



E3P
Taylor Road
Trafford Park
Urmston
Manchester
M41 7JQ

Manchester | London | Edinburgh

info@E3P.co.uk
www.E3P.co.uk

Ref: 14-207- V23
Date: 18th August 2021

Daniel Sonley
Chandos House
Oak Green Business Park,
Cheadle
Cheshire
SK8 6QL

By email

Dear Sirs,

GARDEN VALIDATION – BRUNSWICK MANCHESTER

An E3P engineer attended the above site to validate the thickness of the cover system that had been placed within the rear garden of plots 317-320 at the site of Brunswick Manchester.

In total 4 No hand excavated trial pits were advanced with the resulting strata detailed to the rear of this letter.

All trial pits were completed to highlight the required cover system 600mm (150mm topsoil and 450mm subsoil).

E3P can confirm that our independent validation demonstrates that all gardens have been installed with 150mm of certified topsoil and at least 450mm subsoil in accordance with the NHBC requirements for a site of this nature.

TOPSOIL

E3P attended site on 24th November 2020 to obtain three samples of the stockpiled imported topsoil deposits which were analysed in accordance with the URS Remediation Strategy. The samples were submitted to the independent MCERTS accredited laboratory I2 for analysis including pH, Metals, PAHs and TPH and Asbestos Screen in general accordance with the requirements of the remediation strategy.

Chemical analysis results are included within lab reports 20-43841-20-42488-19-27362 (attached to this letter).

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



Yours sincerely,

For and on behalf of E3P Ltd



Rob Horseman
Associate Director



Site: Brunswick - Manchester

Date: 18-08-2021	Project Number: 14-207
Project Manager: R. Horseman	E3P Engineer: T. Preston
Plot Numbers Validated: 317-320	

Chemical Laboratory Analysis

Analysis for topsoil and subsoil undertaken by I2 Analytical Laboratory using UKAS accredited methods where applicable.

Chemical analysis suite comprises heavy metals, sulphates, phenols, speciated Polycyclic Aromatic Hydrocarbons (PAHs), speciated and total Petroleum Hydrocarbons (TPH) and asbestos. Sampling frequency in accordance with the agreed Remediation Strategy. Laboratory analysis certificates attached to this validation certificate.

	Topsoil	Subsoil
<i>Chemical analysis confirmed materials suitable?</i>	Pass	Pass
<i>Further Comments</i>	N/A	N/A



Plot No: 317

Depth of Strata (m bgl)	0.00-0.15	Validated TOPSOIL
	0.15-0.60	Validated SUBSOIL

Depth of Cover System Materials



Depth of Cover System Materials



Depth of Cover System at Ground Level



Depth of Cover System in Relation to Plot



Plot No: 318

Depth of Strata (m bgl)	0.00-0.15	Validated TOPSOIL
	0.15-0.60	Validated SUBSOIL

Depth of Cover System Materials



Depth of Cover System Materials



Depth of Cover System at Ground Level



Depth of Cover System in Relation to Plot



Plot No: 319

	0.00-0.15	Validated TOPSOIL
Depth of Strata (m bgl)	0.15-0.60	Validated SUBSOIL

Depth of Cover System Materials



Depth of Cover System at Ground Level



Depth of Cover System Materials



Depth of Cover System in Relation to Plot



Plot No: 320

Depth of Strata (m bgl)	0.00-0.15	Validated TOPSOIL
	0.15-0.60	Validated SUBSOIL

Depth of Cover System Materials



Depth of Cover System at Ground Level



Depth of Cover System Materials



Depth of Cover System in Relation to Plot





Rob Horseman

e3p
Taylor Road
Urmston
Manchester
M41 7JQ

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

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

e: Rhorseman@e3p.co.uk

Analytical Report Number : 20-43841

Project / Site name:	Brunswick	Samples received on:	26/11/2020
Your job number:	14207	Samples instructed on/ Analysis started on:	26/11/2020
Your order number:	14-207-R-A	Analysis completed by:	03/12/2020
Report Issue Number:	1	Report issued on:	03/12/2020
Samples Analysed:	3 soil samples		

Signed:

Zina Abdul Razzak
Senior Quality 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

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: 20-43841

Project / Site name: Brunswick

Your Order No: 14-207-R-A

Lab Sample Number				1698240	1698241	1698242
Sample Reference				TS101	TS102	TS103
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied
Date Sampled				24/11/2020	24/11/2020	24/11/2020
Time Taken				1600	1600	1600
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	23	26	39
Total mass of sample received	kg	0.001	NONE	0.7	0.7	0.7

