

Our Ref: RH/12032/VP100-107

Your Ref:

Contact: Ruth Howells

10<sup>th</sup> June 2021

NHBC

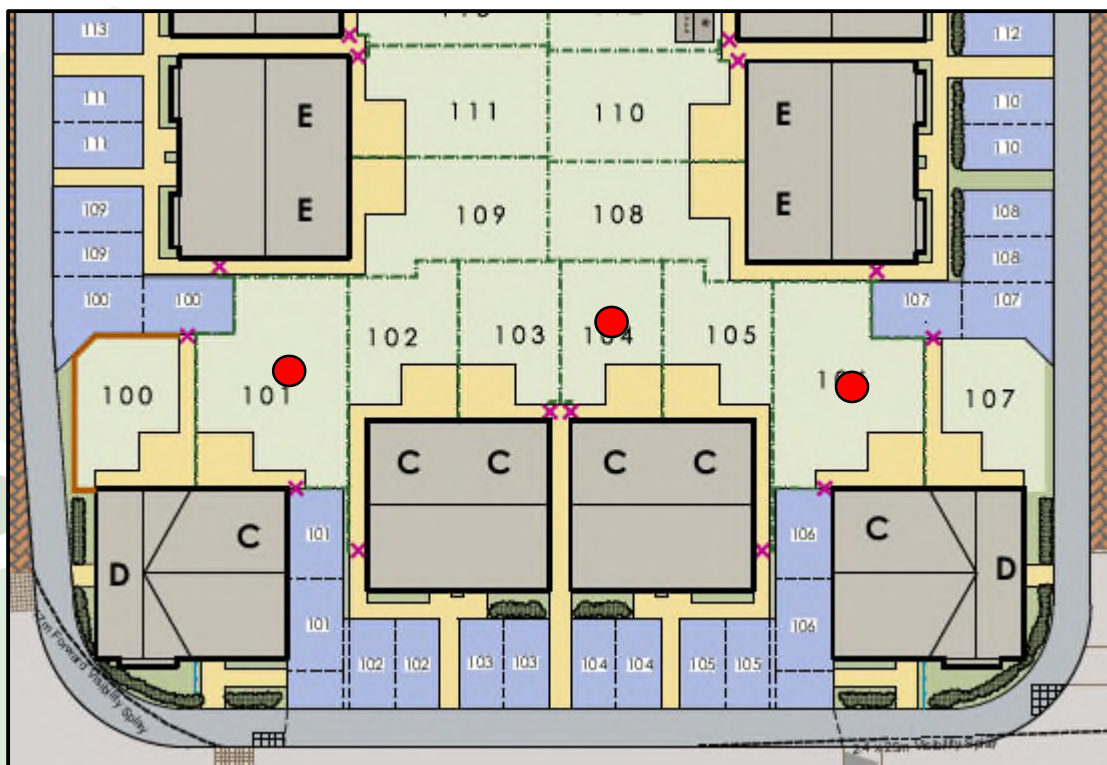
For the attn. of Mr Steve Moreby

Dear Steve

**PLOTS 100 - 107 PHASE 2, HERBERT ROAD NEWPORT: CAPPING VALIDATION**

I confirm that the required 600mm of remedial capping has now been imported and validated within the gardens of Plots 100-107.

Validation of capping thickness and soil sampling was undertaken in Plots 101, 104 and 106, as illustrated below.



**Figure 1: Validation Locations**

The subsoil was imported and placed in the gardens at the same time as Plots 108 – 119 (volume <250m<sup>3</sup>). The subsoil was sourced from a development site in Bonvilston. Terra Firma (Wales) Limited sampled and tested this at source (please refer to **Annex A** for the test results) from a stockpile and in Plots 108 – 119 and as such sufficient representative samples have already been tested from this soil source.

The topsoil was supplied by Neal Soils. A volume of topsoil imported was <250m<sup>3</sup>.

Topsoil samples were retrieved from the prepared gardens and submitted for analysis at the laboratory of Eurofins Chemtest. Test results for the topsoil samples may be found in **Annex B**.

