



E3P

Heliport Business Park
Liverpool Road
Eccles
Manchester
M30 7RU

Manchester | London | Edinburgh

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

Ref: 12-396 V1
Date: 14th February 2020

Vistry Partnerships
Innovation House
Kelburn Court,
Birchwood
Warrington
WA3 6UT

By Email

Dear Tufail,

GARDEN VALIDATION PRINCESS PARKWAY

An E3P engineer attended the above site to validate the thickness of the cover system that had been placed within the areas of public open space at the Clockworks site, Princess Parkway.

In total 3No. 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 of 300mm topsoil.

E3P can confirm that our independent validation demonstrates that all gardens have been installed with 300mm of certified topsoil in accordance with the NHBC requirements for a site of this nature.

TOPSOIL

E3P attended site on 24th February 2017 to obtain ten samples of the stockpiled topsoil deposits which were analysed in accordance with the E3P Remediation Strategy. Chemical analysis confirmed that these topsoil deposits were chemically suitable for use within the proposed soft landscaping areas and public open space.

Chemical analysis results are included within lab report 20-87408 (attached to this letter).



Princess Parkway
Vistry Partnership
February 2020

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: Princess Parkway

Date: 14-02-2020	Project Number: 12-396
Project Manager: R. Horseman	E3P Engineer: T. Preston
Plot Numbers Validated: Public Open Space	

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: Public Open Space 1

Depth of Strata (m bgl)	300mm	Validated TOPSOIL
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
		

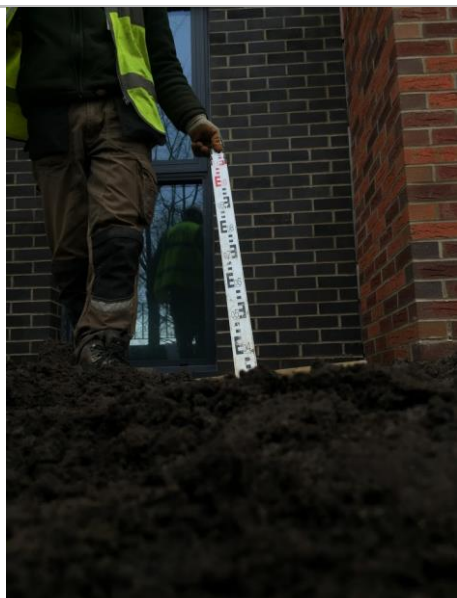


Plot No: Public Open Space 2

Depth of Strata (m bgl)	300mm	Validated TOPSOIL
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: Public Open Space 3

Depth of Strata (m bgl)	300mm	Validated TOPSOIL
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
		



**Rob Horseman**

e3p
Office 4
Heliport Business Park
Eccles
Liverpool Road
Manchester
M30 7RU

t: 0161 707 9612

e: Rhorseman@e3p.co.uk

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

t: 01923 225404

f: 01923 237404

e: reception@i2analytical.com

Analytical Report Number : 20-87408

Project / Site name:	Princess Way	Samples received on:	17/02/2020
Your job number:	12396	Samples instructed on:	17/02/2020
Your order number:		Analysis completed by:	24/02/2020
Report Issue Number:	1	Report issued on:	24/02/2020
Samples Analysed:	6 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: 20-87408

Project / Site name: Princess Way

Lab Sample Number				1444851	1444852	1444853	1444854	1444855
Sample Reference				TS101	TS102	TS103	SS101	SS102
Sample Number				TS	TS	TS	SS	SS
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				14/02/2020	14/02/2020	14/02/2020	14/02/2020	14/02/2020
Time Taken				None Supplied	None Supplied	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	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	16	14	12	11	12
Total mass of sample received	kg	0.001	NONE	0.37	0.55	0.53	0.54	0.54

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

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	9.4	8.4	8.7	10.5	8.3
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total Sulphate as SO ₄	mg/kg	50	MCERTS	320	230	290	730	390
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	200	160	200	370	150
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.099	0.080	0.10	0.19	0.074
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	99.2	79.8	101	186	74.2
Sulphide	mg/kg	1	MCERTS	1.6	< 1.0	2.1	2.3	2.8
Total Sulphur	mg/kg	50	MCERTS	320	250	340	330	140

Total Phenols

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

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.53	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.75	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.83	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.54	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.52	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.49	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.23	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.40	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80	4.29	< 0.80
-----------------------------	-------	-----	--------	--------	--------	--------	------	--------

Analytical Report Number: 20-87408

Project / Site name: Princess Way

Lab Sample Number				1444851	1444852	1444853	1444854	1444855
Sample Reference				TS101	TS102	TS103	SS101	SS102
Sample Number				TS	TS	TS	SS	SS
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				14/02/2020	14/02/2020	14/02/2020	14/02/2020	14/02/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	1.9	< 1.0	< 1.0	2.9	1.1
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	7.8	4.0	4.6	11	9.1
Copper (aqua regia extractable)	mg/kg	1	MCERTS	11	6.7	7.5	14	4.6
Lead (aqua regia extractable)	mg/kg	1	MCERTS	8.8	6.4	110	73	17
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	6.6	4.6	4.3	7.9	6.0
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	27	18	19	35	13

Petroleum Hydrocarbons

TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	7.0	< 4.0
TPH (C16 - C21)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	25	< 1.0
TPH (C21 - C35)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	32	< 1.0
TPH (C35 - C40)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH Total C5 - C40	mg/kg	10	MCERTS	< 10	< 10	< 10	68	< 10

Analytical Report Number: 20-87408

Project / Site name: Princess Way

Lab Sample Number				1444856				
Sample Reference				SS103				
Sample Number				SS				
Depth (m)				None Supplied				
Date Sampled				14/02/2020				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	13				
Total mass of sample received	kg	0.001	NONE	0.56				

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

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.2				
Total Cyanide	mg/kg	1	MCERTS	< 1				
Total Sulphate as SO ₄	mg/kg	50	MCERTS	510				
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	350				
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.18				
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	177				
Sulphide	mg/kg	1	MCERTS	4.8				
Total Sulphur	mg/kg	50	MCERTS	180				

Total Phenols

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

Speciated PAHs

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

Total PAH

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

Analytical Report Number: 20-87408

Project / Site name: Princess Way

Lab Sample Number				1444856				
Sample Reference				SS103				
Sample Number				SS				
Depth (m)				None Supplied				
Date Sampled				14/02/2020				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	1.6				
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2				
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0				
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	9.0				
Copper (aqua regia extractable)	mg/kg	1	MCERTS	6.5				
Lead (aqua regia extractable)	mg/kg	1	MCERTS	31				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3				
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	5.9				
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0				
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	19				

Petroleum Hydrocarbons

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



Analytical Report Number : 20-87408

Project / Site name: Princess Way

* 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 *
1444851	TS101	TS	None Supplied	Brown sandy loam with vegetation.
1444852	TS102	TS	None Supplied	Brown sandy loam with vegetation.
1444853	TS103	TS	None Supplied	Brown sandy loam with vegetation.
1444854	SS101	SS	None Supplied	Brown sandy loam with gravel.
1444855	SS102	SS	None Supplied	Brown sandy loam with gravel.
1444856	SS103	SS	None Supplied	Brown loam and clay with gravel.

Analytical Report Number : 20-87408

Project / Site name: Princess Way

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

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

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.