



Pam Brown Associates
2 Needwood House
Lancaster Park
Newborough Road
Needwood
Burton-on-Trent
DE13 9PD

Borehole Log

Borehole No.

WS4

Sheet 2 of 2

Project Name: Plas Coch Road, Wrexham

Project No.
1928-19

Co-ords: -

Hole Type
WS

Location:

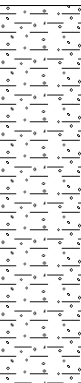
Level:

Scale
1:20

Client:

Dates: 10/06/2019 - 10/06/2019

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					5.00			grained sandstone. Poor recovery 3m-4m (30%) Soft light brown slightly gravelly CLAY. Gravel is occasional, coarse, subangular of sandstone. Poor recovery 4m-5m (15%)	5
								End of borehole at 5.00 m	6
									7
									8

Remarks

Excavation terminated at 5.0m At depth.
No Groundwater encountered.
Standpipe installed to 3.0m, due to material collapse within the borehole. Response zone 1.0m to 3.0m.
Hand pit excavated to 0.5m (constrained by 150mm core).
Dynamic probing undertaken from the surface.





Borehole Log

Borehole No.

R1

Sheet 1 of 3

Project Name: Plas Coch Road, Wrexham

Project No.
1928-19

Co-ords: -

Hole Type
RO

Location:

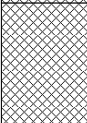
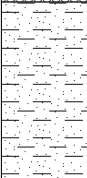
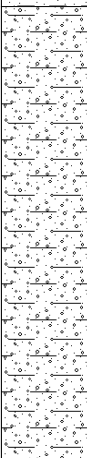
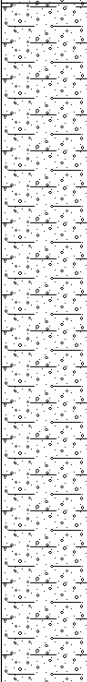
Level:

Scale
1:50

Client:

Dates: 10/06/2019 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
					0.10			Asphalt Stone Fill	1	
					0.50			Black ash clay fill		
					1.30			Brown sandy CLAY	2	
					2.50				Brown sandy GRAVEL with clay bands.	3
					5.50					Brown clayey sandy GRAVEL with boulders.
										5
										6
									7	
									8	
									9	
			10							
							Continued on next sheet			

Remarks

Excavation terminated at desired depth.
No voids or flush loss.



Borehole Log

Borehole No.

R1

Sheet 2 of 3

Project Name: Plas Coch Road, Wrexham

Project No.
1928-19

Co-ords: -

Hole Type
RO

Location:

Level:

Scale
1:50

Client:

Dates: 10/06/2019 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					15.20				11
									12
									13
									14
									15
								Grey sandy CLAY	16
									17
									18
									19
					19.30			Brown sandy GRAVEL with coal	20

Continued on next sheet

Remarks

Excavation terminated at desired depth.
No voids or flush loss.



Borehole Log

Borehole No.

R1

Sheet 3 of 3

Project Name: Plas Coch Road, Wrexham

Project No.
1928-19

Co-ords: -

Hole Type
RO

Location:

Level:

Scale
1:50

Client:

Dates: 10/06/2019 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					21.10				21
								Brownish grey sandy CLAY. Possible weathered, weak rock head.	22
									23
					24.20				24
								Weak greys red SANDSTONE.	25
									26
									27
									28
									29
					30.00			End of borehole at 30.00 m	30

Remarks

Excavation terminated at desired depth.

No voids or flush loss.





Borehole Log

Borehole No.

R2

Sheet 1 of 3

Project Name: Plas Coch Road, Wrexham

Project No.
1928-19

Co-ords: -

Hole Type
RO

Location:

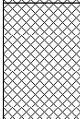
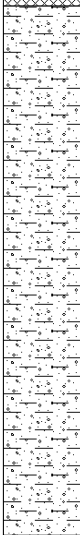
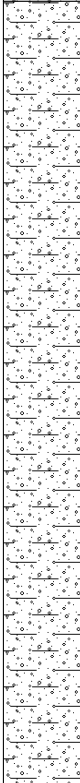
Level:

Scale
1:50

Client:

Dates: 10/06/2019 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description					
		Depth (m)	Type	Results									
					0.10			Asphalt Stone fill	1 2 3 4 5 6 7 8 9 10				
					0.50			Sand ash fill					
					1.30			Brown sandy slightly gravelly CLAY.					
					4.80			Brown sandy GRAVEL with large boulders and clay bands.					
					Continued on next sheet								

Remarks

Excavation terminated at desired depth.





Borehole Log

Borehole No.

R2

Sheet 2 of 3

Project Name: Plas Coch Road, Wrexham

Project No.
1928-19

Co-ords: -

Hole Type
RO

Location:

Level:

Scale
1:50

Client:

Dates: 10/06/2019 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					16.00				11
									12
									13
									14
									15
									16
								Grey sandy CLAY	17
									18
									19
					20.00				20

Continued on next sheet

Remarks

Excavation terminated at desired depth.





Borehole Log

Borehole No.

R2

Sheet 3 of 3

Project Name: Plas Coch Road, Wrexham

Project No.
1928-19

Co-ords: -

Hole Type
RO

Location:

Level:

Scale
1:50

Client:

Dates: 10/06/2019 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					21.80			Brown sandy GRAVEL with coal.	21
								Brownish grey sandy CLAY.	22
					23.80			Weak greyish red SANDSTONE.	23
									24
									25
									26
									27
									28
									29
					30.00			End of borehole at 30.00 m	30

Remarks

Excavation terminated at desired depth.





Borehole Log

Borehole No.

R3

Sheet 1 of 3

Project Name: Plas Coch Road, Wrexham

Project No.
1928-19

Co-ords: -

Hole Type
RO

Location:

Level:

Scale
1:50

Client:

Dates: 10/06/2019 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.10			Asphalt	1
					0.40			Stone Fill	
								Sand and brick gravel fill.	
					1.10			Brown clayey SAND.	
					2.80			Brown clayey sandy GRAVEL with coal.	2
									3
									4
									5
									6
									7
									8
									9
									10
					8.80			Grey sandy gravelly bouldery CLAY.	
								Continued on next sheet	

Remarks

Excavation terminated at desired depth.





Borehole Log

Borehole No.

R3

Sheet 3 of 3

Project Name: Plas Coch Road, Wrexham

Project No.
1928-19

Co-ords: -

Hole Type
RO

Location:

Level:

Scale
1:50

Client:

Dates: 10/06/2019 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					21.30				21
								Brownish grey sandy CLAY	22
					23.20				23
								Weak greyish red SANDSTONE.	24
									25
									26
									27
									28
									29
					30.00				30

End of borehole at 30.00 m

Remarks

Excavation terminated at desired depth.



