terra firma
Geotechnical & Geoenvironmental Specialists
www.terrafirmawales.co.uk

Our Ref: RH/12032/VR-PHASE 3/1

Your Ref:

Contact: Ruth Howells

15th December 2023

Equans Regeneration Limited
Equinox North
Great Park Road
Almondsbury
Bristol
BS32 4QL

For the attn. of Richard Mackin

Dear Richard

CAPPING VALIDATION REPORT: HERBERT ROAD, PHASE 3 PLOTS 47-55, 120-126, 138-143, 161 - 195

1.0 Introduction

Equans is currently completing the residential development of Phase 3 of the Herbert Road development, Newport, on behalf of Pobl Group.

Following completion of earthworks on land south of the drainage reen, it was concluded that all properties in this area should be capped with 600mm clean imported soils.

Terra Firma letter report 'Phase 3 Piling Mat', dated 8th September 2023 covers the placement of a piling mat across the Phase 3 area of the site north of the drainage reen prior to development. Sampling and analysis of this material concluded that all gardens should be capped with 600mm of clean imported soils, and that a no-dig barrier was required below the capping layer around the apartment blocks Plots 138-143 and 161-166.

TFW Group Limited have been commissioned by Equans to validate the thickness of the capping soil, and its suitability to be used in residential gardens with plant uptake based upon their chemical concentrations. The presence of the no-dig barrier in Plots 138-143 and 161-166 must also be confirmed.

2.0 Capping Soils

Equans confirmed that the subsoil imported is from two sources. One source of topsoil was used.

Subsoil amounting to 900m^3 was imported for use from Neal Soils. This soil has been placed in Plots 167 – 195.

Subsoil from a source in Tranch was used in the remaining plots. This source was 700m^3 in volume.

Topsoil was imported from Bristol and Avon Group. The volume of topsoil will not exceed 500m^3.

Chemical test data provided for the capping soils from their respective sources are provided in **Annex A**.

In accordance with publication 'Requirements for the Chemical testing of Imported Materials for Various End Uses and Validation of Cover Systems' a sampling regime to test 16 representative samples of the Neal Soils subsoil, 12 samples of the Tranch subsoil and 8 samples of the topsoil was determined.

The capping soil thickness should be confirmed in 1 in 4 gardens and in landscaped areas.

The validation regime is summarised in **Table 2.1** below.

TFW Group Limited visited site on numerous occasions to obtain the required samples. Samples were despatched to the laboratories of Eurofins Chemtest Ltd for chemical testing for a broad pathfinder suite of metals, inorganics, speciated polycyclic aromatic hydrocarbons (PAH) and petroleum hydrocarbons. The samples were also screened for asbestos.

Table 2.1: Summary of Sampling Locations

Plot Number	Test Certificate No.
TOPSOIL	
50	No topsoil present
55	No topsoil present
122	25652
131	25654
138-143 East	38706
138-143 South	38706
144-149 North	25654
157	25654
161-166 East	38706
161-166 North	38706
171	25654
182	38706
194	39392

SUBSOIL – TRANCH SOURCE	
50	15652
55	15652
122	25652
126	25652
144-149 North	25654
138 – 143 East	38706
138 – 143 South	38706
161-166 East	38706
161-166 North	38706
SUBSOIL – NEAL SOILS SOURCE	
47	39392
167	25654
168	25654
170	25654
171	25654
175	25652
177	25652
178	25652
179	38706
180	25652
181	28639
182	38706
183	28639
185	28639
189	39392
190	39392
191	39392
194	39392

3.0 Verification of Capping Thickness and Soil Sampling

It can be confirmed that a minimum 600mm capping thickness was present in in all plots.

A geotextile no-dig barrier was noted as required at the base of the capping in the landscaped areas around Plots 138-143 and 161-166.

Photographs of the capping thickness validation may be found in **Annex B**.

4.0 Soil Test Results

The representative samples of topsoil and subsoil retrieved are listed in **Table 2.1**.

Additional subsoil samples were also retrieved from Plots 130, 132, 137, 150, 151, 154, 155, 160 for speciated PAH analysis.

Comparison of the analytical results has been made with the 2015 Suitable 4 Use Levels (S4UL) provided by Land Quality Management (LQM) Limited and the Chartered Institute of Environmental Health (CIEH) or provisional Category 4 Screening Levels (pC4SL).

The soil test certificates may be found in **Annex C**.

Results for topsoil and two subsoil sources are summarised in the tables below and on the following pages.

4.1 Topsoil

Table 4.1 Topsoil Summary of Soil Chemical Test Results – Inorganics & Miscellaneous

Substance	Threshold Value (mg/kg)	Source	Measured Concentrations (mg/kg)		Number of Exceedances
			Minimum	Maximum	
Arsenic	37	LQM/CIEH	9.1	22	0
Cadmium	11	LQM/CIEH	0.37	4.4	0
Chromium III	910	LQM/CIEH	20	42	0
Chromium VI	6	LQM/CIEH	<0.5	<0.5	0
Copper	2400	LQM/CIEH	16	55	0
Lead	200	pC4SL	24	130	0
Mercury (inorganic)	40	LQM/CIEH	<0.05	0.87	0
Nickel	180	LQM/CIEH	18	36	0
Selenium	250	LQM/CIEH	0.66	1.7	0
Zinc	3700	LQM/CIEH	92	440	0
Cyanide	-	-	<0.5	0.5	0
Phenols	120	LQM/CIEH	<0.1	0.13	0
Boron	290	LQM/CIEH	<0.4	4.7	0
Organic Matter (%)	-	-	<0.1	5.6	-
pH	-	-	6.8	8.6	-
Asbestos	-	-	Not detected		

Notes:
- No available guideline

Table 4.2 Topsoil Summary of Soil Chemical Test Results – Speciated PAH

Substance	Threshold Value (mg/kg)	Source	Measured Concentrations (mg/kg)		Number of Exceedances
			Minimum	Maximum	
Naphthalene	2.3	LQM/CIEH	<0.10	0.53	0
Acenaphthylene	170	LQM/CIEH	<0.10	<0.10	0
Acenaphthene	210	LQM/CIEH	<0.10	<0.10	0
Fluorene	170	LQM/CIEH	<0.10	<0.10	0
Phenanthrene	95	LQM/CIEH	<0.10	0.61	0
Anthracene	2400	LQM/CIEH	<0.10	<0.10	0
Fluoranthene	280	LQM/CIEH	<0.10	1.3	0
Pyrene	620	LQM/CIEH	<0.10	1.0	0
Benzo(a)anthracene	7.2	LQM/CIEH	<0.10	0.78	0
Chrysene	15	LQM/CIEH	<0.10	0.82	0
Benzo(b)fluoranthene	2.6	LQM/CIEH	<0.10	1.1	0
Benzo(k)fluoranthene	77	LQM/CIEH	<0.10	0.33	0
Benzo(a)pyrene	2.2	LQM/CIEH	<0.10	0.75	0
Indeno(123cd)pyrene	27	LQM/CIEH	<0.10	0.65	0
Dibenzo(ah)anthracene	0.24	LQM/CIEH	<0.10	0.19	0
Benzo(ghi)perylene	320	LQM/CIEH	<0.10	0.72	0
Total PAH	-	-	<2.0	8.8	-

Notes:
Thresholds based on 1.0% soil organic matter
- No available guidelines

Table 4.3 Topsoil Summary of Soil Chemical Test Results – Petroleum Hydrocarbons

Substance	Threshold Value (mg/kg)	Source	Measured Concentrations (mg/kg)		Number of Exceedances
			Min	Max	
Aliphatic					
VPH C5 – C6 Ali	42	LQM/CIEH	<0.05	<0.05	0
VPH C6 – C7 Ali	100^	LQM/CIEH	<0.05	<0.05	0
VPH C7 – C8 Ali	100^	LQM/CIEH	<0.05	<0.05	0
VPH C8 – C10 Ali	27	LQM/CIEH	<0.05	<0.05	0
EPH C10 – C12 Ali	130	LQM/CIEH	<2.0	3.8	0
EPH C12 – C16 Ali	1100	LQM/CIEH	<1.0	1.2	0
EPH C16 – C21 Ali	65000*	LQM/CIEH	<2.0	2.8	0
EPH C21 – C35 Ali	65000*	LQM/CIEH	<3.0	20	0
EPH C35 – C40 Ali	65000	LQM/CIEH	<10	<10	0
Aromatic					
VPH C5 – C7 Arom	70	LQM/CIEH	<0.05	<0.05	0
VPH C7 – C8 Arom	130	LQM/CIEH	<0.05	<0.05	0
VPH C8 – C10 Arom	34	LQM/CIEH	<0.05	<0.05	0

EPH C10 – C12 Arom	74	LQM/CIEH	<1.0	<1.0	0
EPH C12 – C16 Arom	140	LQM/CIEH	<1.0	<1.0	0
EPH C16 – C21 Arom	260	LQM/CIEH	<2.0	23	0
EPH C21 – C35 Arom	1100	LQM/CIEH	8.8	120	0
EPH C35 – C40 Arom	1100	LQM/CIEH	<1.0	23	0

Notes:
VPH –Volatile Petroleum Hydrocarbon
EPH – Extractable Petroleum Hydrocarbon
Ali – Aliphatic
Arom – Aromatic
Thresholds based on 1.0% soil organic matter
^ – Ali C6-C7 and C7-C8 based on criteria for Ali EC >6-8
* – Ali C16-21 and C21-C35 based on criteria for Ali EC >16-35

4.2 Subsoil – Tranch Source

Table 4.4 Tranch Source Subsoil Summary of Soil Chemical Test Results – Inorganics & Miscellaneous

Substance	Threshold Value (mg/kg)	Source	Measured Concentrations (mg/kg)		Number of Exceedances
			Minimum	Maximum	
Arsenic	37	LQM/CIEH	6.6	15	0
Cadmium	11	LQM/CIEH	0.11	2	0
Chromium III	910	LQM/CIEH	14	40	0
Chromium VI	6	LQM/CIEH	<0.5	<0.5	0
Copper	2400	LQM/CIEH	6.7	36	0
Lead	200	pC4SL	17	58	0
Mercury (inorganic)	40	LQM/CIEH	<0.05	0.14	0
Nickel	180	LQM/CIEH	10	40	0
Selenium	250	LQM/CIEH	0.61	1.6	0
Zinc	3700	LQM/CIEH	30	220	0
Cyanide	-	-	<0.5	<0.5	0
Phenols	120	LQM/CIEH	<0.1	<0.1	0
Boron	290	LQM/CIEH	<0.4	1.3	0
Organic Matter (%)	-	-	0.5	5.1	-
pH	-	-	7.7.	8.5	-
Asbestos	-	-	Not detected		

Notes:
- No available guideline

Table 4.5 Tranch Source Subsoil Summary of Soil Chemical Test Results – Speciated PAH

Substance	Threshold Value (mg/kg)	Source	Measured Concentrations (mg/kg)		Number of Exceedances
			Minimum	Maximum	
Naphthalene	2.3	LQM/CIEH	<0.10	0.24	0
Acenaphthylene	170	LQM/CIEH	<0.10	<0.10	0
Acenaphthene	210	LQM/CIEH	<0.10	<0.10	0
Fluorene	170	LQM/CIEH	<0.10	<0.10	0
Phenanthrene	95	LQM/CIEH	<0.10	0.49	0
Anthracene	2400	LQM/CIEH	<0.10	0.22	0
Fluoranthene	280	LQM/CIEH	<0.10	1.5	0
Pyrene	620	LQM/CIEH	<0.10	1.2	0
Benzo(a)anthracene	7.2	LQM/CIEH	<0.10	0.82	0
Chrysene	15	LQM/CIEH	<0.10	0.83	0
Benzo(b)fluoranthene	2.6	LQM/CIEH	<0.10	0.87	0
Benzo(k)fluoranthene	77	LQM/CIEH	<0.10	0.22	0
Benzo(a)pyrene	2.2	LQM/CIEH	<0.10	0.66	0
Indeno(123cd)pyrene	27	LQM/CIEH	<0.10	0.45	0
Dibenzo(ah)anthracene	0.24	LQM/CIEH	<0.10	0.2	0
Benzo(ghi)perylene	320	LQM/CIEH	<0.10	0.36	0
Total PAH	-	-	<2.0	7.5	-

Notes:
Thresholds based on 1.0% soil organic matter
- No available guidelines

Table 4.6 Tranch Source Subsoil Summary of Soil Chemical Test Results – Petroleum Hydrocarbons

Substance	Threshold Value (mg/kg)	Source	Measured Concentrations (mg/kg)		Number of Exceedances
			Min	Max	
Aliphatic					
VPH C5 – C6 Ali	42	LQM/CIEH	<0.05	<0.05	0
VPH C6 – C7 Ali	100^	LQM/CIEH	<0.05	<0.05	0
VPH C7 – C8 Ali	100^	LQM/CIEH	<0.05	<0.05	0
VPH C8 – C10 Ali	27	LQM/CIEH	<0.05	<0.05	0
EPH C10 – C12 Ali	130	LQM/CIEH	<2.0	6.6	0
EPH C12 – C16 Ali	1100	LQM/CIEH	<1.0	1.4	0
EPH C16 – C21 Ali	65000*	LQM/CIEH	<2.0	<2.0	0
EPH C21 – C35 Ali	65000*	LQM/CIEH	<3.0	15	0
EPH C35 – C40 Ali	65000	LQM/CIEH	<10	<10	0
Aromatic					
VPH C5 – C7 Arom	70	LQM/CIEH	<0.05	<0.05	0
VPH C7 – C8 Arom	130	LQM/CIEH	<0.05	<0.05	0

VPH C8 – C10 Arom	34	LQM/CIEH	<0.05	<0.05	0
EPH C10 – C12 Arom	74	LQM/CIEH	<1.0	1.5	0
EPH C12 – C16 Arom	140	LQM/CIEH	<1.0	<1.0	0
EPH C16 – C21 Arom	260	LQM/CIEH	<2.0	4.2	0
EPH C21 – C35 Arom	1100	LQM/CIEH	2.8	28	0
EPH C35 – C40 Arom	1100	LQM/CIEH	<1.0	6.6	0

