







Chemical Testing of Placed Materials





Issued:

Certificate Number 23-21904

Client SOLMEK 12 Yarm Road Stockton On Tees Cleveland TS18 3NA

- Our Reference 23-21904
- Client Reference S230909
 - Order No SOL-7676
 - Contract Title DARLINGTON
 - Description 3 Soil samples.
 - Date Received 14-Sep-23
 - Date Started 14-Sep-23
- Date Completed 22-Sep-23

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By



Kirk Bridgewood General Manager



22-Sep-23



Summary of Chemical Analysis Matrix Descriptions

Our Ref 23-21904 Client Ref 5230909 Contract Title DARLINGTON

Sample ID	Lab No	Completed	Matrix Description
ES1 BOTTOM	2233745	22/09/2023	Dark brown sandy CLAY including odd rootlets
ES1 MIDDLE	2233746	22/09/2023	Dark brown sandy CLAY including odd rootlets
ES1 TOP	2233747	22/09/2023	Dark brown sandy CLAY including odd rootlets



Summary of Chemical Analysis Soil Samples

Our Ref 23-21904 Client Ref S230909 Contract Title DARLINGTON

	Lab No			2233745	2233746	2233747
				ES1	ES1 MIDDLE	ES1 TOP
	.Sample ID			BOTTOM		
			Depth			
			Other ID			
		Sam	ple lype	ES	ES	ES
		Sampl	ing Date	12/09/2023	<u>12/09/2023</u>	<u>12/09/2023</u>
		Sampl	ing lime	n/s	n/s	n/s
lest	Method	LOD	Units			
Metals		0.01	"	0.4	0.7	0.(
Arsenic	DETSC 2301#	0.2	mg/kg	9.1	8.7	8.6
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	1.3	1.2	0.9
	DETSC 2301#	0.1	mg/kg	0.3	0.4	0.4
Chromium	DETSC 2301#	0.15	mg/kg	29	32	27
Copper	DETSC 2301#	0.2	mg/кg	29	28	40
	DETSC 2301#	0.3	mg/kg	60	5/	011
Mercury	DETSC 2325#	0.05	mg/kg	0.15	0.14	0.14
	DETSC 2301#		mg/kg	20	24	19
Selenium	DETSC 2301#	0.5	mg/кg	< 0.5	< 0.5	< 0.5
	DETSC 2301#	I	mg/kg	80	/8	110
		[[7.0	7.0	7.0
pH Cyanida Tatal	DETSC 2008#	0.1	рн	7.0	7.0	7.8
Cyanide, Total	DETSC 2130#	0.1	mg/кg	0.3	0.4	0.3
Organic matter	DETSC 2002#	0.1	%	5.4	4.7	5.0
Suphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/I	25	23	18
Aliphotic CE C() US 1D Al		0.01		0.01	0.01	0.01
Aliphatic C5-C6: H5_TD_AL	DETSC 3321^	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic Co-Co: HS_ID_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic Co-CTU. HS_TU_AL	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5
Aliphatic C12-C10. EH_CU_1D_AL	DETSC 3072#	1.Z	mg/kg	< 1.2	< 1.2	< 1.2
Aliphatic C10-C21. EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	C.I >	C.I >	< 1.5
Aliphatic C5 C25: EH_CU_HS_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4
Aromatic C5 C7: US 1D AD	DETSC 3072	0.01	mg/kg	< 10	< 10	< 10
Aromatic C7 C9: HS 1D AR	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic C8 C10: HS 1D AP	DETSC 2221*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 2072#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic C12 C16: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9	1.Z	< 0.9
Aromatic C12-C10: EII_CU_ID_AR	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Aromatic C21-C25: EH_CU_1D_AR	DETSC 2072#	0.0	ma/ka	< 0.0	< 0.0	< 0.0
Aromatic $C_2 = C_3 = C_1 = C_2 = D_A R$	DETSC 2072*	1.4	ma/ka	< 1.4	1.0	< 1.4
	DE13C 3072	10	шу/ку	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35: EH_CU+HS_1D_Total	DETSC 3072*	10	mg/kg	< 10	< 10	< 10
PAHs		I		-		_
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	0.1	< 0.1	0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	0.6	0.7	0.8