APPENDIX 9

Dynamic Probe Test Results Sheet

Site: WREXHAM

Date: 10-Jun-19

Job Number: 1928-19

Test Type: DPSH

Client: Glanville Group

Final Depth: 5.00

Rig Type: Competitor 130

Sheet 1 of 1

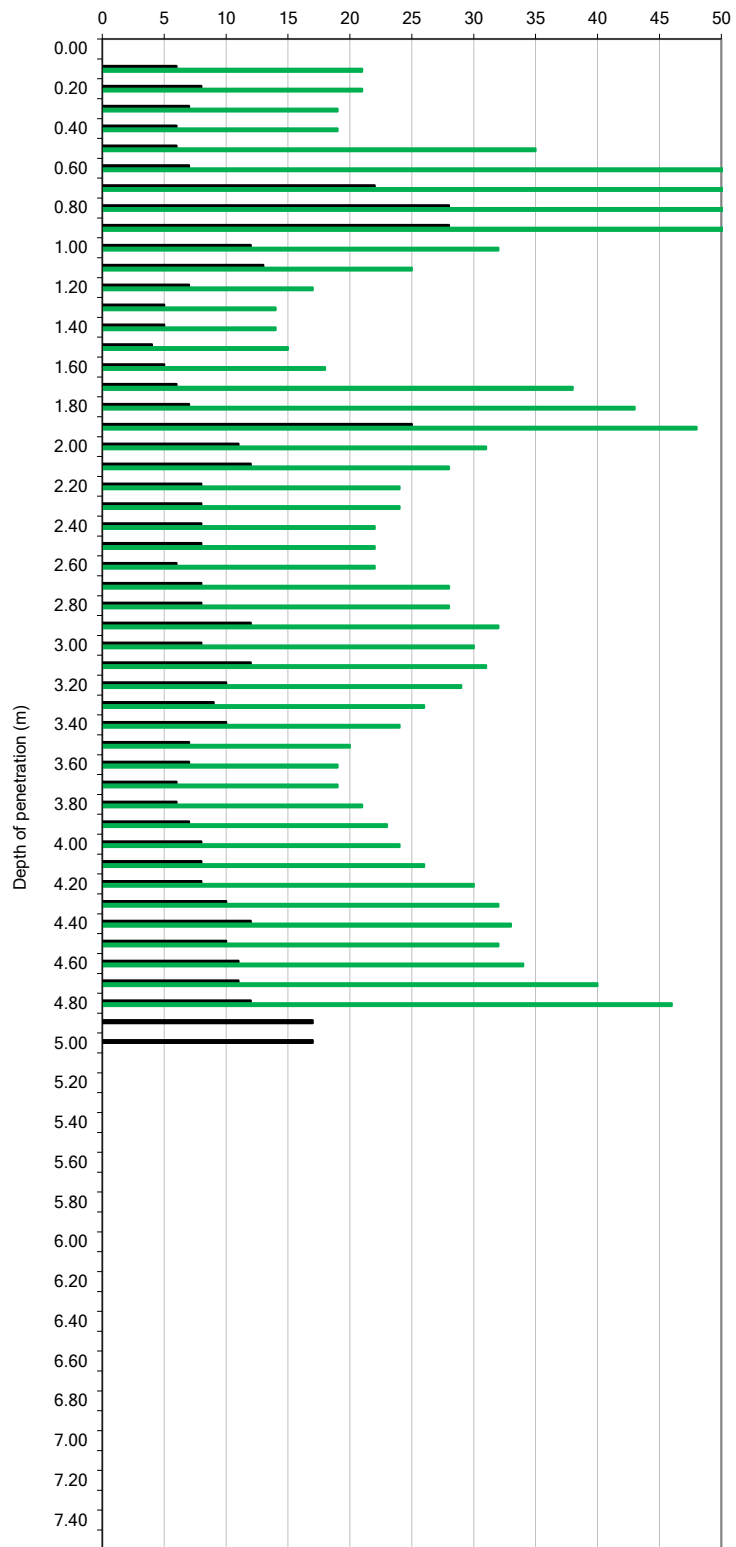
DP No: WS1



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Depth (m)	DPN ₁₀₀	DPN ₃₀₀	SPT N *
0.00			
0.10	6	21	21
0.20	8	21	21
0.30	7	19	19
0.40	6	19	19
0.50	6	35	35
0.60	7	57	57
0.70	22	78	78
0.80	28	68	68
0.90	28	53	53
1.00	12	32	32
1.10	13	25	25
1.20	7	17	17
1.30	5	14	14
1.40	5	14	14
1.50	4	15	15
1.60	5	18	18
1.70	6	38	38
1.80	7	43	43
1.90	25	48	48
2.00	11	31	31
2.10	12	28	28
2.20	8	24	24
2.30	8	24	24
2.40	8	22	22
2.50	8	22	22
2.60	6	22	22
2.70	8	28	28
2.80	8	28	28
2.90	12	32	32
3.00	8	30	30
3.10	12	31	31
3.20	10	29	29
3.30	9	26	26
3.40	10	24	24
3.50	7	20	20
3.60	7	19	19
3.70	6	19	19
3.80	6	21	21
3.90	7	23	23
4.00	8	24	24
4.10	8	26	26
4.20	8	30	30
4.30	10	32	32
4.40	12	33	33
4.50	10	32	32
4.60	11	34	34
4.70	11	40	40
4.80	12	46	46
4.90	17		
5.00	17		
5.10			
5.20			
5.30			
5.40			
5.50			
5.60			
5.70			
5.80			
5.90			
6.00			
6.10			
6.20			
6.30			
6.40			
6.50			
6.60			
6.70			
6.80			
6.90			
7.00			
7.10			
7.20			
7.30			
7.40			
7.50			

Hammer Mass: 63.5 kg Cone Dia: 50.5mm
Drop Height: 750 mm Test by: PM



General Remarks:

DPN₁₀₀ = Dynamic penetration resistance for 100mm penetration.
DPN₃₀₀ = Dynamic penetration resistance for 300mm penetration (ie: sum of 3 consecutive DPN₁₀₀ values), starting at the depth given.
* Equivalent SPT N-values (for 300mm penetration) assumed to approximate the DPN₃₀₀ values for dynamic probe "super-heavy" test (DPSH).
For dynamic probe "heavy" test (DPH), equivalent SPT N-values estimated using the theoretical relationship DPN₃₀₀ = 1.5 SPT-N. [see Card, G.B., Roche, D.P. & Herbert, S.M., in Geol. Soc. Special Publication No 6, *Field Testing in Engineering Geology* (1990)]. SPT values are estimated and are for general guidance only.