Notes:
VPH –Volatile Petroleum Hydrocarbon
EPH – Extractable Petroleum Hydrocarbon
Ali – Aliphatic
Arom – Aromatic
Thresholds based on 1.0% soil organic matter
^ – Ali C6-C7 and C7-C8 based on criteria for Ali EC >6-8
* – Ali C16-21 and C21-C35 based on criteria for Ali EC >16-35

4.3 Subsoil – Neal Soils Source

Table 4.7 Neal Soils Source Subsoil Summary of Soil Chemical Test Results – Inorganics & Miscellaneous

Substance	Threshold Value (mg/kg)	Source	Measured Concentrations (mg/kg)		Number of Exceedances
			Minimum	Maximum	
Arsenic	37	LQM/CIEH	6.2	29	0
Cadmium	11	LQM/CIEH	0.38	4.4	0
Chromium III	910	LQM/CIEH	17	43	0
Chromium VI	6	LQM/CIEH	<0.5	<0.5	0
Copper	2400	LQM/CIEH	7.4	260	0
Lead	200	pC4SL	41	180	0
Mercury (inorganic)	40	LQM/CIEH	0.06	0.23	0
Nickel	180	LQM/CIEH	9.4	36	0
Selenium	250	LQM/CIEH	0.58	1.7	0
Zinc	3700	LQM/CIEH	93	440	0
Cyanide	-	-	<0.5	3.1	0
Phenols	120	LQM/CIEH	<0.1	<0.1	0
Boron	290	LQM/CIEH	0.53	4.8	0
Organic Matter (%)	-	-	<0.1	3.0	-
pH	-	-	7.8	9.3	-
Asbestos	-	-	Not detected		

Notes:
- No available guideline

Table 4.8 Neal Soils Source Subsoil Summary of Soil Chemical Test Results – Speciated PAH

Substance	Threshold Value (mg/kg)	Source	Measured Concentrations (mg/kg)		Number of Exceedances
			Minimum	Maximum	
Naphthalene	2.3	LQM/CIEH	<0.10	0.22	0
Acenaphthylene	170	LQM/CIEH	<0.10	<0.10	0
Acenaphthene	210	LQM/CIEH	<0.10	0.15	0
Fluorene	170	LQM/CIEH	<0.10	0.14	0
Phenanthrene	95	LQM/CIEH	<0.10	0.6	0
Anthracene	2400	LQM/CIEH	<0.10	0.47	0
Fluoranthene	280	LQM/CIEH	<0.10	1.2	0
Pyrene	620	LQM/CIEH	<0.10	0.78	0
Benzo(a)anthracene	7.2	LQM/CIEH	<0.10	0.61	0
Chrysene	15	LQM/CIEH	<0.10	0.66	0
Benzo(b)fluoranthene	2.6	LQM/CIEH	<0.10	0.88	0
Benzo(k)fluoranthene	77	LQM/CIEH	<0.10	0.49	0
Benzo(a)pyrene	2.2	LQM/CIEH	<0.10	0.69	0
Indeno(123cd)pyrene	27	LQM/CIEH	<0.10	0.74	0
Dibenzo(ah)anthracene	0.24	LQM/CIEH	<0.10	0.43	**1**
Benzo(ghi)perylene	320	LQM/CIEH	<0.10	0.76	0
Total PAH	-	-	<2.0	7.4	-

Notes:
Thresholds based on 1.0% soil organic matter
- No available guidelines

Table 4.9 Subsoil Neal Soils Source -Summary of Soil Chemical Test Results – Petroleum Hydrocarbons

Substance	Threshold Value (mg/kg)	Source	Measured Concentrations (mg/kg)		Number of Exceedances
			Min	Max	
Aliphatic					
VPH C5 – C6 Ali	42	LQM/CIEH	<0.05	<0.05	0
VPH C6 – C7 Ali	100^	LQM/CIEH	<0.05	<0.05	0
VPH C7 – C8 Ali	100^	LQM/CIEH	<0.05	<0.05	0
VPH C8 – C10 Ali	27	LQM/CIEH	<0.05	<0.05	0
EPH C10 – C12 Ali	130	LQM/CIEH	<2.0	4.6	0
EPH C12 – C16 Ali	1100	LQM/CIEH	<1.0	3.6	0
EPH C16 – C21 Ali	65000*	LQM/CIEH	<2.0	4.1	0
EPH C21 – C35 Ali	65000*	LQM/CIEH	<3.0	52	0
EPH C35 – C40 Ali	65000	LQM/CIEH	<10	43	0
Aromatic					
VPH C5 – C7 Arom	70	LQM/CIEH	<0.05	<0.05	0
VPH C7 – C8 Arom	130	LQM/CIEH	<0.05	<0.05	0

VPH C8 – C10 Arom	34	LQM/CIEH	<0.05	<0.05	0
EPH C10 – C12 Arom	74	LQM/CIEH	<1.0	<1.0	0
EPH C12 – C16 Arom	140	LQM/CIEH	<1.0	<1.0	0
EPH C16 – C21 Arom	260	LQM/CIEH	<2.0	30	0
EPH C21 – C35 Arom	1100	LQM/CIEH	<2.0	140	0
EPH C35 – C40 Arom	1100	LQM/CIEH	<1.0	46	0

Notes:
VPH –Volatile Petroleum Hydrocarbon
EPH – Extractable Petroleum Hydrocarbon
Ali – Aliphatic
Arom – Aromatic
Thresholds based on 1.0% soil organic matter
^ – Ali C6-C7 and C7-C8 based on criteria for Ali EC >6-8
* – Ali C16-21 and C21-C35 based on criteria for Ali EC >16-35

5.0 Conclusions

A single of exceedance of dibenz(a,h)anthracene was recorded in the Neal Soils subsoil in Plot 180. It was therefore recommended that the subsoil in Plot 180 be removed and replaced.

This has now been completed, and TFW Group Limited returned to site to inspect and sample the new subsoil on Friday 8th December 2023.

The sample was submitted for laboratory analysis for all the substances listed in the above tables. The results are provided in **Annex D**. All substances were found to be present at concentrations below their respective regulatory threshold levels.

It is therefore concluded that all plots are now suitable for use.

We trust that the above is to your satisfaction, however, if you have any queries or require any further information please do not hesitate to contact us.

Yours sincerely

for: TFW Group Limited

R. Howells.

Mrs Ruth Howells

Enc.

ANNEX A
Soil Sources Laboratory
Chemical Results

Terra Firma (Wales) Ltd. 5 Deryn Court, Wharfedale Road, Pentwyn, Cardiff CF23 7HA
Tel: 029 2073 5354 **Fax:** 029 2073 5433 **Email:** info@terrafirmawales.co.uk **www.terrafirmawales.co.uk**
Registered in Wales No. 4013230. VAT No: 753 2566 25. Registered Office: 5 Deryn Court, Wharfedale Road, Pentwyn, Cardiff CF23 7HA

Chris Jury
Bristol & Avon Group
Ironchurch Road
Avonmouth
Bristol
BS11 9BP

Derwentside Environmental Testing Services Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 23-02803

Site Reference:	Bristol + Avon
Project / Job Ref:	Hallen
Order No:	Chris Jury
Sample Receipt Date:	01/03/2023
Sample Scheduled Date:	01/03/2023
Report Issue Number:	1
Reporting Date:	07/03/2023

Authorised by:

Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.

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.

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate						
DETS Report No: 23-02803	**Date Sampled**	27/02/23				
Bristol & Avon Group	**Time Sampled**	None Supplied				
Site Reference: Bristol + Avon	**TP / BH No**	As Dug Topsoil				
Project / Job Ref: Hallen	**Additional Refs**	None Supplied				
Order No: Chris Jury	**Depth (m)**	None Supplied				
Reporting Date: 07/03/2023	**DETS Sample No**	637568				

Determinand	**Unit**	**RL**	**Accreditation**					
Asbestos Screen (S)	N/a	N/a	**ISO17025**	Not Detected				
pH	pH Units	N/a	**MCERTS**	6.3				
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	**MCERTS**	< 10				
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	**MCERTS**	< 0.01				
Arsenic (As)	mg/kg	< 2	**MCERTS**	8				
Barium (Ba)	mg/kg	< 2.5	**MCERTS**	110				
Beryllium (Be)	mg/kg	< 0.5	**MCERTS**	0.6				
W/S Boron	mg/kg	< 1	NONE	< 1				
Cadmium (Cd)	mg/kg	< 0.2	**MCERTS**	0.3				
Chromium (Cr)	mg/kg	< 2	**MCERTS**	19				
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2				
Copper (Cu)	mg/kg	< 4	**MCERTS**	16				
Lead (Pb)	mg/kg	< 3	**MCERTS**	50				
Mercury (Hg)	mg/kg	< 1	**MCERTS**	< 1				
Nickel (Ni)	mg/kg	< 3	**MCERTS**	14				
Selenium (Se)	mg/kg	< 2	**MCERTS**	< 2				
Vanadium (V)	mg/kg	< 1	**MCERTS**	30				
Zinc (Zn)	mg/kg	< 3	**MCERTS**	87				
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2				

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-02803	**Date Sampled**	27/02/23				
Bristol & Avon Group	**Time Sampled**	None Supplied				
Site Reference: Bristol + Avon	**TP / BH No**	As Dug Topsoil				
Project / Job Ref: Hallen	**Additional Refs**	None Supplied				
Order No: Chris Jury	**Depth (m)**	None Supplied				
Reporting Date: 07/03/2023	**DETS Sample No**	637568				

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1				
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1				
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1				
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1				
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1				
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1				
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1				
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1				
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1				
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1				
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1				
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6				

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - EPH Banded (Type F)						
DETS Report No: 23-02803	**Date Sampled**	27/02/23				
Bristol & Avon Group	**Time Sampled**	None Supplied				
Site Reference: Bristol + Avon	**TP / BH No**	As Dug Topsoil				
Project / Job Ref: Hallen	**Additional Refs**	None Supplied				
Order No: Chris Jury	**Depth (m)**	None Supplied				
Reporting Date: 07/03/2023	**DETS Sample No**	637568				

Determinand	Unit	RL	Accreditation					
EPH (>C8 - C10)	mg/kg	< 1	MCERTS	< 1				
EPH (>C10 - C12)	mg/kg	< 1	MCERTS	< 1				
EPH (>C12 - C16)	mg/kg	< 1	MCERTS	< 1				
EPH (>C16 - C21)	mg/kg	< 1	MCERTS	< 1				
EPH (>C21 - C40)	mg/kg	< 6	MCERTS	11				
EPH (C8 - C40)	mg/kg	< 6	MCERTS	11				

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Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 23-02803	
Bristol & Avon Group	
Site Reference: Bristol + Avon	
Project / Job Ref: Hallen	
Order No: Chris Jury	
Reporting Date: 07/03/2023	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
& 637568	As Dug Topsoil	None Supplied	None Supplied	5.3	Light brown sandy clay with vegetation

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
& samples received in inappropriate containers for hydrocarbon analysis

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 23-02803
Bristol & Avon Group
Site Reference: Bristol + Avon
Project / Job Ref: Hallen
Order No: Chris Jury
Reporting Date: 07/03/2023

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

terra firma
Geotechnical & Geoenvironmental Specialists
www.terrafirmawales.co.uk

Our Ref: DE/17562/GAC

Your Ref:

Contact: David Emanuel

25th April 2023

Firmacore Limited
7 Westend Courtyard
Grove Lane
Westend
Stonehouse
Gloucestershire
GL10 3SL

For the attn. of Mr Macca Jones (macca.jones@firmacore.co.uk)

Dear Mr Jones

ASSESSMENT OF PROPOSED CAPPING SOIL AGAINST RESIDENTIAL GACs: HERBERT ROAD, NEWPORT

Firmacore Groundworks and Civil Engineering have retained TFW Group Limited to compare a Soil Chemical Analysis Report to published Generic Assessment Criteria (Chemical) for a residential setting with plant uptake.

TFW Group was provided with Chemtech Environmental Report 121006 dated 6th April 2023. The Covering sheet records the client as Neal Soil Suppliers. Seven samples were analysed (Lab Ref. 121006 -01 to 121006-07)

It should be noted that TFW Group Limited did not take the samples and have not observed the physical nature of the soils. TFW Group Limited does not know the history of the source site and, thus, the applicability of the analytical suite. The report recorded the samples as deviating. This report only compares the result sheet to published GACs for a residential setting with plant uptake.

The Chemical Test Results are attached for reference.

Comparison of the chemical results with Generic Assessment Criteria for a residential setting with plant uptake published by the Chartered Institute for Environmental Health (S4UL) or, in their absence, CLEA, confirmed that the chemical concentrations did not exceed the GACs.

Any import should be performed under an appropriate Permit, Exemption or MMP.

We trust that the above is to your satisfaction, however, if you have any queries or require any further information please do not hesitate to contact us.