Inspection of the capping soils in hand dug pits confirmed the capping thickness to be 600mm. Please see **Annex C** for photographs of the pits.

Comparison of the analytical results has been made residential (including plant uptake) Suitable 4 Use Levels (S4ULs) provided by Land Quality Management Limited and the Chartered Institute of Environmental Health (CIEH). Where CIEH thresholds are not available reference has been made to Category 4 Screening Levels (C4SLs).

The topsoil results from the three sampling locations are summarised in the following table.

<b>Table 1 Summary of Soil Chemical Test Results Imported Soils</b>					
<b>Substance</b>	<b>SGV/GAC (mg/kg)</b>	<b>Source</b>	<b>Measured Concentrations of Tested Substances (mg/kg)</b>		<b>Number of Exceedances</b>
			<b>Minimum</b>	<b>Maximum</b>	
Arsenic	37	CIEH	6.3	9.4	0
Boron	290	CIEH	1.9	2.7	0
Cadmium	11	CIEH	0.22	0.74	0
Chromium III	910	CIEH	19	24	0
Chromium VI	6	CIEH	<0.5	<0.5	0
Copper	2400	CIEH	15	42	0
Lead	200	C4SL	18	29	0
Mercury	40	CIEH	0.07	0.09	0
Nickel	130	CIEH	33	62	0
Selenium	250	CIEH	<0.2	<0.2	0
Zinc	3700	CIEH	83	120	0
Cyanide	8	-	<0.5	<0.5	0
Phenols	120	CIEH	<0.1	<0.1	0
Organic Matter	-	-	5.1	6.2	-
pH	-	-	8.4	8.5	-
Asbestos	-	-	Not detected	Not detected	-

**Table 1 Summary of Soil Chemical Test Results (Continued)  
Imported Soils**

Substance	GAC (mg/kg)	Source	Measured Concentrations of Tested Substances (mg/kg)		Number of Exceedances
			Minimum	Maximum	
Naphthalene	2.3	CIEH	<0.1	<0.1	0
Acenaphthylene	170	CIEH	<0.1	<0.1	0
Acenaphthene	210	CIEH	<0.1	<0.1	0
Fluorene	170	CIEH	<0.1	<0.1	0
Phenanthrene	95	CIEH	<0.1	<0.1	0
Anthracene	2400	CIEH	<0.1	<0.1	0
Fluoranthene	280	CIEH	<0.1	<0.1	0
Pyrene	620	CIEH	<0.1	<0.1	0
Benzo(a)anthracene	7.2	CIEH	<0.1	<0.1	0
Chrysene	15	CIEH	<0.1	<0.1	0
Benzo(b)fluoranthene	2.6	CIEH	<0.1	<0.1	0
Benzo(k)fluoranthene	77	CIEH	<0.1	<0.1	0
Benzo(a)pyrene	2.2	CIEH	<0.1	<0.1	0
Indeno(123cd)pyrene	27	CIEH	<0.1	<0.1	0
Dibenzo(ah)anthracene	0.24	CIEH	<0.1	<0.1	0
Benzo(ghi)perylene	320	CIEH	<0.1	<0.1	0
<b>Aliphatic</b>					
PH C5 – C6 Ali	42	CIEH	<1.0	<1.0	0
PH C6 – C8 Ali	100	CIEH	<1.0	<1.0	0
PH C8 – C10 Ali	27	CIEH	<1.0	<1.0	0
PH C10 – C12 Ali	130	CIEH	<1.0	<1.0	0
PH C12 – C16 Ali	1100	CIEH	<1.0	<1.0	0
PH C16 – C21 Ali*	65000	CIEH	<1.0	<1.0	0
PH C21 – C35 Ali*	65000	CIEH	<1.0	<1.0	0
PH C35 – C44 Ali	65000	CIEH	<1.0	<1.0	0
<b>Aromatic</b>					
PH C5 – C7 Arom	70	CIEH	<1.0	<1.0	0
PH C7 – C8 Arom	130	CIEH	<1.0	<1.0	0
PH C8 – C10 Arom	34	CIEH	<1.0	<1.0	0
PH C10 – C12 Arom	74	CIEH	<1.0	<1.0	0
PH C12 – C16 Arom	140	CIEH	<1.0	<1.0	0
PH C16 – C21 Arom	260	CIEH	<1.0	<1.0	0
PH C21 – C35 Arom	1100	CIEH	<1.0	<1.0	0
PH C35 – C44 Arom	1100	CIEH	<1.0	<1.0	0