Dynamic Probe Test Results Sheet



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DE13 9PD

Site: WREXHAM

Date: 10-Jun-19

Job Number: 1928-19

Test Type: DPSH

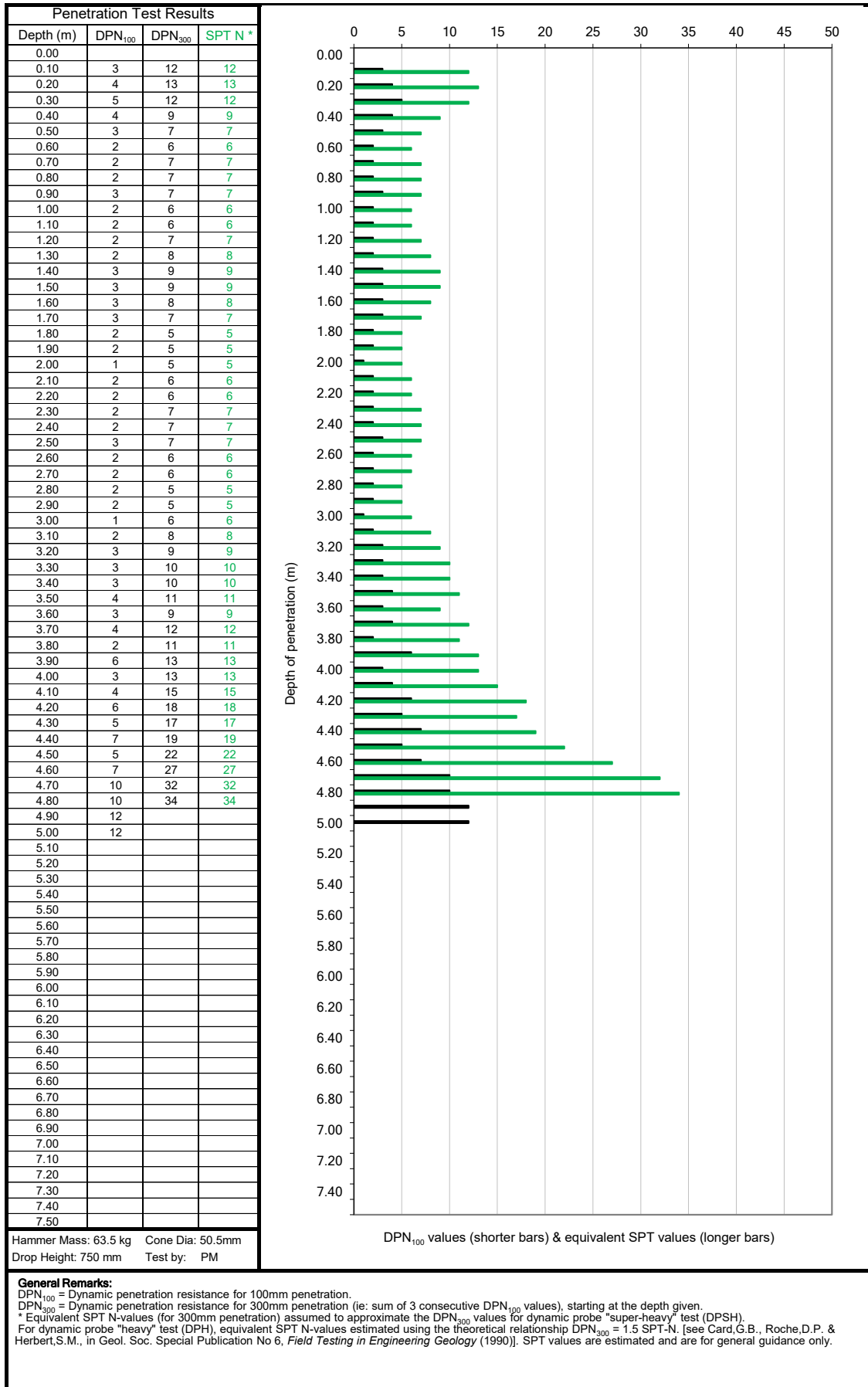
Client: Glanville Group

Final Depth: 5.00

Rig Type: Competitor 130

Sheet 1 of 1

DP No: WS2



Dynamic Probe Test Results Sheet



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2 Needwood House
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Site: WREXHAM