Yours sincerely
for: Terra Firma (Wales) Ltd

Mr D Emanuel

terra firma

Chemical Test Result Sheet

Terra Firma (Wales) Ltd. 5 Deryn Court, Wharfedale Road, Pentwyn, Cardiff CF23 7HA
Tel: 029 2073 5354 **Fax:** 029 2073 5433 **Email:** info@terrafirmawales.co.uk **www.terrafirmawales.co.uk**

Registered in Wales No. 4013230. VAT No: 753 2566 25. Registered Office: 5 Deryn Court, Wharfedale Road, Pentwyn, Cardiff CF23 7HA

ANALYTICAL TEST REPORT

Contract no: 121006

Contract name: -

Client reference: -

Clients name: Neal Soil Suppliers

Clients address: Ty-To-Maen Farm
Newton Road
Rumney, Cardiff
CF3 2EJ

Samples received: 28 March 2023

Analysis started: 28 March 2023

Analysis completed: 06 April 2023

Report issued: 06 April 2023

Key

U	UKAS accredited test
M	MCERTS & UKAS accredited test
$	Test carried out by an approved subcontractor
I/S	Insufficient sample to carry out test
N/S	Sample not suitable for testing
NAD	No Asbestos Detected

Approved by:

Will Fardon
Technical Director

Chemtech Environmental Limited

SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
121006-1	Sample 1	-	Sandy Clay with Gravel & Roots	-	-	26.0
121006-2	Sample 2	-	Sandy Clay with Gravel & Roots	-	-	30.6
121006-3	Sample 3	-	Sandy Clay with Gravel & Roots	-	-	27.6
121006-4	Sample 4	-	Loamy Sand with Gravel & Roots	-	-	19.1
121006-5	Sample 5	-	Sandy Clay with Gravel & Roots	-	-	26.1
121006-6	Sample 6	-	Sandy Clay with Gravel & Roots	-	-	29.8
121006-7	Sample 7	-	Sandy Clay with Gravel & Roots	-	-	25.7

Chemtech Environmental Limited

SOILS

Lab number			121006-1	121006-2	121006-3	121006-4	121006-5	121006-6
Sample id			Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6
Depth (m)			-	-	-	-	-	-
Date sampled			24/03/2023	24/03/2023	24/03/2023	24/03/2023	24/03/2023	24/03/2023
Test	**GAC**	**Units**						
Boron (water soluble)	290	mg/kg B	2.0	2.8	2.4	1.8	2.4	2.7
Chromium (III)	CE208	mg/kg CrIII	36	41	53	40	45	48
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1	<1	<1	<1
Arsenic	$ M	mg/kg	14	11	10	8.9	10	12
Beryllium	$ M	mg/kg	0.5	0.6	0.6	0.6	0.6	0.6
Cadmium	$ M	mg/kg	5.1	2.5	2.6	2.1	5.3	3.3
Chromium	$ M	mg/kg	36	41	53	40	45	48
Copper	$ M	mg/kg	70	74	76	45	62	79
Lead	$ M	mg/kg	37	32	35	47	43	55
Mercury	$ M	mg/kg	0.2	0.2	0.1	0.1	0.1	0.1
Nickel	$ M	mg/kg	20	21	20	26	20	22
Selenium	$ M	mg/kg	<1	<1	<1	<1	<1	<1
Vanadium	$ M	mg/kg	26	25	26	22	27	31
Zinc	$ M	mg/kg	172	292	263	180	205	261
pH	CE004 M	units	8.6	8.6	8.8	8.7	8.6	8.6
Cyanide (total)	CE077	mg/kg CN	<1	<1	<1	<1	<1	<1
Phenols (total)	CE078	mg/kg PhOH	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Organic Carbon (TOC)	CE197	% w/w C	7.2	9.5	9.9	4.4	7.9	9.0
Estimate of OMC (calculated from TOC)	CE197	% w/w	12.5	16.4	17.0	7.6	13.5	15.6
PAH								
Naphthalene	CE087 M	mg/kg	0.07	0.03	0.05	0.04	0.04	0.05
Acenaphthylene	CE087 M	mg/kg	0.03	0.02	0.03	<0.02	<0.02	<0.02
Acenaphthene	CE087 M	mg/kg	0.03	<0.02	0.06	<0.02	<0.02	0.04
Fluorene	CE087 U	mg/kg	0.03	0.02	0.07	0.03	<0.02	0.05
Phenanthrene	CE087 M	mg/kg	0.34	0.21	0.40	0.18	0.18	0.56
Anthracene	CE087 U	mg/kg	0.07	0.07	0.14	0.04	0.05	0.15
Fluoranthene	CE087 M	mg/kg	0.49	0.61	0.88	0.35	0.38	0.95
Pyrene	CE087 M	mg/kg	0.40	0.50	0.69	0.29	0.31	0.75
Benzo(a)anthracene	CE087 U	mg/kg	0.24	0.33	0.50	0.19	0.20	0.45
Chrysene	CE087 M	mg/kg	0.30	0.39	0.53	0.25	0.26	0.48
Benzo(b)fluoranthene	CE087 M	mg/kg	0.32	0.45	0.60	0.28	0.39	0.53
Benzo(k)fluoranthene	CE087 M	mg/kg	0.11	0.16	0.24	0.10	0.13	0.20
Benzo(a)pyrene	CE087 U	mg/kg	0.21	0.28	0.40	0.17	0.27	0.37
Indeno(123cd)pyrene	CE087 M	mg/kg	0.20	0.25	0.34	0.16	0.29	0.34
Dibenz(ah)anthracene	CE087 M	mg/kg	0.04	0.04	0.09	0.04	0.06	0.07
Benzo(ghi)perylene	CE087 M	mg/kg	0.13	0.18	0.26	0.12	0.18	0.24
PAH (total of USEPA 16)	CE087	mg/kg	3.00	3.56	5.28	2.24	2.73	5.23
TPH								
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Chemtech Environmental Limited

SOILS

Lab number			121006-1	121006-2	121006-3	121006-4	121006-5	121006-6
Sample id			Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6
Depth (m)			-	-	-	-	-	-
Date sampled			24/03/2023	24/03/2023	24/03/2023	24/03/2023	24/03/2023	24/03/2023
Test	**Method**	**Units**						
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	<10	<10	<10	<10	<10	<10
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	<10	11	<10	<10	<10	<10
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	<1	48	<1	<1	10	<1
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	50	167	110	24	84	79
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EPH Aliphatic (>C10-C12)	CE250	mg/kg	<6	<6	<6	<6	<6	<6
EPH Aliphatic (>C12-C16)	CE250	mg/kg	7	7	<6	<6	<6	<6
EPH Aliphatic (>C16-C35)	CE250	mg/kg	28	58	58	<15	61	28
Total Aliphatic/Aromatic (>C5-C35)	CE225	mg/kg	85.16	290.06	167.98	24.35	154.97	106.96
Subcontracted analysis								
Asbestos (qualitative)	$	-	NAD	NAD	NAD	NAD	NAD	NAD

Chemtech Environmental Limited

SOILS

Lab number			121006-7
Sample id			Sample 7
Depth (m)			-
Date sampled			24/03/2023
Test	**Method**	**Units**	
Boron (water soluble)	CE063 [U]	mg/kg B	2.6
Chromium (III)	CE208	mg/kg CrIII	55
Chromium (VI)	CE146	mg/kg CrVI	<1
Arsenic	$ [M]	mg/kg	13
Beryllium	$ [M]	mg/kg	0.6
Cadmium	$ [M]	mg/kg	3.0
Chromium	$ [M]	mg/kg	55
Copper	$ [M]	mg/kg	93
Lead	$ [M]	mg/kg	12
Mercury	$ [M]	mg/kg	0.2
Nickel	$ [M]	mg/kg	25
Selenium	$ [M]	mg/kg	<1
Vanadium	$ [M]	mg/kg	30
Zinc	$ [M]	mg/kg	279
pH	CE004 [M]	units	8.5
Cyanide (total)	CE077	mg/kg CN	<1
Phenols (total)	CE078	mg/kg PhOH	<0.5
Total Organic Carbon (TOC)	CE197	% w/w C	6.5
Estimate of OMC (calculated from TOC)	CE197	% w/w	11.1
PAH			
Naphthalene	CE087 [M]	mg/kg	0.04
Acenaphthylene	CE087 [M]	mg/kg	0.03
Acenaphthene	CE087 [M]	mg/kg	0.04
Fluorene	CE087 [U]	mg/kg	0.05
Phenanthrene	CE087 [M]	mg/kg	0.68
Anthracene	CE087 [U]	mg/kg	0.19
Fluoranthene	CE087 [M]	mg/kg	1.63
Pyrene	CE087 [M]	mg/kg	1.23
Benzo(a)anthracene	CE087 [U]	mg/kg	0.80
Chrysene	CE087 [M]	mg/kg	0.81
Benzo(b)fluoranthene	CE087 [M]	mg/kg	0.92
Benzo(k)fluoranthene	CE087 [M]	mg/kg	0.34
Benzo(a)pyrene	CE087 [U]	mg/kg	0.60
Indeno(123cd)pyrene	CE087 [M]	mg/kg	0.49
Dibenz(ah)anthracene	CE087 [M]	mg/kg	0.13
Benzo(ghi)perylene	CE087 [M]	mg/kg	0.38
PAH (total of USEPA 16)	CE087	mg/kg	8.36
TPH			
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01

Chemtech Environmental Limited

SOILS

Lab number			121006-7
Sample id			Sample 7
Depth (m)			-
Date sampled			24/03/2023
Test	**Method**	**Units**	
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	<10
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	<10
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	<1
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	60
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1
EPH Aliphatic (>C10-C12)	CE250	mg/kg	<6
EPH Aliphatic (>C12-C16)	CE250	mg/kg	<6
EPH Aliphatic (>C16-C35)	CE250	mg/kg	32
Total Aliphatic/Aromatic (>C5-C35)	CE225	mg/kg	91.34
Subcontracted analysis			
Asbestos (qualitative)	$	-	NAD

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE063	Boron (water soluble)	Hot water extract, ICP-OES	Dry	U	0.5	mg/kg B
CE208	Chromium (III)	Calculation: Cr (total) - Cr (VI)	Dry		1	mg/kg CrIII
CE146	Chromium (VI)	Acid extraction, Colorimetry	Dry		1	mg/kg CrVI
^{M}	Arsenic	Aqua regia digest, ICP-MS	Dry	M	0.5	mg/kg
^{M}	Beryllium	Aqua regia digest, ICP-MS	Dry	M	0.5	mg/kg
^{M}	Cadmium	Aqua regia digest, ICP-MS	Dry	M	0.2	mg/kg
^{M}	Chromium	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg
^{M}	Copper	Aqua regia digest, ICP-MS	Dry	M	4	mg/kg
^{M}	Lead	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg
^{M}	Mercury	Aqua regia digest, ICP-MS	Dry	M	0.1	mg/kg
^{M}	Nickel	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg
^{M}	Selenium	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg
^{M}	Vanadium	Aqua regia digest, ICP-MS	Dry	M	0.5	mg/kg
^{M}	Zinc	Aqua regia digest, ICP-MS	Dry	M	4.5	mg/kg
CE004	pH	Based on BS 1377, pH Meter	As received	M	-	units
CE077	Cyanide (total)	Extraction, Continuous Flow Colorimetry	As received		1	mg/kg CN
CE078	Phenols (total)	Extraction, Continuous Flow Colorimetry	As received		0.5	mg/kg PhOH
CE197	Total Organic Carbon (TOC)	Carbon Analyser	Dry		0.1	% w/w C
CE197	Estimate of OMC (calculated from TOC)	Calculation from Total Organic Carbon	Dry		0.1	% w/w
CE087	Naphthalene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Fluorene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Phenanthrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(a)anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Chrysene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(b)fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(k)fluoranthene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(a)pyrene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Indeno(123cd)pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Dibenz(ah)anthracene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(ghi)perylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	PAH (total of USEPA 16)	Solvent extraction, GC-MS	As received		0.34	mg/kg
CE067	VPH Aromatic (>EC5-EC7)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC7-EC8)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC8-EC10)	Headspace GC-FID	As received		0.01	mg/kg
CE250	EPH Aromatic (>EC10-EC12)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC12-EC16)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC16-EC21)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC21-EC35)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE067	VPH Aliphatic (>C5-C6)	Headspace GC-FID	As received		0.1	mg/kg

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE067	VPH Aliphatic (>C6-C8)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C8-C10)	Headspace GC-FID	As received		0.1	mg/kg
CE250	EPH Aliphatic (>C10-C12)	Solvent extraction, GCxGC-FID	As received		6	mg/kg
CE250	EPH Aliphatic (>C12-C16)	Solvent extraction, GCxGC-FID	As received		6	mg/kg
CE250	EPH Aliphatic (>C16-C35)	Solvent extraction, GCxGC-FID	As received		15	mg/kg
CE225	Total Aliphatic/Aromatic (>C5-C35)	Sum of Aliphatic & Aromatic VPH (>C5-C10) & EPH (>C10-C35)	As received		15	mg/kg
$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments
Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.
For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.
Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
121006-1	Sample 1	-	Y	PAH (IC), TPH (IC)
121006-2	Sample 2	-	Y	PAH (IC), TPH (IC)
121006-3	Sample 3	-	Y	PAH (IC), TPH (IC)
121006-4	Sample 4	-	Y	PAH (IC), TPH (IC)
121006-5	Sample 5	-	Y	PAH (IC), TPH (IC)
121006-6	Sample 6	-	Y	PAH (IC), TPH (IC)
121006-7	Sample 7	-	Y	PAH (IC), TPH (IC)

Chemtech Environmental Limited

ADDITIONAL INFORMATION

Notes

Opinions and interpretations expressed herein are outside the UKAS accreditation scope.

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

This report shall not be reproduced except in full, without prior written approval.

Samples will be disposed of 4 weeks from initial receipt unless otherwise instructed.

For soils and solids, all results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

For soils and solids, analytical results are inclusive of stones, where applicable.

Moisture Content Calculated on a Wet Weight basis

terra firma
Geotechnical & Geoenvironmental Specialists
www.terrafirmawales.co.uk

Our Ref: DE/17562/Garden

Your Ref:

Contact: David Emanuel

30th January 2023

Firmacore Limited
7 Westend Courtyard
Grove Lane
Westend
Stonehouse
Gloucestershire
GL10 3SL

For the attn. of Mr Macca Jones (macca.jones@firmacore.co.uk)

Dear Mr Jones

ASSESSMENT OF PROPOSED CAPPING SOIL AGAINST RESIDENTIAL GACs: HERBERT ROAD, NEWPORT

Firmacore Groundworks and Civil Engineering have retained TFW Group Limited to compare a Soil Chemical Analysis Report to published Generic Assessment Criteria (Chemical) for a residential setting with plant uptake. The source site is Penywaun Lane, Tranch.