**Notes**

- Thresholds based on 1.0% SOM
- CIEH for Ali C16 - 21 and C21 - C35 based on CIEH for EC >16 – 35

From the above table it can be seen that all substances tested for are present at levels below their respective human health threshold levels.

It may, therefore, be confirmed that the imported subsoil and topsoil does not present a risk to the human health of future site residents.

I 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 me.

Yours sincerely

**for: Terra Firma (Wales) Ltd**



**Mrs Ruth Howells**

**Annex A**  
**Bonvilston Subsoil Source Test Results**



# Final Report

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**Report No.:** 20-28927-1  
**Initial Date of Issue:** 02-Nov-2020  
**Client:** Terra Firma (Wales) Ltd  
**Client Address:** 5 Deryn Court  
Wharfedale Road  
Pentwyn  
Cardiff  
CF23 7HA  
**Contact(s):** ruth@terrafirmawales.co.uk  
**Project:** Bonvilston  
**Quotation No.:** **Date Received:** 27-Oct-2020  
**Order No.:** 13032/RH **Date Instructed:** 27-Oct-2020  
**No. of Samples:** 9  
**Turnaround (Wkdays):** 5 **Results Due:** 02-Nov-2020  
**Date Approved:** 02-Nov-2020

**Approved By:**

**Details:** Glynn Harvey, Technical Manager

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## Results - Soil

**Project: Bonvilston**

Client: Terra Firma (Wales) Ltd		Chemtest Job No.: 20-28927 20-28927 20-28927 20-28927 20-28927 20-28927 20-28927 20-28927 20-28927 20-28927 20-28927												
Quotation No.:		Chemtest Sample ID.: 1086797 1086798 1086799 1086800 1086801 1086802 1086803 1086804 1086805												
Order No.: 13032/RH		Client Sample Ref.: SS S1 SS S2 SS S3 SS S4 SS S5 SS S6 TS S1 TS S2 TS S3												
		Client Sample ID.: SS S1 SS S2 SS S3 SS S4 SS S5 SS S6 TS S1 TS S2 TS S3												
		Sample Type: SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL												
		Date Sampled: 23-Oct-2020 23-Oct-2020 23-Oct-2020 23-Oct-2020 23-Oct-2020 23-Oct-2020 23-Oct-2020 23-Oct-2020 23-Oct-2020 23-Oct-2020 23-Oct-2020												
		Time Sampled: 12:00 12:00 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 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	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	-	-	-	-	-	-	-	-	-
Moisture	N	2030	%	0.020	13	10	12	11	10	13	16	13	13	13
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones and Roots	Stones
Soil Texture	N	2040		N/A	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand
pH	M	2010		4.0	8.7	8.6	8.9	9.3	8.4	8.0	7.3	7.6	8.1	8.1
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	< 0.40	< 0.40	< 0.40	0.47	< 0.40	< 0.40	0.47	0.51	< 0.40	< 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	0.50
Sulphate (Acid Soluble)	M	2430	%	0.010	0.022	0.036	0.048	0.042	< 0.010	0.022	0.054	0.051	0.036	0.036
Arsenic	M	2450	mg/kg	1.0	11	14	12	11	9.2	8.6	12	12	11	11
Cadmium	M	2450	mg/kg	0.10	0.24	0.36	0.28	0.29	0.28	0.17	0.34	0.34	0.32	0.32
Chromium	M	2450	mg/kg	1.0	20	21	20	17	17	17	14	15	13	13
Mercury Low Level	M	2450	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.06	0.13	0.12	0.12
Copper	M	2450	mg/kg	0.50	17	18	20	24	17	14	15	16	14	14
Nickel	M	2450	mg/kg	0.50	25	27	25	23	27	22	14	17	16	16
Lead	M	2450	mg/kg	0.50	32	33	33	28	41	34	47	52	43	43
Selenium	M	2450	mg/kg	0.20	0.28	< 0.20	< 0.20	< 0.20	0.32	0.42	0.37	0.37	0.40	0.40
Zinc	M	2450	mg/kg	0.50	83	89	90	79	89	80	72	75	71	71
Chromium (Trivalent)	N	2490	mg/kg	1.0	20	21	20	17	17	17	14	15	13	13
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	< 0.50
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