Summary of Chemical Analysis Soil Samples

Our Ref 23-21904 Client Ref S230909 Contract Title DARLINGTON

			Lab No	2233745	2233746	2233747
				ES1	ES1 MIDDLE	ES1 TOP
		.Sa	ample ID	BOTTOM		
			Depth			
			Other ID			
		Sam	ple Type	ES	ES	ES
		Sampl	ing Date	12/09/2023	12/09/2023	12/09/2023
		Sampl	ing Time	n/s	n/s	n/s
Test	Method	LOD	Units			
Anthracene	DETSC 3301	0.1	mg/kg	0.2	0.2	0.2
Fluoranthene	DETSC 3301	0.1	mg/kg	2.0	1.6	1.4
Pyrene	DETSC 3301	0.1	mg/kg	1.9	1.3	1.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	1.1	0.7	0.6
Chrysene	DETSC 3301	0.1	mg/kg	1.1	0.7	0.5
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	1.0	0.8	0.5
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	1.0	0.8	0.6
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	1.1	0.8	0.5
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	0.7	0.5	0.3
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	0.1	0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	0.7	0.5	0.3
PAH 16 Total	DETSC 3301	1.6	mg/kg	11	8.7	7.1
Phenols						
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	1.2	1.0	1.1



Summary of Asbestos Analysis Soil Samples

Our Ref 23-21904 Client Ref S230909 Contract Title DARLINGTON

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2233745	ES1 BOTTOM	SOIL	NAD	none	Vicky Convery
2233746	ES1 MIDDLE	SOIL	NAD	none	Vicky Convery
2233747	ES1 TOP	SOIL	NAD	none	Vicky Convery

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * · not included in laboratory scope of accreditation.



Information in Support of the Analytical Results

Our Ref 23-21904 Client Ref S230909 Contract DARLINGTON

Containers Received & Deviating Samples

		5	1	Holding time	
		Date		exceeded for	Inappropriate container for
Lab No	Sample ID	Sampled	Containers Received	tests	tests
2233745	ES1 BOTTOM SOIL	12/09/23	PT 1L		Aliphatics/Aromatics, BTEX / C5-
					C10, Naphthalene, PAH FID
2233746	ES1 MIDDLE SOIL	12/09/23	PT 1L		Aliphatics/Aromatics, BTEX / C5-
					C10, Naphthalene, PAH FID
2233747	ES1 TOP SOIL	12/09/23	PT 1L		Aliphatics/Aromatics, BTEX / C5-
					C10, Naphthalene, PAH FID

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377. Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis. The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
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
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det Aliphatic C5-C6 Acronym HS_1D_AL



Appendix A - Details of Analysis

			Limit of	Sample			
Method	Parameter	Units	Detection	Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC 2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC 2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC 2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC 2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC 2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC 2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC 2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC 2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 2311	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	As Received	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes



Appendix A - Details of Analysis

			LIMIT OF	Sample			
Method	Parameter	Units	Detection	Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3321	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3321	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3321	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3321	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3321	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3321	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3521	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3521	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3521	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3521	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3521	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3521	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3521	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3521	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3521	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3521	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3521	Aromatic C21-C35	ma/ka	1.4	As Received	Νο	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report



Ergo Ltd Unit 38B North Tyne Industrial Estate Benton Newcastle upon Tyne NE12 9SZ

0191 389 6200 info@ergoenvironmental.com http://www.ergoenvironmental.com

Ref: 22-1155-GV2 Date: 14th November 2023

Graeme Walton Oaktree Living Limited Teesside Grange, Eaglescliffe, Stockton On Tees, TS16 0QH

BY Email

Dear Graeme,

Garden Validation Plots 6-9 & 12-15 Maple Avenue, Shildon

Introduction

ERGO understands that garden areas have been completed within Plots 6-9 & 12-15 at the Maple Avenue, Shildon site. In line with the previously completed and approved ERGO Remediation Strategy (22-1155-r1, dated September 2022), plots were inspected to ensure the appropriate clean cover system.

