		
Aliphatic EPH >C21-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	3.00					9.8		
Aliphatic EPH >C35-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00					< 10		
Total Aliphatic EPH >C10-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	5.00					19		
Total Aliphatic EPH >C10-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00					19		
Aromatic VPH >C5-C7	HS_2D_AR	U	2780	mg/kg	0.05					< 0.05		
Aromatic VPH >C7-C8	HS_2D_AR	U	2780	mg/kg	0.05					< 0.05		
Aromatic VPH >C8-C10	HS_2D_AR	U	2780	mg/kg	0.05					< 0.05		
Total Aromatic VPH >C5-C10	HS_2D_AR	U	2780	mg/kg	0.25					< 0.25		

Results - Soil

Project: C10271

Client: Sirius Geotechnical Ltd				**Chemtest Job No.:**		24-36111	24-36111	24-36111	24-36111	24-36111	24-36111	24-36111
Quotation No.:				**Chemtest Sample ID.:**		1891060	1891061	1891062	1891063	1891064	1891065	1891066
				Client Sample ID.:		WS107	WS107	WS109	WS111	WS112	WS112	WS113
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.60	1.50	0.50	0.50	0.20	0.90	0.40
				Date Sampled:		31-Oct-2024	31-Oct-2024	01-Nov-2024	01-Nov-2024	01-Nov-2024	01-Nov-2024	01-Nov-2024
				Asbestos Lab:		DURHAM		DURHAM	DURHAM			DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**							
Aromatic EPH >C10-C12 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00					< 1.0		
Aromatic EPH >C12-C16 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00					1.0		
Aromatic EPH >C16-C21 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00					38		
Aromatic EPH >C21-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00					62		
Aromatic EPH >C35-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	1.00					130		
Total Aromatic EPH >C10-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	5.00					100		
Total Aromatic EPH >C10-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	10.00					230		
Total VPH >C5-C10	HS_2D_Total	U	2780	mg/kg	0.50					< 0.50		
Total EPH >C10-C35 MC	EH_2D_Total_#1	U	2690	mg/kg	10.00					120		
Total EPH >C10-C40 MC	EH_2D_Total_#1	N	2690	mg/kg	10.00					250		
Total Organic Carbon		M	2625	%	0.20	2.5		1.4	3.6			6.0
Naphthalene		M	2700	mg/kg	0.10	0.48		1.6	0.87			0.54
Acenaphthylene		M	2700	mg/kg	0.10	0.80		1.2	0.54			0.50
Acenaphthene		M	2700	mg/kg	0.10	1.0		6.8	0.71			0.66
Fluorene		M	2700	mg/kg	0.10	0.70		6.8	0.83			0.60
Phenanthrene		M	2700	mg/kg	0.10	12		55	11			6.4
Anthracene		M	2700	mg/kg	0.10	3.0		14	3.1			1.9
Fluoranthene		M	2700	mg/kg	0.10	22		67	22			17
Pyrene		M	2700	mg/kg	0.10	23		67	22			18
Benzo[a]anthracene		M	2700	mg/kg	0.10	11		29	11			9.8
Chrysene		M	2700	mg/kg	0.10	14		32	13			11
Benzo[b]fluoranthene		M	2700	mg/kg	0.10	15		40	14			15
Benzo[k]fluoranthene		M	2700	mg/kg	0.10	5.9		16	5.5			5.5
Benzo[a]pyrene		M	2700	mg/kg	0.10	11		34	11			11
Indeno(1,2,3-c,d)Pyrene		M	2700	mg/kg	0.10	6.6		21	6.8			7.6
Dibenz(a,h)Anthracene		M	2700	mg/kg	0.10	2.1		5.8	1.9			2.0
Benzo[g,h,i]perylene		M	2700	mg/kg	0.10	7.5		20	9.2			7.6
Total Of 16 PAH's		M	2700	mg/kg	2.0	140		420	130			120
Benzene		M	2760	µg/kg	1.0					< 1.0		
Toluene		M	2760	µg/kg	1.0					< 1.0		
Ethylbenzene		M	2760	µg/kg	1.0					< 1.0		
m & p-Xylene		M	2760	µg/kg	1.0					< 1.0		
o-Xylene		M	2760	µg/kg	1.0					< 1.0		
Methyl Tert-Butyl Ether		M	2760	µg/kg	1.0					< 1.0		
Demeton-O		N	2820	mg/kg	0.20				< 0.20			
Phorate		N	2820	mg/kg	0.20				< 0.20			
Demeton-S		N	2820	mg/kg	0.20				< 0.20			
Disulfoton		N	2820	mg/kg	0.20				< 0.20			
Fenthion		N	2820	mg/kg	0.20				< 0.20			

Results - Soil

Project: C10271

Client: Sirius Geotechnical Ltd				**Chemtest Job No.:**		24-36111	24-36111	24-36111	24-36111	24-36111	24-36111	24-36111
Quotation No.:				**Chemtest Sample ID.:**		1891060	1891061	1891062	1891063	1891064	1891065	1891066
				Client Sample ID.:		WS107	WS107	WS109	WS111	WS112	WS112	WS113
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.60	1.50	0.50	0.50	0.20	0.90	0.40
				Date Sampled:		31-Oct-2024	31-Oct-2024	01-Nov-2024	01-Nov-2024	01-Nov-2024	01-Nov-2024	01-Nov-2024
				Asbestos Lab:		DURHAM		DURHAM	DURHAM			DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**							
Trichloronate		N	2820	mg/kg	0.20				< 0.20			
Prothiofos		N	2820	mg/kg	0.20				< 0.20			
Fensulphothion		N	2820	mg/kg	0.20				< 0.20			
Sulprofos		N	2820	mg/kg	0.20				< 0.20			
Azinphos-Methyl		N	2820	mg/kg	0.20				< 0.20			
Coumaphos		N	2820	mg/kg	0.20				< 0.20			
Alpha-HCH		N	2840	mg/kg	0.20				< 0.20			
Gamma-HCH (Lindane)		N	2840	mg/kg	0.20				< 0.20			
Beta-HCH		N	2840	mg/kg	0.20				< 0.20			
Delta-HCH		N	2840	mg/kg	0.20				< 0.20			
Heptachlor		N	2840	mg/kg	0.20				< 0.20			
Aldrin		N	2840	mg/kg	0.20				< 0.20			
Heptachlor Epoxide		N	2840	mg/kg	0.20				< 0.20			
Gamma-Chlordane		N	2840	mg/kg	0.20				< 0.20			
Alpha-Chlordane		N	2840	mg/kg	0.20				< 0.20			
Endosulfan I		N	2840	mg/kg	0.20				< 0.20			
4,4-DDE		N	2840	mg/kg	0.20				< 0.20			
Dieldrin		N	2840	mg/kg	0.20				< 0.20			
Endrin		N	2840	mg/kg	0.20				< 0.20			
4,4-DDD		N	2840	mg/kg	0.20				< 0.20			
Endosulfan II		N	2840	mg/kg	0.20				< 0.20			
Endrin Aldehyde		N	2840	mg/kg	0.20				< 0.20			
4,4-DDT		N	2840	mg/kg	0.20				< 0.20			
Endosulfan Sulphate		N	2840	mg/kg	0.20				< 0.20			
Methoxychlor		N	2840	mg/kg	0.20				< 0.20			
Endrin Ketone		N	2840	mg/kg	0.20				< 0.20			
Total Phenols		M	2920	mg/kg	0.10	< 0.10		< 0.10	< 0.10			< 0.10

Results - Soil

Project: C10271

Client: Sirius Geotechnical Ltd				**Chemtest Job No.:**		24-36111
Quotation No.:				**Chemtest Sample ID.:**		1891067
				Client Sample ID.:		WS114
				Sample Type:		SOIL
				Top Depth (m):		0.20
				Date Sampled:		01-Nov-2024
				Asbestos Lab:		
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**	
ACM Type		U	2192		N/A	
Asbestos Identification		U	2192		N/A	
Moisture		N	2030	%	0.020	13
Soil Colour		N	2040		N/A	Brown
Other Material		N	2040		N/A	Stones and Roots
Soil Texture		N	2040		N/A	Clay
pH at 20C		M	2010		4.0	
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010	
Calorific Value		N	2140	MJ/kg	0.10	
Sulphate (Total)		U	2430	%	0.010	
Arsenic		M	2455	mg/kg	0.5	
Cadmium		M	2455	mg/kg	0.10	
Chromium		M	2455	mg/kg	0.5	
Copper		M	2455	mg/kg	0.50	
Mercury		M	2455	mg/kg	0.05	
Nickel		M	2455	mg/kg	0.50	
Lead		M	2455	mg/kg	0.50	
Selenium		M	2455	mg/kg	0.25	
Zinc		M	2455	mg/kg	0.50	
Chromium (Hexavalent)		N	2490	mg/kg	0.50	
Aliphatic VPH >C5-C6	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05
Aliphatic VPH >C6-C7	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05
Aliphatic VPH >C7-C8	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05
Aliphatic VPH >C6-C8 (Sum)	HS_2D_AL	N	2780	mg/kg	0.10	< 0.10
Aliphatic VPH >C8-C10	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05
Total Aliphatic VPH >C5-C10	HS_2D_AL	U	2780	mg/kg	0.25	< 0.25
Aliphatic EPH >C10-C12 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00	< 2.0
Aliphatic EPH >C12-C16 MC	EH_2D_AL_#1	M	2690	mg/kg	1.00	< 1.0
Aliphatic EPH >C16-C21 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00	< 2.0
Aliphatic EPH >C21-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	3.00	6.7
Aliphatic EPH >C35-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00	< 10
Total Aliphatic EPH >C10-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	5.00	8.7
Total Aliphatic EPH >C10-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00	< 10
Aromatic VPH >C5-C7	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05
Aromatic VPH >C7-C8	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05
Aromatic VPH >C8-C10	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05
Total Aromatic VPH >C5-C10	HS_2D_AR	U	2780	mg/kg	0.25	< 0.25

Results - Soil

Project: C10271

Client: Sirius Geotechnical Ltd				**Chemtest Job No.:**		24-36111
Quotation No.:				**Chemtest Sample ID.:**		1891067
				Client Sample ID.:		WS114
				Sample Type:		SOIL
				Top Depth (m):		0.20
				Date Sampled:		01-Nov-2024
				Asbestos Lab:		
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**	
Aromatic EPH >C10-C12 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00	< 1.0
Aromatic EPH >C12-C16 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00	< 1.0
Aromatic EPH >C16-C21 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00	12
Aromatic EPH >C21-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00	20
Aromatic EPH >C35-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	1.00	23
Total Aromatic EPH >C10-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	5.00	32
Total Aromatic EPH >C10-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	10.00	55
Total VPH >C5-C10	HS_2D_Total	U	2780	mg/kg	0.50	< 0.50
Total EPH >C10-C35 MC	EH_2D_Total_#1	U	2690	mg/kg	10.00	41
Total EPH >C10-C40 MC	EH_2D_Total_#1	N	2690	mg/kg	10.00	63
Total Organic Carbon		M	2625	%	0.20	
Naphthalene		M	2700	mg/kg	0.10	
Acenaphthylene		M	2700	mg/kg	0.10	
Acenaphthene		M	2700	mg/kg	0.10	
Fluorene		M	2700	mg/kg	0.10	
Phenanthrene		M	2700	mg/kg	0.10	
Anthracene		M	2700	mg/kg	0.10	
Fluoranthene		M	2700	mg/kg	0.10	
Pyrene		M	2700	mg/kg	0.10	
Benzo[a]anthracene		M	2700	mg/kg	0.10	
Chrysene		M	2700	mg/kg	0.10	
Benzo[b]fluoranthene		M	2700	mg/kg	0.10	
Benzo[k]fluoranthene		M	2700	mg/kg	0.10	
Benzo[a]pyrene		M	2700	mg/kg	0.10	
Indeno(1,2,3-c,d)Pyrene		M	2700	mg/kg	0.10	
Dibenz(a,h)Anthracene		M	2700	mg/kg	0.10	
Benzo[g,h,i]perylene		M	2700	mg/kg	0.10	
Total Of 16 PAH's		M	2700	mg/kg	2.0	
Benzene		M	2760	µg/kg	1.0	< 1.0
Toluene		M	2760	µg/kg	1.0	< 1.0
Ethylbenzene		M	2760	µg/kg	1.0	< 1.0
m & p-Xylene		M	2760	µg/kg	1.0	< 1.0
o-Xylene		M	2760	µg/kg	1.0	< 1.0
Methyl Tert-Butyl Ether		M	2760	µg/kg	1.0	< 1.0
Demeton-O		N	2820	mg/kg	0.20	
Phorate		N	2820	mg/kg	0.20	
Demeton-S		N	2820	mg/kg	0.20	
Disulfoton		N	2820	mg/kg	0.20	
Fenthion		N	2820	mg/kg	0.20	

Results - Soil

Project: C10271

Client: Sirius Geotechnical Ltd				**Chemtest Job No.:**		24-36111
Quotation No.:				**Chemtest Sample ID.:**		1891067
				Client Sample ID.:		WS114
				Sample Type:		SOIL
				Top Depth (m):		0.20
				Date Sampled:		01-Nov-2024
				Asbestos Lab:		
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**	
Trichloronate		N	2820	mg/kg	0.20	
Prothiofos		N	2820	mg/kg	0.20	
Fensulphothion		N	2820	mg/kg	0.20	
Sulprofos		N	2820	mg/kg	0.20	
Azinphos-Methyl		N	2820	mg/kg	0.20	
Coumaphos		N	2820	mg/kg	0.20	
Alpha-HCH		N	2840	mg/kg	0.20	
Gamma-HCH (Lindane)		N	2840	mg/kg	0.20	
Beta-HCH		N	2840	mg/kg	0.20	
Delta-HCH		N	2840	mg/kg	0.20	
Heptachlor		N	2840	mg/kg	0.20	
Aldrin		N	2840	mg/kg	0.20	
Heptachlor Epoxide		N	2840	mg/kg	0.20	
Gamma-Chlordane		N	2840	mg/kg	0.20	
Alpha-Chlordane		N	2840	mg/kg	0.20	
Endosulfan I		N	2840	mg/kg	0.20	
4,4-DDE		N	2840	mg/kg	0.20	
Dieldrin		N	2840	mg/kg	0.20	
Endrin		N	2840	mg/kg	0.20	
4,4-DDD		N	2840	mg/kg	0.20	
Endosulfan II		N	2840	mg/kg	0.20	
Endrin Aldehyde		N	2840	mg/kg	0.20	
4,4-DDT		N	2840	mg/kg	0.20	
Endosulfan Sulphate		N	2840	mg/kg	0.20	
Methoxychlor		N	2840	mg/kg	0.20	
Endrin Ketone		N	2840	mg/kg	0.20	
Total Phenols		M	2920	mg/kg	0.10	

Test Methods

SOP	Title	Parameters included	Method summary	Water Accred.
2010	pH Value of Soils	pH at 20°C	pH Meter	
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <30°C.	
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930	
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES	
2140	Calorific Value	Calorific Value	Bomb Calorimeter	
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry	
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.	
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.	
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.	
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.	
2690	EPH A/A Split	Aliphatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40 Aromatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40	Acetone/Heptane extraction / GCxGC FID detection	
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)	
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.	
2780	VPH A/A Split	Aliphatics: >C5–C6, >C6–C7,>C7–C8,>C8-C10 Aromatics: >C5–C7,>C7-C8,>C8–C10	Water extraction / Headspace GCxGC FID detection	
2820	Organophosphorus (O-P) Pesticides in Soils by GC-MS	Organophosphorus pesticide representative suite including Parathion, Malathion etc, plus client specific determinands	Dichloromethane extraction / GC-MS	
2840	Organochlorine (O-Cl) Pesticides in Soils by GC-MS	Organochlorine pesticide representative suite including DDT and its metabolites, 'drins' and HCH etc, plus client specific determinands	Dichloromethane extraction / GC-MS	
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.	

Report Information

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SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

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Uncertainty of measurement for the determinands tested are available upon request .
None of the results in this report have been recovery corrected.
All results are expressed on a dry weight basis.