Date: 10-Jun-19

Job Number: 1928-19

Test Type: DPSH

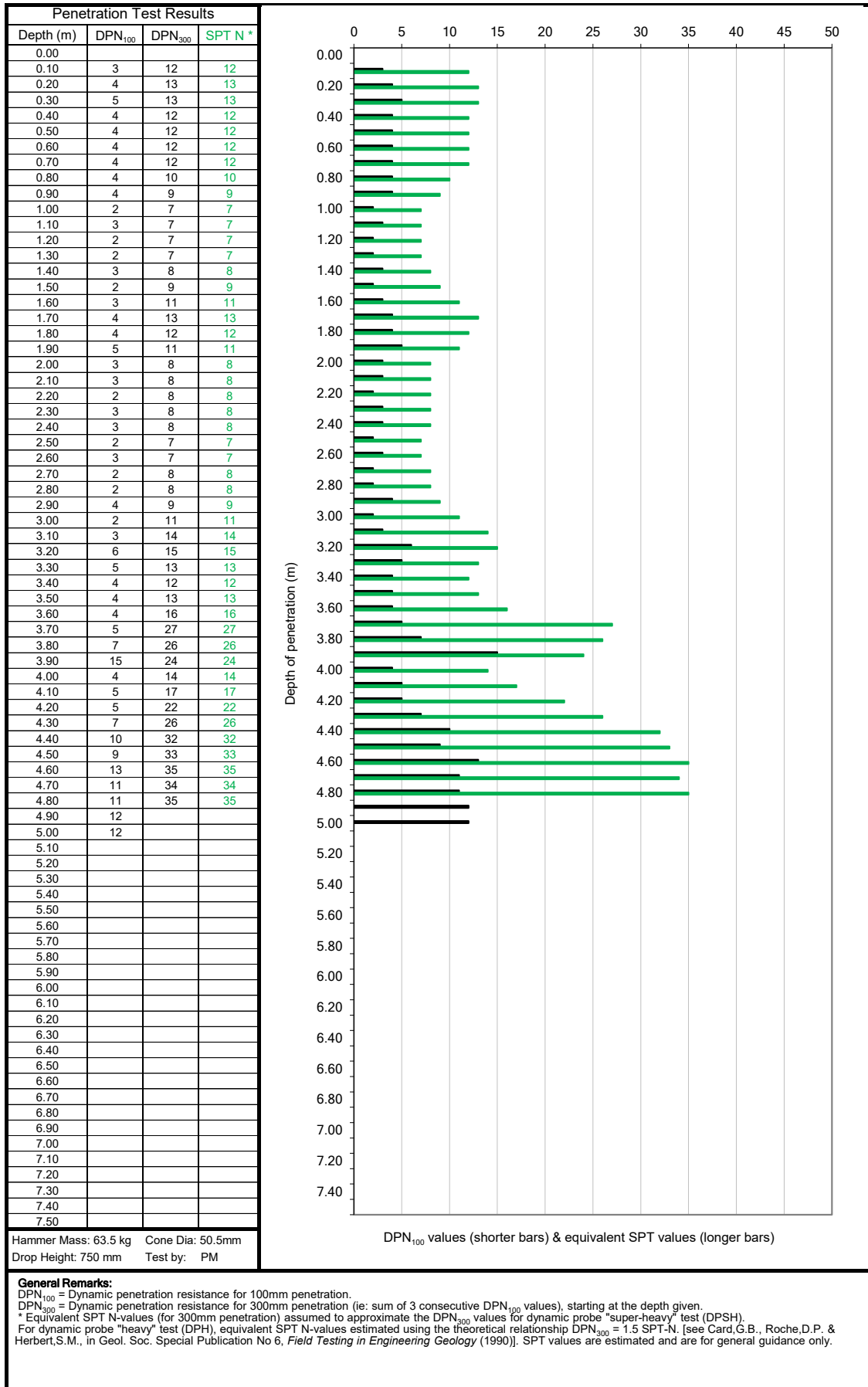
Client: Glanville Group

Final Depth: 5.00

Rig Type: Competitor 130

Sheet 1 of 1

DP No: WS3



Dynamic Probe Test Results Sheet

Site: WREXHAM

Date: 10-Jun-19

Job Number: 1928-19

Test Type: DPSH

Client: Glanville Group

Final Depth: 5.00

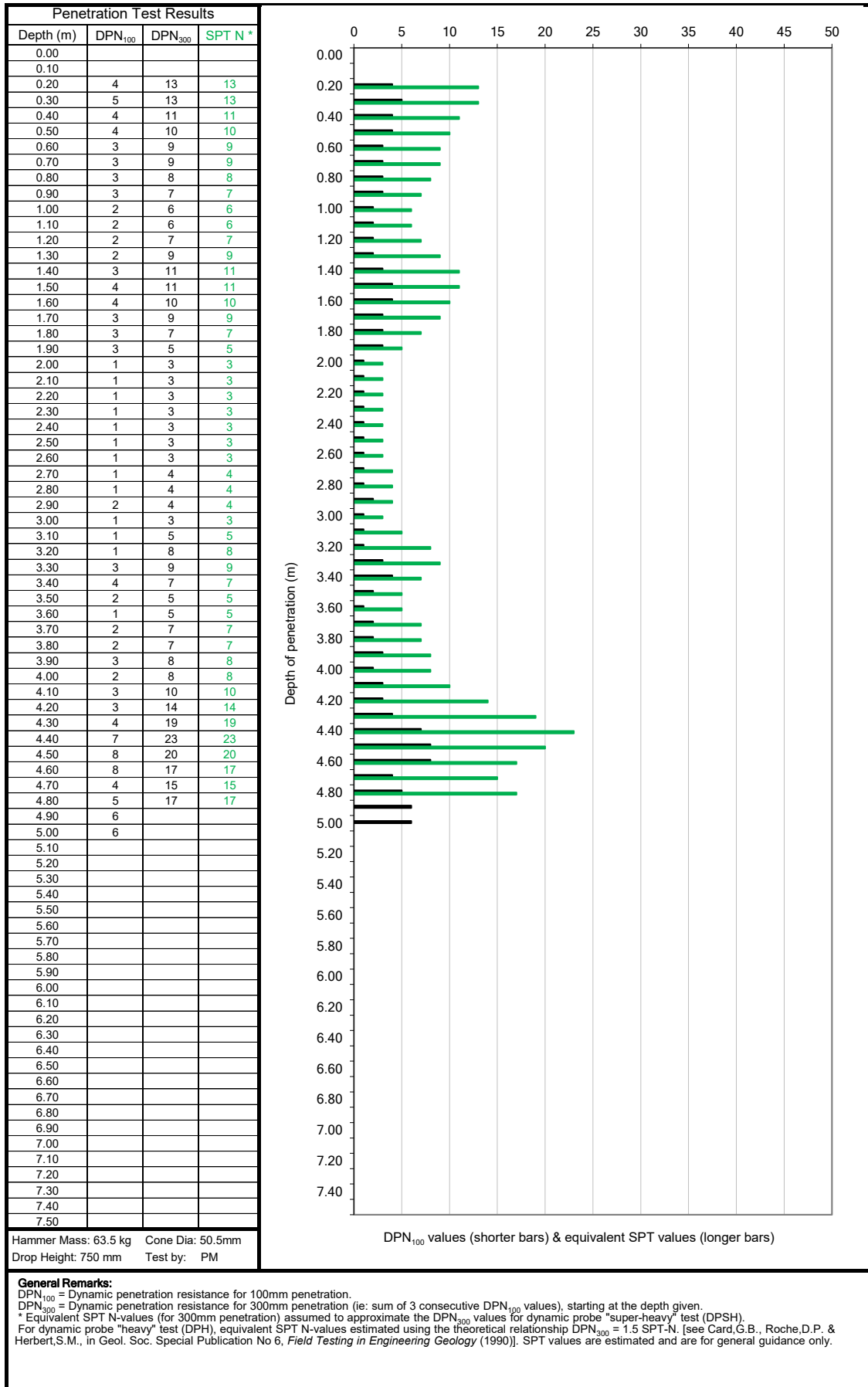
Rig Type: Competitor 130

Sheet 1 of 1

DP No: WS4



Pam Brown Associates
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DYNAMIC CONE PENETROMETER - CBR RELATIONSHIP

(To: Transport Research Laboratory Road Notes 8 & 31)