The report was presumably taken from *Annex G* of a Site Investigation Report for Penywaun Lane, Tranch. It should be noted that TFW Group Limited did not take the samples and have not observed the physical nature of the soils. TFW Group Limited do does not know the history of the source site and, thus, the applicability of the analytical suite. This report only compares the result sheet to published GACs for a residential setting. The Chemical Test Results are attached for reference.

Comparison of the chemical results with Generic Assessment Criteria for a residential setting with plant uptake published by the Chartered Institute for Environmental Health (S4UL) or, in their absence, CLEA, confirmed that the soils chemical concentrations do not exceed the GACs.

We trust that the above is to your satisfaction, however, if you have any queries or require any further information please do not hesitate to contact us.

Yours sincerely
for: Terra Firma (Wales) Ltd

Mr D Emanuel

Chemical Test Result Sheet

Terra Firma (Wales) Ltd. 5 Deryn Court, Wharfedale Road, Pentwyn, Cardiff CF23 7HA
Tel: 029 2073 5354 **Fax:** 029 2073 5433 **Email:** info@terrafirmawales.co.uk **www.terrafirmawales.co.uk**

Registered in Wales No. 4013230. VAT No: 753 2566 25. Registered Office: 5 Deryn Court, Wharfedale Road, Pentwyn, Cardiff CF23 7HA

APPENDIX G

LABORATORY CHEMICAL TEST RESULTS (SOILS)

Jack Jones
Integral Geotechnique
Integral House
7 Beddau Way
Castlegate Business Park
CF83 2AX

t: 02920807991
f: 02920862176
e: jack@integralgeotec.com

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 20-80658

Project / Site name:	Penywain Ln	**Samples received on:**	14/01/2020
Your job number:	12582	**Samples instructed on:**	14/01/2020
Your order number:		**Analysis completed by:**	21/01/2020
Report Issue Number:	1	**Report issued on:**	21/01/2020
Samples Analysed:	6 soil samples		

Signed: A. Czerwińska

Agnieszka Czerwińska

Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 20-80658

Project / Site name: Penywain Ln

Lab Sample Number				1409724	1409725	1409726	1409727	1409728
Sample Reference				SA2	TP1	TP2	TP3	TP5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	0.20	0.20	0.30	0.50
Date Sampled				10/01/2020	10/01/2020	10/01/2020	10/01/2020	10/01/2020
Time Taken				0930	1000	1030	1100	1200
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	13	10	9.4	10	14
Total mass of sample received	kg	0.001	NONE	0.60	0.60	0.80	0.60	0.60
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.7	7.6	7.9	8.0	8.0
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total Sulphate as SO_4	mg/kg	50	MCERTS	350	180	970	1400	700
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.010	0.0086	0.023	0.010	0.024
Sulphide	mg/kg	1	MCERTS	< 1.0	1.0	< 1.0	1.3	< 1.0
Total Sulphur	mg/kg	50	MCERTS	140	72	400	480	360
Total Organic Carbon (TOC)	%	0.1	MCERTS	1.1	0.5	0.7	0.8	0.8
Loss on Ignition @ 450°C	%	0.2	MCERTS	4.2	2.2	3.3	3.5	4.0
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.31	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.42	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.29	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.24	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.22	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	1.48	< 0.80	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	4.6	5.2	6.4	9.1	6.7
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.96	0.65	0.75	0.77	1.0
Boron (water soluble)	mg/kg	0.2	MCERTS	0.4	0.2	0.3	0.3	0.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.4	< 0.2	4.1	8.0	5.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	17	12	17	17	17
Copper (aqua regia extractable)	mg/kg	1	MCERTS	23	21	20	22	25
Lead (aqua regia extractable)	mg/kg	1	MCERTS	25	31	64	30	24
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	31	20	25	25	24
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	1.9	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	19	16	18	19	22
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	96	35	170	340	250

Analytical Report Number: 20-80658

Project / Site name: Penywain Ln

Lab Sample Number				1409729				
Sample Reference				TP7				
Sample Number				None Supplied				
Depth (m)				0.40				
Date Sampled				10/01/2020				
Time Taken				1300				
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	15				
Total mass of sample received	kg	0.001	NONE	0.60				
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected				
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.7				
Total Cyanide	mg/kg	1	MCERTS	< 1				
Total Sulphate as SO_4	mg/kg	50	MCERTS	420				
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.040				
Sulphide	mg/kg	1	MCERTS	< 1.0				
Total Sulphur	mg/kg	50	MCERTS	190				
Total Organic Carbon (TOC)	%	0.1	MCERTS	2.1				
Loss on Ignition @ 450°C	%	0.2	MCERTS	6.2				
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0				
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05				
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05				
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05				
Fluorene	mg/kg	0.05	MCERTS	< 0.05				
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05				
Anthracene	mg/kg	0.05	MCERTS	< 0.05				
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05				
Pyrene	mg/kg	0.05	MCERTS	< 0.05				
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05				
Chrysene	mg/kg	0.05	MCERTS	< 0.05				
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05				
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05				
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05				
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05				
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05				
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05				
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80				
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.0				
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.2				
Boron (water soluble)	mg/kg	0.2	MCERTS	0.4				
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.4				
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0				
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	19				
Copper (aqua regia extractable)	mg/kg	1	MCERTS	31				
Lead (aqua regia extractable)	mg/kg	1	MCERTS	30				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3				
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	29				
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	1.5				
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	24				
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	97				

Analytical Report Number : 20-80658

Project / Site name: Penywain Ln

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1409724	SA2	None Supplied	0.20	Brown loam and clay with gravel and vegetation.
1409725	TP1	None Supplied	0.20	Brown loam and clay with gravel and vegetation.
1409726	TP2	None Supplied	0.20	Brown loam and clay with gravel and vegetation.
1409727	TP3	None Supplied	0.30	Brown loam and clay with gravel and vegetation.
1409728	TP5	None Supplied	0.50	Brown loam and clay with gravel and vegetation.
1409729	TP7	None Supplied	0.40	Brown loam and clay with gravel and vegetation.

Analytical Report Number : 20-80658

Project / Site name: Penywain Ln

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L047-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In-house method based on BS1377 Part 2, 1990, Classification tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, and MEWAM 2006 Methods for the Determination of Metals in Soil	L038-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Determinant	Unit	Generic Assessment Criteria for Residential Setting with Plant Uptake	Source of GAC
Asbestos	%	None Detected	
Boron (Hot Water Soluble)	mg/kg	290	S4UL
Cyanide (Total)	mg/kg	8	CLEA (WITHDRAWN)
Arsenic	mg/kg	37	S4UL
Cadmium	mg/kg	11	S4UL
Mercury (Inorganic)	mg/kg	40	S4UL
Copper	mg/kg	2400	S4UL
Nickel	mg/kg	130	S4UL
Lead	mg/kg	200	C4SL
Selenium	mg/kg	250	S4UL
Vanadium	mg/kg	410	S4UL
Zinc	mg/kg	3700	S4UL
Chromium (Trivalent)	mg/kg	910	S4UL
Chromium (Hexavalent)	mg/kg	6	S4UL
Aliphatic TPH >C5-C6	mg/kg	42	S4UL
Aliphatic TPH >C6-C8	mg/kg	100	S4UL
Aliphatic TPH >C8-C10	mg/kg	27	S4UL
Aliphatic TPH >C10-C12	mg/kg	130	S4UL
Aliphatic TPH >C12-C16	mg/kg	1100	S4UL
Aliphatic TPH >C16-C21	mg/kg	65000	S4UL
Aliphatic TPH >C21-C35	mg/kg	65000	S4UL
Aliphatic TPH >C35-C44	mg/kg	65000	S4UL
Aromatic TPH >C5-C7	mg/kg	70	S4UL
Aromatic TPH >C7-C8	mg/kg	130	S4UL
Aromatic TPH >C8-C10	mg/kg	34	S4UL
Aromatic TPH >C10-C12	mg/kg	74	S4UL
Aromatic TPH >C12-C16	mg/kg	140	S4UL
Aromatic TPH >C16-C21	mg/kg	260	S4UL
Aromatic TPH >C21-C35	mg/kg	1100	S4UL
Aromatic TPH >C35-C44	mg/kg	1100	S4UL
Naphthalene	mg/kg	2.3	S4UL
Acenaphthylene	mg/kg	170	S4UL
Acenaphthene	mg/kg	210	S4UL
Fluorene	mg/kg	170	S4UL
Phenanthrene	mg/kg	95	S4UL
Anthracene	mg/kg	2400	S4UL
Fluoranthene	mg/kg	280	S4UL
Pyrene	mg/kg	620	S4UL
Benzo[a]anthracene	mg/kg	7.2	S4UL
Chrysene	mg/kg	15	S4UL
Benzo[b]fluoranthene	mg/kg	2.6	S4UL
Benzo[k]fluoranthene	mg/kg	77	S4UL
Benzo[a]pyrene	mg/kg	2.2	S4UL
Indeno(1,2,3-c,d)Pyrene	mg/kg	27	S4UL
Dibenz(a,h)Anthracene	mg/kg	0.24	S4UL
Benzo[g,h,i]perylene	mg/kg	320	S4UL
Total Phenols	mg/kg	120	S4UL
Benzene	mg/kg	0.087	S4UL
Toluene	mg/kg	130	S4UL
Ethylbenzene	mg/kg	47	S4UL
Xylene	mg/kg	56	S4UL

ANNEX B
Capping Thickness Validation Photos

Terra Firma (Wales) Ltd. 5 Deryn Court, Wharfedale Road, Pentwyn, Cardiff CF23 7HA
Tel: 029 2073 5354 **Fax:** 029 2073 5433 **Email:** info@terrafirmawales.co.uk **www.terrafirmawales.co.uk**
Registered in Wales No. 4013230. VAT No: 753 2566 25. Registered Office: 5 Deryn Court, Wharfedale Road, Pentwyn, Cardiff CF23 7HA

Plot 47

Plot 50

Plot 55

Plot 122

Plot 126

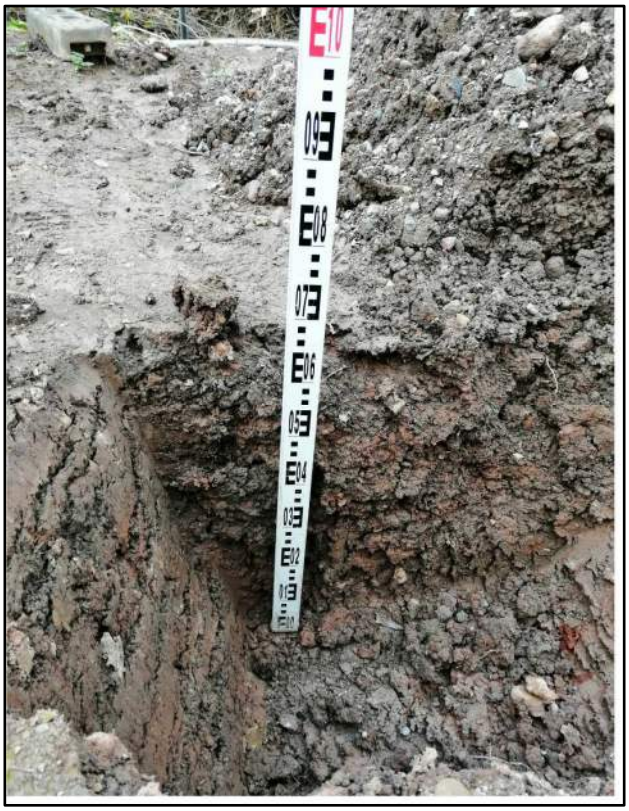
Plots 144-149 (before topsoil)

Plot 168

Plot 171

Plot 177

Plot 182



Plot 185

Plot 190

Plot 194

Plots 138-143

Plots 161-166

ANNEX C
Imported Soils – Laboratory Test Results

Terra Firma (Wales) Ltd. 5 Deryn Court, Wharfedale Road, Pentwyn, Cardiff CF23 7HA
Tel: 029 2073 5354 **Fax:** 029 2073 5433 **Email:** info@terrafirmawales.co.uk **www.terrafirmawales.co.uk**
Registered in Wales No. 4013230. VAT No: 753 2566 25. Registered Office: 5 Deryn Court, Wharfedale Road, Pentwyn, Cardiff CF23 7HA

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

Final Report

Report No.:	23-25652-1
Initial Date of Issue:	04-Aug-2023
Re-Issue Details:	
Client	Terra Firma (Wales) Ltd
Client Address:	5 Deryn Court Wharfedale Road Pentwyn Cardiff CF23 7HA
Contact(s):	ruth@terrafirmawales.co.uk
Project	Herbert Road (H.Road)
Quotation No.:	
Order No.:	12032-P3S - RH
No. of Samples:	10
Turnaround (Wkdays):	5
Date Approved:	04-Aug-2023
Approved By:	
Details:	Stuart Henderson, Technical Manager

Date Received:	31-Jul-2023
Date Instructed:	31-Jul-2023
Results Due:	04-Aug-2023

Results - Soil

Project: Herbert Road (H.Road)