## Results - Soil

**Project: Bonvilston**

Client: Terra Firma (Wales) Ltd		Chemtest Job No.: 20-28927 20-28927 20-28927 20-28927 20-28927 20-28927 20-28927 20-28927 20-28927 20-28927											
Quotation No.:		Chemtest Sample ID.: 1086797 1086798 1086799 1086800 1086801 1086802 1086803 1086804 1086805											
Order No.: 13032/RH		Client Sample Ref.: SS S1 SS S2 SS S3 SS S4 SS S5 SS S6 TS S1 TS S2 TS S3											
		Client Sample ID.: SS S1 SS S2 SS S3 SS S4 SS S5 SS S6 TS S1 TS S2 TS S3											
		Sample Type: SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL											
		Date Sampled: 23-Oct-2020 23-Oct-2020 23-Oct-2020 23-Oct-2020 23-Oct-2020 23-Oct-2020 23-Oct-2020 23-Oct-2020 23-Oct-2020 23-Oct-2020											
		Time Sampled: 12:00 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 DURHAM											
Determinand	Accred.	SOP	Units	LOD									
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Naphthalene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.13	< 0.10	< 0.10	< 0.10	< 0.10	1.1
Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.12	< 0.10	< 0.10	< 0.10	< 0.10	1.0
Benzo[a]anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	2.1
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Organic Matter BS1377	N	2930	%	0.10	0.80	0.60	0.60	0.80	0.30	1.4	3.1	2.6	2.5

# Results - Topsoil Report

BS3882:2015

**Chemtest Job No.:** 20-28927  
**Chemtest Sample ID.:** 1086803  
 Client Sample Ref.: TS S1  
 Sample Location:  
**Client Sample ID.:** TS S1  
 Top Depth (m):  
 Bottom Depth (m):  
 Date Sampled: 23-Oct-2020  
 Time Sampled:

Parameter	Units	Multipurpose Range	Result	Compliant with Multipurpose Range? (Y/N)	Compliant with Specific Purpose Range? (Y/N)		
					Acid	Low F	Calc.
<b>Texture</b>							
Clay content	%		21				
Silt content	%		27				
Sand content	%		52				
Soil texture class		See Attached Chart	Sandy Clay Loam	YES			
<b>Mass Loss on Ignition</b>							
Clay 5-20%		3.0-20	4.1	NO	NO	YES	NO
Clay 20-35%		5.0-20					
<b>Stone Content</b>	% m/m						
>2mm		0-30	28	YES			
>20mm		0-10	3.8	YES			
>50mm		0	< 0.020	YES			
Soil pH value		5.5-8.5	7.3	YES	NO	YES	NO
Carbonate (Calcareous only)	%		5.3				YES
Electrical Conductivity	µS/cm	If >3300 do ESP	2200	YES			
<b>Available Nutrient Content</b>							
Nitrogen %		>0.15	0.23	YES	YES		YES
Extractable phosphorus	mg/l	16-140	6.5	NO	NO	YES	NO
Extractable potassium	mg/l	121-1500	75	NO	NO		NO
Extractable magnesium	mg/l	51-600	120	YES	YES		YES
<b>Carbon : Nitrogen Ratio</b>		<20:1	10.4/1	YES	YES	YES	YES
<b>Exchangeable sodium</b>	%	<15	0.95				
Available Calcium	mg/l		1900				
Available Sodium	mg/l		24				
<b>Phytotoxic Contaminants (by soil pH)</b>		< 6.0	6.0-7.0	> 7.0			
Zinc (Nitric Acid extract)	mg/kg	<200	<200	<300	57	YES	
Copper (Nitric Acid extract)	mg/kg	<100	<135	<200	14	YES	
Nickel (Nitric Acid extract)	mg/kg	<60	<75	<110	12	YES	
<b>Visible Contaminants</b>	% mm						
>2mm		<0.5	0.000	YES			
..... of which plastics		<0.25	0.000	YES			
..... man-made sharps		zero in 1kg	0.000	YES			