The following tests were analysed on samples 'as received' and the results subsequently corrected to a dry weight basis EPH, VPH, TPH, BTEX, VOCs, SVOCs, PCBs, Phenols.

For all other tests the samples were dried at ≤ 30°C prior to analysis.
All Asbestos testing is performed at the indicated laboratory .
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1.

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt.
All water samples will be retained for 14 days from the date of receipt.
Charges may apply to extended sample storage.

Water Sample Category Key for Accreditation

DW - Drinking Water
GW - Ground Water
LE - Land Leachate
NA - Not Applicable

Report Information

PL - Prepared Leachate
PW - Processed Water
RE - Recreational Water
SA - Saline Water
SW - Surface Water
TE - Treated Effluent
TS - Treated Sewage
UL - Unspecified Liquid

Clean Up Codes

NC - No Clean Up
MC - Mathematical Clean Up
FC - Florisil Clean Up

HWOL Acronym System

HS - Headspace analysis
EH - Extractable hydrocarbons – i.e. everything extracted by the solvent
CU - Clean-up – e.g. by Florisil, silica gel
1D - GC – Single coil gas chromatography
Total - Aliphatics & Aromatics
AL - Aliphatics only
AR - Aromatic only
2D - GC-GC – Double coil gas chromatography
#1 - EH_2D_Total but with humics mathematically subtracted
#2 - EH_2D_Total but with fatty acids mathematically subtracted
+ - Operator to indicate cumulative e.g. EH+EH_Total or EH_CU+HS_Total

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

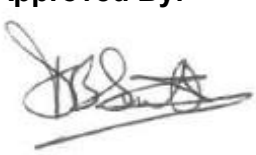
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	24-36781-1
Initial Date of Issue:	15-Nov-2024
Re-Issue Details:	
Client	Sirius Geotechnical Ltd
Client Address:	4250 (Downstairs) Thorpe Park Park Approach Leeds West Yorkshire LS15 8GB
Contact(s):	Ami Cooper Gemma Halliday
Project	C10271 Shaw Lane Carlton

Quotation No.:		**Date Received:**	11-Nov-2024
Order No.:	24975/C10271/CP	**Date Instructed:**	11-Nov-2024
No. of Samples:	5		
Turnaround (Wkdays):	5	**Results Due:**	15-Nov-2024
Date Approved:	15-Nov-2024		

Approved By:



Details: David Smith, Technical Director

For details about application of accreditation to specific matrix types, please refer to the Table at the back of this report

Results - Water

Project: C10271 Shaw Lane Carlton

Client: Sirius Geotechnical Ltd				**Chemtest Job No.:**		24-36781	24-36781	24-36781	24-36781	24-36781
Quotation No.:				**Chemtest Sample ID.:**		1893650	1893651	1893652	1893653	1893654
				Client Sample ID.:		WS105	WS107	WS108	WS111	WS113
				Sample Type:		WATER	WATER	WATER	WATER	WATER
				Sample Sub Type:						
				Date Sampled:		07-Nov-2024	07-Nov-2024	07-Nov-2024	07-Nov-2024	07-Nov-2024
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**					
pH at 20C		U	1010		4.0	7.8	7.9	7.9	7.7	7.6
Electrical Conductivity at 25C		U	1020	µS/cm	1.0	1700	1100	480	1500	970
Ammoniacal Nitrogen		U	1220	mg/l	0.050	0.18	0.60	0.056	0.25	0.86
Sulphate		U	1220	mg/l	1.0	290	150	74	410	180
Arsenic (Dissolved)		U	1455	µg/l	0.20	0.40	1.1	0.24	0.80	0.99
Cadmium (Dissolved)		U	1455	µg/l	0.11	0.26	< 0.11	< 0.11	< 0.11	0.13
Chromium (Dissolved)		U	1455	µg/l	0.50	1.2	1.6	1.6	1.6	1.9
Copper (Dissolved)		U	1455	µg/l	0.50	2.7	1.9	1.1	1.4	1.6
Mercury (Dissolved)		U	1455	µg/l	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel (Dissolved)		U	1455	µg/l	0.50	8.8	5.8	3.8	8.6	12
Lead (Dissolved)		U	1455	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Selenium (Dissolved)		U	1455	µg/l	0.50	0.55	0.95	0.60	0.89	< 0.50
Zinc (Dissolved)		U	1455	µg/l	2.5	14	6.4	9.0	8.9	13
Aliphatic TPH >C5-C6	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	EH_2D_AL_#1	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	EH_2D_AR_#1	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	EH_2D_Total_#1	N	1675	µg/l	10	< 10	< 10	< 10	< 10	< 10
Naphthalene		U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene		U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene		U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene		U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene		U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene		U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene		U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene		U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Water

Project: C10271 Shaw Lane Carlton

Client: Sirius Geotechnical Ltd				**Chemtest Job No.:**		24-36781	24-36781	24-36781	24-36781	24-36781
Quotation No.:				**Chemtest Sample ID.:**		1893650	1893651	1893652	1893653	1893654
				Client Sample ID.:		WS105	WS107	WS108	WS111	WS113
				Sample Type:		WATER	WATER	WATER	WATER	WATER
				Sample Sub Type:						
				Date Sampled:		07-Nov-2024	07-Nov-2024	07-Nov-2024	07-Nov-2024	07-Nov-2024
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**					
Benzo[a]anthracene		U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene		N	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene		U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene		U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene		U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene		U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene		U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene		U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's		N	1700	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Benzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl Tert-Butyl Ether		N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Phenols		U	1920	mg/l	0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030

Test Methods

SOP	Title	Parameters included	Method summary	Water Accred.
1010	pH Value of Waters	pH at 20°C	pH Meter	RE PW TE TS PL DW GW
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity at 25°C and Total Dissolved Solids (TDS) in Waters	Conductivity Meter	TE TS PL LE SW GW
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.	RE PW PL LE DW GW
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).	RE PW PL SW DW GW
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection	
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)	PL GW
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.	PL GW
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.	PL GW

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2D - GC-GC – Double coil gas chromatography
#1 - EH_2D_Total but with humics mathematically subtracted
#2 - EH_2D_Total but with fatty acids mathematically subtracted
+ - Operator to indicate cumulative e.g. EH+EH_Total or EH_CU+HS_Total

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

APPENDIX G
Monitoring Results

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Network Space
Site: Shaw Lane, Carlton
Date: 07/11/2024

Job No: C10271
Visit No: 1 **of** 6
Operator: CP/RT **Project Manager:** AEC

	GAS CONCENTRATIONS												VOLATILES		FLOW DATA				Qhg per borehole		WELL AND WATER DATA					Comments
Monitoring Point	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Methane (l/hr)	CO2 (l/hr)	Water level (mbgl)	Depth of well (m)	Top of BH (mAOD)	Water level (mAOD)	Response Zone	
	Peak	Steady	Peak	Steady	Peak	**Steady**	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady										
WS102	**ND**	ND	ND	ND	0.2	**0.2**	1	ND	ND	ND	19.6	19.6	ND	NR	ND	ND	ND	NR	0.0001	0.0002	1.38	2.11	45.30	43.92	1-2m	All boreholes purged following monitoring
WS104	**ND**	ND	ND	ND	ND	**ND**	ND	ND	ND	ND	19.9	19.9	ND	NR	ND	ND	ND	NR	0.0001	0.0001	1.30	2.10	42.30	41.00	1-2m	
WS105	**ND**	ND	ND	ND	0.4	**0.4**	1	ND	ND	ND	20.0	20.0	ND	NR	ND	ND	ND	NR	0.0001	0.0004	1.49	3.07	45.90	44.41	1-3m	
WS107	**ND**	ND	ND	ND	1.8	**1.8**	8	7	1	ND	18.2	18.2	ND	NR	1.2	ND	1.0	60	0.0012	0.0018	1.18	3.12	46.60	45.42	1-3m	
WS108	**ND**	ND	ND	ND	0.1	**0.1**	1	ND	ND	ND	18.9	18.9	ND	NR	ND	ND	ND	NR	0.0001	0.0001	2.84	4.08	46.30	43.46	1-4m	
WS110	**ND**	ND	ND	ND	ND	**ND**	1	ND	2	ND	20.1	20.1	ND	NR	ND	ND	ND	NR	0.0001	0.0001	1.39	2.09	46.50	45.11	1-2m	
WS111	**ND**	ND	ND	ND	0.9	**0.9**	1	ND	ND	ND	6.9	6.9	ND	NR	ND	ND	ND	NR	0.0001	0.0009	1.56	3.76	46.40	44.84	1-3m	
WS113	**ND**	ND	ND	ND	1.4	**1.4**	1	ND	1	ND	17.8	17.8	ND	NR	ND	ND	ND	NR	0.0001	0.0014	1.56	3.95	46.40	44.84	1-4m	
DS01	**ND**	ND	ND	ND	4.0	**4.0**	2	ND	1	ND	14.3	14.3	ND	NR	ND	ND	ND	NR	0.0001	0.0040	1.57	3.01	45.50	43.93	1-3m	
DS02	**ND**	ND	ND	ND	0.8	**0.8**	1	ND	1	ND	14.4	14.4	ND	NR	ND	ND	ND	NR	0.0001	0.0008	1.25	2.93	43.20	41.95	1-3m	
DS03	**ND**	ND	ND	ND	1.5	**1.5**	1	ND	ND	ND	13.3	13.3	ND	NR	ND	ND	ND	NR	0.0001	0.0015	2.70	2.95	46.80	44.10	1-3m	
DS04	**ND**	ND	ND	ND	0.9	**0.9**	1	ND	ND	ND	16.2	16.2	ND	NR	ND	ND	ND	NR	0.0001	0.0009	1.55	2.97	45.90	44.35	1-3m	
DS05	**ND**	ND	ND	ND	0.2	**0.2**	ND	ND	4	1	19.4	19.4	ND	NR	ND	ND	ND	NR	0.0001	0.0002	0.90	2.54	46.50	45.60	1-2.5m	
Max	**ND**	**ND**	**ND**	**ND**	**4.0**	**4.0**	**8**	**7**	**4**	**1**	**20.1**	**20.1**	**ND**	**NR**	**1.2**	**ND**	**1.0**	**60**	**0.0012**	**0.0040**	**2.84**			**45.60**		
Min	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**6.9**	**6.9**	**ND**	**NR**	**ND**	**ND**	**ND**	**NR**	**0.0001**	**0.0001**	**0.90**			**41.00**		

ND - Not detected

NR - Not recorded

NB: Where no flow (ND) recorded, Qhg values are calculated using equiment limit of detection (0.1l/hr). Where negative flows recorded, these are converted to positive values for calculation of Qhg.

METEOROLOGICAL AND SITE INFORMATION: (Select correct box with X or enter data, as applicable)

State of ground:		Dry	X	Moist		Wet		Snow		Frozen
Wind:		Calm		Light	X	Moderate		Strong	
Cloud cover:		None		Slight		Cloudy	X	Overcast	
Precipitation:	X	None		Slight		Moderate		Heavy	
Time monitoring performed:			10:30	Start			16:00	End	
Barometric pressure (mbar):			1024	Start			1022	End	
Pressure trend (Daily):			X	Falling		Steady		Rising	
Source:	https://www.timeanddate.com/weather/uk/barnsley/historic								
Air Temperature (Deg. C):			11	Before			9	After	

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter: GMF430 (BM36)
Gas Range: **CH_4** 0 - 100% **CO_2** 0 - 100% **O_2** 0 - 25%
Gas Flow range: +100/-50 l/hour
Differential Pressure: (+/-) 1000 Pa
Date of last external calibration: 13/05/2024 **Date of last in-house calibration:** 10/04/2024
Date of next external calibration: 13/05/2025

Ambient air check: **CH_4** ND **CO_2** ND **O_2** 20.5

PID: LE76
Calibrated range: 5
Calibration gas: Benzene C6H6
Response time: 2 seconds
Accuracy: (+/-) 3% displayed reading
Date of last external calibration: 10/07/2024 **Date of last in-house calibration:** 10/04/2024
Date of next external calibration: 10/07/2025

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Network Space
Site: Shaw Lane, Carlton
Date: 22/11/2024
Job No: C10271
Visit No: 2 **of** 6
Operator: RT **Project Manager:** AEC

Monitoring Point	GAS CONCENTRATIONS												VOLATILES		FLOW DATA				Qhg per borehole		WELL AND WATER DATA					Comments
	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Methane (l/hr)	CO2 (l/hr)	Water level (mbgl)	Depth of well (m)	Top of BH (mAOD)	Water level (mAOD)	Response Zone	
	Peak	Steady	Peak	Steady	Peak	**Steady**	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady										
WS102	**ND**	ND	ND	ND	ND	**ND**	2	1	2	1	19.1	19.1	ND	NR	14.5	0.4	1.0	150	0.0145	0.0004	1.12	2.11	45.30	44.18	1-2m	
WS104	**ND**	ND	ND	ND	ND	**ND**	2	1	4	ND	19.6	19.6	ND	NR	0.3	0.3	ND	20	0.0003	0.0003	1.42	2.10	42.30	40.88	1-2m	
WS105	**ND**	ND	ND	ND	1.2	**1.1**	2	ND	1	ND	19.1	19.1	ND	NR	0.3	0.2	ND	90	0.0003	0.0022	1.63	3.07	45.90	44.27	1-3m	
WS107	**ND**	ND	ND	ND	4.1	**4.1**	4	2	5	1	16.5	16.5	ND	NR	3.6	0.4	4.0	90	0.0036	0.0164	1.20	3.12	46.60	45.40	1-3m	
WS108	**ND**	ND	ND	ND	ND	**ND**	2	ND	1	ND	14.2	14.2	ND	NR	ND	ND	ND	NR	0.0001	0.0001	2.90	4.08	46.30	43.40	1-4m	
WS110	**ND**	ND	ND	ND	ND	**ND**	2	ND	2	ND	19.8	19.8	ND	NR	0.2	0.1	ND	40	0.0002	0.0001	1.26	2.09	46.50	45.24	1-2m	
WS111	**ND**	ND	ND	ND	1.6	**1.6**	2	ND	2	ND	9.8	9.8	ND	NR	0.1	ND	ND	2	0.0001	0.0016	1.69	3.76	46.40	44.71	1-3m	
WS113	**ND**	ND	ND	ND	0.9	**0.9**	2	ND	1	ND	18.4	18.4	ND	NR	1.0	ND	ND	2	0.0010	0.0009	1.72	3.95	46.40	44.68	1-4m	
DS01	**ND**	ND	ND	ND	2.8	**2.8**	2	1	1	ND	12.3	12.3	ND	NR	0.2	ND	ND	70	0.0002	0.0028	1.69	3.01	45.50	43.81	1-3m	
DS02	**ND**	ND	ND	ND	0.8	**0.8**	4	2	1	ND	12.2	12.2	ND	NR	0.2	0.1	ND	120	0.0002	0.0008	1.37	2.93	43.20	41.83	1-3m	
DS03	**ND**	ND	ND	ND	1.3	**1.3**	2	1	1	ND	13.7	13.7	ND	NR	0.3	0.3	ND	30	0.0003	0.0039	2.84	2.95	46.80	43.96	1-3m	
DS04	**ND**	ND	ND	ND	0.8	**0.8**	4	ND	1	ND	16.8	16.8	ND	NR	0.1	0.1	ND	20	0.0001	0.0008	1.72	2.97	45.90	44.18	1-3m	
DS05	**ND**	ND	ND	ND	ND	**ND**	2	ND	1	ND	19.9	19.9	ND	NR	0.3	ND	ND	40	0.0003	0.0001	1.02	2.54	46.50	45.48	1-2.5m	
Max	**ND**	**ND**	**ND**	**ND**	**4.1**	**4.1**	**4**	**2**	**5**	**1**	**19.9**	**19.9**	**ND**	**NR**	**14.5**	**0.4**	**4.0**	**150**	**0.0145**	**0.0164**	**2.90**			**45.48**		
Min	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**2**	**ND**	**1**	**ND**	**9.8**	**9.8**	**ND**	**NR**	**ND**	**ND**	**ND**	**NR**	**0.0001**	**0.0001**	**1.02**			**40.88**		

ND - Not detected

NR - Not recorded

NB: Where no flow (ND) recorded, Qhg values are calculated using equiment limit of detection (0.1l/hr). Where negative flows recorded, these are converted to positive values for calculation of Qhg.