Client: Terra Firma (Wales) Ltd		**Chemtest Job No.:**			23-25652	23-25652	23-25652	23-25652	23-25652	23-25652	23-25652	23-25652	23-25652
Quotation No.:		**Chemtest Sample ID.:**			1681209	1681210	1681211	1681213	1681214	1681215	1681216	1681217	1681218
Order No.: 12032-P3S - RH		Client Sample Ref.:			PLOT 178 SS	PLOT 55 SS	PLOT 175 SS	PLOT 177 SS	PLOT 180 SS	PLOT 50 SS	PLOT 122 SS	PLOT 122 TS	PLOT 126 SS
		Client Sample ID.:			PLOT 178 SS	PLOT 55 SS	PLOT 175 SS	PLOT 177 SS	PLOT 180 SS	PLOT 50 SS	PLOT 122 SS	PLOT 122 TS	PLOT 126 SS
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Date Sampled:			28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023
		Time Sampled:			12:00	12:00	12:00	12:00	12:00	12:00	12:00	12:00	12:00
		Asbestos Lab:			DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**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	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	-	-	-	-	-	-	-	-
Moisture	N	2030	%	0.020	17	25	17	16	15	17	30	26	18
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones and Roots	Stones and Roots	Stones and Roots	Stones	Stones and Roots	Stones	Stones and Roots	Stones and Roots	Stones and Roots
Soil Texture	N	2040		N/A	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay
pH	M	2010		4.0	8.2	8.1	8.6	8.8	8.4	8.2	7.7	7.8	8.1
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	0.53	1.3	0.64	0.55	0.55	< 0.40	1.0	2.0	< 0.40
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	< 0.50	3.1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Sulphate (Acid Soluble)	U	2430	%	0.010	0.042	0.020	0.073	0.083	0.093	0.028	0.10	0.080	0.046
Arsenic	M	2455	mg/kg	0.5	6.7	11	10	9.7	12	8.4	15	14	7.2
Cadmium	M	2455	mg/kg	0.10	0.38	0.34	0.97	0.72	0.91	0.11	1.9	1.3	2.0
Chromium	M	2455	mg/kg	0.5	37	14	28	25	30	15	40	36	16
Mercury Low Level	M	2450	mg/kg	0.05	0.14	< 0.05	0.09	0.08	0.12	< 0.05	0.06	< 0.05	0.11
Copper	M	2455	mg/kg	0.50	16	6.7	25	22	24	12	27	16	26
Nickel	M	2455	mg/kg	0.50	22	10	27	23	28	17	32	30	23
Lead	M	2455	mg/kg	0.50	41	17	49	44	180	19	58	41	45
Selenium	M	2455	mg/kg	0.25	0.62	1.6	0.81	0.77	1.0	0.71	0.85	0.80	0.61
Zinc	M	2455	mg/kg	0.50	93	30	140	110	140	65	220	170	150
Chromium (Trivalent)	N	2490	mg/kg	1.0	37	14	28	25	30	15	40	36	16
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Aliphatic VPH >C5-C6	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C7	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C7-C8	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C8 (Sum)	N	2780	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic VPH >C8-C10	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aliphatic VPH >C5-C10	U	2780	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Aliphatic EPH >C10-C12	M	2690	mg/kg	2.00	4.6	3.2	2.8	2.5	3.4	3.2	6.6	3.8	3.5
Aliphatic EPH >C12-C16	M	2690	mg/kg	1.00	2.9	1.1	3.6	< 1.0	< 1.0	< 1.0	1.4	< 1.0	1.0
Aliphatic EPH >C16-C21	M	2690	mg/kg	2.00	< 2.0	< 2.0	4.1	< 2.0	3.4	< 2.0	< 2.0	< 2.0	< 2.0
Aliphatic EPH >C21-C35	M	2690	mg/kg	3.00	< 3.0	< 3.0	14	5.5	52	< 3.0	3.5	< 3.0	< 3.0
Aliphatic EPH >C35-C40	N	2690	mg/kg	10.00	< 10	< 10	13	< 10	43	< 10	< 10	< 10	< 10
Total Aliphatic EPH >C10-C35	M	2690	mg/kg	5.00	12	7.1	25	8.9	59	< 5.0	12	6.2	6.8
Aromatic VPH >C5-C7	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic VPH >C7-C8	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Results - Soil

Project: Herbert Road (H.Road)

Client: Terra Firma (Wales) Ltd			**Chemtest Job No.:**		23-25652	23-25652	23-25652	23-25652	23-25652	23-25652	23-25652	23-25652	23-25652
Quotation No.:			**Chemtest Sample ID.:**		1681209	1681210	1681211	1681213	1681214	1681215	1681216	1681217	1681218
Order No.: 12032-P3S - RH			Client Sample Ref.:		PLOT 178 SS	PLOT 55 SS	PLOT 175 SS	PLOT 177 SS	PLOT 180 SS	PLOT 50 SS	PLOT 122 SS	PLOT 122 TS	PLOT 126 SS
			Client Sample ID.:		PLOT 178 SS	PLOT 55 SS	PLOT 175 SS	PLOT 177 SS	PLOT 180 SS	PLOT 50 SS	PLOT 122 SS	PLOT 122 TS	PLOT 126 SS
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Date Sampled:		28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023
			Time Sampled:		12:00	12:00	12:00	12:00	12:00	12:00	12:00	12:00	12:00
			Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Aromatic VPH >C8-C10	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aromatic VPH >C5-C10	U	2780	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Aromatic EPH >C10-C12	U	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.5	< 1.0	< 1.0
Aromatic EPH >C12-C16	U	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic EPH >C16-C21	U	2690	mg/kg	2.00	2.4	< 2.0	8.4	< 2.0	6.3	< 2.0	< 2.0	< 2.0	< 2.0
Aromatic EPH >C21-C35	U	2690	mg/kg	2.00	18	14	35	18	140	6.0	28	9.5	4.4
Aromatic EPH >C35-C40	N	2690	mg/kg	1.00	3.2	2.6	9.6	3.9	46	2.4	6.6	2.3	< 1.0
Total Aromatic EPH >C10-C35	U	2690	mg/kg	5.00	21	14	44	20	150	7.3	31	10	< 5.0
Total VPH >C5-C10	U	2780	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total EPH >C10-C35	U	2690	mg/kg	10.00	32	21	68	29	210	12	42	16	11
Naphthalene	M	2800	mg/kg	0.10	0.21	< 0.10	0.22	0.15	0.20	0.24	< 0.10	0.13	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.15	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.13	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2800	mg/kg	0.10	0.34	0.24	0.36	0.20	0.35	0.49	< 0.10	< 0.10	0.32
Anthracene	M	2800	mg/kg	0.10	< 0.10	< 0.10	0.13	< 0.10	0.22	0.11	< 0.10	< 0.10	0.22
Fluoranthene	M	2800	mg/kg	0.10	0.72	0.46	0.67	0.42	0.63	0.97	< 0.10	< 0.10	1.5
Pyrene	M	2800	mg/kg	0.10	0.56	0.31	0.55	0.33	0.64	0.75	< 0.10	< 0.10	1.2
Benzo[a]anthracene	M	2800	mg/kg	0.10	0.38	0.16	0.28	0.20	0.53	0.46	< 0.10	< 0.10	0.82
Chrysene	M	2800	mg/kg	0.10	0.43	0.17	0.30	0.25	0.66	0.69	< 0.10	< 0.10	0.83
Benzo[b]fluoranthene	M	2800	mg/kg	0.10	0.48	< 0.10	0.53	0.36	0.82	0.68	< 0.10	< 0.10	0.87
Benzo[k]fluoranthene	M	2800	mg/kg	0.10	0.13	< 0.10	0.11	0.13	0.49	0.20	< 0.10	< 0.10	0.22
Benzo[a]pyrene	M	2800	mg/kg	0.10	0.40	< 0.10	0.38	0.18	0.65	0.49	< 0.10	< 0.10	0.66
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10	0.32	< 0.10	< 0.10	0.21	0.74	0.46	< 0.10	< 0.10	0.37
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.43	0.20	< 0.10	< 0.10	0.15
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10	0.32	< 0.10	0.27	0.30	0.76	0.35	< 0.10	< 0.10	0.36
Total Of 16 PAH's	N	2800	mg/kg	2.0	4.3	< 2.0	3.8	2.7	7.4	6.1	< 2.0	< 2.0	7.5
Total Phenols	M	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Organic Matter BS1377	N	2930	%	0.10	0.70	4.2	1.2	0.90	1.1	1.8	5.1	3.3	0.90

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	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 <37°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
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	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.
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.
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
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
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	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-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.
2930	Organic Matter	Organic Matter	Acid Dichromate digestion/Titration

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
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

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
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 TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°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

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

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

Final Report

Report No.:	23-25654-1
Initial Date of Issue:	07-Aug-2023
Re-Issue Details:	
Client	Terra Firma (Wales) Ltd
Client Address:	5 Deryn Court Wharfedale Road Pentwyn Cardiff CF23 7HA
Contact(s):	ruth@terrafirmawales.co.uk
Project	Herbert Road (H.Road) North of Reen

Quotation No.:		**Date Received:**	31-Jul-2023
Order No.:	12032 - P3N - RH	**Date Instructed:**	31-Jul-2023
No. of Samples:	26		
Turnaround (Wkdays):	5	**Results Due:**	04-Aug-2023
Date Approved:	07-Aug-2023		

Approved By:

Details: Stuart Henderson, Technical Manager

Bulk Identification Certificate

Client: Terra Firma (Wales) Ltd

Site Address:

Date Sampled: 28-Jul-2023

Date Received: 31-Jul-2023

Your Ref.:

Project: Herbert Road (H.Road) North of Reen

Job Number: 23-25654

No Samples:

Date Reported: 07-Aug-2023

Sample No.	Sample ID	Sample Ref.	Description	Top (m)	Bottom (m)	SOP	Accred.	Laboratory	Material	Result
1681243	PLOTS 161 - 166	161-166 BEFORE CAP				2185	U	NEW-ASB	Cement	Chrysotile
1681244	PLOTS 161 - 166	161-166 TOPSOIL				2185	U	NEW-ASB	Cement	Chrysotile

The in-house procedure SOP2185 is in accordance with the requirements of Appendix 2 of the Analyst Guide (HSG 248).
The results relate only to items tested as supplied by the client.
Comments and interpretations are beyond the scope of UKAS accreditation.
Samples associated with asbestos in building surveys are retained for six months (HSG 264 refers)

Results - Soil

Project: Herbert Road (H.Road) North of Reen

Client: Terra Firma (Wales) Ltd				**Chemtest Job No.:**	23-25654	23-25654	23-25654	23-25654	23-25654	23-25654	23-25654	23-25654	23-25654
Quotation No.:				**Chemtest Sample ID.:**	1681219	1681223	1681226	1681229	1681231	1681232	1681233	1681237	1681238
Order No.: 12032 - P3N - RH				Client Sample Ref.:	PLOT 157 TS	PLOT 131 TS	PLOT 168 SS	PLOT 167 SS	PLOT 170 SS	PLOT 171 TS	PLOT 171 SS	PLOTS 144-149 TS	PLOTS 144 - 149 SS
				Client Sample ID.:	PLOT 157 TS	PLOT 131 TS	PLOT 168 SS	PLOT 167 SS	PLOT 170 SS	PLOT 171 TS	PLOT 171 SS	PLOTS 144-149 TS	PLOTS 144-149 SS
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):									
				Date Sampled:	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023
				Time Sampled:	12:00	12:00	12:00	12:00	12:00	12:00	12:00	12:00	12:00
				Asbestos Lab:	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**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	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	-	-	-	-	-	-	-	-
Moisture	N	2030	%	0.020	30	23	16	16	15	30	17	29	17
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Black	Brown
Other Material	N	2040		N/A	Stones and Roots	Stones and Roots	Stones	Stones	Stones and Roots	Stones and Roots	Stones and Roots	Stones and Roots	Stones
Soil Texture	N	2040		N/A	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay
pH	M	2010		4.0	7.3	6.8	8.8	8.4	8.6	6.9	8.2	6.8	7.7
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	1.9	1.1	0.91	0.70	0.85	4.7	0.96	2.3	< 0.40
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Sulphate (Acid Soluble)	U	2430	%	0.010	0.095	0.051	0.11	0.12	0.10	0.17	0.10	0.14	0.055
Arsenic	M	2455	mg/kg	0.5	16	22	9.7	8.0	8.8	13	8.6	12	9.4
Cadmium	M	2455	mg/kg	0.10	2.3	0.37	1.8	0.95	0.63	2.7	0.72	2.1	0.68
Chromium	M	2455	mg/kg	0.5	41	20	27	21	22	37	27	30	17
Mercury Low Level	M	2450	mg/kg	0.05	0.10	0.87	0.23	0.09	0.14	0.08	0.11	0.08	0.11
Copper	M	2455	mg/kg	0.50	22	55	34	20	20	21	26	17	34
Nickel	M	2455	mg/kg	0.50	31	22	24	21	21	27	26	23	35
Lead	M	2455	mg/kg	0.50	72	100	62	45	46	73	46	69	53
Selenium	M	2455	mg/kg	0.25	1.1	1.7	0.70	0.61	0.67	0.85	0.67	0.66	0.69
Zinc	M	2455	mg/kg	0.50	260	130	180	100	100	250	120	220	160
Chromium (Trivalent)	N	2490	mg/kg	1.0	41	20	27	21	22	37	27	30	17
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Aliphatic VPH >C5-C6	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C7	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C7-C8	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C8 (Sum)	N	2780	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic VPH >C8-C10	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aliphatic VPH >C5-C10	U	2780	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Aliphatic EPH >C10-C12	M	2690	mg/kg	2.00	3.7	3.5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	2.5	2.1
Aliphatic EPH >C12-C16	M	2690	mg/kg	1.00	1.1	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.2	1.2
Aliphatic EPH >C16-C21	M	2690	mg/kg	2.00	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	2.8	< 2.0
Aliphatic EPH >C21-C35	M	2690	mg/kg	3.00	6.3	4.3	< 3.0	< 3.0	18	4.9	3.8	20	15
Aliphatic EPH >C35-C40	N	2690	mg/kg	10.00	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10