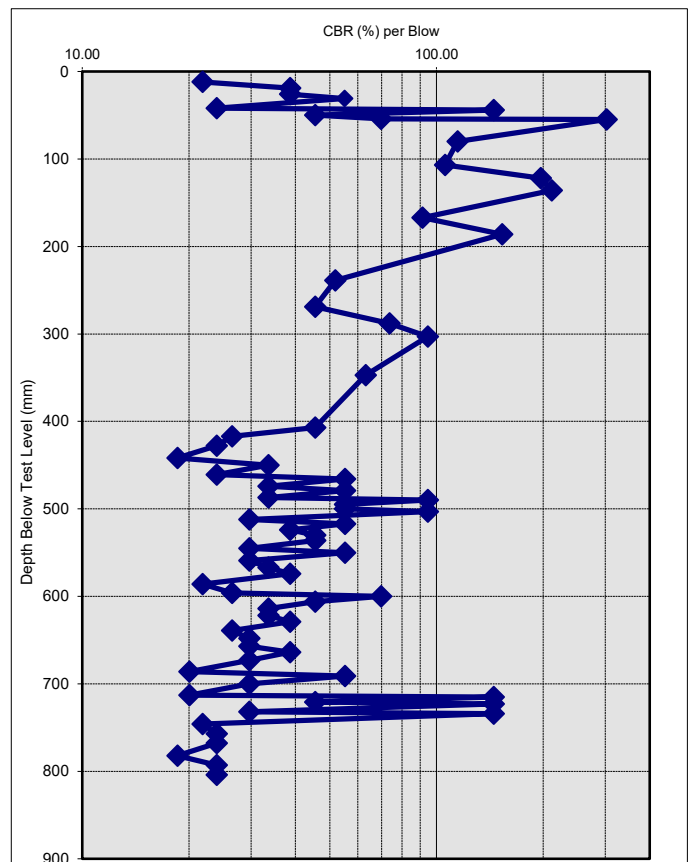
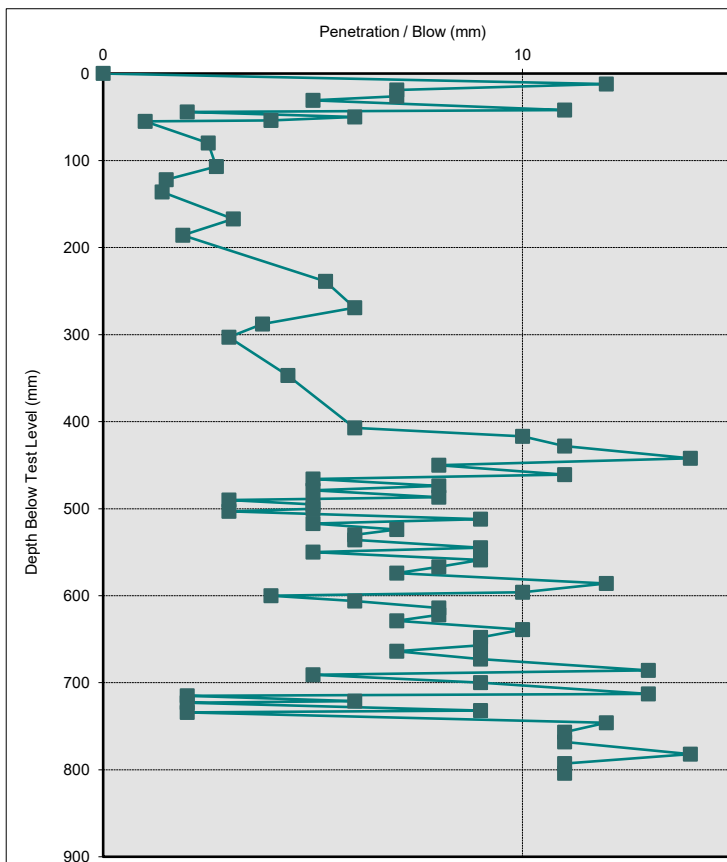
Job No:	1928-19
Site:	Plas Coch Road, Wrexham
Client:	Glanville Group

Location Reference:	DCP01
Date of Test:	11 June 2019
Material at Surface / Subgrade:	Gravel
Anticipated Depth to Subgrade (mm):	
Test Start Depth (mm):	157
Access to Test Depth:	Beneath tarmac surface*

Weight (kg):	8
Drop Height (mm):	575
Cone:	60 degrees; 20mm diameter
Test Procedure & Specification:	TRL Road Notes 8 & 3 TRL Dynamic Cone Penetrometer, Information Note (1986)
DCP / CBR Relationship:	$\log_{10}(\text{CBR}) = 2.480 - 1.057 \times \log_{10}(\text{penetration} / \text{mm})$ (after TRL Road Note 8)

Average CBR per blow = 58.96%

*Tarmac at surface 110mm thick. Anticipated surface level CBR% much higher.



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DYNAMIC CONE PENETROMETER - CBR RELATIONSHIP

(To: Transport Research Laboratory Road Notes 8 & 31)

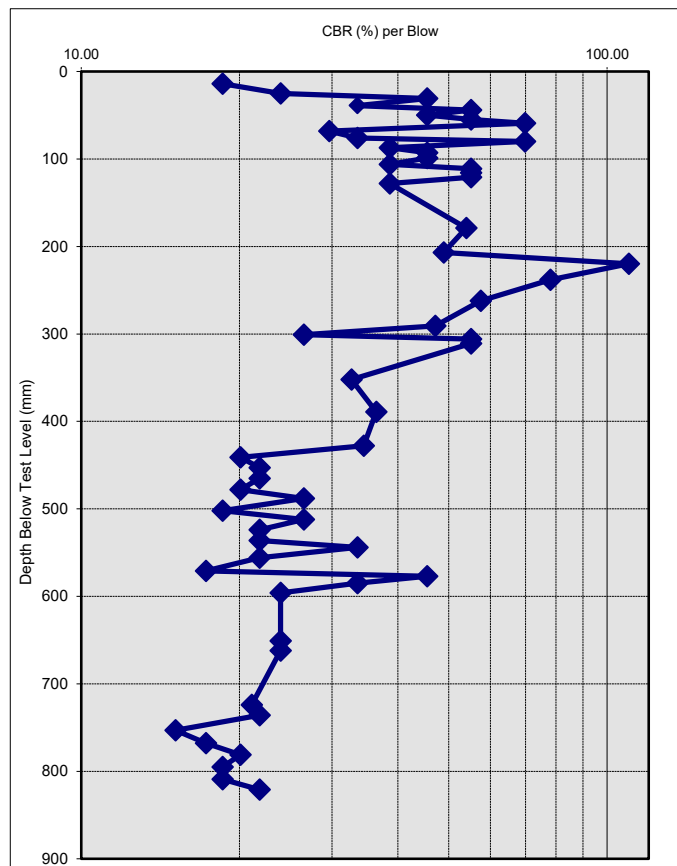
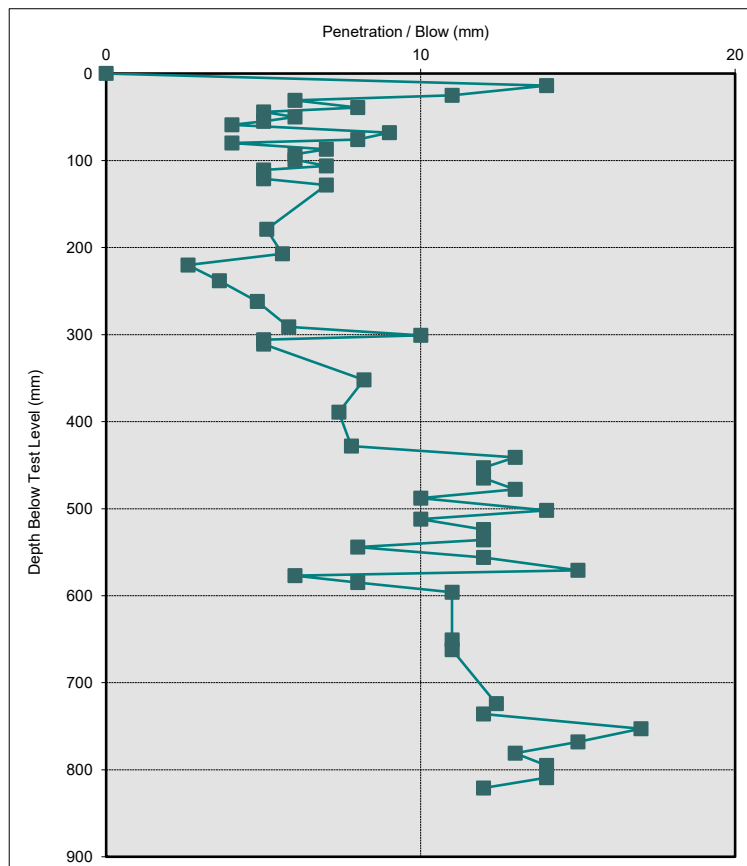
Job No:	1928-19
Site:	Plas Coch Road, Wrexham
Client:	Glanville Group