METEOROLOGICAL AND SITE INFORMATION: (Select correct box with X or enter data, as applicable)

State of ground:		Dry	X	Moist		Wet		Snow	X	Frozen
Wind:		Calm	X	Light		Moderate		Strong		
Cloud cover:	X	None		Slight		Cloudy		Overcast		
Precipitation:	X	None		Slight		Moderate		Heavy		
Time monitoring performed:			11:30	Start			14:30	End		
Barometric pressure (mbar):			998	Start			998	End		
Pressure trend (Daily):				Falling	X	Steady		Rising		
Source:	https://www.timeanddate.com/weather/uk/barnsley/historic									
Air Temperature (Deg. C):			3	Before			4	After		

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter: GMF430
Gas Range: **CH_4** 0 - 100% **CO_2** 0 - 100% **O_2** 0 - 25%
Gas Flow range: +100/-50 l/hour
Differential Pressure: (+/-) 1000 Pa
Date of last external calibration: 13/05/2024 **Date of last in-house calibration:** 10/04/2024
calibration: 13/05/2025

Ambient air check: **CH_4** ND **CO_2** ND **O_2** 20.3

PID: LE76
Calibrated range: 5
Calibration gas: Benzene C6H6
Response time: 2 seconds
Accuracy: (+/-) 3% displayed reading
Date of last external calibration: 10/07/2024 **Date of last in-house calibration:** 10/04/2024
Date of next external calibration: 10/07/2025

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Network Space
Site: Shaw Lane, Carlton
Date: 06/12/2024

Job No: C10271
Visit No: 3 **of** 6
Operator: RT **Project Manager:** AEC

Monitoring Point	GAS CONCENTRATIONS												VOLATILES		FLOW DATA				Qhg per borehole		WELL AND WATER DATA					Comments
	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Methane (l/hr)	CO2 (l/hr)	Water level (mbgl)	Depth of well (m)	Top of BH (mAOD)	Water level (mAOD)	Response Zone	
	Peak	Steady	Peak	Steady	Peak	**Steady**	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady										
WS102	**ND**	ND	ND	ND	0.2	**0.2**	2	1	1	ND	18.6	18.6	ND	NR	ND	ND	ND	NR	0.0001	0.0002	0.73	2.11	45.30	44.57	1-2m	
WS104	**NR**	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.00	2.10	42.30	42.30	1-2m	Borehole flooded - unable to monitor
WS105	**ND**	ND	ND	ND	ND	**ND**	4	2	2	1	19.9	19.9	ND	NR	-17.5	ND	ND	40	0.0175	0.0001	0.81	3.07	45.90	45.09	1-3m	
WS107	**ND**	ND	ND	ND	2.2	**2.2**	2	2	2	ND	16.0	16.0	ND	NR	65.2	3.4	20.0	180	0.0652	0.0748	0.75	3.12	46.60	45.85	1-3m	
WS108	**ND**	ND	ND	ND	ND	**ND**	2	2	1	ND	19.3	19.3	ND	NR	ND	ND	ND	NR	0.0001	0.0001	1.67	4.08	46.30	44.63	1-4m	
WS110	**ND**	ND	ND	ND	ND	**ND**	2	ND	1	ND	19.5	19.5	ND	NR	ND	ND	ND	NR	0.0001	0.0001	0.25	2.09	46.50	46.25	1-2m	
WS111	**ND**	ND	ND	ND	1.3	**1.3**	2	1	2	ND	17.0	17.0	ND	NR	ND	ND	ND	NR	0.0001	0.0013	0.65	3.76	46.40	45.75	1-3m	
WS113	**ND**	ND	ND	ND	1.8	**1.8**	2	1	1	ND	16.8	16.8	ND	NR	0.4	ND	ND	2	0.0004	0.0018	1.13	3.95	46.40	45.27	1-4m	
DS01	**ND**	ND	ND	ND	2.3	**2.3**	2	1	1	ND	10.7	10.7	ND	NR	-7.6	ND	ND	25	0.0076	0.0023	1.15	3.01	45.50	44.35	1-3m	
DS02	**ND**	ND	ND	ND	0.4	**0.4**	2	ND	2	ND	18.1	18.1	ND	NR	ND	ND	ND	NR	0.0001	0.0004	1.02	2.93	43.20	42.18	1-3m	
DS03	**ND**	ND	ND	ND	ND	**ND**	2	1	1	ND	18.9	18.9	ND	NR	ND	ND	ND	NR	0.0001	0.0001	1.60	2.95	46.80	45.20	1-3m	
DS04	**ND**	ND	ND	ND	ND	**ND**	2	1	1	ND	18.8	18.8	ND	NR	ND	ND	ND	NR	0.0001	0.0001	0.78	2.97	45.90	45.12	1-3m	
DS05	**ND**	ND	ND	ND	0.8	**0.7**	2	1	1	ND	17.4	17.4	ND	NR	ND	ND	ND	NR	0.0001	0.0007	0.15	2.54	46.50	46.35	1-2.5m	
Max	**ND**	**ND**	**ND**	**ND**	**2.3**	**2.3**	**4**	**2**	**2**	**1**	**19.9**	**19.9**	**ND**	**NR**	**65.2**	**3.4**	**20.0**	**180**	**0.0652**	**0.0748**	**1.67**			**46.35**		
Min	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**2**	**ND**	**1**	**ND**	**10.7**	**10.7**	**ND**	**NR**	**ND**	**ND**	**ND**	**NR**	**0.0001**	**0.0001**	**0.00**			**42.18**		

ND - Not detected

NR - Not recorded

NB: Where no flow (ND) recorded, Qhg values are calculated using equiment limit of detection (0.1l/hr). Where negative flows recorded, these are converted to positive values for calculation of Qhg.

METEOROLOGICAL AND SITE INFORMATION: (Select correct box with X or enter data, as applicable)

State of ground:		Dry		Moist	X	Wet		Snow		Frozen
Wind:		Calm	X	Light		Moderate		Strong		
Cloud cover:		None		Slight		Cloudy	X	Overcast		
Precipitation:	X	None		Slight		Moderate		Heavy		
Time monitoring performed:			11:00	Start			14:30	End		
Barometric pressure (mbar):			1008	Start			1005	End		
Pressure trend (Daily):			X	Falling		Steady		Rising		
Source:	https://www.timeanddate.com/weather/uk/barnsley/historic									
Air Temperature (Deg. C):			7	Before			8	After		

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter: GMF430 (BM36)
Gas Range: **CH_4** 0 - 100% **CO_2** 0 - 100% **O_2** 0 - 25%
Gas Flow range: +100/-50 l/hour
Differential Pressure: (+/-) 1000 Pa
Date of last external calibration: 13/05/2024 **Date of last in-house calibration:** 10/04/2024
Date of next external calibration: 13/05/2025

Ambient air check: **CH_4** ND **CO_2** ND **O_2** 20.3

PID: LE76
Calibrated range: 5
Calibration gas: Benzene C6H6
Response time: 2 seconds
Accuracy: (+/-) 3% displayed reading
Date of last external calibration: 10/07/2024 **Date of last in-house calibration:** 10/04/2024
Date of next external calibration: 10/07/2025

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Network Space
Site: Shaw Lane, Carlton
Date: 20/12/2024
Job No: C10271
Visit No: 4 **of** 6
Operator: RT **Project Manager:** AEC

Monitoring Point	GAS CONCENTRATIONS												VOLATILES		FLOW DATA				Qhg per borehole		WELL AND WATER DATA					Comments
	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Methane (l/hr)	CO2 (l/hr)	Water level (mbgl)	Depth of well (m)	Top of BH (mAOD)	Water level (mAOD)	Response Zone	
	Peak	Steady	Peak	Steady	Peak	**Steady**	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady										
WS102	**ND**	ND	ND	ND	ND	**ND**	2	1	1	ND	19.6	19.6	ND	NR	ND	ND	ND	NR	0.0001	0.0001	0.49	2.11	45.30	44.81	1-2m	
WS104	**ND**	ND	ND	ND	ND	**ND**	2	1	2	1	18.2	18.2	ND	NR	ND	ND	ND	NR	0.0001	0.0001	0.80	2.10	42.30	41.50	1-2m	
WS105	**ND**	ND	ND	ND	0.6	**0.5**	9	5	1	ND	19.3	19.3	ND	NR	ND	ND	ND	NR	0.0001	0.0005	0.67	3.07	45.90	45.23	1-3m	
WS107	**ND**	ND	ND	ND	2.1	**2.1**	5	2	2	1	17.7	17.7	ND	NR	ND	ND	ND	NR	0.0001	0.0021	0.88	3.12	46.60	45.72	1-3m	
WS108	**ND**	ND	ND	ND	ND	**ND**	2	1	1	ND	17.8	17.8	ND	NR	ND	ND	ND	NR	0.0001	0.0001	1.64	4.08	46.30	44.66	1-4m	
WS110	**ND**	ND	ND	ND	ND	**ND**	5	2	1	ND	18.1	18.1	ND	NR	0.1	ND	ND	1	0.0001	0.0001	0.49	2.09	46.50	46.01	1-2m	
WS111	**ND**	ND	ND	ND	0.9	**0.9**	4	1	2	1	16.8	16.8	ND	NR	0.7	0.7	3.0	20	0.0007	0.0063	0.56	3.76	46.40	45.84	1-3m	
WS113	**ND**	ND	ND	ND	3.4	**3.4**	2	1	1	ND	16.9	16.9	ND	NR	0.1	ND	ND	5	0.0001	0.0034	0.91	3.95	46.40	45.49	1-4m	
DS01	**ND**	ND	ND	ND	2.6	**2.6**	2	1	1	ND	13.1	13.1	ND	NR	ND	ND	ND	NR	0.0001	0.0026	1.03	3.01	45.50	44.47	1-3m	
DS02	**ND**	ND	ND	ND	ND	**ND**	4	2	1	ND	19.8	19.8	ND	NR	ND	ND	ND	NR	0.0001	0.0001	1.02	2.93	43.20	42.18	1-3m	
DS03	**ND**	ND	ND	ND	ND	**ND**	2	1	1	ND	18.6	18.6	ND	NR	ND	ND	ND	NR	0.0001	0.0001	1.74	2.95	46.80	45.06	1-3m	
DS04	**ND**	ND	ND	ND	1.7	**1.7**	2	1	1	ND	18.1	18.1	ND	NR	ND	ND	ND	NR	0.0001	0.0017	0.74	2.97	45.90	45.16	1-3m	
DS05	**ND**	ND	ND	ND	ND	**ND**	2	1	1	ND	18.6	18.6	ND	NR	0.1	ND	ND	10	0.0001	0.0001	0.00	2.54	46.50	46.50	1-2.5m	
Max	**ND**	**ND**	**ND**	**ND**	**3.4**	**3.4**	**9**	**5**	**2**	**1**	**19.8**	**19.8**	**ND**	**NR**	**0.7**	**0.7**	**3.0**	**20**	**0.0007**	**0.0063**	**1.74**			**46.50**		
Min	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**2**	**1**	**1**	**ND**	**13.1**	**13.1**	**ND**	**NR**	**ND**	**ND**	**ND**	**NR**	**0.0001**	**0.0001**	**0.00**			**41.50**		

ND - Not detected

NR - Not recorded

NB: Where no flow (ND) recorded, Qhg values are calculated using equiment limit of detection (0.1l/hr). Where negative flows recorded, these are converted to positive values for calculation of Qhg.

METEOROLOGICAL AND SITE INFORMATION: (Select correct box with X or enter data, as applicable)

State of ground:		Dry		Moist	X	Wet		Snow		Frozen
Wind:		Calm		Light	X	Moderate		Strong	
Cloud cover:		None		Slight		Cloudy	X	Overcast	
Precipitation:	X	None		Slight		Moderate		Heavy	
Time monitoring performed:			09:00	Start			12:00	End	
Barometric pressure (mbar):			1006	Start			1005	End	
Pressure trend (Daily):			X	Falling		Steady		Rising	
Source:	https://www.timeanddate.com/weather/uk/barnsley/historic								
Air Temperature (Deg. C):			6	Before			7	After	

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter: GMF430 (BM36)
Gas Range: **CH_4** 0 - 100% **CO_2** 0 - 100% **O_2** 0 - 25%
Gas Flow range: +100/-50 l/hour
Differential Pressure: (+/-) 1000Pa
Date of last external calibration: 13/05/2024 **Date of last in-house calibration:** 10/04/2024
Date of next external calibration: 13/05/2025

Ambient air check: **CH_4** ND **CO_2** ND **O_2** 20.3

PID: LE76
Calibrated range: 5
Calibration gas: Benzene C6H6
Response time: 2 Seconds
Accuracy: (+/-) 3% displayed reading
Date of last external calibration: 10/07/2024 **Date of last in-house calibration:** 10/04/2024
Date of next external calibration: 10/07/2025

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Network Space
Site: Shaw Lane, Carlton
Date: 08/01/2025

Job No: C10271
Visit No: 5A **of** 6
Operator: RT **Project Manager:** AEC

Monitoring Point	GAS CONCENTRATIONS												VOLATILES		FLOW DATA				Qhg per borehole		WELL AND WATER DATA					Comments
	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Methane (l/hr)	CO2 (l/hr)	Water level (mbgl)	Depth of well (m)	Top of BH (mAOD)	Water level (mAOD)	Response Zone	
	Peak	Steady	Peak	Steady	Peak	**Steady**	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady										
WS102	**NR**	NR	NR	NR	NR	**NR**	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	0.00	2.11	45.30	45.30	1-2m	Borehole flooded - unable to monitor
WS104	**ND**	ND	ND	ND	ND	**ND**	2	1	2	1	19.5	19.5	ND	NR	0.5	0.5	1.0	5	0.0005	0.0005	0.90	2.10	42.30	41.40	1-2m	
WS105	**ND**	ND	ND	ND	ND	**ND**	5	2	2	1	19.9	19.9	ND	NR	ND	ND	ND	NR	0.0001	0.0001	0.68	3.07	45.90	45.22	1-3m	
WS107	**ND**	ND	ND	ND	1.8	**ND**	4	2	1	ND	18.8	18.9	ND	NR	28.2	2.7	12.0	90	0.0282	0.0027	0.70	3.12	46.60	45.90	1-3m	
WS108	**ND**	ND	ND	ND	ND	**ND**	3	1	1	ND	19.6	19.6	ND	NR	0.4	0.4	1.0	10	0.0004	0.0004	1.28	4.08	46.30	45.02	1-4m	
WS110	**ND**	ND	ND	ND	ND	**ND**	2	1	1	ND	19.6	19.6	ND	NR	0.3	0.3	1.0	5	0.0003	0.0003	0.00	2.09	46.50	46.50	1-2m	
WS111	**ND**	ND	ND	ND	ND	**ND**	4	2	1	ND	19.6	19.6	ND	NR	-18.2	-3.4	-21.0	100	0.0182	0.0034	0.00	3.76	46.40	46.40	1-3m	Monitored pre-purging groundwater
WS113	**ND**	ND	ND	ND	ND	**ND**	4	1	4	1	19.4	19.4	ND	NR	ND	ND	ND	NR	0.0001	0.0001	0.00	3.95	46.40	46.40	1-4m	
DS01	**ND**	ND	ND	ND	1.4	**1.3**	4	2	1	ND	17.7	17.7	ND	NR	ND	ND	ND	NR	0.0001	0.0013	0.98	3.01	45.50	44.52	1-3m	
DS02	**ND**	ND	ND	ND	ND	**ND**	2	1	1	ND	19.5	19.5	ND	NR	0.6	0.5	2.0	30	0.0006	0.0005	1.00	2.93	43.20	42.20	1-3m	
DS03	**ND**	ND	ND	ND	ND	**ND**	2	1	3	1	19.5	19.5	ND	NR	0.5	0.4	1.0	5	0.0005	0.0004	0.28	2.95	46.80	46.52	1-3m	
DS04	**ND**	ND	ND	ND	ND	**ND**	2	1	2	1	19.5	19.6	ND	NR	0.6	0.5	1.0	10	0.0006	0.0005	0.36	2.97	45.90	45.54	1-3m	
DS05	**ND**	ND	ND	ND	ND	**ND**	2	1	1	ND	19.6	19.6	ND	NR	0.3	0.3	1.0	2	0.0003	0.0003	0.00	2.54	46.50	46.50	1-2.5m	
Max	**ND**	**ND**	**ND**	**ND**	**1.8**	**1.3**	**5**	**2**	**4**	**1**	**19.9**	**19.9**	**ND**	**NR**	**28.2**	**2.7**	**12.0**	**100**	**0.0282**	**0.0034**	**1.28**			**46.52**		
Min	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**2**	**1**	**1**	**ND**	**17.7**	**17.7**	**ND**	**NR**	**ND**	**-3.4**	**ND**	**NR**	**0.0001**	**0.0001**	**0.00**			**41.40**		

ND - Not detected
NR - Not recorded

NB: Where no flow (ND) recorded, Qhg values are calculated using equiment limit of detection (0.1l/hr). Where negative flows recorded, these are converted to positive values for calculation of Qhg.