Results - Soil

Project: Herbert Road (H.Road) North of Reen

Client: Terra Firma (Wales) Ltd					**Chemtest Job No.:**	23-25654	23-25654	23-25654	23-25654	23-25654	23-25654	23-25654	23-25654	23-25654
Quotation No.:					**Chemtest Sample ID.:**	1681219	1681223	1681226	1681229	1681231	1681232	1681233	1681237	1681238
Order No.: 12032 - P3N - RH					Client Sample Ref.:	PLOT 157 TS	PLOT 131 TS	PLOT 168 SS	PLOT 167 SS	PLOT 170 SS	PLOT 171 TS	PLOT 171 SS	PLOTS 144-149 TS	PLOTS 144 - 149 SS
					Client Sample ID.:	PLOT 157 TS	PLOT 131 TS	PLOT 168 SS	PLOT 167 SS	PLOT 170 SS	PLOT 171 TS	PLOT 171 SS	PLOTS 144-149 TS	PLOTS 144-149 SS
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):									
					Date Sampled:	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023
					Time Sampled:	12:00	12:00	12:00	12:00	12:00	12:00	12:00	12:00	12:00
					Asbestos Lab:	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**										
Total Aliphatic EPH >C10-C35	M	2690	mg/kg	5.00		12	10	< 5.0	< 5.0	19	7.2	5.3	26	19
Aromatic VPH >C5-C7	U	2780	mg/kg	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic VPH >C7-C8	U	2780	mg/kg	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic VPH >C8-C10	U	2780	mg/kg	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aromatic VPH >C5-C10	U	2780	mg/kg	0.25		< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Aromatic EPH >C10-C12	U	2690	mg/kg	1.00		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic EPH >C12-C16	U	2690	mg/kg	1.00		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic EPH >C16-C21	U	2690	mg/kg	2.00		< 2.0	6.1	19	19	23	23	21	6.6	3.9
Aromatic EPH >C21-C35	U	2690	mg/kg	2.00		43	32	< 2.0	< 2.0	36	53	8.2	120	27
Aromatic EPH >C35-C40	N	2690	mg/kg	1.00		9.0	1.8	< 1.0	< 1.0	2.0	4.5	< 1.0	13	1.9
Total Aromatic EPH >C10-C35	U	2690	mg/kg	5.00		45	39	21	20	59	76	29	120	31
Total VPH >C5-C10	U	2780	mg/kg	0.50		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total EPH >C10-C35	U	2690	mg/kg	10.00		57	49	22	21	78	83	35	150	51
Naphthalene	M	2800	mg/kg	0.10		0.22	0.53	0.21	0.18	0.17	0.19	0.16	0.24	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	0.15	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	0.14	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2800	mg/kg	0.10		0.14	0.61	0.39	0.53	0.51	< 0.10	0.44	< 0.10	< 0.10
Anthracene	M	2800	mg/kg	0.10		< 0.10	< 0.10	0.47	0.15	0.17	< 0.10	0.13	< 0.10	< 0.10
Fluoranthene	M	2800	mg/kg	0.10		0.21	1.3	0.64	0.95	0.93	0.16	0.93	0.13	< 0.10
Pyrene	M	2800	mg/kg	0.10		0.17	1.0	0.48	0.72	0.68	0.13	0.71	0.11	< 0.10
Benzo[a]anthracene	M	2800	mg/kg	0.10		0.11	0.78	0.42	0.50	0.55	< 0.10	0.46	< 0.10	< 0.10
Chrysene	M	2800	mg/kg	0.10		< 0.10	0.82	0.38	0.56	0.57	< 0.10	0.45	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2800	mg/kg	0.10		< 0.10	1.1	0.55	0.59	0.81	< 0.10	0.59	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2800	mg/kg	0.10		< 0.10	0.33	0.13	0.21	0.31	< 0.10	0.15	< 0.10	< 0.10
Benzo[a]pyrene	M	2800	mg/kg	0.10		< 0.10	0.75	0.38	0.40	0.53	< 0.10	0.38	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10		< 0.10	0.65	0.32	0.40	0.49	< 0.10	0.39	< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10		< 0.10	0.19	< 0.10	0.13	0.24	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10		< 0.10	0.72	0.28	0.38	0.42	< 0.10	0.30	< 0.10	< 0.10
Total Of 16 PAH's	N	2800	mg/kg	2.0		< 2.0	8.8	4.7	5.7	6.7	< 2.0	5.1	< 2.0	< 2.0
Total Phenols	M	2920	mg/kg	0.10		0.13	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Organic Matter BS1377	N	2930	%	0.10		5.6	5.1	0.60	1.2	0.40	4.8	0.90	4.5	0.50

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	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 <37°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
2185	Asbestos	Asbestos	Polarised light microscopy
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	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.
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.
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
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
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	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-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.
2930	Organic Matter	Organic Matter	Acid Dichromate digestion/Titration

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
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

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
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 TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°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

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

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

Amended Report

Report No.:	23-28639-3		
Initial Date of Issue:	17-Sep-2023	**Date of Re-Issue:**	20-Sep-2023
Re-Issue Details:	This report has been revised and directly supersedes 23-28639-2 in its entirety		
Client	Terra Firma (Wales) Ltd		
Client Address:	5 Deryn Court Wharfedale Road Pentwyn Cardiff CF23 7HA		
Contact(s):	ruth@terrafirmawales.co.uk		
Project	Herbert Road		
Quotation No.:	Q20-21666	**Date Received:**	25-Aug-2023
Order No.:	13683 SO	**Date Instructed:**	25-Aug-2023
No. of Samples:	14		
Turnaround (Wkdays):	20	**Results Due:**	22-Sep-2023
Date Approved:	20-Sep-2023		
Approved By:			
Details:	Stuart Henderson, Technical Manager		

Results - Soil

Project: Herbert Road

Client: Terra Firma (Wales) Ltd			**Chemtest Job No.:**		23-28639	23-28639	23-28639
Quotation No.: Q20-21666			**Chemtest Sample ID.:**		1693529	1693530	1693531
			Client Sample ID.:		181	183	185
			Sample Type:		SOIL	SOIL	SOIL
			Top Depth (m):		0.5	0.4	0.5
			Date Sampled:		23-Aug-2023	23-Aug-2023	23-Aug-2023
			Time Sampled:		12:00	12:00	12:00
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY
Determinand	**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
ACM Detection Stage	U	2192		N/A	-	-	-
Moisture	N	2030	%	0.020	8.6	12	3.2
Soil Colour	N	2040		N/A	Brown	Brown	Brown
Other Material	N	2040		N/A	15% Stones and Roots	30% Stones and Roots	30% Stones
Soil Texture	N	2040		N/A	Loam	Loam	Loam
pH	M	2010		4.0	8.8	7.8	8.9
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	1.2	4.8	0.95
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Sulphate (Acid Soluble)	U	2430	%	0.010	0.087	0.17	0.10
Arsenic	M	2455	mg/kg	0.5	7.0	16	7.8
Cadmium	M	2455	mg/kg	0.10	0.39	0.71	0.53
Chromium	M	2455	mg/kg	0.5	24	43	25
Mercury Low Level	M	2450	mg/kg	0.05	0.08	0.13	0.06
Copper	M	2455	mg/kg	0.50	19	28	24
Nickel	M	2455	mg/kg	0.50	19	35	22
Lead	M	2455	mg/kg	0.50	42	60	49
Selenium	M	2455	mg/kg	0.25	0.87	1.1	0.80
Zinc	M	2455	mg/kg	0.50	150	230	110
Chromium (Trivalent)	N	2490	mg/kg	1.0	24	43	25
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Aliphatic VPH >C5-C6	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C7	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C7-C8	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C8 (Sum)	N	2780	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Aliphatic VPH >C8-C10	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Total Aliphatic VPH >C5-C10	U	2780	mg/kg	0.25	< 0.25	< 0.25	< 0.25
Aliphatic EPH >C10-C12	M	2690	mg/kg	2.00	4.3	4.0	< 2.0
Aliphatic EPH >C12-C16	M	2690	mg/kg	1.00	1.5	1.5	< 1.0
Aliphatic EPH >C16-C21	M	2690	mg/kg	2.00	< 2.0	< 2.0	< 2.0
Aliphatic EPH >C21-C35	M	2690	mg/kg	3.00	29	6.6	< 3.0
Aliphatic EPH >C35-C40	N	2690	mg/kg	10.00	17	< 10	< 10
Total Aliphatic EPH >C10-C35	M	2690	mg/kg	5.00	35	12	< 5.0
Aromatic VPH >C5-C7	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Aromatic VPH >C7-C8	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05

Results - Soil

Project: Herbert Road

Client: Terra Firma (Wales) Ltd			**Chemtest Job No.:**		23-28639	23-28639	23-28639
Quotation No.: Q20-21666			**Chemtest Sample ID.:**		1693529	1693530	1693531
			Client Sample ID.:		181	183	185
			Sample Type:		SOIL	SOIL	SOIL
			Top Depth (m):		0.5	0.4	0.5
			Date Sampled:		23-Aug-2023	23-Aug-2023	23-Aug-2023
			Time Sampled:		12:00	12:00	12:00
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Aromatic VPH >C8-C10	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Total Aromatic VPH >C5-C10	U	2780	mg/kg	0.25	< 0.25	< 0.25	< 0.25
Aromatic EPH >C10-C12	U	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0
Aromatic EPH >C12-C16	U	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0
Aromatic EPH >C16-C21	U	2690	mg/kg	2.00	2.3	< 2.0	30
Aromatic EPH >C21-C35	U	2690	mg/kg	2.00	42	47	< 2.0
Aromatic EPH >C35-C40	N	2690	mg/kg	1.00	6.6	12	< 1.0
Total Aromatic EPH >C10-C35	U	2690	mg/kg	5.00	44	47	31
Total VPH >C5-C10	U	2780	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Total EPH >C10-C35	U	2690	mg/kg	10.00	79	60	32
Naphthalene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2800	mg/kg	0.10	< 0.10	< 0.10	0.60
Anthracene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	M	2800	mg/kg	0.10	0.82	< 0.10	1.2
Pyrene	M	2800	mg/kg	0.10	0.75	< 0.10	0.76
Benzo[a]anthracene	M	2800	mg/kg	0.10	0.61	< 0.10	0.56
Chrysene	M	2800	mg/kg	0.10	0.57	< 0.10	0.65
Benzo[b]fluoranthene	M	2800	mg/kg	0.10	0.82	< 0.10	0.76
Benzo[k]fluoranthene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	M	2800	mg/kg	0.10	0.69	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10	0.50	< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	N	2800	mg/kg	2.0	4.8	< 2.0	4.5
Total Phenols	M	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Organic Matter BS1377	N	2930	%	0.10	0.20	3.0	0.20

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	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 <37°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
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	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.
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.
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
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
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	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-MS
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane 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.
2930	Organic Matter	Organic Matter	Acid Dichromate digestion/Titration

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
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

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
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 TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°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

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

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

Final Report

Report No.:	23-38706-1
Initial Date of Issue:	28-Nov-2023
Re-Issue Details:	
Client	Terra Firma (Wales) Ltd
Client Address:	5 Deryn Court Wharfedale Road Pentwyn Cardiff CF23 7HA
Contact(s):	j.mcananey@tfwgroup.co.uk
Project	1203 Herbert Road
Quotation No.:	**Date Received:** 22-Nov-2023
Order No.:	1203 HERBERT ROAD NOVEMBER 202 **Date Instructed:** 22-Nov-2023
No. of Samples:	11
Turnaround (Wkdays):	5 **Results Due:** 28-Nov-2023
Date Approved:	28-Nov-2023
Approved By:	
Details:	Stuart Henderson, Technical Manager

Results - Soil

Project: 1203 Herbert Road

=A2:E70Client: Terra Firma (Wales) Ltd					Chemtest Job No.:	23-38706	23-38706	23-38706	23-38706	23-38706	23-38706	23-38706
Quotation No.:					Chemtest Sample ID.:	1734441	1734442	1734443	1734444	1734445	1734446	1734447
Order No.: 1203 HERBERT ROAD NOVEMBER 202					Client Sample Ref.:	182 TOPSOIL	182 SUBSOIL	179 SUBSOIL	161-166 east SUB	161-166 east TOP	161-166 NORTH SUB	161-166 NORTH TOP
					Client Sample ID.:	182 TOPSOIL	182 SUBSOIL	179 SUBSOIL	161-166 east SUB	161-166 east TOP	161-166 NORTH SUB	161-166 NORTH TOP
					Sample Location:	182 topsoil	182 subsoil	179 subsoil	161-166 south sub	161-166 south top	161-166 north sub	161-166 north top
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.20	0.60	0.50	0.60	0.30	0.50	0.10
					Date Sampled:	20-Nov-2023	20-Nov-2023	20-Nov-2023	20-Nov-2023	20-Nov-2023	20-Nov-2023	20-Nov-2023
					Time Sampled:	12:00	12:00	12:00	12:00	12:00	12:00	12:00
					Asbestos Lab:	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**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	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A		-	-	-	-	-	-	-
Moisture	N	2030	%	0.020		33	13	16	14	21	15	22
Soil Colour	N	2040		N/A		Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A		Stones and Roots	Stones	Stones and Roots	Stones	Stones	Stones	Stones and Roots
Soil Texture	N	2040		N/A		Sand	Sand	Sand	Clay	Sand	Clay	Clay
pH at 20C	M	2010		4.0		8.2	8.1	8.5	8.5	8.5	8.5	8.6
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40		< 0.40	1.3	0.94	0.44	1.6	< 0.40	1.1
Cyanide (Total)	M	2300	mg/kg	0.50		0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Sulphate (Acid Soluble)	U	2430	%	0.010		0.097	0.27	0.089	0.020	0.089	0.049	0.083
Arsenic	M	2455	mg/kg	0.5		13	6.8	6.2	6.6	12	9.3	10
Cadmium	M	2455	mg/kg	0.10		1.9	0.94	0.66	0.64	4.0	0.52	2.6
Chromium	M	2455	mg/kg	0.5		42	17	17	14	30	19	25
Mercury Low Level	M	2450	mg/kg	0.05		0.07	0.07	0.08	0.10	0.14	0.14	0.13
Copper	M	2455	mg/kg	0.50		20	30	20	25	30	36	48
Nickel	M	2455	mg/kg	0.50		32	17	16	23	24	37	21
Lead	M	2455	mg/kg	0.50		62	56	43	33	120	50	92
Selenium	M	2455	mg/kg	0.25		1.1	0.77	0.70	0.74	0.97	1.0	0.81
Zinc	M	2455	mg/kg	0.50		210	110	99	110	410	160	310
Chromium (Trivalent)	N	2490	mg/kg	1.0		42	17	17	14	30	19	25
Chromium (Hexavalent)	N	2490	mg/kg	0.50		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Aliphatic VPH >C5-C6	U	2780	mg/kg	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C7	U	2780	mg/kg	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C7-C8	U	2780	mg/kg	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C8 (Sum)	N	2780	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic VPH >C8-C10	U	2780	mg/kg	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aliphatic VPH >C5-C10	U	2780	mg/kg	0.25		< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Aliphatic EPH >C10-C12	M	2690	mg/kg	2.00		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Aliphatic EPH >C12-C16	M	2690	mg/kg	1.00		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic EPH >C16-C21	M	2690	mg/kg	2.00		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0