Location Reference:	DCP02
Date of Test:	11 June 2019
Material at Surface / Subgrade:	Gravel
Anticipated Depth to Subgrade (mm):	
Test Start Depth (mm):	142
Access to Test Depth:	Beneath tarmac surface*

Weight (kg):	8
Drop Height (mm):	575
Cone:	60 degrees; 20mm diameter
Test Procedure & Specification:	TRL Road Notes 8 & 3 TRL Dynamic Cone Penetrometer, Information Note (1986)
DCP / CBR Relationship:	$\log_{10}(\text{CBR}) = 2.480 - 1.057 \times \log_{10}(\text{penetration} / \text{mm})$ (after TRL Road Note 8)

Average CBR per blow = 36.86%

*Tarmac at surface 80mm thick. Anticipated surface level CBR% much higher.



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DYNAMIC CONE PENETROMETER - CBR RELATIONSHIP

(To: Transport Research Laboratory Road Notes 8 & 31)

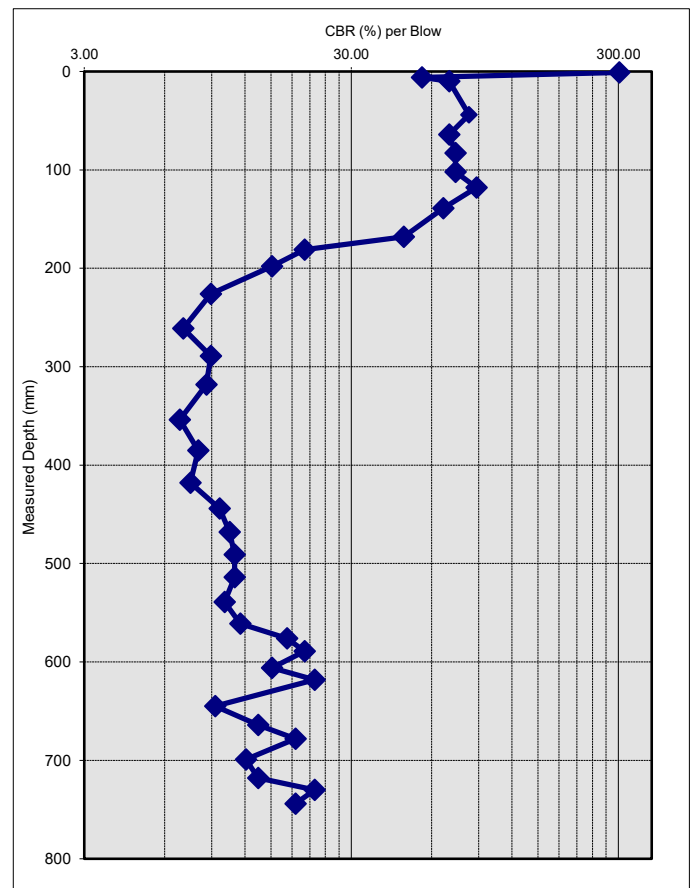
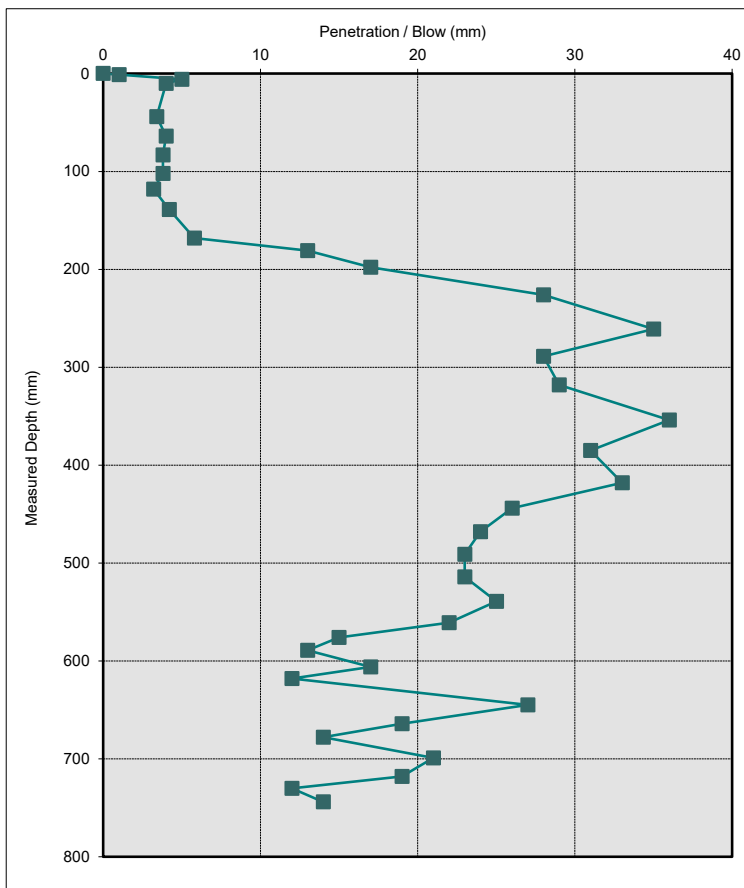
Job No:	1928-19
Site:	Plas Coch Road, Wrexham
Client:	Glanville Group

Location Reference:	DCP03
Date of Test:	11 June 2019
Material at Surface / Subgrade:	Gravel
Anticipated Depth to Subgrade (mm):	
Test Start Depth (mm):	225
Access to Test Depth:	Beneath tarmac surface*

Weight (kg):	8
Drop Height (mm):	575
Cone:	60 degrees; 20mm diameter
Test Procedure & Specification:	TRL Road Notes 8 & 3 TRL Dynamic Cone Penetrometer, Information Note (1986)
DCP / CBR Relationship:	$\log_{10}(\text{CBR}) = 2.480 - 1.057 \times \log_{10}(\text{penetration} / \text{mm})$ (after TRL Road Note 8)

Average CBR per blow = 35.13%

*Tarmac at surface 160mm thick. Anticipated surface level CBR% much higher.