METEOROLOGICAL AND SITE INFORMATION: (Select correct box with X or enter data, as applicable)

State of ground:		Dry		Moist	X	Wet	X	Snow	X	Frozen
Wind:	X	Calm		Light		Moderate		Strong		
Cloud cover:		None	X	Slight		Cloudy		Overcast		
Precipitation:	X	None		Slight		Moderate		Heavy		
Time monitoring performed:			11:00	Start			16:00	End		
Barometric pressure (mbar):			993	Start			993	End		
Pressure trend (Daily):				Falling	X	Steady		Rising		
Source:	https://www.timeanddate.com/weather/uk/barnsley/historic									
Air Temperature (Deg. C):			-2	Before			0	After		

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter: GMF430 (BM36)
Gas Range: **CH_4** 0 - 100% **CO_2** 0 - 100% **O_2** 0 - 25%
Gas Flow range: +100/-50 l/hour
Differential Pressure: (+/-) 1000Pa
Date of last external calibration: 13/05/2024 **Date of last in-house calibration:** 10/04/2024
Date of next external calibration: 13/05/2025

Ambient air check: **CH_4** ND **CO_2** ND **O_2** 20.3

PID: LE76
Calibrated range: 5
Calibration gas: Benzene C6H6
Response time: 2 Seconds
Accuracy: (+/-) 3% displayed reading
Date of last external calibration: 10/07/2024 **Date of last in-house calibration:** 10/04/2024
Date of next external calibration: 10/07/2025

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Network Space
Site: Shaw Lane, Carlton
Date: 08/01/2025
Job No: C10271
Visit No: 5B **of** 6
Operator: RT **Project Manager:** AEC

Monitoring Point	GAS CONCENTRATIONS												VOLATILES		FLOW DATA				Qhg per borehole		WELL AND WATER DATA					Comments
	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Methane (l/hr)	CO2 (l/hr)	Water level (mbgl)	Depth of well (m)	Top of BH (mAOD)	Water level (mAOD)	Response Zone	
	Peak	Steady	Peak	Steady	Peak	**Steady**	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady										
WS102	**ND**	ND	ND	ND	ND	**ND**	4	2	3	1	19.5	19.5	ND	NR	0.5	0.4	1.0	5	0.0005	0.0004	2.08	2.11	45.30	43.22	1-2m	Monitored post purging
WS104	**ND**	ND	ND	ND	ND	**ND**	3	2	2	1	19.5	19.5	ND	NR	0.4	0.4	1.0	5	0.0004	0.0004	2.00	2.10	42.30	40.30	1-2m	Monitored post purging
WS105	**ND**	ND	ND	ND	ND	**ND**	4	2	1	ND	19.9	19.9	ND	NR	ND	ND	ND	NR	0.0001	0.0001	2.83	3.07	45.90	43.07	1-3m	Monitored post purging
WS107	**ND**	ND	ND	ND	ND	**ND**	3	1	1	ND	19.7	19.7	ND	NR	0.6	0.5	1.0	10	0.0006	0.0005	2.47	3.12	46.60	44.13	1-3m	Monitored post purging
WS108	**ND**	ND	ND	ND	ND	**ND**	3	2	1	ND	19.6	19.6	ND	NR	0.5	0.4	1.0	10	0.0005	0.0004	3.88	4.08	46.30	42.42	1-4m	Monitored post purging
WS110	**ND**	ND	ND	ND	ND	**ND**	2	1	2	1	19.5	19.5	ND	NR	0.4	0.4	1.0	5	0.0004	0.0004	1.82	2.09	46.50	44.68	1-2m	Monitored post purging
WS111	**ND**	ND	ND	ND	ND	**ND**	2	1	1	ND	19.6	19.6	ND	NR	0.3	0.3	1.0	10	0.0003	0.0003	0.85	3.76	46.40	45.55	1-3m	Monitored post purging - rapid recharge
WS113	**ND**	ND	ND	ND	ND	**ND**	4	1	1	ND	19.7	19.7	ND	NR	0.6	0.3	1.0	5	0.0006	0.0003	3.89	3.95	46.40	42.51	1-4m	Monitored post purging
DS01	**ND**	ND	ND	ND	ND	**ND**	4	2	1	ND	20.0	20.0	ND	NR	1.0	1.0	4.0	2	0.0010	0.0010	2.36	3.01	45.50	43.14	1-3m	Monitored post purging
DS02	**ND**	ND	ND	ND	ND	**ND**	4	1	1	ND	19.5	19.5	ND	NR	0.5	0.4	1.0	10	0.0005	0.0004	2.68	2.93	43.20	40.52	1-3m	Monitored post purging
DS03	**ND**	ND	ND	ND	ND	**ND**	4	2	1	ND	19.5	19.5	ND	NR	0.4	0.4	1.0	2	0.0004	0.0004	2.75	2.95	46.80	44.05	1-3m	Monitored post purging
DS04	**ND**	ND	ND	ND	ND	**ND**	2	1	2	1	19.5	19.5	ND	NR	0.5	0.4	1.0	10	0.0005	0.0004	0.54	2.97	45.90	45.36	1-3m	Monitored post purging - rapid recharge
DS05	**ND**	ND	ND	ND	ND	**ND**	4	2	2	1	19.6	19.6	ND	NR	0.3	0.3	ND	1	0.0003	0.0003	2.34	2.54	46.50	44.16	1-2.5m	Monitored post purging
Max	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**4**	**2**	**3**	**1**	**20.0**	**20.0**	**ND**	**NR**	**1.0**	**1.0**	**4.0**	**10**	**0.0010**	**0.0010**	**3.89**			**45.55**		
Min	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**2**	**1**	**1**	**ND**	**19.5**	**19.5**	**ND**	**NR**	**ND**	**ND**	**ND**	**NR**	**0.0001**	**0.0001**	**0.54**			**40.30**		

ND - Not detected

NR - Not recorded

NB: Where no flow (ND) recorded, Qhg values are calculated using equiment limit of detection (0.1l/hr). Where negative flows recorded, these are converted to positive values for calculation of Qhg.

METEOROLOGICAL AND SITE INFORMATION: (Select correct box with X or enter data, as applicable)

State of ground:		Dry		Moist	X	Wet	X	Snow	X	Frozen
Wind:	X	Calm		Light		Moderate		Strong		
Cloud cover:		None	X	Slight		Cloudy		Overcast		
Precipitation:	X	None		Slight		Moderate		Heavy		
Time monitoring performed:			11:00	Start			16:00	End		
Barometric pressure (mbar):			993	Start			993	End		
Pressure trend (Daily):				Falling	X	Steady		Rising		
Source:	https://www.timeanddate.com/weather/uk/barnsley/historic									
Air Temperature (Deg. C):			-2	Before			0	After		

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter: GMF430 (BM36)
Gas Range: **CH_4** 0 - 100% **CO_2** 0 - 100% **O_2** 0 - 25%
Gas Flow range: +100/-50 l/hour
Differential Pressure: (+/-) 1000 Pa
Date of last external calibration: 13/05/2024 **Date of last in-house calibration:** 10/04/2024
Date of next external calibration: 13/05/2025

Ambient air check: **CH_4** ND **CO_2** ND **O_2** 20.3

PID: LE76
Calibrated range: 5
Calibration gas: Benzene C6H6
Response time: 2 Seconds
Accuracy: (+/-) 3% displayed reading
Date of last external calibration: 10/07/2024 **Date of last in-house calibration:** 10/04/2024
Date of next external calibration: 10/07/2025

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Network Space
Site: Shaw Lane, Carlton
Date: 16/01/2025
Job No: C10271
Visit No: 6A **of** 6
Operator: RT
Project Manager: AEC

Monitoring Point	GAS CONCENTRATIONS												VOLATILES		FLOW DATA				Qhg per borehole		WELL AND WATER DATA					Comments
	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Methane (l/hr)	CO2 (l/hr)	Water level (mbgl)	Depth of well (m)	Top of BH (mAOD)	Water level (mAOD)	Response Zone	
	Peak	Steady	Peak	Steady	Peak	**Steady**	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady										
WS102	**ND**	ND	ND	ND	ND	**ND**	3	2	2	1	19.6	19.6	ND	NR	0.2	0.2	ND	5	0.0002	0.0002	1.00	2.11	45.30	44.30	1-2m	
WS104	**ND**	ND	ND	ND	ND	**ND**	2	1	1	ND	19.3	19.3	ND	NR	0.2	0.2	ND	2	0.0002	0.0002	0.98	2.10	42.30	41.32	1-2m	
WS105	**ND**	ND	ND	ND	ND	**ND**	2	1	1	ND	19.8	20.0	ND	NR	ND	ND	ND	NR	0.0001	0.0001	0.78	3.07	45.90	45.12	1-3m	
WS107	**ND**	ND	ND	ND	1.9	**1.9**	4	2	1	ND	18.7	18.7	ND	NR	0.3	0.1	ND	5	0.0003	0.0019	1.00	3.12	46.60	45.60	1-3m	
WS108	**ND**	ND	ND	ND	ND	**ND**	2	1	1	ND	19.8	19.8	ND	NR	ND	ND	ND	NR	0.0001	0.0001	1.77	4.08	46.30	44.53	1-4m	
WS110	**ND**	ND	ND	ND	ND	**ND**	2	1	1	ND	19.7	19.7	ND	NR	ND	ND	ND	NR	0.0001	0.0001	0.10	2.09	46.50	46.40	1-2m	
WS111	**ND**	ND	ND	ND	ND	**ND**	2	1	1	ND	19.6	19.6	ND	NR	ND	ND	ND	NR	0.0001	0.0001	0.15	3.76	46.40	46.25	1-3m	
WS113	**ND**	ND	ND	ND	0.2	**ND**	2	1	2	1	19.7	19.7	ND	NR	ND	ND	ND	NR	0.0001	0.0001	0.77	3.95	46.40	45.63	1-4m	
DS01	**ND**	ND	ND	ND	ND	**ND**	2	1	1	ND	19.7	19.7	ND	NR	ND	ND	ND	NR	0.0001	0.0001	1.15	3.01	45.50	44.35	1-3m	
DS02	**ND**	ND	ND	ND	ND	**ND**	2	1	1	ND	19.6	19.6	ND	NR	0.3	0.2	ND	5	0.0003	0.0002	1.14	2.93	43.20	42.06	1-3m	
DS03	**ND**	ND	ND	ND	ND	**ND**	3	1	1	ND	19.7	19.7	ND	NR	0.2	0.1	ND	4	0.0002	0.0001	1.76	2.95	46.80	45.04	1-3m	
DS04	**ND**	ND	ND	ND	ND	**ND**	2	1	1	ND	19.6	19.6	ND	NR	0.1	ND	ND	5	0.0001	0.0001	0.77	2.97	45.90	45.13	1-3m	
DS05	**ND**	ND	ND	ND	ND	**ND**	2	1	1	ND	19.7	19.7	ND	NR	ND	ND	ND	NR	0.0001	0.0001	0.00	2.54	46.50	46.50	1-2.5m	
Max	**ND**	**ND**	**ND**	**ND**	**1.9**	**1.9**	**4**	**2**	**2**	**1**	**19.8**	**20.0**	**ND**	**NR**	**0.3**	**0.2**	**ND**	**5**	**0.0003**	**0.0019**	**1.77**			**46.50**		
Min	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**2**	**1**	**1**	**ND**	**18.7**	**18.7**	**ND**	**NR**	**ND**	**ND**	**ND**	**NR**	**0.0001**	**0.0001**	**0.00**			**41.32**		

ND - Not detected

NR - Not recorded

NB: Where no flow (ND) recorded, Qhg values are calculated using equiment limit of detection (0.1l/hr). Where negative flows recorded, these are converted to positive values for calculation of Qhg.

METEOROLOGICAL AND SITE INFORMATION: (Select correct box with X or enter data, as applicable)

State of ground:		Dry		Moist	X	Wet		Snow	X	Frozen
Wind:		Calm	X	Light		Moderate		Strong		
Cloud cover:	X	None		Slight		Cloudy		Overcast		
Precipitation:	X	None		Slight		Moderate		Heavy		
Time monitoring performed:			10:00	Start			15:00	End		
Barometric pressure (mbar):			1024	Start			1023	End		
Pressure trend (Daily):			X	Falling		Steady		Rising		
Source:	https://www.timeanddate.com/weather/uk/barnsley/historic									
Air Temperature (Deg. C):			2	Before			8	After		

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter: GMF430 (BM36)
Gas Range: **CH_4** 0 - 100% **CO_2** 0 - 100% **O_2** 0 - 25%
Gas Flow range: +100/-50 l/hour
Differential Pressure: (+/-) 1000 Pa
Date of last external calibration: 13/05/2024 **Date of last in-house calibration:** 10/04/2024
Date of next external calibration: 13/05/2025

Ambient air check: **CH_4** ND **CO_2** ND **O_2** 19.8

PID: LE76
Calibrated range: 5
Calibration gas: Benzene C6H6
Response time: 2 Seconds
Accuracy: (+/-) 3% displayed reading
Date of last external calibration: 10/07/2024 **Date of last in-house calibration:** 10/04/2024
Date of next external calibration: 10/07/2025

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Network Space
Site: Shaw Lane, Carlton
Date: 16/01/2025
Job No: C10271
Visit No: 6B **of** 6
Operator: RT
Project Manager: AEC