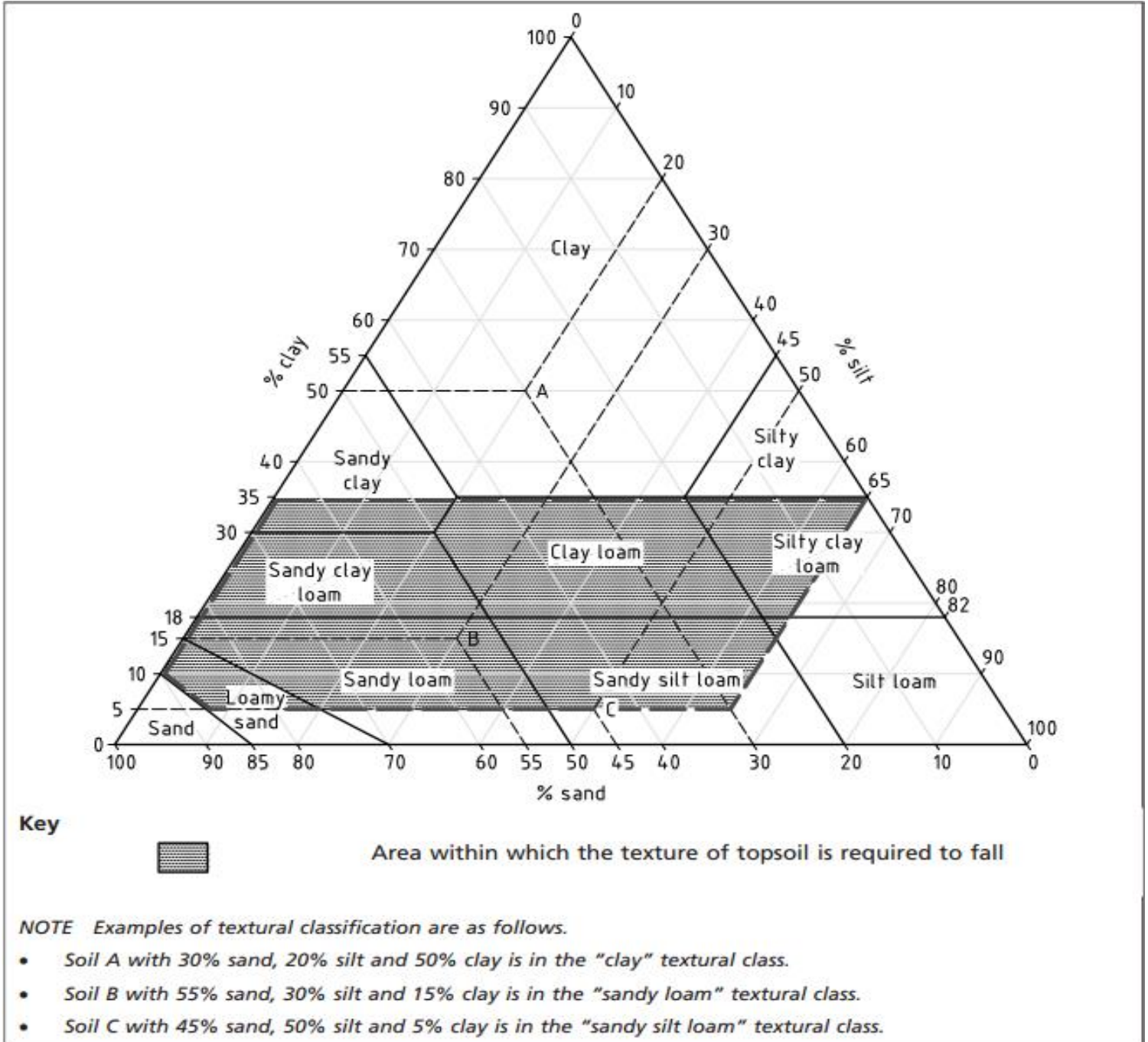
# Results - Topsoil Report

BS3882:2015

**Chemtest Job No.:** 20-28927  
**Chemtest Sample ID.:** 1086804  
 Client Sample Ref.: TS S2  
 Sample Location:  
**Client Sample ID.:** TS S2  
 Top Depth (m):  
 Bottom Depth (m):  
 Date Sampled: 23-Oct-2020  
 Time Sampled:

Parameter	Units	Multipurpose Range	Result	Compliant with Multipurpose Range? (Y/N)	Compliant with Specific Purpose Range? (Y/N)		
					Acid	Low F	Calc.
<b>Texture</b>							
Clay content	%		19				
Silt content	%		24				
Sand content	%		56				
Soil texture class		See Attached Chart	Sandy Clay Loam	YES			
<b>Mass Loss on Ignition</b>							
Clay 5-20%		3.0-20	3.5	YES	YES	YES	YES
Clay 20-35%		5.0-20					
<b>Stone Content</b>	% m/m						
>2mm		0-30	23	YES			
>20mm		0-10	9.7	YES			
>50mm		0	< 0.020	YES			
Soil pH value		5.5-8.5	7.6	YES	NO	YES	YES
Carbonate (Calcareous only)	%		4.0				YES
Electrical Conductivity	µS/cm	If >3300 do ESP	2200	YES			
<b>Available Nutrient Content</b>							
Nitrogen %		>0.15	0.21	YES	YES		YES
Extractable phosphorus	mg/l	16-140	7.2	NO	NO	YES	NO
Extractable potassium	mg/l	121-1500	85	NO	NO		NO
Extractable magnesium	mg/l	51-600	130	YES	YES		YES
<b>Carbon : Nitrogen Ratio</b>		<20:1	9.9/1	YES	YES	YES	YES
<b>Exchangeable sodium</b>	%	<15	0.87				
Available Calcium	mg/l		1600				
Available Sodium	mg/l		19				
<b>Phytotoxic Contaminants (by soil pH)</b>		<b>&lt; 6.0</b> <b>6.0-7.0</b> <b>&gt; 7.0</b>					
Zinc (Nitric Acid extract)	mg/kg	<200 <200 <300	59	YES			