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

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.5	7.6	7.2
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1
Total Sulphate as SO ₄	mg/kg	50	MCERTS	720	610	1400
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	g/l	0.00125	MCERTS	0.022	0.017	0.044
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/kg	2.5	MCERTS	43	34	88
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/l	1.25	MCERTS	21.5	17.1	44.2
Sulphide	mg/kg	1	MCERTS	160	5.8	< 1.0
Total Sulphur	mg/kg	50	MCERTS	470	590	1300

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
----------------------------	-------	---	--------	-------	-------	-------

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80
-----------------------------	-------	-----	--------	--------	--------	--------

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	8.1	9.7	7
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	14	17	14
Copper (aqua regia extractable)	mg/kg	1	MCERTS	21	22	19
Lead (aqua regia extractable)	mg/kg	1	MCERTS	35	41	32
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	11	12	14
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	1

Analytical Report Number: 20-43841

Project / Site name: Brunswick

Your Order No: 14-207-R-A

Lab Sample Number				1698240	1698241	1698242
Sample Reference				TS101	TS102	TS103
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied
Date Sampled				24/11/2020	24/11/2020	24/11/2020
Time Taken				1600	1600	1600
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	50	55	49

Petroleum Hydrocarbons

TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0
TPH (C16 - C21)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
TPH (C21 - C35)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
TPH (C35 - C40)	mg/kg	10	MCERTS	< 10	< 10	< 10
TPH Total C5 - C40	mg/kg	10	MCERTS	< 10	< 10	< 10

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



Analytical Report Number : 20-43841
Project / Site name: Brunswick

* 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 *
1698240	TS101	None Supplied	None Supplied	Brown loam and clay with gravel and vegetation.
1698241	TS102	None Supplied	None Supplied	Brown loam and clay with vegetation.
1698242	TS103	None Supplied	None Supplied	Brown loam and clay with plastic and vegetation.

Analytical Report Number : 20-43841

Project / Site name: Brunswick

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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
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
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
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	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
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
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
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 sulphate (as SO ₄ in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-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
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.	L038-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
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS
Sulphate, water soluble, in soil (1hr extraction)	Sulphate, water soluble, in soil (1hr extraction)	In-house method	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.



Final Report

Report No.: 19-27362-1

Initial Date of Issue: 21-Aug-2019

Client Redstart Northwest Limited

Client Address: Unit 6
Oak Green Business Park
Earl Road
Cheadle Hulme
Cheshire
SK8 6QL

Contact(s): Phil Sales

Project 314.23 Brunswick

Quotation No.: Q18-12443 **Date Received:** 15-Aug-2019

Order No.: **Date Instructed:** 15-Aug-2019

No. of Samples: 8

Turnaround (Wkdays): 5 **Results Due:** 21-Aug-2019

Date Approved: 21-Aug-2019

Approved By:

Details: Robert Monk, Technical Manager

Results - Soil

Client: Redstart Northwest Limited				Chemtest Job No.:			19-27362	19-27362	19-27362	19-27362	19-27362	19-27362	19-27362
Quotation No.: Q18-12443				Chemtest Sample ID.:			873465	873466	873467	873468	873469	873470	873471
				Client Sample ID.:			P2501	P2502	P2503	P2504	P2505	P2506	P2507
				Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Date Sampled:			14-Aug-2019	14-Aug-2019	14-Aug-2019	14-Aug-2019	14-Aug-2019	14-Aug-2019	14-Aug-2019
				Asbestos Lab:			DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD				19-27362	19-27362	19-27362	19-27362	19-27362	19-27362
ACM Type	U	2192		N/A				-	-	-	-	-	-
Asbestos Identification	U	2192	%	0.001	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	-			-	-	-	-	-	-
Total Asbestos	N	2192	%	0.001	-			-	-	-	-	-	-
Moisture	N	2030	%	0.020	26			28	27	28	25	28	28
pH	U	2010		N/A	8.1			7.9	7.6	7.8	7.8	7.8	7.8
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	0.55			0.50	0.59	0.44	0.43	0.42	0.63
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.028			0.019	0.018	0.028	0.019	0.023	0.020
Sulphur (Elemental)	U	2180	mg/kg	1.0	11			7.3	6.4	5.7	5.1	6.3	4.6
Cyanide (Free)	U	2300	mg/kg	0.50	< 0.50			< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	U	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	0.065			0.079	0.079	0.073	0.059	0.081	0.076
Arsenic	U	2450	mg/kg	1.0	13			11	14	13	14	13	14
Barium	U	2450	mg/kg	10	230			130	150	140	150	130	140
Beryllium	U	2450	mg/kg	1.0	1.4			< 1.0	< 1.0	1.1	1.1	< 1.0	1.2
Cadmium	U	2450	mg/kg	0.10	0.20			0.23	0.29	0.28	0.21	0.25	0.22
Chromium	U	2450	mg/kg	1.0	34			23	26	28	33	27	29
Molybdenum	U	2450	mg/kg	2.0	< 2.0			< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Antimony	N	2450	mg/kg	2.0	< 2.0			< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Copper	U	2450	mg/kg	0.50	24			22	22	26	24	24	24
Mercury	U	2450	mg/kg	0.10	0.10			0.11	0.11	0.14	0.10	0.13	0.10
Nickel	U	2450	mg/kg	0.50	33			20	21	25	28	22	26
Lead	U	2450	mg/kg	0.50	41			44	44	51	45	51	46
Selenium	U	2450	mg/kg	0.20	< 0.20			0.30	0.28	0.30	0.29	0.34	0.34
Vanadium	U	2450	mg/kg	5.0	40			30	34	36	39	35	39
Zinc	U	2450	mg/kg	0.50	67			60	63	71	65	69	74
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50			< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	4.7			5.3	5.5	5.2	4.1	5.0	4.8
Aliphatic TPH >C5-C6	N	2680	mg/kg	0.010	< 0.010			< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Aliphatic TPH >C6-C8	N	2680	mg/kg	0.010	< 0.010			< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Aliphatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	2680	mg/kg	0.10	< 0.10			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	2680	mg/kg	0.10	< 0.10			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	2680	mg/kg	0.10	< 0.10			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	2680	mg/kg	0.10	< 0.10			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	2680	mg/kg	1.0	< 1.0			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C5-C7	N	2680	mg/kg	0.010	< 0.010			< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Aromatic TPH >C7-C8	N	2680	mg/kg	0.010	< 0.010			< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010

Results - Soil

Client: Redstart Northwest Limited		Chemtest Job No.:		19-27362		19-27362		19-27362		19-27362		19-27362		19-27362		19-27362		19-27362	
Quotation No.: Q18-12443		Chemtest Sample ID.:		873465		873466		873467		873468		873469		873470		873471		873472	
		Client Sample ID.:		P2501		P2502		P2503		P2504		P2505		P2506		P2507		P2508	
		Sample Type:		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
		Date Sampled:		14-Aug-2019		14-Aug-2019		14-Aug-2019		14-Aug-2019		14-Aug-2019		14-Aug-2019		14-Aug-2019		14-Aug-2019	
		Asbestos Lab:		DURHAM		DURHAM		DURHAM		DURHAM		DURHAM		DURHAM		DURHAM		DURHAM	
Determinand	Accred.	SOP		Units		LOD													
		2680		mg/kg		0.10													
Aromatic TPH >C8-C10	N	2680		mg/kg		0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10	
Aromatic TPH >C10-C12	N	2680		mg/kg		0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10	
Aromatic TPH >C12-C16	N	2680		mg/kg		0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10	
Aromatic TPH >C16-C21	N	2680		mg/kg		0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10	
Aromatic TPH >C21-C35	N	2680		mg/kg		0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10	
Aromatic TPH >C35-C44	N	2680		mg/kg		0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10	
Total Aromatic Hydrocarbons	N	2680		mg/kg		1.0		< 1.0		< 1.0		< 1.0		< 1.0		< 1.0		< 1.0	
Total Petroleum Hydrocarbons	N	2680		mg/kg		2.0		< 2.0		< 2.0		< 2.0		< 2.0		< 2.0		< 2.0	
Benzene	N	2760		µg/kg		0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20	
Toluene	N	2760		µg/kg		0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20	
Ethylbenzene	N	2760		µg/kg		0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20	
m & p-Xylene	N	2760		µg/kg		0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20	
o-Xylene	N	2760		µg/kg		0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20	
Methyl Tert-Butyl Ether	N	2760		µg/kg		0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20	
Naphthalene	N	2800		mg/kg		0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010	
Acenaphthylene	N	2800		mg/kg		0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010	
Acenaphthene	N	2800		mg/kg		0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010	
Fluorene	N	2800		mg/kg		0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010	
Phenanthrene	N	2800		mg/kg		0.010		0.52		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010	
Anthracene	N	2800		mg/kg		0.010		0.10		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010	
Fluoranthene	N	2800		mg/kg		0.010		0.73		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010	
Pyrene	N	2800		mg/kg		0.010		0.78		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010	
Benzo[a]anthracene	N	2800		mg/kg		0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010	
Chrysene	N	2800		mg/kg		0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010	
Benzo[b]fluoranthene	N	2800		mg/kg		0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010	
Benzo[k]fluoranthene	N	2800		mg/kg		0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010	
Benzo[a]pyrene	N	2800		mg/kg		0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010	
Indeno(1,2,3-c,d)Pyrene	N	2800		mg/kg		0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010	
Dibenz[a,h]Anthracene	N	2800		mg/kg		0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010	
Benzo[g,h,i]perylene	N	2800		mg/kg		0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010	
Total Of 16 PAH's	N	2800		mg/kg		0.20		2.1		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20	
Total Phenols	U	2920		mg/kg		0.30		< 0.30		< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	

