



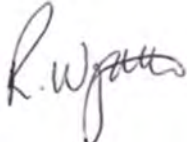
GROUNDTECH
CONSULTING

Job title: Dob Brook Close, Newton Heath

Report type: Cover System Verification Report – Plots 1 to 24

Prepared for: Adapt Civils

Date: 16 December 2022

Document Control Form	
PROJECT	DOB BROOK CLOSE, NEWTON HEATH
REPORT NAME	COVER SYSTEM VALIDATION REPORT – PLOTS 1 to 24
REPORT REFERENCE	GRO-21052-4034
STATUS	FINAL
ISSUE DATE	16 DECEMBER 2022
REVISION	
CLIENT	ADAPT CIVILS
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Introduction

Groundtech Consulting visited the housing development at Dob Brook Close in Newton Heath, Manchester to validate the depth of the cover system placed in the gardens of Plot 1 to 24 as outlined in the Groundtech Consulting Remediation Specification referenced GRO-21052-2396, dated 16th September 2021. An extract showing the validated plots is below.



Please find below the Cover System Validation Report in accordance with the agreed scope of works.

Site Works

Groundtech Consulting carried out the following site visits to undertake the validation works:

- *18th November 2022* - to validate the depth and placement of the cover system in the garden areas of Plots 3 to 5 and 22 to 24.
- *30th November 2022* - to validate the depth and placement of the cover system in the garden areas of Plots 1 and 2.
- *8th December 2022* - to validate the depth and placement of the cover system in the garden areas of Plots 6 to 21.

Geo-Environmental Testing Results

The material used within the gardens of Plot 1 to 24 was clean imported material sourced from a greenfield site. The imported topsoil was tested at a frequency specified in the Remedial Specification and compared to the remedial target values.

The Geo-Environmental testing results for Plots 1 to 5 and Plots 22 to 24 are appended. No elevated Contaminants of Concern were recorded when screened against the RTVs.

The Geo-Environmental test results for Plot 6 to 21 are outstanding and will be forwarded on once we receive them.

Cover System Depth Validation

The depth of cover required across the site is presented within the Groundtech Consulting Remedial Specification. If Made Ground is present at garden formation level, the cover system should comprise 600mm of topsoil and subsoil (minimum of 150mm of topsoil). The remedial specification does not specify a requirement for a remediation break layer and has not been installed.

Inspection pits were excavated by hand to confirm the placement of the cover system in the garden areas of Plot 1 to 24. The position of the hand dug verification pits are presented on *GRO-21052-P03*. Photographs are appended to this report which verify the presence of at least 600mm of clean cover comprising a minimum of 150mm of topsoil and 450mm of subsoil.

The cover system comprised dark brown sandy silty topsoil to depths of between 0.15m and 0.2m bgl and the subsoil consisted of dark brown silty sand to depths in excess of 600mm. No anthropogenic materials were present in the topsoil or subsoil.

Conclusions

The material used for the cover system of Plots 1 to 5 and Plots 22 to 24 was all imported and suitable for residential with plant uptake end use based on the results of laboratory testing adhering to the Remedial Specification produced by Groundtech Consulting. Additional testing is ongoing for the material placed in Plots 6 to 21 and will be reported separately.

The depth validation excavations in the garden areas confirm the presence of at least 600mm cover in accordance with the remedial requirements.

Based on the recent site visits and laboratory testing, the cover system installed in Plots 1 to 5 and Plots 22 to 24 is suitable for the proposed residential end use. Laboratory testing is currently ongoing to determine the chemical suitability of Plots 5 to 21 however, a sufficient thickness of clean cover has been placed.