Monitoring Point	GAS CONCENTRATIONS												VOLATILES		FLOW DATA				Qhg per borehole		WELL AND WATER DATA					Comments
	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Methane (l/hr)	CO2 (l/hr)	Water level (mbgl)	Depth of well (m)	Top of BH (mAOD)	Water level (mAOD)	Response Zone	
	Peak	Steady	Peak	Steady	Peak	**Steady**	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady										
WS102	**ND**	ND	ND	ND	ND	**ND**	2	1	1	ND	19.6	19.7	ND	NR	0.1	0.1	ND	1	0.0001	0.0001	2.03	2.11	45.30	43.27	1-2m	
WS104	**ND**	ND	ND	ND	ND	**ND**	2	1	1	ND	19.5	19.5	ND	NR	0.2	0.2	ND	2	0.0002	0.0002	1.98	2.10	42.30	40.32	1-2m	
WS105	**ND**	ND	ND	ND	ND	**ND**	2	1	1	ND	19.9	19.9	ND	NR	ND	ND	ND	NR	0.0001	0.0001	2.85	3.07	45.90	43.05	1-3m	
WS107	**ND**	ND	ND	ND	1.8	**1.6**	2	1	1	ND	18.8	18.8	ND	NR	ND	ND	ND	NR	0.0001	0.0016	2.46	3.12	46.60	44.14	1-3m	
WS108	**ND**	ND	ND	ND	ND	**ND**	2	1	1	ND	19.5	19.5	ND	NR	ND	ND	ND	NR	0.0001	0.0001	3.79	4.08	46.30	42.51	1-4m	
WS110	**ND**	ND	ND	ND	ND	**ND**	2	2	1	ND	19.8	19.8	ND	NR	ND	ND	ND	NR	0.0001	0.0001	1.87	2.09	46.50	44.63	1-2m	
WS111	**ND**	ND	ND	ND	ND	**ND**	5	2	2	1	19.6	19.6	ND	NR	ND	ND	ND	NR	0.0001	0.0001	0.98	3.76	46.40	45.42	1-3m	
WS113	**ND**	ND	ND	ND	ND	**ND**	3	2	2	1	19.6	19.6	ND	NR	ND	ND	ND	NR	0.0001	0.0001	3.64	3.95	46.40	42.76	1-4m	
DS01	**ND**	ND	ND	ND	ND	**ND**	3	1	1	ND	19.4	19.4	ND	NR	ND	ND	ND	NR	0.0001	0.0001	2.75	3.01	45.50	42.75	1-3m	
DS02	**ND**	ND	ND	ND	ND	**ND**	2	1	1	1	19.0	19.0	ND	NR	0.3	0.2	ND	5	0.0003	0.0002	2.84	2.93	43.20	40.36	1-3m	
DS03	**ND**	ND	ND	ND	ND	**ND**	2	1	2	ND	19.7	19.7	ND	NR	ND	ND	ND	NR	0.0001	0.0001	2.35	2.95	46.80	44.45	1-3m	
DS04	**ND**	ND	ND	ND	ND	**ND**	2	1	1	ND	19.7	19.7	ND	NR	ND	ND	ND	NR	0.0001	0.0001	2.16	2.97	45.90	43.74	1-3m	
DS05	**ND**	ND	ND	ND	ND	**ND**	2	1	1	ND	19.8	19.8	ND	NR	ND	ND	ND	NR	0.0001	0.0001	2.25	2.54	46.50	44.25	1-2.5m	
Max	**ND**	**ND**	**ND**	**ND**	**1.8**	**1.6**	**5**	**2**	**2**	**1**	**19.9**	**19.9**	**ND**	**NR**	**0.3**	**0.2**	**ND**	**5**	**0.0003**	**0.0016**	**3.79**			**45.42**		
Min	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**2**	**1**	**1**	**ND**	**18.8**	**18.8**	**ND**	**NR**	**ND**	**ND**	**ND**	**NR**	**0.0001**	**0.0001**	**0.98**			**40.32**		

ND - Not detected

NR - Not recorded

NB: Where no flow (ND) recorded, Qhg values are calculated using equiment limit of detection (0.1l/hr). Where negative flows recorded, these are converted to positive values for calculation of Qhg.

METEOROLOGICAL AND SITE INFORMATION: (Select correct box with X or enter data, as applicable)

State of ground:		Dry		Moist	X	Wet		Snow	X	Frozen
Wind:		Calm	X	Light		Moderate		Strong		
Cloud cover:	X	None		Slight		Cloudy		Overcast		
Precipitation:	X	None		Slight		Moderate		Heavy		
Time monitoring performed:			10:00	Start			15:00	End		
Barometric pressure (mbar):			1024	Start			1023	End		
Pressure trend (Daily):			X	Falling		Steady		Rising		
Source:	https://www.timeanddate.com/weather/uk/barnsley/historic									
Air Temperature (Deg. C):			2	Before			8	After		

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter: GMF430 (BM36)
Gas Range: **CH_4** 0 - 100% **CO_2** 0 - 100% **O_2** 0 - 25%
Gas Flow range: +100/-50 l/hour
Differential Pressure: (+/-) 1000 Pa
Date of last external calibration: 13/05/2024 **Date of last in-house calibration:** 10/04/2024
Date of next external calibration: 13/05/2025

Ambient air check: **CH_4** ND **CO_2** ND **O_2** 19.8

PID: LE76
Calibrated range: 5
Calibration gas: Benzene C6H6
Response time: 2 Seconds
Accuracy: (+/-) 3% displayed reading
Date of last external calibration: 10/07/2024 **Date of last in-house calibration:** 10/04/2024
Date of next external calibration: 10/07/2025

Summary of all gas monitoring events

JOB DETAILS:

Client: Network Space
Site: Shaw Lane, Carlton
Start Date: 07/11/2024
End Date: 16/01/2025

Job No: C10271
No. events: 6

Monitoring Point	GAS CONCENTRATIONS												PID	FLOW DATA						Max. Qhg Recorded		Worst-credible Qhg		Comments
	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		Peak (ppm)	Peak flow rate (l/hr)		Steady flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Methane (l/hr)	CO2 (l/hr)	Methane (l/hr)	CO2 (l/hr)	
	Peak	Steady	Peak	Steady	Peak	**Steady**	Peak	Steady	Peak	Steady	Min.	Steady		Max.	Min.	Max.	Min.						
WS102	**ND**	ND	ND	ND	0.2	**0.2**	4	2	3	1	18.6	18.6	ND	14.5	ND	0.4	ND	1.0	150	0.0145	0.0004	0.0145	0.0008	
WS104	**ND**	ND	ND	ND	ND	**ND**	3	2	4	1	18.2	18.2	ND	0.5	ND	0.5	ND	1.0	20	0.0005	0.0005	0.0005	0.0005	
WS105	**ND**	ND	ND	ND	1.2	**1.1**	9	5	2	1	19.1	19.1	ND	0.3	-17.5	0.2	ND	ND	90	0.0175	0.0022	0.0175	0.0022	
WS107	**ND**	ND	ND	ND	4.1	**4.1**	8	7	5	1	16.0	16.0	ND	65.2	ND	3.4	ND	20.0	180	0.0652	0.0748	0.0652	0.1394	
WS108	**ND**	ND	ND	ND	0.1	**0.1**	3	2	1	ND	14.2	14.2	ND	0.5	ND	0.4	ND	1.0	10	0.0005	0.0004	0.0005	0.0004	
WS110	**ND**	ND	ND	ND	ND	**ND**	5	2	2	1	18.1	18.1	ND	0.4	ND	0.4	ND	1.0	40	0.0004	0.0004	0.0004	0.0004	
WS111	**ND**	ND	ND	ND	1.6	**1.6**	5	2	2	1	6.9	6.9	ND	0.7	-18.2	0.7	-3.4	3.0	100	0.0182	0.0063	0.0182	0.0544	
WS113	**ND**	ND	ND	ND	3.4	**3.4**	4	2	4	1	16.8	16.8	ND	1.0	ND	0.3	ND	1.0	5	0.0010	0.0034	0.0010	0.0102	
DS01	**ND**	ND	ND	ND	4.0	**4.0**	4	2	1	ND	10.7	10.7	ND	1.0	-7.6	1.0	ND	4.0	70	0.0076	0.0040	0.0076	0.0400	
DS02	**ND**	ND	ND	ND	0.8	**0.8**	4	2	2	1	12.2	12.2	ND	0.6	ND	0.5	ND	2.0	120	0.0006	0.0008	0.0006	0.0040	
DS03	**ND**	ND	ND	ND	1.5	**1.5**	4	2	3	1	13.3	13.3	ND	0.5	ND	0.4	ND	1.0	30	0.0005	0.0039	0.0005	0.0060	
DS04	**ND**	ND	ND	ND	1.7	**1.7**	4	1	2	1	16.2	16.2	ND	0.6	ND	0.5	ND	1.0	20	0.0006	0.0017	0.0006	0.0085	
DS05	**ND**	ND	ND	ND	0.8	**0.7**	4	2	4	1	17.4	17.4	ND	0.3	ND	0.3	ND	1.0	40	0.0003	0.0007	0.0003	0.0021	
Max	**ND**	**ND**	**ND**	**ND**	**4.1**	**4.1**	**9**	**7**	**5**	**1**	**19.1**	**19.1**	**ND**	**65.2**	**-7.6**	**3.4**	**-3.4**	**20.0**	**180**	**0.0652**	**0.0748**	**0.0652**	**0.1394**	
Min	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**3**	**1**	**1**	**ND**	**6.9**	**6.9**	**ND**	**0.3**	**-18.2**	**0.2**	**-3.4**	**ND**	**5**	**0.0003**	**0.0004**	**0.0003**	**0.0004**	
																						Worst-possible Qhg		
																						0.0652	**0.1394**	

ND - Not detected
NR - Not recorded

Qhg calculated for methane on the basis of peak flow and concentration (short-term explosive risk).
Qhg calculated for carbon dioxide on the basis of steady flow and concentration (risk of long-term accumulation of suffocating mixture).
For calculation purposes, it is assumed that negative flows could be realised as positive flows.
Max. Qhg recorded is the highest Qhg determined in any individual monitoring event.
Worst-credible Qhg is the value calculated from the highest concentration and flow recorded in any monitoring event for an individual borehole.
Worst-possible Qhg is the value calculated from the highest concentration and flow recorded in any monitoring event for any borehole.

Summary of Groundwater Data

JOB DETAILS:

Client: Network Space
Site: Shaw Lane, Carlton
Start Date: 07/11/2024
End Date: 16/01/2025

Job No: C10271
No. events: 6

Monitoring Point	Product thickness (mm)	Water level (mbgl)		Water level (mAOD)		Water level range (m)	Response zone
	Max.	Max.	Min.	Max.	Min.		
WS102	ND	2.08	0.00	45.30	43.22	2.08	1-2m
WS104	ND	2.00	0.00	42.30	40.30	2.00	1-2m
WS105	ND	2.85	0.67	45.90	43.05	2.18	1-3m
WS107	ND	2.47	0.70	46.60	44.13	1.77	1-3m
WS108	ND	3.88	1.28	46.30	42.42	2.60	1-4m
WS110	ND	1.87	0.00	46.50	44.63	1.87	1-2m
WS111	ND	1.69	0.00	46.40	44.71	1.69	1-3m
WS113	ND	3.89	0.00	46.40	42.51	3.89	1-4m
DS01	ND	2.75	0.98	45.50	42.75	1.77	1-3m
DS02	ND	2.84	1.00	43.20	40.36	1.84	1-3m
DS03	ND	2.84	0.28	46.80	43.96	2.56	1-3m
DS04	ND	2.16	0.36	45.90	43.74	1.80	1-3m
DS05	ND	2.34	0.00	46.50	44.16	2.34	1-2.5m
Max.	**ND**	**3.89**	**1.28**	**46.80**	**44.71**	**3.89**	
Min.	**NR**	**NR**	**0**	**42.3**	**40.3**	**1.69**	

APPENDIX H
Sirius Generic Assessment Criteria

SIRIUS GENERIC ASSESSMENT CRITERIA

Context

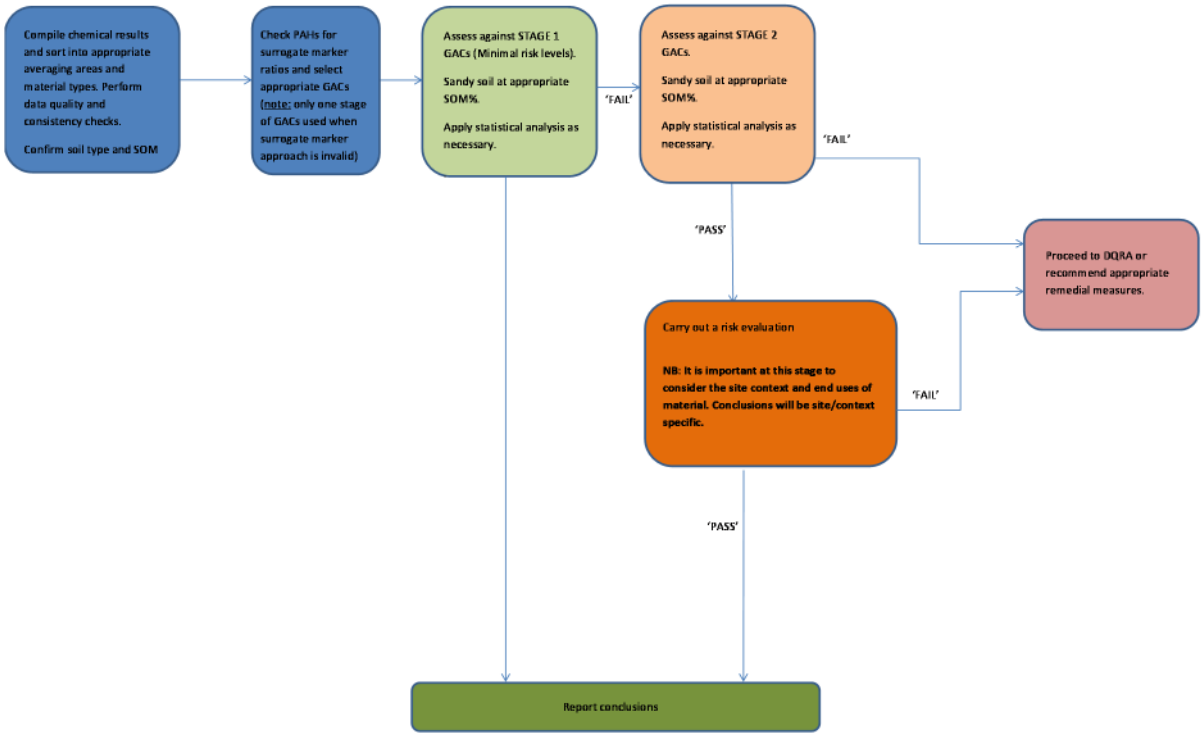
The framework for conducting site investigations, risk assessments and undertaking any necessary remedial works in the UK is provided by Environment Agency report CLR11 "Model Procedures for the Management of Contaminated Land". This presents a phased approach to risk assessment, involving: identification and qualitative assessment of potential pollutant linkages (source-pathway-receptor relationships) by means of a Conceptual Site Model; Generic Quantitative Risk Assessment (GQRA) of potentially significant pollutant links by comparing contaminant concentrations with appropriate Generic Assessment Criteria (GAC) values; and, if required, a Detailed Quantitative Risk Assessment (DQRA) based on site-specific conditions.

Assessment of Risk to Human Health

Introduction

A staged approach to GQRA has been adopted by Sirius for the evaluation of soil concentration data, as shown schematically in Figure 1.

Figure 1. GQRA Process.



The first stage of GQRA comprises assessment of the data against GAC values derived using toxicological parameter values based on "minimum risk". Any contaminants exceeding their GACs at this stage are further assessed against Stage 2 GACs, which have been derived using Low Level of Toxicological Concern (LLTC) criteria, where these are available.

With appropriate justification, a contaminant concentration that does not exceed the relevant Stage 2 GAC value may be considered to indicate that the land is "suitable for use". The appropriate use of LLTC-based criteria within the planning regime is considered reasonable by government agencies, as most recently highlighted in the letter (dated 3rd September 2014) to all local authorities from Lord de Mauley, Parliamentary Under Secretary at DEFRA.

A narrative "risk evaluation" must therefore accompany any Stage 2 assessment to justify the conclusions drawn. Where appropriate, this may provide a basis for eliminating from further consideration those contaminants whose concentrations do not exceed the applicable Stage 2 GAC value.

For the specific case of lead, the Category 4 Screening Level criteria given in CL:AIRE (2014)[1] have been adopted directly as GACs, as these are considered to be based on expert interpretation of current toxicological evidence.

In some areas, background concentrations of lead, other metals and metalloids, and/or individual PAHs may exceed their respective GACs and it may be appropriate to consider relative site and background concentration data as part of a more detailed assessment of the data.

Derivation of GACs

Except where otherwise stated, GACs have been derived by Sirius using CLEA version 1.071.

The GAC values have been derived for a sandy soil type, which will be conservative for the majority of soils (including made ground) encountered on historically contaminated sites. For organic contaminants of concern, criteria have been derived for a number of Soil Organic Matter (SOM) contents.

Genotoxic PAHs are assessed by the "Surrogate Method" using benzo(a)pyrene. Further information on this approach is given below.