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.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
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-diphenylcarbazine.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
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
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
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*; Dibenzo[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.

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"

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 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

Rob Horseman

e3p
Taylor Road
Urmston
Manchester
M41 7JQ

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

t: 01923 225404

f: 01923 237404

e: reception@i2analytical.com

e: Rhorseman@e3p.co.uk

Analytical Report Number : 20-42488

Replaces Analytical Report Number: 20-42488, issue no. 1
Report format change.

Project / Site name:	Brunswick	Samples received on:	19/11/2020
Your job number:	14207	Samples instructed on/ Analysis started on:	19/11/2020
Your order number:		Analysis completed by:	26/11/2020
Report Issue Number:	2	Report issued on:	26/11/2020
Samples Analysed:	2 soil samples		

Signed:



Will Fardon
Technical Reviewer (CS 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: 20-42488

Project / Site name: Brunswick

Lab Sample Number				1690386	1690387
Sample Reference				TS101	TS102
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				16/11/2020	16/11/2020
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	26	27
Total mass of sample received	kg	0.001	NONE	0.4	0.4

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

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.2	6.8
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1
Total Sulphate as SO ₄	mg/kg	50	MCERTS	1200	1100
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	g/l	0.00125	MCERTS	0.2	0.16
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/kg	2.5	MCERTS	400	320
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/l	1.25	MCERTS	202	162
Sulphide	mg/kg	1	MCERTS	3.1	< 1.0
Total Sulphur	mg/kg	50	MCERTS	740	670

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0
----------------------------	-------	---	--------	-------	-------

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80
-----------------------------	-------	-----	--------	--------	--------

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13	11
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	34	33
Copper (aqua regia extractable)	mg/kg	1	MCERTS	34	25
Lead (aqua regia extractable)	mg/kg	1	MCERTS	52	45
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	24	24
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	1.2	< 1.0

Analytical Report Number: 20-42488

Project / Site name: Brunswick

Lab Sample Number				1690386	1690387
Sample Reference				TS101	TS102
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				16/11/2020	16/11/2020
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	67	59

Petroleum Hydrocarbons

TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	< 1.0
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	< 0.1
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0	< 4.0
TPH (C16 - C21)	mg/kg	1	MCERTS	< 1.0	< 1.0
TPH (C21 - C35)	mg/kg	1	MCERTS	< 1.0	< 1.0
TPH (C35 - C40)	mg/kg	10	MCERTS	< 10	< 10
TPH Total C5 - C40	mg/kg	10	MCERTS	< 10	< 10

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

Analytical Report Number : 20-42488

Project / Site name: Brunswick

* 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 *
1690386	TS101	None Supplied	None Supplied	Brown loam and clay with gravel and vegetation.
1690387	TS102	None Supplied	None Supplied	Brown loam and clay with gravel and vegetation.

Analytical Report Number : 20-42488

Project / Site name: Brunswick

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

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 disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	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
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
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
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 sulphate (as SO ₄ in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-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
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.	L038-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
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS
Sulphate, water soluble, in soil (1hr extraction)	Sulphate, water soluble, in soil (1hr extraction)	In-house method	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.