Plans



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CLIENT

ADAPT CIVILS

PROJECT TITLE

DOB BROOK CLOSE, NEWTON HEATH

PLAN TITLE

COVER SYSTEM VALIDATION PLAN

DATE

DECEMBER 2022

SCALE

NTS

PLAN NUMBER

GRO-21052-P03

Rev. Details

Date

Status

Preliminary

Draft

Issued

For Comment

Approved

Notes

VALIDATED PLOT LOCATIONS

✕ HAND DUG VERIFICATION PIT LOCATION



Laboratory Testing Results



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Analytical Report Number : 22-90645

Project / Site name:	Dob Brook Close	Samples received on:	12/10/2022
Your job number:	GRO 21052	Samples instructed on/ Analysis started on:	17/10/2022
Your order number:	ORD 21052 2880	Analysis completed by:	31/10/2022
Report Issue Number:	1	Report issued on:	01/11/2022
Samples Analysed:	3 soil samples		

Signed:


Dominika Warjan
Junior Reporting Specialist
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

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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: 22-90645
Project / Site name: Dob Brook Close
Your Order No: ORD 21052 2880

Lab Sample Number				2463987	2463988	2463989
Sample Reference				SP1	SP2	SP3
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied
Date Sampled				07/10/2022	07/10/2022	07/10/2022
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	27	28	22
Total mass of sample received	kg	0.001	NONE	1	1	1

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	DSO	DSO	DSO

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.4	8.3	8.4
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	140	120	140
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.07	0.061	0.071
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	69.6	61.4	70.8
Organic Matter (automated)	%	0.1	MCERTS	9.3	5	0.7

Speciated PAHs

Naphthalene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	NONE	< 0.05	0.23	0.3
Anthracene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	NONE	0.48	0.55	0.66
Pyrene	mg/kg	0.05	NONE	0.39	0.56	0.61
Benzo(a)anthracene	mg/kg	0.05	NONE	0.29	0.17	0.41
Chrysene	mg/kg	0.05	NONE	0.28	0.39	0.33
Benzo(b)fluoranthene	mg/kg	0.05	NONE	< 0.05	0.35	0.37
Benzo(k)fluoranthene	mg/kg	0.05	NONE	< 0.05	0.15	0.29
Benzo(a)pyrene	mg/kg	0.05	NONE	< 0.05	0.29	0.39
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	NONE	< 0.05	0.18	0.22
Dibenz(a,h)anthracene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	NONE	< 0.05	0.21	0.26

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	NONE	1.44	3.08	3.84
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	5.9	6.9	5.7
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	12	12	12
Copper (aqua regia extractable)	mg/kg	1	MCERTS	20	27	27
Lead (aqua regia extractable)	mg/kg	1	MCERTS	35	48	40
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	10	11	9.7
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	60	77	67

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 22-90645

Project / Site name: Dob Brook Close

* 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 *
2463987	SP1	None Supplied	None Supplied	Brown clay and loam with gravel and vegetation.
2463988	SP2	None Supplied	None Supplied	Brown clay and loam with gravel and vegetation.
2463989	SP3	None Supplied	None Supplied	Brown loam and clay with gravel and vegetation.

Analytical Report Number : 22-90645
Project / Site name: Dob Brook Close

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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.	L038-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
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
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	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-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
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL or B' 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.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Remedial Target Values