Unless specifically stated, chemical properties and Health Criteria Values (HCVs) were obtained from:

- Environment Agency Science Report SC050021 series;
- Nathanail *et al*. (2009) "The LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment", 2nd edition, Land Quality Press, Nottingham;
- CL:AIRE - AGS - EIC (2010) "Soil Generic Assessment Criteria for Human Health Risk Assessment". CL:AIRE, London.

GACs for arsenic, benzene, benzo(a)pyrene, cadmium and chromium (VI) have been derived using the

[1] CL:AIRE (2014) "Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination", Report SP1010, rev. 2.

Low Level of Toxicological Concern (LLTC) criteria given in CL:AIRE (2013). These criteria are considered a reasonable basis for assessment as they are still highly precautionary and definitely do not approach an intake level that could be defined as approaching Significant Possibility of Significant Harm to human health in the context of Part 2A of the Environmental Protection Act 1990. It must be further understood that the GACs derived will still incorporate a residual level of conservatism resulting from the exposure parameters used and the assumptions inherent in the model algorithms.

GACs for Genotoxic PAHs

Our approach to the assessment of genotoxic PAHs retains the use of benzo(a)pyrene as a surrogate marker. This approach for genotoxic PAHs is recommended by the HPA (2010)[2], which we consider to be the authoritative current guidance produced by a UK expert body and note that it was retained in the DEFRA Category 4 Screening Levels project (CL:AIRE, 2014).

The surrogate marker approach allows the assessment of the combined carcinogenic risk associated with all genotoxic PAHs[3] present as a mixture within soil, even though detailed toxicological information for many of the individual compounds may be lacking. The approach is based on determining the risk posed by the genotoxic PAH mixture using the concentration of benzo(a)pyrene present as an indicator.

To use the GAC for benzo(a)pyrene as a surrogate marker, a number of requirements must be met (HPA, 2010):

- Benzo(a)pyrene must be present in all soil samples containing genotoxic PAHs for which this method of assessment is being used;
- A similar profile of the genotoxic PAHs relative to benzo(a)pyrene should be present in all of the samples being assessed;
- The PAH profile of PAHs in the soil samples should be similar to that present in the pivotal toxicity study on which toxicological criterion for benzo(a)pyrene was based (Culp et al., 1998[4]). Table 1 provides the basis for defining the acceptable range.

Data indicate that contaminated soils in the UK generally meet these criteria[5] but the assessor must review their dataset before adopting this approach. If the above criteria are not met, then the surrogate marker approach must not be adopted and individual GAC or SSAC values are to be applied.

[2] HPA (2010) "Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs)", version 5.

[3] The genotoxic PAHs included in the USEPA PAH 16 analysis reported by analytical labs are: benz[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[g,h,i]perylene, benzo(a)pyrene, chrysene, dibenz[a,h]anthracene and indeno[1,2,3-c,d]pyrene.

[4] Culp, S. *et al*. (1998) Carcinogenesis, 19, 117-124.

[5] Bull, S. & Collins, C. (2013) Environ. Geochem. Health, 31, 101-109.

Table 1. Profile of Genotoxic PAHs Relative to Benzo(a)pyrene that are Considered Acceptable for Application of Benzo(a)pyrene as a Surrogate Marker.

PAH	Acceptable Ratio of PAH Concentration to Benzo(a)pyrene for Application of Surrogate Marker Assessment	
	Lower Limit	Upper Limit
Benz[a]anthracene	0.12	12.43
Benzo[b]fluoranthene	0.11	10.85
Benzo[k]fluoranthene	0.04	3.72
Benzo[g,h,i]perylene	0.08	8.22
Chrysene	0.12	11.61
Dibenz[a,h]anthracene	0.01	1.38
Indeno[1,2,3-c,d]pyrene	0.07	7.27

For further information see: HPA (2010).

Soil Criteria Set for Purposes Other Than Human Health Protection

The Sirius GACs for sulphate, total organic carbon (TOC) and calorific value are set on basis of risks other than human health and their exceedance does not indicate a potential risk to future site users:

- The GAC for sulphate content is based on potential detrimental effects on buried concrete[6] and must be assessed with reference to the soil pH;
- The GAC for TOC content is provided for indicative assessment of disposal options if off-site landfill of soil were to be considered. This GAC is set at the 'Inert' waste threshold and should be considered as being applied for information purposes only;
- The GAC for calorific value is set to assist in an initial assessment of the potential fire risk posed by made ground or natural soils containing elevated concentrations of potentially combustible organic matter.

Assessment criteria more stringent than those for human health may be set for specific purposes, for example, elimination of nuisance odours or ensuring that potentially mobile free-phase organic products are not present.

Controlled Waters

The Environment Agency's "Remedial Targets Methodology" (2006) provides a framework for assessing the potential for pollution of controlled waters and for deriving remedial target concentrations in soil and groundwater.

There are no generic groundwater or surface water quality standards that are applicable to all sites. Drinking Water Standards and Environmental Quality Standards (EQS) are used by Sirius as assessment criteria where they are appropriate to the contaminant linkages under consideration. Given that these standards apply at the receptor point, this is a conservative approach for samples collected at a source or along a transport pathway.

[6] BRE (2005) "Concrete in Aggressive Ground", Special Digest No. 1; 3rd Edition.

Soil Leachability

Sirius specifies that the analytical laboratory undertakes leachate preparation by BS EN 12475-2:2002. Where specific circumstances require a different method to be used, then this will be explained and justified within the report body text.

The results of leachate analysis are compared to the relevant GAC values for controlled waters.

The Sirius Group
Stage 1 Generic Assessment Criteria for Soils

Revision: 24 January 2020

Parameter	Residential (mg/kg, unless otherwise stated)						Commercial / Industrial (mg/kg, unless otherwise stated)			Note
	With Homegrown Produce			Without Homegrown Produce						
	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	
Metals/Metalloids										
Arsenic (inorganic)	37			40			630			[1]
Cadmium	11			85			190			[2]
Chromium (III)	910			4000			8600			
Chromium (VI)	6.0			6.1			33			[3]
Copper	200			7100			68000			[4]
Lead	200			310			2300			[5]
Mercury (inorganic)	40			56			1100			[6]
Nickel	130			180			980			[7]
Selenium	250			430			12000			
Vanadium	410			1200			9000			
Zinc	450			40000			750000			[4]
Other Inorganics										
pH	<5 or >9			<5 or >9			<5 or >9			
Total Sulphate	2400			2400			2400			[8]
Water-Soluble Sulphate	0.5 g/l			0.5 g/l			0.5 g/l			[8]
Free Cyanide	34			34			1400			[9]
Organics										
PAHs										
Acenaphthene	200	490	920	2000	3600	4900	75000	92000	100000	
Acenaphthylene	170	400	760	2000	3600	4900	76000	93000	100000	
Anthracene	2300	5300	9400	30000	34000	36000	520000	540000	540000	[10]
Benzo(a)anthracene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Benzo(a)pyrene	2.1	2.1	2.2	2.3	2.3	2.3	27	27	27	[11]
Benzo(b)fluoranthene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Benzo(k)fluoranthene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Benzo(g,h,i)perylene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Chrysene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Dibenzo(a,h)anthracene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Fluoranthene	280	560	820	1500	1600	1600	23000	23000	23000	
Fluorene	170	390	730	2200	3400	4000	60000	67000	70000	
Indeno(1,2,3-c,d)pyrene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Naphthalene	1.0	2.3	4.6	1.0	2.4	4.7	110	260	510	
Phenanthrene	95	220	380	1300	1400	1500	22000	22000	23000	
Pyrene	620	1200	1900	3700	3800	3800	54000	54000	54000	
BTEX and related										
Benzene	0.063	0.13	0.24	0.16	0.30	0.38	15	28	49	
Toluene	100	240	460	370	830	1100	33000	68000	110000	
Ethylbenzene	26	62	120	34	81	110	3200	7400	14000	
Xylenes (total)	28	67	130	33	78	110	3200	7700	15000	[12]
1,2,4-trimethylbenzene	0.22	0.53	1.1	0.24	0.58	1.2	39	93	170	
Iso-propylbenzene	6.6	16	32	6.8	17	33	1300	3100	6100	
Propylbenzene	21	51	100	23	57	110	3800	9100	17000	
Styrene	6.9	16	32	21	49	93	3100	6100	9500	
TPH										
Aliphatic EC 5-6	24	41	68	24	41	68	2400	4100	6900	
Aliphatic EC >6-8	53	110	210	53	110	210	5300	11000	21000	
Aliphatic EC >8-10	13	31	61	13	31	61	1300	3100	6000	
Aliphatic EC >10-12	62	150	300	62	150	300	6100	15000	28000	
Aliphatic EC >12-16	510	1200	2300	510	1200	2300	43000	72000	85000	
Aliphatic EC >16-35	41000	70000	90000	42000	70000	90000	>1E6	>1E6	>1E6	[13]
Aromatic EC >5-7	53	110	200	150	300	538	15000	28000	48000	
Aromatic EC >7-8	100	240	460	370	820	1500	33000	68000	110000	
Aromatic EC >8-10	20	48	94	22	54	100	2200	5200	9800	
Aromatic EC >10-12	63	150	290	120	290	560	11000	22000	30000	
Aromatic EC >12-16	140	320	570	1100	1900	2200	35000	37000	37000	
Aromatic EC >16-21	260	540	840	1800	1900	1900	28000	28000	28000	
Aromatic EC >21-35	1100	1500	1700	1900	1900	1900	28000	28000	28000	
Chlorinated Organics										
Chlorobenzene	0.19	0.44	0.86	0.19	0.45	0.87	31	71	140	
Dichloromethane (DCM)	0.47	0.78	1.2	1.2	1.7	2.4	250	340	470	
1,1-dichloroethane (DCA)	1.4	2.4	4.0	1.4	2.4	4.1	260	420	690	
1,2-dichloroethane (DCA)	0.0031	0.0048	0.0076	0.0035	0.0053	0.0084	0.34	0.51	0.81	
1,1-dichloroethene (DCE)	0.15	0.26	0.45	0.15	0.26	0.46	24	43	74	
cis-1,2-dichloroethene (DCE)	0.066	0.12	0.20	0.069	0.12	0.21	14	23	38	
trans-1,2-dichloroethene (DCE)	0.11	0.21	0.38	0.12	0.22	0.39	21	37	65	
Pentachlorophenol	0.21	0.52	1.0	27	30	31	400	400	400	
1,1,1,2-tetrachloroethane	0.56	1.3	2.6	0.63	1.5	2.9	59	140	270	

Parameter	Residential (mg/kg, unless otherwise stated)						Commercial / Industrial (mg/kg, unless otherwise stated)			Note
	With Homegrown Produce			Without Homegrown Produce						
	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	
1,1,2,2-tetrachloroethane	0.98	2.1	4.0	1.6	3.4	6.3	150	310	570	
Tetrachloroethene (PCE)	0.074	0.17	0.32	0.07	0.17	0.33	10	23	45	
Tetrachloromethane (CT)	0.011	0.024	0.046	0.011	0.024	0.046	1.6	3.6	6.9	
1,1,1-trichloroethane (TCA)	3.7	7.8	15	3.8	7.9	15	370	770	1400	
1,1,2-trichloroethane (TCA)	0.39	0.85	1.6	0.51	1.1	2.0	89	180	320	
Trichloroethene (TCE)	0.0070	0.015	0.028	0.0071	0.015	0.028	1.5	2.8	44	
Trichloromethane (CF)	0.43	0.80	1.4	0.48	0.89	53	98	170	300	
Vinyl Chloride	0.00034	0.00045	0.00062	0.00037	0.00048	0.00066	0.038	0.049	0.068	
Miscellaneous Organics										
Carbon disulphide	0.066	0.13	0.25	0.066	0.13	0.25	6.7	14	25	
Di-(2-ethylhexyl)-phthalate	290	660	1100	3900	4000	4100	85000	85000	8600	
MTBE	31	55	94	39	68	120	7400	12000	19000	
Phenol	110	190	330	420	440	440	440			[14]
Methylphenols (cresols), total	78	170	330	5600	8200	9900	160000	170000	18000	[15]
2,4-dimethylphenol (m-xylenol)	18	43	82	200	430	720	15000	23000	28000	
Other Parameters										
TOC	3% w/w			3% w/w			3% w/w			[16]
Calorific Value	2 MJ/kg			2 MJ/kg			2 MJ/kg			[17]
Asbestos	Fibres present			Fibres present			Fibres present			

All concentration-based criteria are rounded to 2 significant figures.

The criteria assume a sandy soil type, which will be conservative for the great majority of soils (including made ground) encountered on historically contaminated sites.

Except where otherwise stated, criteria have been derived by Sirius using CLEA version 1.06. Parameters for the land use cases are consistent with those given in Environment Agency (2009) "Updated Technical Background to the CLEA Model", report SC050021/SR3 but updated (where relevant) for respiration rate, exposure frequency for dermal contact outdoors, soil adherence factors for children, and plant uptake concentration factors given in CL:AIRE (2014) and Nathanail et al., (2015). No correction has been made for the "Top Two" crop types in the Residential with Homegrown Produce land use and the criteria will therefore be conservative in this regard.

Health Criteria Values (HCVs) and (except where specifically noted) chemical property data were obtained from:
- Environment Agency Science Report SC050021 Series;
- Nathanail et al. (2015);
- CL:AIRE-AGS-EIC (2010).

Footnotes

[1] Based on oral GAC as this is the lower GAC and reflects a cancer risk many orders of magnitude greater than for inhalation.

[2] Determined for lifetime exposure. Plant uptake concentration factors applied were as given in CL:AIRE (2014). The GAC values are based on data for soils having a pH value in the range 6-8; caution should be applied in applying them at pH values outside this range, especially at pH values <5.

[3] Both oral and inhalation HCVs are based on local toxicological effects and therefore the lowest (oral) GAC value is adopted.

[4] For the Residential with Homegrown Produce land use, the GAC values for Cu and Zn are based on potential phytotoxic effects and have been set at the maximum allowable concentrations for sewage sludge-amended soils presented in the "Sludge (Use in Agriculture) Regulations" (SI 1263/1989); these criteria may also be applied in any land use where plants are to be grown. The equivalent GAC values for human health protection in the Residential with Homegrown Produce land use are around an order of magnitude greater.

[5] The Category 4 Screening Levels for lead defined in CL:AIRE (2013) have been adopted directly to provide an acceptable basis for initial assessment of data. Where background concentrations of lead exceed the GAC value, then site-specific evaluation will be required.

[6] The SGV for mercury is based on inorganic mercury which represents the most common form encountered within the environment. This is considered appropriate for most sites as: "…the SGV for inorganic mercury can normally be compared with chemical analysis for total mercury content because the equilibrium concentrations of elemental and methylmercury compounds are likely to be very low" (Environment Agency report SC050021/Mercury SGV). Analysis and specific assessment for elemental or methylated forms of mercury will need to be considered if historical land use or site-specific factors indicate that these forms of mercury are likely to be present.

[7] Toxicological effects by inhalation are localised, therefore the lower of the GAC values for oral and inhalation HCVs have been adopted.

[8] BRE (2005). Sulphate is not considered to pose a potential risk to human health under normal circumstances – this GAC applies to construction cases only and is set at the upper limit for DS-1 Design Sulphate Class concrete.

[9] GAC calculated for acute risk. Further information can be provided upon request.

[10] The genotoxic PAHs (benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-c,d)pyrene) are routinely assessed using benzo(a)pyrene as a surrogate (HPA (2010) "Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs)", version 5). Separate information on this approach is provided.

[11] Calculated using a 'minimum risk' oral index dose derived from the application of a 10,000x safety factor to the BMD10 presented in CL:AIRE (2014) for benzo(a)pyrene as a surrogate marker and the inhalation index dose specified in CL:ARE (2014) and Nathanail *et al*. (2015). As a conservative measure, the GAC is based on combined exposure pathways to account for systemic carcinogenic effects. Further information on the derivation can be provided upon request.

[12] For screening purposes, a single GAC has been set for total xylene. This is the lowest of the values calculated for the three individual xylene isomers.

[13] "No GAC" indicates that no value has been specified for this land use as the TDSI cannot be exceeded at achievable soil concentrations.