Copper (Nitric Acid extract)	mg/kg	<100 <135 <200	16	YES			
Nickel (Nitric Acid extract)	mg/kg	<60 <75 <110	14	YES			
<b>Visible Contaminants</b>	% mm						
>2mm		<0.5	0.000	YES			
..... of which plastics		<0.25	0.000	YES			
..... man-made sharps		zero in 1kg	0.000	YES			

**Texture Classification Chart**



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## Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2020	Electrical Conductivity	Electrical conductivity (EC) of aqueous extract or calcium sulphate solution for topsoil	Measurement of the electrical resistance of a 2:1 water/soil extract.
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
2115	Total Nitrogen in Soils	Nitrogen	Determination by elemental analyser
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2260	Carbonate	Carbonate	Titration
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2400	Cations	Cations	ICP-MS
2420	Phosphate	Phosphate	Spectrophotometry - Discrete 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.
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.
2620	LOI 440	LOI 440 Trommel Fines	Determination of the proportion by mass that is lost from a soil by ignition at 440°C.
2680	TPH A/A Split	Aliphatics: >C5-C6, >C6-C8,>C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35- C44Aromatics: >C5-C7, >C7-C8, >C8- C10, >C10-C12, >C12-C16, >C16- C21, >C21- C35, >C35- C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
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**