Remedial Target Values

Proposed End Use	Unit	Residential with Plant Uptake			Source
SOM	%	1	2.5	6	
Arsenic	mg/kg	37	37	37	SGVs
Beryllium	mg/kg	1.7	1.7	1.7	LQM S4ULs
Boron (water soluble)	mg/kg	290	290	290	LQM S4ULs
Cadmium	mg/kg	10	10	10	SGVs
Chromium (Total)	mg/kg	910	910	910	LQM S4ULs
Chromium (VI)	mg/kg	21	21	21	DEFRA C4SLs
Copper	mg/kg	2400	2400	2400	LQM S4ULs
Lead	mg/kg	200	200	200	DEFRA C4SLs
Organic Mercury	mg/kg	1.2	1.2	1.2	LQM S4ULs
Nickel	mg/kg	130	130	130	SGVs
Selenium	mg/kg	350	350	350	SGVs
Vanadium	mg/kg	410	410	410	LQM S4ULs
Zinc	mg/kg	3700	3700	3700	LQM S4ULs
Aliphatic EC 5 - 6	mg/kg	42	78	160	LQM S4ULs
Aliphatic EC 6 - 8	mg/kg	100	230	530	LQM S4ULs
Aliphatic EC 8 - 10	mg/kg	27	65	150	LQM S4ULs
Aliphatic EC 10 - 12	mg/kg	130 (48) ^{vap}	330 (118) ^{vap}	760 (283) ^{vap}	LQM S4ULs
Aliphatic EC 12 - 16	mg/kg	1100 (24) ^{sol}	2400 (59) ^{sol}	4300 (142) ^{sol}	LQM S4ULs
Aliphatic EC 16 - 35	mg/kg	65000 (8.48) ^{f,sol}	92000 (21) ^{f,sol}	110000 ^f	LQM S4ULs
Aliphatic EC 35 - 44	mg/kg	65000 (8.48) ^{f,sol}	92000 (21) ^{f,sol}	110000 ^f	LQM S4ULs
Aromatic EC 5 - 7	mg/kg	70	140	300	LQM S4ULs
Aromatic EC 7 - 8	mg/kg	130	290	660	LQM S4ULs
Aromatic EC 8 - 10	mg/kg	34	83	190	LQM S4ULs
Aromatic EC 10 - 12	mg/kg	74	180	380	LQM S4ULs
Aromatic EC 12 -16	mg/kg	140	330	660	LQM S4ULs
Aromatic EC 16 - 21	mg/kg	260 ^f	540 ^f	930 ^f	LQM S4ULs
Aromatic EC 21 - 35	mg/kg	1100 ^f	1500 ^f	1700 ^f	LQM S4ULs
Aromatic EC 35 - 44	mg/kg	1100 ^f	1500 ^f	1700 ^f	LQM S4ULs
Benzene	mg/kg	0.33	0.33	0.33	SGVs
Toluene	mg/kg	610	610	610	SGVs
Ethyl Benzene	mg/kg	350	350	350	SGVs
Xylene - o	mg/kg	250	250	250	SGVs
Xylene - m	mg/kg	240	240	240	SGVs
Xylene - p	mg/kg	230	230	230	SGVs
MTBE (methyl tert-butyl	mg/kg	49	84	160	CL:AIRE 2010
Acenaphthene	mg/kg	210	510	1100	LQM SAULs
Acenaphthylene	mg/kg	170	420	920	LQM S4ULs
Anthracene	mg/kg	2400	5400	11000	LQM S4ULs
Benz(a)anthracene	mg/kg	7.2	11	13	LQM S4ULs
Benzo(a)pyrene	mg/kg	2.2	2.7	5*	DEFRA C4SL*/LQM S4ULs
Benzo(b)fluoranthene	mg/kg	2.6	3.3	3.7	LQM S4ULs
Benzo(ghi)perylene	mg/kg	320	340	350	LQM S4ULs
Benzo(k)fluoranthene	mg/kg	77	93	100	LQM S4ULs
Chrysene	mg/kg	15	22	27	LQM S4ULs
Dibenz(ah)anthracene	mg/kg	0.24	0.28	0.3	LQM S4ULs
Fluoranthene	mg/kg	280	560	890	LQM S4ULs
Fluorene	mg/kg	170	400	860	LQM S4ULs
Indeno(123-cd)pyrene	mg/kg	27	36	41	LQM S4ULs
Naphthalene	mg/kg	2.3 f	5.6 f	13 f	LQM S4ULs
Phenanthrene	mg/kg	95	220	440	LQM S4ULs
Pyrene	mg/kg	620	1200	2000	LQM S4ULs
Phenol	mg/kg	420	420	420	SGVs
Asbestos	No fibres detected				