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DYNAMIC CONE PENETROMETER - CBR RELATIONSHIP

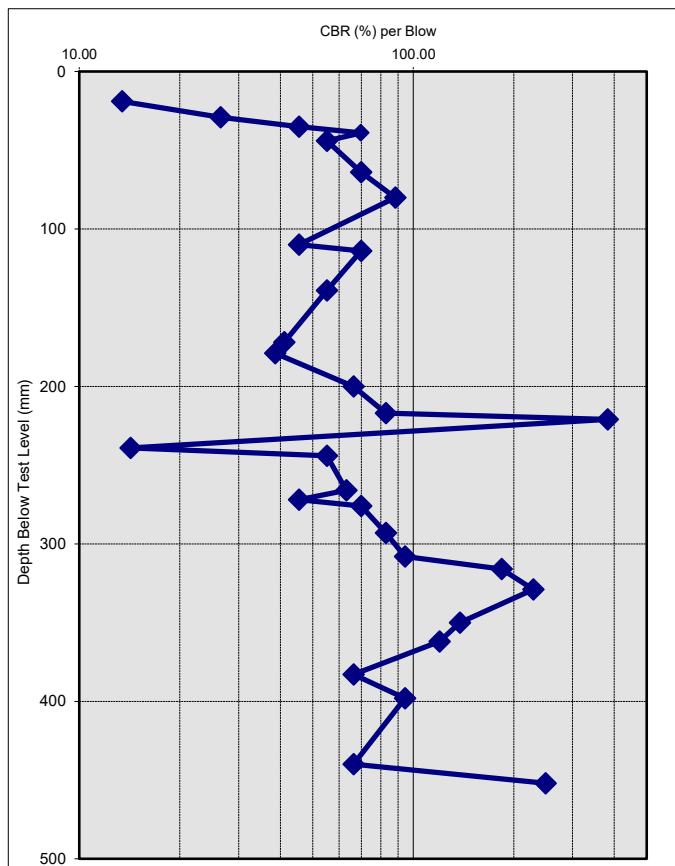
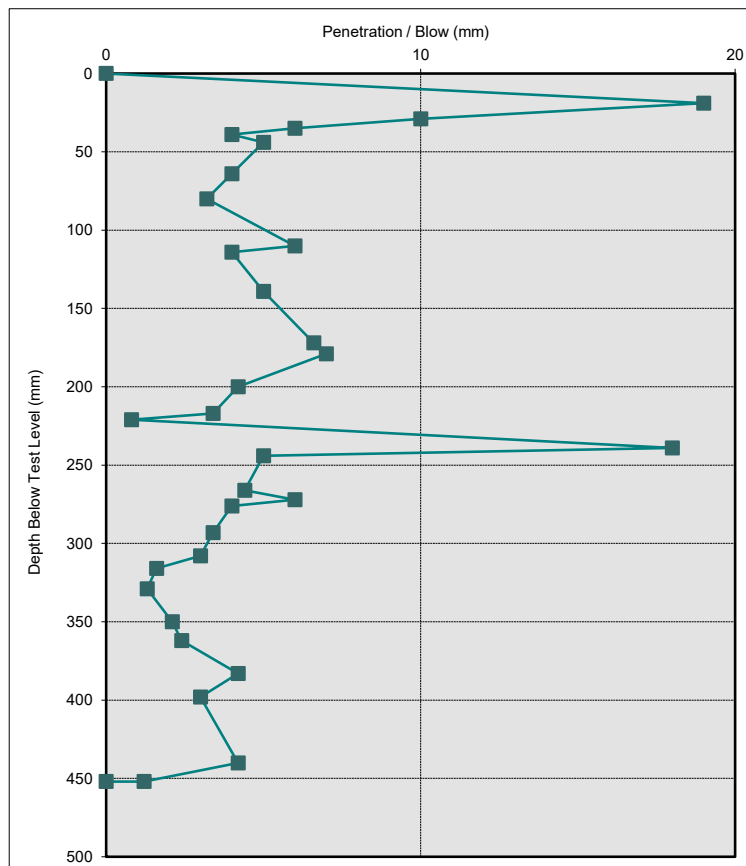
(To: Transport Research Laboratory Road Notes 8 & 31)

Job No:	1928-19
Site:	Plas Coch Road, Wrexham
Client:	Glanville Group

Location Reference:	DCP04
Date of Test:	11 June 2019
Material at Surface / Subgrade:	Gravel
Anticipated Depth to Subgrade (mm):	
Test Start Depth (mm):	151
Access to Test Depth:	Beneath tarmac surface*

Weight (kg):	8
Drop Height (mm):	575
Cone:	60 degrees; 20mm diameter
Test Procedure & Specification:	TRL Road Notes 8 & 3 TRL Dynamic Cone Penetrometer, Information Note (1986)
DCP / CBR Relationship:	$\text{Log}_{10}(\text{CBR}) = 2.480 - 1.057 \times \text{Log}_{10}(\text{penetration} / \text{mm})$ (after TRL Road Note 8)

Average CBR per blow =	90.70%
*Tarmac at surface 90mm thick. Anticipated surface level CBR% much higher. Refusal in dense material.	



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DYNAMIC CONE PENETROMETER - CBR RELATIONSHIP

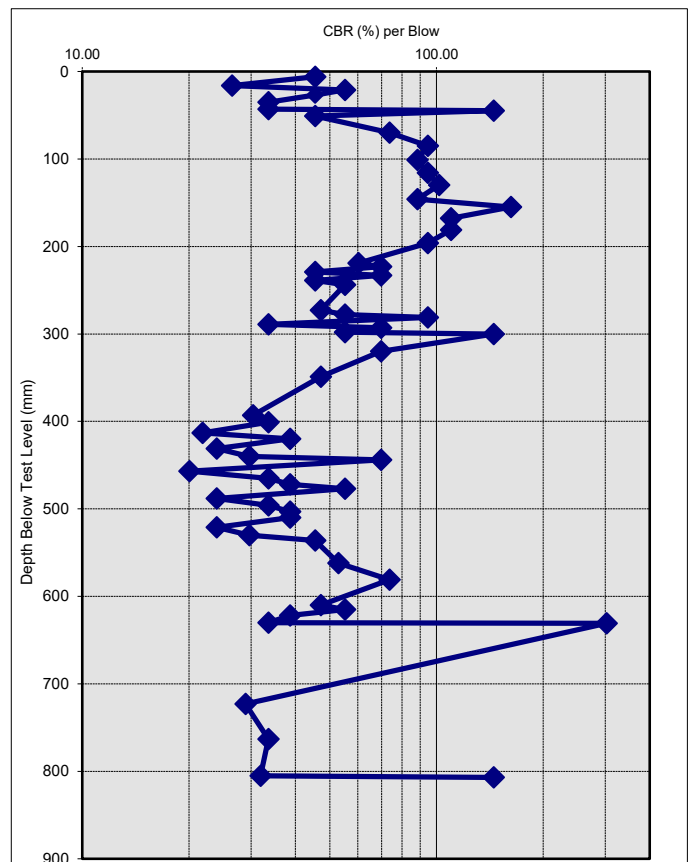
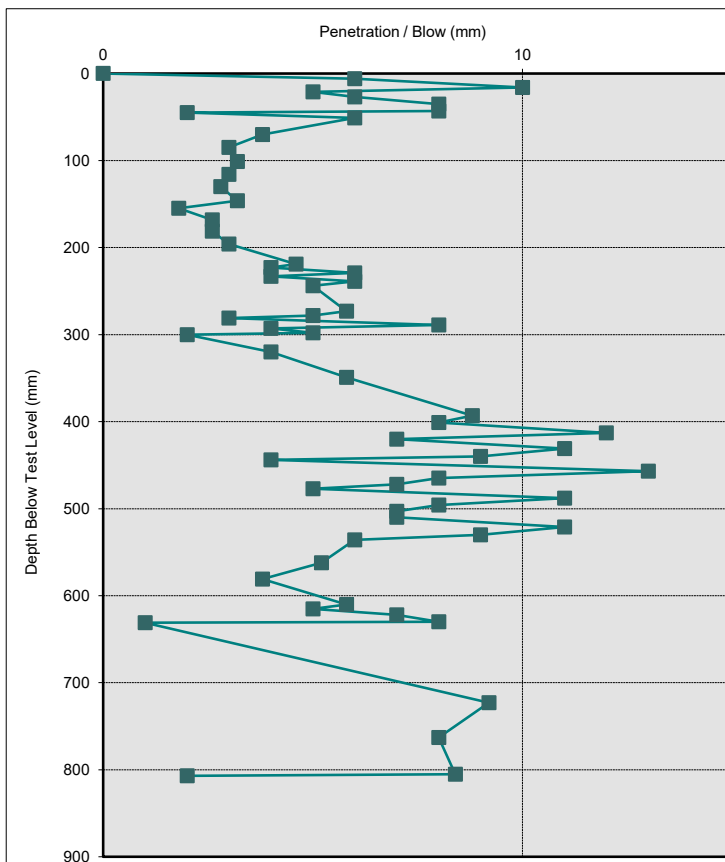
(To: Transport Research Laboratory Road Notes 8 & 31)