Results - Soil

Project: 1203 Herbert Road

=A2:E70Client: Terra Firma (Wales) Ltd					Chemtest Job No.:	23-38706	23-38706	23-38706	23-38706	23-38706	23-38706	23-38706
Quotation No.:					Chemtest Sample ID.:	1734441	1734442	1734443	1734444	1734445	1734446	1734447
Order No.: 1203 HERBERT ROAD NOVEMBER 202					Client Sample Ref.:	182 TOPSOIL	182 SUBSOIL	179 SUBSOIL	161-166 east SUB	161-166 east TOP	161-166 NORTH SUB	161-166 NORTH TOP
					Client Sample ID.:	182 TOPSOIL	182 SUBSOIL	179 SUBSOIL	161-166 east SUB	161-166 east TOP	161-166 NORTH SUB	161-166 NORTH TOP
					Sample Location:	182 topsoil	182 subsoil	179 subsoil	161-166 south sub	161-166 south top	161-166 north sub	161-166 north top
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.20	0.60	0.50	0.60	0.30	0.50	0.10
					Date Sampled:	20-Nov-2023	20-Nov-2023	20-Nov-2023	20-Nov-2023	20-Nov-2023	20-Nov-2023	20-Nov-2023
					Time Sampled:	12:00	12:00	12:00	12:00	12:00	12:00	12:00
					Asbestos Lab:	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Aliphatic EPH >C21-C35	M	2690	mg/kg	3.00		6.7	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Aliphatic EPH >C35-C40	N	2690	mg/kg	10.00		< 10	< 10	< 10	< 10	< 10	< 10	< 10
Total Aliphatic EPH >C10-C35	M	2690	mg/kg	5.00		8.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic VPH >C5-C7	U	2780	mg/kg	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic VPH >C7-C8	U	2780	mg/kg	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic VPH >C8-C10	U	2780	mg/kg	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aromatic VPH >C5-C10	U	2780	mg/kg	0.25		< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Aromatic EPH >C10-C12	U	2690	mg/kg	1.00		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic EPH >C12-C16	U	2690	mg/kg	1.00		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic EPH >C16-C21	U	2690	mg/kg	2.00		4.0	3.9	9.5	3.1	3.9	4.2	3.6
Aromatic EPH >C21-C35	U	2690	mg/kg	2.00		49	4.8	33	3.9	15	2.8	21
Aromatic EPH >C35-C40	N	2690	mg/kg	1.00		23	< 1.0	1.4	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic EPH >C10-C35	U	2690	mg/kg	5.00		53	8.7	42	7.0	19	7.1	25
Total VPH >C5-C10	U	2780	mg/kg	0.50		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total EPH >C10-C35	U	2690	mg/kg	10.00		61	10	45	< 10	22	< 10	28
Naphthalene	M	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2800	mg/kg	0.10		< 0.10	0.42	0.56	< 0.10	< 0.10	< 0.10	0.38
Anthracene	M	2800	mg/kg	0.10		< 0.10	0.14	0.16	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	M	2800	mg/kg	0.10		< 0.10	0.95	0.88	< 0.10	< 0.10	< 0.10	0.59
Pyrene	M	2800	mg/kg	0.10		< 0.10	0.78	0.72	< 0.10	< 0.10	< 0.10	0.40
Benzo[a]anthracene	M	2800	mg/kg	0.10		< 0.10	0.53	0.56	< 0.10	< 0.10	< 0.10	0.40
Chrysene	M	2800	mg/kg	0.10		< 0.10	0.53	0.50	< 0.10	< 0.10	< 0.10	0.44
Benzo[b]fluoranthene	M	2800	mg/kg	0.10		< 0.10	0.88	0.73	< 0.10	< 0.10	< 0.10	0.47
Benzo[k]fluoranthene	M	2800	mg/kg	0.10		< 0.10	0.31	0.27	< 0.10	< 0.10	< 0.10	0.15
Benzo[a]pyrene	M	2800	mg/kg	0.10		< 0.10	0.60	0.53	< 0.10	< 0.10	< 0.10	0.27
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10		< 0.10	0.47	0.32	< 0.10	< 0.10	< 0.10	0.22
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10		< 0.10	0.46	0.36	< 0.10	< 0.10	< 0.10	0.22
Total Of 16 PAH's	N	2800	mg/kg	2.0		< 2.0	6.1	5.6	< 2.0	< 2.0	< 2.0	3.5
Total Phenols	M	2920	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: 1203 Herbert Road

=A2:E70Client: Terra Firma (Wales) Ltd					Chemtest Job No.:	23-38706	23-38706	23-38706	23-38706	23-38706	23-38706	23-38706
Quotation No.:					Chemtest Sample ID.:	1734441	1734442	1734443	1734444	1734445	1734446	1734447
Order No.: 1203 HERBERT ROAD NOVEMBER 202					Client Sample Ref.:	182 TOPSOIL	182 SUBSOIL	179 SUBSOIL	161-166 east SUB	161-166 east TOP	161-166 NORTH SUB	161-166 NORTH TOP
					Client Sample ID.:	182 TOPSOIL	182 SUBSOIL	179 SUBSOIL	161-166 east SUB	161-166 east TOP	161-166 NORTH SUB	161-166 NORTH TOP
					Sample Location:	182 topsoil	182 subsoil	179 subsoil	161-166 south sub	161-166 south top	161-166 north sub	161-166 north top
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.20	0.60	0.50	0.60	0.30	0.50	0.10
					Date Sampled:	20-Nov-2023	20-Nov-2023	20-Nov-2023	20-Nov-2023	20-Nov-2023	20-Nov-2023	20-Nov-2023
					Time Sampled:	12:00	12:00	12:00	12:00	12:00	12:00	12:00
					Asbestos Lab:	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Organic Matter BS1377	N	2930	%	0.10		< 0.10	< 0.10	1.5	5.0	1.6	4.9	2.7

Results - Soil

Project: 1203 Herbert Road

=A2:E70Client: Terra Firma (Wales) Ltd				Chemtest Job No.:	23-38706	23-38706	23-38706	23-38706
Quotation No.:				Chemtest Sample ID.:	1734448	1734449	1734450	1734451
Order No.: 1203 HERBERT ROAD NOVEMBER 202				Client Sample Ref.:	138-143 east SUB	138-143 east TOP	138-143 SOUTH SUB	138-143 SOUTH TOP
				Client Sample ID.:	138-143 east SUB	138-143 east TOP	138-143 SOUTH SUB	138-143 SOUTH TOP
				Sample Location:	138-143 north sub	138-143 north top	138-143 south sub	138-143 south top
				Sample Type:	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.50	0.20	0.60	0.10
				Date Sampled:	20-Nov-2023	20-Nov-2023	20-Nov-2023	20-Nov-2023
				Time Sampled:	12:00	12:00	12:00	12:00
				Asbestos Lab:	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**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
ACM Detection Stage	U	2192		N/A	-	-	-	-
Moisture	N	2030	%	0.020	16	16	17	19
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones and Roots	Stones and Roots	Stones	Stones and Roots
Soil Texture	N	2040		N/A	Sand	Sand	Clay	Sand
pH at 20C	M	2010		4.0	8.2	8.4	8.2	8.5
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	0.44	1.0	0.50	1.7
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Sulphate (Acid Soluble)	U	2430	%	0.010	0.047	0.071	0.050	0.061
Arsenic	M	2455	mg/kg	0.5	11	9.1	11	11
Cadmium	M	2455	mg/kg	0.10	0.86	0.47	0.53	0.48
Chromium	M	2455	mg/kg	0.5	22	23	22	23
Mercury Low Level	M	2450	mg/kg	0.05	0.10	0.08	0.13	0.13
Copper	M	2455	mg/kg	0.50	36	17	31	23
Nickel	M	2455	mg/kg	0.50	40	18	29	19
Lead	M	2455	mg/kg	0.50	48	24	39	32
Selenium	M	2455	mg/kg	0.25	0.99	0.68	0.88	0.87
Zinc	M	2455	mg/kg	0.50	190	92	120	96
Chromium (Trivalent)	N	2490	mg/kg	1.0	22	23	22	23
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Aliphatic VPH >C5-C6	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C7	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C7-C8	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C8 (Sum)	N	2780	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic VPH >C8-C10	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aliphatic VPH >C5-C10	U	2780	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25
Aliphatic EPH >C10-C12	M	2690	mg/kg	2.00	< 2.0	< 2.0	< 2.0	< 2.0
Aliphatic EPH >C12-C16	M	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic EPH >C16-C21	M	2690	mg/kg	2.00	< 2.0	< 2.0	< 2.0	< 2.0

Results - Soil

Project: 1203 Herbert Road

=A2:E70Client: Terra Firma (Wales) Ltd			Chemtest Job No.:		23-38706	23-38706	23-38706	23-38706
Quotation No.:			Chemtest Sample ID.:		1734448	1734449	1734450	1734451
Order No.: 1203 HERBERT ROAD NOVEMBER 202			Client Sample Ref.:		138-143 east SUB	138-143 east TOP	138-143 SOUTH SUB	138-143 SOUTH TOP
			Client Sample ID.:		138-143 east SUB	138-143 east TOP	138-143 SOUTH SUB	138-143 SOUTH TOP
			Sample Location:		138-143 north sub	138-143 north top	138-143 south sub	138-143 south top
			Sample Type:		SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.50	0.20	0.60	0.10
			Date Sampled:		20-Nov-2023	20-Nov-2023	20-Nov-2023	20-Nov-2023
			Time Sampled:		12:00	12:00	12:00	12:00
			Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Aliphatic EPH >C21-C35	M	2690	mg/kg	3.00	< 3.0	< 3.0	< 3.0	< 3.0
Aliphatic EPH >C35-C40	N	2690	mg/kg	10.00	< 10	< 10	< 10	< 10
Total Aliphatic EPH >C10-C35	M	2690	mg/kg	5.00	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic VPH >C5-C7	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic VPH >C7-C8	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic VPH >C8-C10	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aromatic VPH >C5-C10	U	2780	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25
Aromatic EPH >C10-C12	U	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic EPH >C12-C16	U	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic EPH >C16-C21	U	2690	mg/kg	2.00	2.9	4.2	2.9	3.6
Aromatic EPH >C21-C35	U	2690	mg/kg	2.00	11	8.8	2.9	8.9
Aromatic EPH >C35-C40	N	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic EPH >C10-C35	U	2690	mg/kg	5.00	14	13	5.9	13
Total VPH >C5-C10	U	2780	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total EPH >C10-C35	U	2690	mg/kg	10.00	16	15	< 10	14
Naphthalene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	N	2800	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Total Phenols	M	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: 1203 Herbert Road

=A2:E70Client: Terra Firma (Wales) Ltd					Chemtest Job No.:	23-38706	23-38706	23-38706	23-38706
Quotation No.:					Chemtest Sample ID.:	1734448	1734449	1734450	1734451
Order No.: 1203 HERBERT ROAD NOVEMBER 202					Client Sample Ref.:	138-143 east SUB	138-143 east TOP	138-143 SOUTH SUB	138-143 SOUTH TOP
					Client Sample ID.:	138-143 east SUB	138-143 east TOP	138-143 SOUTH SUB	138-143 SOUTH TOP
					Sample Location:	138-143 north sub	138-143 north top	138-143 south sub	138-143 south top
					Sample Type:	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.50	0.20	0.60	0.10
					Date Sampled:	20-Nov-2023	20-Nov-2023	20-Nov-2023	20-Nov-2023
					Time Sampled:	12:00	12:00	12:00	12:00
					Asbestos Lab:	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Organic Matter BS1377	N	2930	%	0.10		4.2	2.1	1.4	2.3

Test Methods

SOP	Title	Parameters included	Method summary
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 <37°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
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	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.
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.
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
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
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	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-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.
2930	Organic Matter	Organic Matter	Acid Dichromate digestion/Titration

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
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

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
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 TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°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

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

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

Final Report

Report No.:	23-39392-1
Initial Date of Issue:	04-Dec-2023
Re-Issue Details:	
Client	Terra Firma
Client Address:	5 Deryn Court Wharfedale Road Pentwyn Cardiff CF23 7HA
Contact(s):	jacob@terrafirmawales.co.uk
Project	Herbert Road
Quotation No.:	Q20-21666
Date Received:	28-Nov-2023
Order No.:	12032-JM
Date Instructed:	28-Nov-2023
No. of Samples:	6
Turnaround (Wkdays):	5
Results Due:	04-Dec-2023
Date Approved:	04-Dec-2023
Approved By:	
Details:	Stuart Henderson, Technical Manager