Depth Validation Photographs



Photograph 1 – Plot 3



Photograph 2 – Plot 3



Photograph 3 – Plot 5



Photograph 4 – Plot 5



Photograph 5 – Plot 24



Photograph 6 – Plot 24



Photograph 7 – Plot 22



Photograph 8 – Plot 22



Photograph 9 – Plot 1



Photograph 10 – Plot 1



Photograph 11 – Plot 21



Photograph 12 – Plot 21



Photograph 13 – Plot 14



Photograph 14 – Plot 14



Photograph 15 – Plot 10



Photograph 16 – Plot 10



Photograph 17 – Plot 6



Photograph 18 – Plot 6

Limitations

Limitations

This report (Report) forms part of the Services and if applicable Additional Services undertaken by Groundtech Consulting Ltd pursuant to a written contract (Agreement) which contains detailed provisions including express limitations of the liability of Groundtech Consulting Ltd.

This Report was prepared using reasonable skill and care as stated in the Agreement for the purpose including intended end use stated by the Client (Purpose) and the liability of Groundtech Consulting Ltd in respect of the form and content of this Report is no greater than its liability under the Agreement. All records, measurements notes, or any other data (Data) obtained by or for the benefit of the Consultant were obtained at a specific point in time and it may not be assumed by the Client or any person relying on this Report that the Data will remain unaffected by the passage of time, the seasons, weather conditions, changes in the water table or the carrying out and completion of works at the Site.

Unless otherwise agreed this Report has been prepared exclusively for the use and reliance of the Client and may not be relied upon, by any other party except as provided for in the Agreement. A third party who relies on this Report, does so at their own and sole risk and Groundtech Consulting Ltd has no liability to such parties.

Groundtech Consulting Ltd that this Report is to be used for the Purpose. The Purpose was instrumental in determining the scope and of the Services provided. If the Purpose should change, the Client may not be able to rely on the Report without the separate agreement of Groundtech Consulting Ltd.

Since the Report was written, later changes in legislation, statutory requirements and industry best practices have not been considered and this should be allowed for. Ground conditions can also change (see below) and should be investigated if there is any significant delay in acting on the findings of this Report. The period of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the Report inaccurate or unreliable. The information and conclusions in this Report should not be relied upon in the future without written confirmation from Groundtech Consulting Ltd that it is safe to do so.

The observations and conclusions outlined in this Report are based exclusively on the services that were provided as set out in the agreement between the client and Groundtech Consulting Ltd.

Groundtech Consulting Ltd is not liable for the existence of any condition, the discovery of which would require additional investigation outside the agreed scope of works or core competency. The Report is based upon Groundtech Consulting Ltd's observations of existing physical conditions at the Site gained from site reconnaissance together with interpretation of information including documentation, obtained from third parties and from the Client on the history and usage of the Site. The findings and recommendations contained in this Report are based in part upon information provided by third parties, and Groundtech Consulting Ltd have relied upon such information assuming it to be correct.

Groundtech Consulting Ltd accepts no responsibility for errors or inaccuracies in third party information presented in this Report. Groundtech Consulting Ltd was not authorised to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services or Additional Services. Groundtech Consulting Ltd is not liable for any inaccurate information, misrepresentation of data or conclusions, which may inform the scope of investigation undertaken by Groundtech Consulting Ltd and forms the contract with the client.

Where field investigations have been carried out these have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions may also vary due to the ground's heterogeneous properties and because investigation exploratory locations only allow examination of the ground at discrete

locations. The potential exists for ground conditions to be encountered which are different to those considered in this Report, particularly between exploratory holes. The extent of the limited area depends on the soil and groundwater conditions, together with other constraints such as the position of any existing structures and underground utilities. If so stipulated in the Agreement, geo-environmental testing was carried out for a limited number of parameters based on an understanding of the available operational and historical information, and it should not be inferred that other chemical species are not present.

Any groundwater conditions entered on the exploratory hole records are those observed at the time of investigation. The groundwater level often has not had time to reach equilibrium and a monitoring period is required. Furthermore, groundwater levels are subject to seasonal variation or changes in local drainage conditions and groundwater levels may occur at other times of the year which are higher than were recorded during this investigation.

Any site drawings provided in this Report are preliminary and used to present the general relative locations of features on, and surrounding, the Site.