[14] 440mg/kg is the minimum concentration that is protective for direct skin contact with phenol (See Environment Agency SR050021/Phenol SGV) and is adopted where GACs for chronic exposure are higher.

[15] For screening purposes, a single GAC has been set for total methylphenol. This is the lowest of the values calculated for the three individual methylphenol isomers.

[16] The Hazardous Waste (England and Wales) Regulations 2005. TOC content in itself does not represent a potential risk to human health. This GAC is provided for indicative assessment of disposal options, in the case that off-site landfill of soil is undertaken. This GAC is specified at the 'Inert' waste threshold and should be considered as for information purposes only.

[17] ICRCL (1986) Guidance Note 61/84, 2nd Edition, Notes on the Fire Hazards of Contaminated Land. Calorific value is not an indication of direct human health risk but may be useful in assessment of the potential fire risk posed by made ground or natural soils containing elevated concentrations of potentially combustible organic matter.

The Sirius Group
Stage 2 Generic Assessment Criteria for Soils

Revision: 24th January 2020

Parameter	Residential (mg/kg, unless otherwise stated)						Commercial / Industrial (mg/kg, unless otherwise stated)			Note
	With Homegrown Produce			Without Homegrown Produce						
	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	
Metals/Metalloids										
Arsenic (inorganic)	37			40			630			[1]
Cadmium	18			150			410			[2]
Chromium (III)	910			4000			8600			
Chromium (VI)	21			21			49			[3]
Copper	200			7100			68000			[4]
Lead	200			310			2300			[5]
Mercury (inorganic)	40			56			1100			[6]
Nickel	130			180			980			[7]
Selenium	250			430			12000			
Vanadium	410			1200			9000			
Zinc	450			40000			750000			[4]
Other Inorganics										
pH	<5 or >9			<5 or >9			<5 or >9			
Total Sulphate	2400			2400			2400			[8]
Water-Soluble Sulphate	0.5 g/l			0.5 g/l			0.5 g/l			[8]
Free Cyanide	34			34			1400			[9]
Organics										
PAHs										
Acenaphthene	200	490	920	2000	3600	4900	75000	92000	100000	
Acenaphthylene	170	400	760	2000	3600	4900	76000	93000	100000	
Anthracene	2300	5300	9400	30000	34000	36000	520000	540000	540000	[10]
Benzo(a)anthracene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Benzo(a)pyrene	4.9	4.9	4.9	5.3	5.3	5.3	76	76	76	[11]
Benzo(b)fluoranthene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Benzo(k)fluoranthene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Benzo(g,h,i)perylene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Chrysene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Dibenzo(a,h)anthracene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Fluoranthene	280	560	820	1500	1600	1600	23000	23000	23000	
Fluorene	170	390	730	2200	3400	4000	60000	67000	70000	
Indeno(1,2,3-c,d)pyrene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Naphthalene	1.0	2.3	4.6	1.0	2.4	4.7	110	260	510	
Phenanthrene	95	220	380	1300	1400	1500	22000	22000	23000	
Pyrene	620	1200	1900	3700	3800	3800	54000	54000	54000	
BTEX and related										
Benzene	0.13	0.27	0.50	0.37	0.71	1.30	15	29	51	[12]
Toluene	100	240	460	370	830	1100	33000	68000	110000	
Ethylbenzene	26	62	120	34	81	110	3200	7400	14000	
Xylenes (total)	28	67	130	33	78	110	3200	7700	15000	[13]
1,2,4-trimethylbenzene	0.22	0.53	1.1	0.24	0.58	1.2	39	93	170	
Iso-propylbenzene	6.6	16	32	6.8	17	33	1300	3100	6100	
Propylbenzene	21	51	100	23	57	110	3800	9100	17000	
Styrene	6.9	16	32	21	49	93	3100	6100	9500	
TPH										
Aliphatic EC 5-6	24	41	68	24	41	68	2400	4100	6900	
Aliphatic EC >6-8	53	110	210	53	110	210	5300	11000	21000	
Aliphatic EC >8-10	13	31	61	13	31	61	1300	3100	6000	
Aliphatic EC >10-12	62	150	300	62	150	300	6100	15000	28000	
Aliphatic EC >12-16	510	1200	2300	510	1200	2300	43000	72000	85000	
Aliphatic EC >16-35	41000	70000	90000	42000	70000	90000	>1E6	>1E6	>1E6	[14]
Aromatic EC >5-7	53	110	200	150	300	530	15000	28000	48000	
Aromatic EC >7-8	100	240	460	370	820	1500	33000	68000	110000	
Aromatic EC >8-10	20	48	94	22	54	100	2200	5200	9800	
Aromatic EC >10-12	63	150	290	120	290	560	11000	22000	30000	
Aromatic EC >12-16	140	320	570	1100	1900	2200	35000	37000	37000	
Aromatic EC >16-21	260	540	840	1800	1900	1900	28000	28000	28000	
Aromatic EC >21-35	1100	1500	1700	1900	1900	1900	28000	28000	28000	
Chlorinated Organics										
Chlorobenzene	0.19	0.44	0.86	0.19	0.45	0.87	31	71	140	
Dichloromethane (DCM)	0.47	0.78	1.2	1.2	1.7	2.4	250	340	470	
1,1-dichloroethane (DCA)	1.4	2.4	4.0	1.4	2.4	4.1	260	420	690	
1,2-dichloroethane (DCA)	0.0031	0.0048	0.0076	0.0035	0.0053	0.0084	0.34	0.51	0.81	
1,1-dichloroethene (DCE)	0.15	0.26	0.45	0.15	0.26	0.46	24	43	74	
cis-1,2-dichloroethene (DCE)	0.066	0.12	0.20	0.069	0.12	0.21	14	23	38	
trans-1,2-dichloroethene (DCE)	0.11	0.21	0.38	0.12	0.22	0.39	21	37	65	
Pentachlorophenol	0.21	0.52	1.0	27	30	31	400	400	400	
1,1,1,2-tetrachloroethane	0.56	1.3	2.6	0.63	1.5	2.9	59	140	270	

Parameter	Residential (mg/kg, unless otherwise stated)						Commercial / Industrial (mg/kg, unless otherwise stated)			Note
	With Homegrown Produce			Without Homegrown Produce						
	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	
1,1,2,2-tetrachloroethane	1.0	2.1	4.0	1.6	3.4	6.3	150	310	570	
Tetrachloroethene (PCE)	0.074	0.17	0.32	0.074	0.17	0.33	10	23	45	
Tetrachloromethane (CT)	0.011	0.024	0.046	0.011	0.024	0.046	1.6	3.6	7	
1,1,1-trichloroethane (TCA)	3.7	7.8	15	3.8	7.9	15	370	770	1400	
1,1,2-trichloroethane (TCA)	0.39	0.85	1.6	0.51	1.1	2.0	89	180	320	
Trichloroethene (TCE)	0.0070	0.015	0.028	0.0071	0.015	0.028	1.5	2.8	44	
Trichloromethane (CF)	0.43	0.80	1.4	0.48	0.89	53	98	170	300	
Vinyl Chloride	0.00034	0.00045	0.00062	0.00037	0.00048	0.00066	0.038	0.049	0.07	
Miscellaneous Organics										
Carbon disulphide	0.066	0.13	0.25	0.066	0.13	0.25	6.7	14	25	
Di-(2-ethylhexyl)-phthalate	290	660	1100	3900	4000	4100	85000	85000	8600	
MTBE	31	55	94	39	68	120	7400	12000	19000	
Phenol	110	190	330	420	440	440	440			[15]
Methylphenols (cresols), total	78	170	330	5600	8200	9900	160000	170000	18000	[16]
2,4-dimethylphenol (m-xylenol)	18	43	82	200	430	720	15000	23000	28000	
Other Parameters										
TOC	3% w/w			3% w/w			3% w/w			[17]
Calorific Value	2 MJ/kg			2 MJ/kg			2 MJ/kg			[18]
Asbestos	Fibres present			Fibres present			Fibres present			

All concentration-based criteria are rounded to 2 significant figures.

The criteria assume a sandy soil type, which will be conservative for the great majority of soils (including made ground) encountered on historically contaminated sites.

Except where otherwise stated, criteria have been derived by Sirius using CLEA version 1.06. Parameters for the land use cases are consistent with those given in Environment Agency (2009) “Updated Technical Background to the CLEA Model”, report SC050021/SR3 but updated (where relevant) for respiration rate, exposure frequency for dermal contact outdoors, soil adherence factors for children, and plant uptake concentration factors given in CL:AIRE (2014) and Nathanail et al. (2015). No correction has been made for the “Top Two” crop types in the Residential with Homegrown Produce land use and the criteria will therefore be conservative in this regard.

Health Criteria Values (HCVs) and (except where specifically noted) chemical property data were obtained from:
- Environment Agency Science Report SC050021 Series;
- CL:AIRE (2014)
- Nathanail et al. (2015);
- CL:AIRE-AGS-EIC (2010).

Footnotes

[1] Determined using LLTC value and plant uptake concentration factors given in CL:AIRE (2014). The oral GAC is adopted as this is the lower value and reflects a cancer risk many orders of magnitude greater than for inhalation.

[2] Determined for lifetime exposure using the LLTC value and plant uptake concentration factors given in CL:AIRE (2014). The GAC values are based on data for soils having a pH value in the range 6-8; caution should be applied in applying them at pH values outside this range, especially at pH values <5.

[3] Determined using LLTC value and plant uptake concentration factors given in CL:AIRE (2014). Both oral and inhalation LLTCs are based on local toxicological effects and therefore the lowest (oral) GAC value is adopted.

[4] For the Residential with Homegrown Produce land use, the GAC values for Cu and Zn are based on potential phytotoxic effects and have been set at the maximum allowable concentrations for sewage sludge-amended soils presented in the "Sludge (Use in Agriculture) Regulations" (SI 1263/1989); these criteria may also be applied in any land use where plants are to be grown. The equivalent GAC values for human health protection in the Residential with Homegrown Produce land use are around an order of magnitude greater.

[5] The Category 4 Screening Levels for lead defined in CL:AIRE (2013) have been adopted directly to provide an acceptable basis for initial assessment of data. Where background concentrations of lead exceed the GAC value, then site-specific evaluation will be required.

[6] The SGV for mercury is based on inorganic mercury which represents the most common form encountered within the environment. This is considered appropriate for most sites as: “…the SGV for inorganic mercury can normally be compared with chemical analysis for total mercury content because the equilibrium concentrations of elemental and methylmercury compounds are likely to be very low” (SC050021/Mercury SGV). Analysis and specific assessment for elemental or methylated forms of mercury will need to be considered if historical land use or site-specific factors indicate that these forms of mercury are likely to be present.

[7] Toxicological effects by inhalation are localised, therefore the lower of the GAC values for oral and inhalation HCVs have been adopted.

[8] BRE (2005). Sulphate is not considered to pose a potential risk to human health under normal circumstances – this GAC applies to construction cases only and is set at the upper limit for DS-1 Design Sulphate Class concrete.

[9] GAC calculated for acute risk. Further information can be provided upon request.

[10] The genotoxic PAHs (benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-c,d)pyrene) are routinely assessed using benzo(a)pyrene as a surrogate (HPA (2010) “Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs)”, version 5). Separate information on this approach is provided.

[11] Determined using oral LLTC value (CL:AIRE, 2014) for assessment of all pathways to determine systemic carcinogenic effect; inhalation HCV and LLTC values are based on local pulmonary effects only and result in a less conservative GAC.

[12] Calculated using LLTC value (CL:AIRE, 2014).

[13] For screening purposes, a single GAC has been set for total xylene. This is the lowest of the values calculated for the three individual xylene isomers.

[14] “No GAC” indicates that no value has been specified for this land use as the TDSI cannot be exceeded at achievable soil concentrations.

[15] 440mg/kg is the minimum concentration that is protective for direct skin contact with phenol (See Environment Agency SR050021/Phenol SGV) and is adopted where GACs for chronic exposure are higher.

[16] For screening purposes, a single GAC has been set for total methylphenol. This is the lowest of the values calculated for the three individual methylphenol isomers.

[17] The Hazardous Waste (England and Wales) Regulations 2005. TOC content in itself does not represent a potential risk to human health. This GAC is provided for indicative assessment of disposal options, in the case that off-site landfill of soil is undertaken. This GAC is specified at the ‘Inert’ waste threshold and should be considered as for information purposes only.

[18] ICRCL (1986) Guidance Note 61/84, 2nd Edition, Notes on the Fire Hazards of Contaminated Land. Calorific value is not an indication of direct human health risk but may be useful in assessment of the potential fire risk posed by made ground or natural soils containing elevated concentrations of potentially combustible organic matter.

The Sirius Group
Generic Assessment Criteria for PAHs in Soils When Surrogate Marker Approach is Invalid

Parameter	Residential (mg/kg)						Commercial / Industrial (mg/kg)			Note
	With Homegrown Produce			Without Homegrown Produce						
	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	
Acenaphthene	200	490	920	2000	3600	4900	75000	92000	100000	
Acenaphthylene	170	400	760	2000	3600	4900	76000	93000	100000	
Anthracene	2300	5300	9400	30000	34000	36000	520000	540000	540000	
Benzo(a)anthracene	7.5	11	13	12	14	15	170	170	180	
Benzo(a)pyrene	2.2	2.7	2.9	3.2	3.2	3.2	35	35	36	
Benzo(b)fluoranthene	2.6	3.3	3.6	4.0	4.0	4.1	45	45	45	
Benzo(k)fluoranthene	77	93	99	110	110	110	1200	1200	1200	
Benzo(g,h,i)perylene	320	340	350	360	360	360	3900	4000	4000	
Chrysene	15	22	26	30	31	32	350	350	360	
Dibenzo(a,h)anthracene	0.24	0.28	0.30	0.31	0.32	0.32	3.5	3.6	3.6	
Fluoranthene	280	560	820	1500	1600	1600	23000	23000	23000	
Fluorene	170	390	730	2200	3400	4000	60000	67000	70000	
Indeno(1,2,3-c,d)pyrene	27	36	40	45	46	46	510	510	510	
Naphthalene	1.0	2.3	4.6	1.0	2.4	4.7	110	260	510	
Phenanthrene	95	220	380	1300	1400	1500	22000	22000	23000	
Pyrene	620	1200	1900	3700	3800	3800	54000	54000	54000	

All concentration-based criteria are rounded to 2 significant figures.

The criteria assume a sandy soil type, which will be conservative for the great majority of soils (including made ground) encountered on historically contaminated sites.

Criteria have been derived by Sirius using CLEA version 1.06. Parameters for the land use cases are consistent with those given in Environment Agency (2009) “Updated Technical Background to the CLEA Model”, report SC050021/SR3 but updated (where relevant) for respiration rate, exposure frequency for dermal contact outdoors, soil adherence factors for children, and plant uptake concentration factors given in CL:AIRE (2014) and Nathanail et al., (2015). No correction has been made for the “Top Two” crop types in the Residential with Homegrown Produce land use and the criteria will therefore be conservative in this regard.

Health Criteria Values (HCVs) and (except where specifically noted) chemical property data were obtained from Nathanail et al. (2015).