A 600mm cover system is required where Made Ground remains at formation level within proposed garden areas, using certified material with appropriate validation. Natural drift deposits encountered within the upper 600mm of finished ground levels can be directly overlain with a suitable cover (minimum 150mm topsoil).

The garden validation has been undertaken as per the specification detailed in the ERGO Remediation Strategy report. It is noted that in some areas of the site, naturally occurring clean subsoils were present at shallow depth and topsoil was placed directly on top of these materials.

ERGO have been instructed by Oaktree Living Limited to attend the site and inspect the depth of the clean cover layer within garden plots.

For the avoidance of doubt ERGO can confirm that our schedule of works will include the following key attributes:

- Attendance on site by suitably qualified ERGO Engineers to inspect the thickness of the clean cover layer within the required plots;
- The sampling and chemical laboratory testing of subsoil & topsoil to confirm chemical suitability at the required frequency;
- Production of Letter Report detailing the findings of the inspection of the clean cover layer within the residential development gardens.

Chemical Suitability

The chemical suitability of the imported topsoil has previously been tested (DETS report 23-21904, dated 22nd September 2023, and DETS report 23-21904, dated 27th September 2023). Preliminary chemical analysis has confirmed the topsoil deposits placed in the gardens are suitable for re-use within a residential development.

Validation Works

ERGO attended site on the 10th November 2023 to inspect and validate the presence of 600mm of clean cover comprising a minimum of 150mm topsoil within garden plots 6-9 & 12-15 as indicated by an Oaktree Living representative.

ERGO completed the works in accordance with the approved ERGO Remediation Strategy inspecting all plots and can confirm that suitable topsoil generally comprising dark brown clayey sandy slightly gravelly TOPSOIL was placed in garden areas to depths of 600mm.

Within plots 6-9, ERGO confirmed natural material comprising stiff brown slightly sandy slightly gravelly CLAY was present within the upper 600mm and was directly overlain with topsoil. This is corroborated by the findings of the Phase II site investigation previously completed by ERGO.

No anthropogenic materials were noted within the strata.

Photographs indicating the depths of clean cover are enclosed for reference. Further photographs are available on request.

Conclusion

It is considered that within the garden areas of plots 6-9 & 12-15, the cover system has been installed in accordance with the agreed Remediation Strategy.

I trust this information is satisfactory to your requirements, and should I be able to be of any further assistance, please do not hesitate to contact me.

Yours sincerely,

For and on behalf of ERGO Ltd

Phil Craigie Geoenvironmental Consultant



Enclosed:

ERGO Drawings Photographs Chemical Testing of Placed Materials



ERGO Drawings









Notes:							
		1					
P1	-	22.03.2022	DRAFT	JR		JN	
Phase	Revision	Date	Issue	Draw	/n Authorised		
Client:			22-1155		Date:	^{Date:} 22 03 2022	
-	Folent Living	Limited	Drawing No:		Scale:		
			002		NTS		
Job Title:			Drawing Title:				
	Maple Ave	enue,		Prop	osed		
	Shildo	n	Development Plan				
				-	_		
Ergo Environmental Ltd Tel: 0191 389 6200							
	Website: www.ergoenvironmental.com						
			Email: In	୲୰୴୧୲	guenvii	onmental.com	
The clien	t must not amend a	ny drawing, design or other	intellectual property pro	duced b	y Ergo En	vironmental Ltd	
without pern such writte be liable fo	nission in writing from n permission is not for any damage and/	m Ergo Environmental Ltd i obtained in advance of the or losses occurring as a res	n advance of any ameno amendments being mad sult of the amended draw	dments b le, Ergo I ving, des	eing mad Environme ign or inte	e. In the event that ental Ltd shall not llectual property.	

Photographs

