

Our Ref: 12032/VR-PHASE 3 (N) – P131-133

Your Ref:

Contact: Ruth Howells

23rd September 2024

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

For the attn. of Mark Davies

Dear Mark

CAPPING VALIDATION REPORT: HERBERT ROAD, PHASE 3 PLOTS 131 & 133

Terra Firma previously provided a validation report for Plots 127-137 & 150-160 (The Island), dated 6th October 2023 (Report Ref: 12032/VR-PHASE3(N)).

This report confirmed that all gardens had been suitability remediation with the exception of Plots 131 and 133 due to unacceptable contamination in the subsoil, and concluded the following

It is recommended that the subsoil and topsoil in Plot 133 be removed and replaced. The replacement soils should be sampled and tested in due course.

An exceedance of dibenz(a,h)anthracene was recorded in the subsoil of Plot 131. No other exceedances were identified in the subsoil. It is therefore recommended that the subsoil in Plot 131 be removed and replaced.

I can confirm that the subsoil in these two plots was replaced in October 2023. Terra Firma attended site to take a sample of the subsoil from each garden.

The subsoil chemical test results, which include the regulatory soil guideline values used in the Tier 1 assessment are given in **Tables 3.1** and **3.2**.

The soil test certificate is enclosed.

Table 3.1 Summary of Soil Chemical Test Results – Inorganics & Miscellaneous

Substance	Threshold Value (mg/kg)	Source	Measured Concentrations (mg/kg)		Number of Exceedances
			Plot 131	Plot 133	
Arsenic	37	LQM/CIEH	12	8.5	0
Cadmium	11	LQM/CIEH	1.0	0.68	0
Chromium III	910	LQM/CIEH	26	19	0
Chromium VI	6	LQM/CIEH	<0.5	<0.5	0
Copper	2400	LQM/CIEH	44	28	0
Lead	200	pC4SL	50	34	0
Mercury (inorganic)	40	LQM/CIEH	0.14	0.1	0
Nickel	180	LQM/CIEH	42	30	0
Selenium	250	LQM/CIEH	1.2	0.99	0
Zinc	3700	LQM/CIEH	200	110	0
Cyanide	-	-	<0.5	<0.5	0
Phenols	120	LQM/CIEH	<0.1	0.34	0
Boron	290	LQM/CIEH	0.42	1.8	0
Organic Matter (%)	-	-	1.4	4.7	-
pH	-	-	8.2	8.1	-
Asbestos	-	-	Not detected		
Notes:					
- No available guideline					

Table 3.2 Summary of Soil Chemical Test Results – Speciated PAH and Petroleum Hydrocarbons

Substance	Threshold Value (mg/kg)	Source	Measured Concentrations (mg/kg)		Number of Exceedances
			Plot 131	Plot 133	
Naphthalene	2.3	LQM/CIEH	< 0.10	< 0.10	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	0.19	< 0.10	0
Anthracene	2400	LQM/CIEH	< 0.10	< 0.10	0
Fluoranthene	280	LQM/CIEH	0.25	< 0.10	0
Pyrene	620	LQM/CIEH	0.18	< 0.10	0
Benzo(a)anthracene	7.2	LQM/CIEH	0.12	< 0.10	0
Chrysene	15	LQM/CIEH	0.11	< 0.10	0
Benzo(b)fluoranthene	2.6	LQM/CIEH	< 0.10	< 0.10	0
Benzo(k)fluoranthene	77	LQM/CIEH	< 0.10	< 0.10	0
Benzo(a)pyrene	2.2	LQM/CIEH	< 0.10	< 0.10	0
Indeno(123cd)pyrene	27	LQM/CIEH	< 0.10	< 0.10	0
Dibenzo(ah)anthracene	0.24	LQM/CIEH	< 0.10	< 0.10	0
Benzo(ghi)perylene	320	LQM/CIEH	< 0.10	< 0.10	0
Total PAH	-	-	<2.0	<2.0	-
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	2.3	0
EPH C12 – C16 Ali	1100	LQM/CIEH	<1.0	<1.0	0
EPH C16 – C21 Ali	65000*	LQM/CIEH	<2.0	<2.0	0
EPH C21 – C35 Ali	65000*	LQM/CIEH	<3.0	17	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	2.3	0
EPH C21 – C35 Arom	1100	LQM/CIEH	<2.0	28	0
EPH C35 – C40 Arom	1100	LQM/CIEH	<1.0	2.3	0
Notes:					
Thresholds based on 1.0% soil organic matter					
- No available guidelines					
^ – 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					

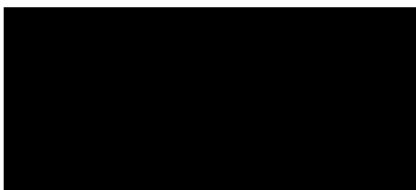
The above tables confirm that the replacement subsoil in Plots 131 and 133 is uncontaminated and suitable for use.