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U	UKAS accredited
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S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
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I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

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**

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All soil samples will be retained for a period of 45 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](mailto:customerservices@chemtest.com)

## **Annex B Topsoil Test Results**



# Final Report

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**Report No.:** 21-18610-1  
**Initial Date of Issue:** 08-Jun-2021  
**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.:** **Date Received:** 03-Jun-2021  
**Order No.:** 12032RH **Date Instructed:** 03-Jun-2021  
**No. of Samples:** 3  
**Turnaround (Wkdays):** 5 **Results Due:** 09-Jun-2021  
**Date Approved:** 08-Jun-2021

**Approved By:**

**Details:** Glynn Harvey, Technical Manager

---

## Results - Soil

**Project: Herbert Road**

Client: Terra Firma (Wales) Ltd		Chemtest Job No.:		21-18610	21-18610	21-18610
Quotation No.:		Chemtest Sample ID.:		1213198	1213199	1213200
Order No.: 12032RH		Client Sample Ref.:		PLOT 101	PLOT 104	PLOT 106
		Client Sample ID.:		PLOT 101	PLOT 104	PLOT 106
		Sample Location:		topsoil	topsoil	topsoil
		Sample Type:		SOIL	SOIL	SOIL
		Date Sampled:		02-Jun-2021	02-Jun-2021	02-Jun-2021
		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
ACM Detection Stage	U	2192		N/A	-	-
Moisture	N	2030	%	0.020	16	15
Soil Colour	N	2040		N/A	Black	Black
Other Material	N	2040		N/A	Stones and Roots	Stones and Roots
Soil Texture	N	2040		N/A	Sand	Sand
pH	M	2010		4.0	8.4	8.5
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	1.9	2.7
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	< 0.50
Sulphate (Acid Soluble)	M	2430	%	0.010	0.059	0.083
Arsenic	M	2450	mg/kg	1.0	6.3	9.4
Cadmium	M	2450	mg/kg	0.10	0.22	0.37
Chromium	M	2450	mg/kg	1.0	19	23
Mercury Low Level	M	2450	mg/kg	0.05	0.07	0.09
Copper	M	2450	mg/kg	0.50	15	42
Nickel	M	2450	mg/kg	0.50	33	62
Lead	M	2450	mg/kg	0.50	18	29
Selenium	M	2450	mg/kg	0.20	< 0.20	< 0.20
Zinc	M	2450	mg/kg	0.50	83	120
Chromium (Trivalent)	N	2490	mg/kg	1.0	19	23
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0

## Results - Soil

**Project: Herbert Road**

<b>Client: Terra Firma (Wales) Ltd</b>	<b>Chemtest Job No.:</b>		21-18610	21-18610	21-18610		
Quotation No.:	<b>Chemtest Sample ID.:</b>		1213198	1213199	1213200		
Order No.: 12032RH	Client Sample Ref.:		PLOT 101	PLOT 104	PLOT 106		
	Client Sample ID.:		PLOT 101	PLOT 104	PLOT 106		
	Sample Location:		topsoil	topsoil	topsoil		
	Sample Type:		SOIL	SOIL	SOIL		
	Date Sampled:		02-Jun-2021	02-Jun-2021	02-Jun-2021		
	Time Sampled:		12:00	12:00	12:00		
	Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY		
<b>Determinand</b>	<b>Accred.</b>	<b>SOP</b>	<b>Units</b>	<b>LOD</b>			
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	< 10
Naphthalene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Chrysene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0	< 2.0	< 2.0	< 2.0
Total Phenols	M	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Organic Matter BS1377	N	2930	%	0.10	5.1	6.2	6.1

## 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	Alkaline 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.
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.
2680	TPH A/A Split	Aliphatics: >C5-C6, >C6-C8,>C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35- C44Aromatics: >C5-C7, >C7-C8, >C8- C10, >C10-C12, >C12-C16, >C16- C21, >C21- C35, >C35- C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
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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**Annex C**  
**Capping Thickness Validation Photos**