The Sirius Group
Stage 2 Generic Assessment Criteria for Soils in Public Open Space Settings

Revision: 20th August 2015

Parameter	Informal POS in Residential Setting (mg/kg, unless otherwise stated)			Park POS (mg/kg, unless otherwise stated)			Note
	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	
Metals/Metalloids							
Arsenic (inorganic)	79			170			[1]
Cadmium	220			840			[2]
Chromium (III)	1500			33000			
Chromium (VI)	23			250			[3]
Copper	200			200			[4]
Lead	630			1300			[5]
Mercury (inorganic)	120			240			[6]
Nickel	230			800			[7]
Selenium	1100			1800			
Vanadium	2000			5000			
Zinc	450			450			[4]
Other Inorganics							
pH	<5 or >9			<5 or >9			
Total Sulphate	2400			2400			[8]
Water-Soluble Sulphate	0.5 g/l			0.5 g/l			[8]
Free Cyanide	34			34			[9]
Organics							
PAHs							
Acenaphthene	15000	15000	15000	30000	30000	30000	
Acenaphthylene	15000	15000	15000	30000	30000	30000	
Anthracene	74000	74000	74000	150000	150000	150000	[10]
Benzo(a)anthracene	Assessed using benzo(a)pyrene as a surrogate marker						[10]
Benzo(a)pyrene	10	10	10	21	21	22	[11]
Benzo(b)fluoranthene	Assessed using benzo(a)pyrene as a surrogate marker						[10]
Benzo(k)fluoranthene	Assessed using benzo(a)pyrene as a surrogate marker						[10]
Benzo(g,h,i)perylene	Assessed using benzo(a)pyrene as a surrogate marker						[10]
Chrysene	Assessed using benzo(a)pyrene as a surrogate marker						[10]
Dibenzo(a,h)anthracene	Assessed using benzo(a)pyrene as a surrogate marker						[10]
Fluoranthene	3100	3100	3100	6300	6300	6400	
Fluorene	9900	9900	9900	20000	20000	20000	
Indeno(1,2,3-c,d)pyrene	Assessed using benzo(a)pyrene as a surrogate marker						[10]
Naphthalene	3500	3800	4000	1300	1800	2400	
Phenanthrene	3100	3100	3100	6300	6300	6300	
Pyrene	7400	7400	7400	15000	15000	15000	
BTEX and related							
Benzene	140	140	140	140	160	180	[12]
Toluene	55000	56000	56000	90000	97000	100000	
Ethylbenzene	23000	24000	24000	18000	23000	28000	
Xylenes (total)	38000	40000	41000	19000	26000	33000	[13]
1,2,4-trimethylbenzene	240	240	240	220	280	320	
Iso-propylbenzene	24000	24000	24000	14000	20000	24000	
Propylbenzene	24000	24000	25000	27000	33000	37000	
Styrene	3000	3000	3000	5600	5800	5900	
TPH							
Aliphatic EC 5-6	520000	550000	570000	120000	150000	200000	
Aliphatic EC >6-8	560000	580000	600000	170000	250000	330000	
Aliphatic EC >8-10	12000	12000	12000	16000	19000	22000	
Aliphatic EC >10-12	13000	13000	13000	22000	24000	24000	
Aliphatic EC >12-16	13000	13000	13000	25000	25000	26000	
Aliphatic EC >16-35	250000	250000	250000	470000	480000	490000	
Aromatic EC >5-7	55000	55000	55000	78000	87000	93000	
Aromatic EC >7-8	55000	55000	55000	89000	97000	100000	
Aromatic EC >8-10	5000	5000	5000	7700	8800	9300	
Aromatic EC >10-12	5000	5000	5000	9400	9800	10000	
Aromatic EC >12-16	5000	5000	5000	10000	10000	10000	
Aromatic EC >16-21	3800	3800	3800	7700	7800	7800	
Aromatic EC >21-35	3800	3800	3800	7800	7900	7900	
Chlorinated Organics							
Chlorobenzene	8800	10000	12000	1500	2200	3000	
Dichloromethane (DCM)	750	750	750	1400	1400	1400	
1,1-dichloroethane (DCA)	42000	43000	45000	11000	14000	17000	
1,2-dichloroethane (DCA)	28	28	28	22	25	28	
1,1-dichloroethene (DCE)	9200	9600	10000	1900	2500	3200	
cis -1,2-dichloroethene (DCE)	1200	1200	1300	390	490	610	
trans -1,2-dichloroethene (DCE)	3500	3700	3800	910	1200	1500	
Pentachlorophenol	180	180	180	250	270	280	
1,1,1,2-tetrachloroethane	1400	1400	1400	1600	1900	2100	
1,1,2,2-tetrachloroethane	1400	1400	1400	1900	2100	2300	
Tetrachloroethene (PCE)	1300	1400	1400	900	1200	1500	
Tetrachloromethane (CT)	790	850	890	210	310	410	
1,1,1-trichloroethane (TCA)	120000	130000	130000	63000	84000	100000	

The Sirius Group
Stage 2 Generic Assessment Criteria for Soils in Public Open Space Settings

Parameter	Informal POS in Residential Setting (mg/kg, unless otherwise stated)			Park POS (mg/kg, unless otherwise stated)			Note
	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	
1,1,2-trichloroethane (TCA)	960	970	980	760	950	1100	
Trichloroethene (TCE)	110	120	120	76	98	120	
Trichloromethane (CF)	2400	2500	2500	2700	2900	3100	
Vinyl Chloride	3.5	3.5	3.5	5.0	5.2	5.5	
Miscellaneous Organics							
Carbon disulphide	9000	10000	11000	1500	2100	2800	
Di-(2-ethylhexyl)-phthalate	9700	9700	9700	16000	16000	16000	
MTBE	73000	73000	73000	70000	81000	92000	
Phenol		440			440		[14]
Methylphenols (cresols), total	25000	25000	25000	47000	49000	50000	[15]
2,4-dimethylphenol (m-xylenol)	5000	5000	5000	8700	9200	9600	
Other Parameters							
TOC		3% w/w			3% w/w		[16]
Calorific Value		2 MJ/kg			2 MJ/kg		[17]
Asbestos		Fibres present			Fibres present		

The POS cases defined are based on the specific Conceptual Site Models given in CL:AIRE (2014). For these GACs to be applied, the relevant conceptual model must be valid for the site under assessment.

All concentration-based criteria are rounded to 2 significant figures.

The criteria assume a sandy soil type, which will be conservative for the great majority of soils (including made ground) encountered on historically contaminated sites.

Except where otherwise stated, criteria have been derived by Sirius using CLEA version 1.06. Parameters for the land use cases are consistent with those given in Environment Agency (2009) "Updated Technical Background to the CLEA Model", report SC050021/SR3 but updated (where relevant) for respiration rate, exposure frequency for dermal contact outdoors, soil adherence factors for children, and plant uptake concentration factors given in CL:AIRE (2014) and Nathanail et al. (2015). No correction has been made for the "Top Two" crop types in the Residential with Homegrown Produce land use and the criteria will therefore be conservative in this regard.

Health Criteria Values (HCVs) and (except where specifically noted) chemical property data were obtained from:
- Environment Agency Science Report SC050021 Series;
- CL:AIRE (2014);
- Nathanail et al. (2015);
- CL:AIRE-AGS-EIC (2010).

Footnotes

[1] Determined using LLTC value and plant uptake concentration factors given in CL:AIRE (2014). The oral GAC is adopted as this is the lower value and reflects a cancer risk many orders of magnitude greater than for inhalation.

[2] Determined for lifetime exposure using the LLTC value given in CL:AIRE (2014).

[3] Determined using LLTC value given in CL:AIRE (2014). Both oral and inhalation LLTCs are based on local toxicological effects and therefore the lowest (oral) GAC value is adopted.

[4] The GAC values for Cu and Zn are based on potential phytotoxic effects and have been set at the maximum allowable concentrations for sewage sludge-amended soils presented in the "Sludge (Use in Agriculture) Regulations" (SI 1263/1989); these criteria may also be applied in any land use where plants are to be grown. The GAC values for human health protection are significantly higher.

[5] The Category 4 Screening Levels for lead defined in CL:AIRE (2014) have been adopted directly to provide an acceptable basis for initial assessment of data. Where background concentrations of lead exceed the GAC value, then site-specific evaluation will be required.

[6] The SGV for mercury is based on inorganic mercury which represents the most common form encountered within the environment. This is considered appropriate for most sites as: "…the SGV for inorganic mercury can normally be compared with chemical analysis for total mercury content because the equilibrium concentrations of elemental and methylmercury compounds are likely to be very low" (SC050021/Mercury SGV). Analysis and specific assessment for elemental or methylated forms of mercury will need to be considered if historical land use or site-specific factors indicate that these forms of mercury are likely to be present.

[7] Toxicological effects by inhalation are localised; consistent with the SGV for nickel, the lower of the GAC values for oral and inhalation HCVs have been adopted in each case.

[8] BRE (2005). Sulphate is not considered to pose a potential risk to human health under normal circumstances – this GAC applies to cases where concrete structures may be constructed within the soil and is set at the upper limit for DS-1 Design Sulphate Class concrete.

[9] GAC calculated for acute risk. Further information can be provided upon request.

[10] The genotoxic PAHs (benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-c,d)pyrene) are routinely assessed using benzo(a)pyrene as a surrogate (HPA (2010) "Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs)", version 5). Separate information on this approach is provided.

[11] Determined using oral LLTC value (CL:AIRE, 2014) for assessment of all pathways to determine systemic carcinogenic effect; inhalation HCV and LLTC values are based on local pulmonary effects only and result in a less conservative GAC.

[12] Calculated using LLTC value (CL:AIRE, 2014).

[13] For screening purposes, a single GAC has been set for total xylene. This is the lowest of the values calculated for the three individual xylene isomers.

[14] The GAC is based on the threshold protective for acute effects of skin contact with phenol (See SR050021/Phenol SGV). The chronic exposure GAC is significantly higher.

[15] For screening purposes, a single GAC has been set for total methylphenol. This is the lowest of the values calculated for the three individual methylphenol isomers.

[16] The Hazardous Waste (England and Wales) Regulations 2005. TOC content in itself does not represent a potential risk to human health. This GAC is provided for indicative assessment of disposal options, in the case that off-site landfill of soil is undertaken. This GAC is specified at the 'Inert' waste threshold and should be considered as for information purposes only.

[17] ICRCL (1986) Guidance Note 61/84, 2nd Edition, Notes on the Fire Hazards of Contaminated Land. Calorific value is not an indication of direct human health risk but may be useful in assessment of the potential fire risk posed by made ground or natural soils containing elevated concentrations of potentially combustible organic matter.

GAC VALUES FOR CONTROLLED WATERS IN ENGLAND AND WALES

Parameter	GAC (µg/l, unless stated)			Notes
	Inland waters		Coastal and transition waters	
	EQS	DWS	EQS	
Metals and metalloids (dissolved)				
Arsenic	50	10	25	1
Cadmium	See separate table	5	0.2	1, 2
Chromium (total)	4.7	50	N.A.	1, 3
Copper	1.0 (bioavailable)	2000	3.76	1, 4
Lead	1.2 (bioavailable)	10	1.3	1, 4
Mercury	0.07	1.0	0.07	1, 4, 5
Nickel	4.0 (bioavailable)	20	8.6	1, 4
Zinc	10.9 (bioavailable) + background	5000	6.8 + background	1, 4, 6
Misc. inorganics				
Ammonia (total, as N)	See separate table	N.A.	N.A.	7
Ammonia (total, as $NH4^+$)	N.A.	500	N.A.	
Ammonia (un-ionised (NH3), as N)	N.A.	N.A.	21	7
Cyanide (free)	10	50	10	
Sulphate	N.A.	250 mg/l	N.A.	8
Petroleum hydrocarbons and related				
TPH (speciated analysis) *per fraction*	10	10	10	9, 10
Benzene	10	1.0	8	
Toluene	74	700	74	11
Xylenes (sum)	N.A.	500	N.A.	11
MTBE	2600	200	2600	12, 13
PAHs				
Anthracene	0.1	N.A.	0.1	
Benzo(b)fluoranthene + Benzo(k)fluoranthene (sum)	N.A.	Sum of 4 = 0.1	N.A.	
Benzo(g,h,i)perylene + indeno(1,2,3-c,d)pyrene (sum)	N.A.		N.A.	
Benzo(a)pyrene	1.7E-04	0.01	1.7E-04	
Fluoranthene	0.0063	N.A.	0.0063	
Naphthalene	2.0	N.A.	2.0	
Phenol				
Phenol	7.7	N.A.	7.7	
Chlorinated organics				
Dichloromethane	20	N.A.	20	
Trichloromethane (chloroform)	2.5	100	2.5	14
Tetrachloromethane (carbon tetrachloride)	12	3.0	12	
1,2-dichloroethane (1,2-DCA)	10	3.0	10	

Cadmium - inland waters EQS	
Hardness (as mg/l CaCO3)	EQS (µg/l)
<40	0.08
40-50	0.08
50-100	0.09
100-200	0.15
>=200	0.25

Ammonia - inland waters EQS		
Alkalinity (as mg/l CaCO3)	Altitude	EQS (µg/l)
<10	Any	300
10-50	Any	300
50-100	<80m	600
50-100	>80m	300
100-200	<80m	600
100-200	>80m	300
>200	Any	600

Parameter	GAC (µg/l, unless stated)			Notes
	Inland waters		Coastal and transition waters	
	EQS	DWS	EQS	
1,1,1-trichloroethane (1,1,1-TCA)	100	N.A.	100	
1,1,2-trichloroethane (1,1,2-TCA)	400	N.A.	300	
Trichloroethene (TCE)	10	Sum of 2 = 10	10	
Tetrachloroethene (PCE)	10		10	
Vinyl chloride	N.A.	0.5	N.A.	

Notes referenced in table:

1. Metals and metalloid EQS relate to dissolved contamination only (i.e. analysis of filtered samples).
2. Inland waters EQS for cadmium is dependent upon hardness or alkalinity of the receiving surface water. See separate table.
3. Separate EQS standards exist for Cr III and CrVI in fresh water. The fresh water Cr III has been value adopted as the screening value for total Cr analysis as it is normally the predominant form in solution. Specific EQS for Cr VI (3.4µg/l in freshwater; 0.6µg/l in transition and coastal waters) must be applied where relevant.
4. The bioavailable concentration of copper, nickel and zinc in fresh water is dependent upon the pH, DOC and calcium data for the receiving surface water. These data should be collected whenever possible to calculate an equivalent GAC for total metal concentration using the UKTAG m-BAT spreadsheet model. Although the standard indicates that lead should be assessed on a bioavilable basis, no tool is currently avaiable and this criterion should be applied as-is for screening purposes.
5. The value for mercury is the Maximum Acceptable Concentration (MAC) as no annual average EQS is specified in the legislation.
6. The EQS for zinc may be adjusted for the ambient uncontaminated background concentration in the receiving surface water where data are available.
7. EQS for ammonia in inland waters depends on the hardness and altitude of the receiving water body - see separate table. The criteria given here are based on the attainment of "good" chemical quality in the water body.
8. No EQS for sulphate appears in the referenced legislation.
9. No concentration-based EQS values currently exist for TPH. In the absence of specific criteria, our recent discussions with the Environment Agency have led us to adopt 10µg/l *for each individual fraction* determined by speciated TPH (TPHCWG) analysis.
10. No concentration-based DWS exists for TPH. A sum TPH concentration of 200µg/l defines the DW2 Class threshold limit in the Surface Water (Abstraction for Drinking Water) (Classification) Regulations 1996; DW2 waters are generally suitable for abstraction as drinking water supplies, subject to standard filtration and chemical treatment. We therefore consider that the 10µg/l criterion *for each fraction* provides a reasonable and proportionate basis for the initial assessment of risk posed to off-site groundwater and/or surface water potable abstractions that may be impacted at a downgradient abstraction point by TPH contamination originating from the site.
11. The drinking water-based criteria are from World Health Organisation (WHO) Guidelines for Drinking Water Quality, 2008. Taint may result at lower concentrations.
12. The "EQS" given here for MTBE is the PNEC value for fresh and sea water life given in: EU Risk Assessment Report (2002) MTBE, 3rd Priority List, volume 19.
13. DWS for MTBE is a 5-fold dilution of the USEPA (1997) Drinking Water Advisory value for taint, EPA-822-F-97-009. Toxicological thresholds are significantly higher.
14. Sum trihalomethanes limit for drinking water is 100µg/l but chloroform is only compound of this class normally encountered at contaminated sites.

Sources and general comments

Unless otherwise stated, EQS-based GACs are annual average surface water quality criteria given in Table 1 within Part 3 (Priority Substances) or long-term average criteria given in Table 1 within Part 2 (Specific Pollutants) of The Water Framework Directive (Standards and Classification) Directions (England and Wales), 2015.

Unless otherwise stated, drinking water standard-based GACs are taken from the Water Supply (Water Quality) Regulations 2016, and relate to concentration at the supply point and/or consumers' taps.

This list presents recommended GAC values for commonly monitored analytes but is not exhaustive. See the above-referenced legislation for the full lists of criteria.

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