The subsoil was overlain with topsoil, as the same source previously used and confirmed acceptable.

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



Mrs Ruth Howells

Enc.



Final Report

Report No.: 23-35767-1

Initial Date of Issue: 01-Nov-2023

Re-Issue Details:

Client Terra Firma (Wales) Ltd

Client Address: 5 Deryn Court
Wharfedale Road
Pentwyn
Cardiff
CF23 7HA

Contact(s): jacob@terrafirmawales.co.uk
ruth@terrafirmawales.co.uk

Project Herbert Road Newport

Quotation No.: **Date Received:** 25-Oct-2023

Order No.: HERBERT ROAD NEWPORT **Date Instructed:** 25-Oct-2023

No. of Samples: 2

Turnaround (Wkdays): 5 **Results Due:** 31-Oct-2023

Date Approved: 01-Nov-2023

Approved By:



Details: Stuart Henderson, Technical
Manager

Results - Soil

Project: Herbert Road Newport

Client: Terra Firma (Wales) Ltd		Chemtest Job No.:		23-35767	23-35767
Quotation No.:		Chemtest Sample ID.:		1722058	1722059
Order No.: HERBERT ROAD NEWPORT		Client Sample Ref.:		PLOT 131	PLOT 133
		Client Sample ID.:		PLOT 131 0.40	PLOT 133 0.30
		Sample Location:		Plot 131	Plot 133
		Sample Type:		SOIL	SOIL
		Top Depth (m):		0.40	0.30
		Date Sampled:		20-Oct-2023	20-Oct-2023
		Time Sampled:		12:00	12:00
		Asbestos Lab:		DURHAM	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	16
Soil Colour	N	2040		N/A	Brown
Other Material	N	2040		N/A	Stones
Soil Texture	N	2040		N/A	Clay
pH at 20C	M	2010		4.0	8.2
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	0.42
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50
Sulphate (Acid Soluble)	U	2430	%	0.010	0.041
Arsenic	M	2455	mg/kg	0.5	12
Cadmium	M	2455	mg/kg	0.10	1.0
Chromium	M	2455	mg/kg	0.5	26
Mercury Low Level	M	2450	mg/kg	0.05	0.14
Copper	M	2455	mg/kg	0.50	44
Nickel	M	2455	mg/kg	0.50	42
Lead	M	2455	mg/kg	0.50	50
Selenium	M	2455	mg/kg	0.25	1.2
Zinc	M	2455	mg/kg	0.50	200
Chromium (Trivalent)	N	2490	mg/kg	1.0	26
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	< 2.0
Aliphatic EPH >C12-C16	M	2690	mg/kg	1.00	< 1.0
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

Results - Soil

Project: Herbert Road Newport

Client: Terra Firma (Wales) Ltd		Chemtest Job No.:		23-35767	23-35767
Quotation No.:		Chemtest Sample ID.:		1722058	1722059
Order No.: HERBERT ROAD NEWPORT		Client Sample Ref.:		PLOT 131	PLOT 133
		Client Sample ID.:		PLOT 131 0.40	PLOT 133 0.30
		Sample Location:		Plot 131	Plot 133
		Sample Type:		SOIL	SOIL
		Top Depth (m):		0.40	0.30
		Date Sampled:		20-Oct-2023	20-Oct-2023
		Time Sampled:		12:00	12:00
		Asbestos Lab:		DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD	
Total Aliphatic EPH >C10-C35	M	2690	mg/kg	5.00	< 5.0
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	< 2.0
Aromatic EPH >C21-C35	U	2690	mg/kg	2.00	< 2.0
Aromatic EPH >C35-C40	N	2690	mg/kg	1.00	< 1.0
Total Aromatic EPH >C10-C35	U	2690	mg/kg	5.00	< 5.0
Total VPH >C5-C10	U	2780	mg/kg	0.50	< 0.50
Total EPH >C10-C35	U	2690	mg/kg	10.00	< 10
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	0.19
Anthracene	M	2800	mg/kg	0.10	< 0.10
Fluoranthene	M	2800	mg/kg	0.10	0.25
Pyrene	M	2800	mg/kg	0.10	0.18
Benzo[a]anthracene	M	2800	mg/kg	0.10	0.12
Chrysene	M	2800	mg/kg	0.10	0.11
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	1.4

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	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.
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