Results - Soil

Project: Herbert Road

Client: Terra Firma		**Chemtest Job No.:**			23-39392	23-39392	23-39392	23-39392	23-39392	23-39392
Quotation No.: Q20-21666		**Chemtest Sample ID.:**			1737136	1737137	1737138	1737139	1737140	1737141
Order No.: 12032-JM		Client Sample Ref.:			PLOT 190 (SUBSOIL)	PLOT 194 (TOPSOIL)	PLOT 47 (SUBSOIL)	PLOT 191 (SUBSOIL)	PLOT 194 (SUBSOIL)	PLOT 189 (SUBSOIL)
		Client Sample ID.:			PLOT 190 (SUBSOIL)	PLOT 194 (TOPSOIL)	PLOT 47 (SUBSOIL)	PLOT 191 (SUBSOIL)	PLOT 194 (SUBSOIL)	PLOT 189 (SUBSOIL)
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.40	0.10	0.50	0.50	0.40	0.35
		Date Sampled:			27-Nov-2023	27-Nov-2023	27-Nov-2023	27-Nov-2023	27-Nov-2023	27-Nov-2023
		Time Sampled:			12:00	12:00	12:00	12:00	12:00	12:00
		Asbestos Lab:			DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**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	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	-	-	-	-	-
Moisture	N	2030	%	0.020	12	19	4.2	18	16	12
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Clay	Sand	Sand	Clay	Sand	Clay
pH at 20C	M	2010		4.0	9.2	8.6	9.3	8.6	8.3	9.0
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	0.78	1.1	< 0.40	0.68	2.2	0.81
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Sulphate (Acid Soluble)	U	2430	%	0.010	0.16	0.11	0.10	0.093	0.14	0.10
Arsenic	M	2455	mg/kg	0.5	8.7	16	8.0	13	29	15
Cadmium	M	2455	mg/kg	0.10	0.75	4.4	1.3	1.7	0.52	1.1
Chromium	M	2455	mg/kg	0.5	29	38	12	39	29	41
Mercury Low Level	M	2450	mg/kg	0.05	0.19	0.23	0.16	0.16	0.14	0.19
Copper	M	2455	mg/kg	0.50	260	51	7.4	26	16	34
Nickel	M	2455	mg/kg	0.50	27	36	9.4	34	21	39
Lead	M	2455	mg/kg	0.50	50	130	40	68	48	75
Selenium	M	2455	mg/kg	0.25	1.0	1.3	0.58	1.5	1.7	1.6
Zinc	M	2455	mg/kg	0.50	130	440	130	240	96	180
Chromium (Trivalent)	N	2490	mg/kg	1.0	29	38	12	39	29	41
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Aliphatic VPH >C5-C6	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C7	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C7-C8	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C8 (Sum)	N	2780	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic VPH >C8-C10	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aliphatic VPH >C5-C10	U	2780	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Aliphatic EPH >C10-C12	M	2690	mg/kg	2.00	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Aliphatic EPH >C12-C16	M	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic EPH >C16-C21	M	2690	mg/kg	2.00	< 2.0	< 2.0	< 2.0	3.2	< 2.0	< 2.0
Aliphatic EPH >C21-C35	M	2690	mg/kg	3.00	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Aliphatic EPH >C35-C40	N	2690	mg/kg	10.00	< 10	< 10	< 10	< 10	< 10	< 10
Total Aliphatic EPH >C10-C35	M	2690	mg/kg	5.00	< 5.0	< 5.0	< 5.0	6.4	< 5.0	< 5.0

Results - Soil

Project: Herbert Road

Client: Terra Firma					**Chemtest Job No.:**	23-39392	23-39392	23-39392	23-39392	23-39392	23-39392
Quotation No.: Q20-21666					**Chemtest Sample ID.:**	1737136	1737137	1737138	1737139	1737140	1737141
Order No.: 12032-JM					Client Sample Ref.:	PLOT 190 (SUBSOIL)	PLOT 194 (TOPSOIL)	PLOT 47 (SUBSOIL)	PLOT 191 (SUBSOIL)	PLOT 194 (SUBSOIL)	PLOT 189 (SUBSOIL)
					Client Sample ID.:	PLOT 190 (SUBSOIL)	PLOT 194 (TOPSOIL)	PLOT 47 (SUBSOIL)	PLOT 191 (SUBSOIL)	PLOT 194 (SUBSOIL)	PLOT 189 (SUBSOIL)
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.40	0.10	0.50	0.50	0.40	0.35
					Date Sampled:	27-Nov-2023	27-Nov-2023	27-Nov-2023	27-Nov-2023	27-Nov-2023	27-Nov-2023
					Time Sampled:	12:00	12:00	12:00	12:00	12:00	12:00
					Asbestos Lab:	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**							
Aromatic VPH >C5-C7	U	2780	mg/kg	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic VPH >C7-C8	U	2780	mg/kg	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic VPH >C8-C10	U	2780	mg/kg	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aromatic VPH >C5-C10	U	2780	mg/kg	0.25		< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Aromatic EPH >C10-C12	U	2690	mg/kg	1.00		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic EPH >C12-C16	U	2690	mg/kg	1.00		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic EPH >C16-C21	U	2690	mg/kg	2.00		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Aromatic EPH >C21-C35	U	2690	mg/kg	2.00		< 2.0	< 2.0	< 2.0	19	7.8	2.8
Aromatic EPH >C35-C40	N	2690	mg/kg	1.00		< 1.0	< 1.0	< 1.0	1.0	< 1.0	< 1.0
Total Aromatic EPH >C10-C35	U	2690	mg/kg	5.00		< 5.0	< 5.0	< 5.0	20	9.0	< 5.0
Total VPH >C5-C10	U	2780	mg/kg	0.50		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total EPH >C10-C35	U	2690	mg/kg	10.00		< 10	< 10	< 10	27	12	< 10
Naphthalene	M	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2800	mg/kg	0.10		0.21	0.11	< 0.10	< 0.10	< 0.10	0.25
Anthracene	M	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	M	2800	mg/kg	0.10		0.48	0.20	< 0.10	< 0.10	< 0.10	0.51
Pyrene	M	2800	mg/kg	0.10		0.37	0.22	< 0.10	< 0.10	< 0.10	0.41
Benzo[a]anthracene	M	2800	mg/kg	0.10		0.28	< 0.10	< 0.10	< 0.10	< 0.10	0.37
Chrysene	M	2800	mg/kg	0.10		0.22	< 0.10	< 0.10	< 0.10	< 0.10	0.39
Benzo[b]fluoranthene	M	2800	mg/kg	0.10		0.44	< 0.10	< 0.10	< 0.10	< 0.10	0.66
Benzo[k]fluoranthene	M	2800	mg/kg	0.10		0.16	< 0.10	< 0.10	< 0.10	< 0.10	0.16
Benzo[a]pyrene	M	2800	mg/kg	0.10		0.26	< 0.10	< 0.10	< 0.10	< 0.10	0.39
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10		0.25	< 0.10	< 0.10	< 0.10	< 0.10	0.33
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10		0.16	< 0.10	< 0.10	< 0.10	< 0.10	0.26
Total Of 16 PAH's	N	2800	mg/kg	2.0		2.8	< 2.0	< 2.0	< 2.0	< 2.0	3.7
Total Phenols	M	2920	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Organic Matter BS1377	N	2930	%	0.10		3.4	1.5	3.0	0.80	3.6	2.8

Test Methods

SOP	Title	Parameters included	Method summary
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 <37°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
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	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.
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.
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
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
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	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-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.
2930	Organic Matter	Organic Matter	Acid Dichromate digestion/Titration

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
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

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
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 TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°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

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

ANNEX D
Replacement Imported Soils Plot 180 – Laboratory Test Results

Terra Firma (Wales) Ltd. 5 Deryn Court, Wharfedale Road, Pentwyn, Cardiff CF23 7HA
Tel: 029 2073 5354 **Fax:** 029 2073 5433 **Email:** info@terrafirmawales.co.uk **www.terrafirmawales.co.uk**
Registered in Wales No. 4013230. VAT No: 753 2566 25. Registered Office: 5 Deryn Court, Wharfedale Road, Pentwyn, Cardiff CF23 7HA

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

Final Report

Report No.:	23-40829-1
Initial Date of Issue:	15-Dec-2023
Re-Issue Details:	
Client	Terra Firma
Client Address:	5 Deryn Court Wharfedale Road Pentwyn Cardiff CF23 7HA
Contact(s):	j.mcananey@tfwgroup.co.uk
Project	Herbert Road Plot 12032
Quotation No.:	**Date Received:** 11-Dec-2023
Order No.:	HERBERT ROAD NEWPORT PLOT 18(**Date Instructed:** 11-Dec-2023
No. of Samples:	1
Turnaround (Wkdays):	5 **Results Due:** 15-Dec-2023
Date Approved:	15-Dec-2023
Approved By:	
Details:	Stuart Henderson, Technical Manager

Results - Soil

Project: Herbert Road Plot 12032

Client: Terra Firma			**Chemtest Job No.:**		23-40829
Quotation No.:			**Chemtest Sample ID.:**		1743534
Order No.: HERBERT ROAD NEWPORT PLOT 180			Client Sample Ref.:		PLOT 180 SUB
			Client Sample ID.:		PLOT 180
			Sample Location:		Plot 180
			Sample Type:		SOIL
			Top Depth (m):		0.40
			Date Sampled:		08-Dec-2023
			Time Sampled:		12:00
			Asbestos Lab:		DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
ACM Type	U	2192		N/A	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-
Moisture	N	2030	%	0.020	19
Soil Colour	N	2040		N/A	Brown
Other Material	N	2040		N/A	Stones
Soil Texture	N	2040		N/A	Sand
pH at 20C	M	2010		4.0	11.4
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	1.4
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50
Sulphate (Acid Soluble)	U	2430	%	0.010	0.22
Arsenic	M	2455	mg/kg	0.5	14
Cadmium	M	2455	mg/kg	0.10	1.9
Chromium	M	2455	mg/kg	0.5	25
Mercury Low Level	M	2450	mg/kg	0.05	0.08
Copper	M	2455	mg/kg	0.50	21
Nickel	M	2455	mg/kg	0.50	20
Lead	M	2455	mg/kg	0.50	53
Selenium	M	2455	mg/kg	0.25	1.2
Zinc	M	2455	mg/kg	0.50	190
Chromium (Trivalent)	N	2490	mg/kg	1.0	25
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50
Aliphatic VPH >C5-C6	U	2780	mg/kg	0.05	< 0.05
Aliphatic VPH >C6-C7	U	2780	mg/kg	0.05	< 0.05
Aliphatic VPH >C7-C8	U	2780	mg/kg	0.05	< 0.05
Aliphatic VPH >C6-C8 (Sum)	N	2780	mg/kg	0.10	< 0.10
Aliphatic VPH >C8-C10	U	2780	mg/kg	0.05	< 0.05
Total Aliphatic VPH >C5-C10	U	2780	mg/kg	0.25	< 0.25
Aliphatic EPH >C10-C12	M	2690	mg/kg	2.00	2.6
Aliphatic EPH >C12-C16	M	2690	mg/kg	1.00	1.1
Aliphatic EPH >C16-C21	M	2690	mg/kg	2.00	< 2.0
Aliphatic EPH >C21-C35	M	2690	mg/kg	3.00	< 3.0
Aliphatic EPH >C35-C40	N	2690	mg/kg	10.00	< 10
Total Aliphatic EPH >C10-C35	M	2690	mg/kg	5.00	6.2

Results - Soil

Project: Herbert Road Plot 12032

Client: Terra Firma			**Chemtest Job No.:**		23-40829
Quotation No.:			**Chemtest Sample ID.:**		1743534
Order No.: HERBERT ROAD NEWPORT PLOT 180			Client Sample Ref.:		PLOT 180 SUB
			Client Sample ID.:		PLOT 180
			Sample Location:		Plot 180
			Sample Type:		SOIL
			Top Depth (m):		0.40
			Date Sampled:		08-Dec-2023
			Time Sampled:		12:00
			Asbestos Lab:		DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Aromatic VPH >C5-C7	U	2780	mg/kg	0.05	< 0.05
Aromatic VPH >C7-C8	U	2780	mg/kg	0.05	< 0.05
Aromatic VPH >C8-C10	U	2780	mg/kg	0.05	< 0.05
Total Aromatic VPH >C5-C10	U	2780	mg/kg	0.25	< 0.25
Aromatic EPH >C10-C12	U	2690	mg/kg	1.00	< 1.0
Aromatic EPH >C12-C16	U	2690	mg/kg	1.00	< 1.0
Aromatic EPH >C16-C21	U	2690	mg/kg	2.00	5.5
Aromatic EPH >C21-C35	U	2690	mg/kg	2.00	3.1
Aromatic EPH >C35-C40	N	2690	mg/kg	1.00	< 1.0
Total Aromatic EPH >C10-C35	U	2690	mg/kg	5.00	8.6
Total VPH >C5-C10	U	2780	mg/kg	0.50	< 0.50
Total EPH >C10-C35	U	2690	mg/kg	10.00	15
Naphthalene	M	2800	mg/kg	0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10
Acenaphthene	M	2800	mg/kg	0.10	< 0.10
Fluorene	M	2800	mg/kg	0.10	< 0.10
Phenanthrene	M	2800	mg/kg	0.10	0.11
Anthracene	M	2800	mg/kg	0.10	< 0.10
Fluoranthene	M	2800	mg/kg	0.10	0.23
Pyrene	M	2800	mg/kg	0.10	0.21
Benzo[a]anthracene	M	2800	mg/kg	0.10	< 0.10
Chrysene	M	2800	mg/kg	0.10	< 0.10
Benzo[b]fluoranthene	M	2800	mg/kg	0.10	< 0.10
Benzo[k]fluoranthene	M	2800	mg/kg	0.10	< 0.10
Benzo[a]pyrene	M	2800	mg/kg	0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10	< 0.10
Total Of 16 PAH's	N	2800	mg/kg	2.0	< 2.0
Total Phenols	M	2920	mg/kg	0.10	< 0.10
Organic Matter BS1377	N	2930	%	0.10	5.3

Test Methods

SOP	Title	Parameters included	Method summary
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 <37°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
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
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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
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	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-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.
2930	Organic Matter	Organic Matter	Acid Dichromate digestion/Titration

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