Job No:	1928-19
Site:	Plas Coch Road, Wrexham
Client:	Glanville Group

Location Reference:	DCP05
Date of Test:	11 June 2019
Material at Surface / Subgrade:	Gravel
Anticipated Depth to Subgrade (mm):	
Test Start Depth (mm):	160
Access to Test Depth:	Beneath tarmac surface*

Weight (kg):	8
Drop Height (mm):	575
Cone:	60 degrees; 20mm diameter
Test Procedure & Specification:	TRL Road Notes 8 & 3 TRL Dynamic Cone Penetrometer, Information Note (1986)
DCP / CBR Relationship:	$\log_{10}(\text{CBR}) = 2.480 - 1.057 \times \log_{10}(\text{penetration} / \text{mm})$ (after TRL Road Note 8)

Average CBR per blow =	62.61%
*Tarmac at surface 100mm thick. Anticipated surface level CBR% much higher.	



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DYNAMIC CONE PENETROMETER - CBR RELATIONSHIP

(To: Transport Research Laboratory Road Notes 8 & 31)

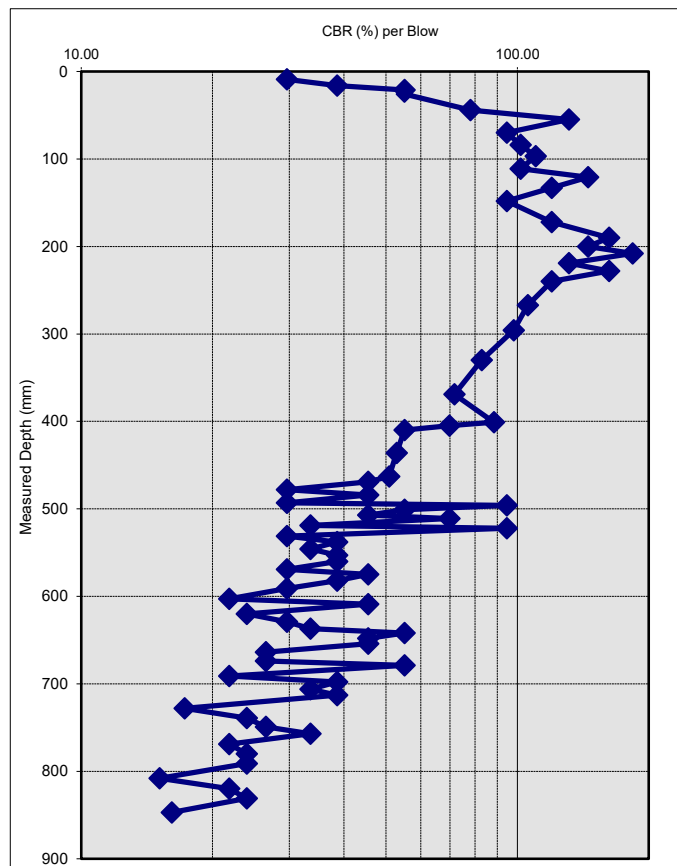
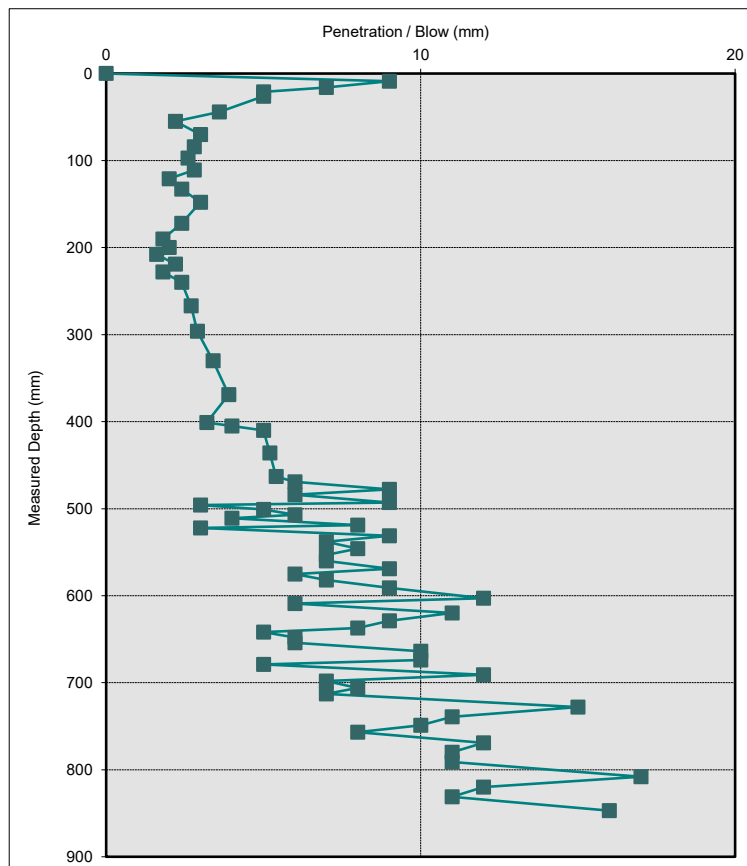
Job No:	1928-19
Site:	Plas Coch Road, Wrexham
Client:	Glanville Group

Location Reference:	DCP06
Date of Test:	11 June 2019
Material at Surface / Subgrade:	Gravel
Anticipated Depth to Subgrade (mm):	
Test Start Depth (mm):	125
Access to Test Depth:	Beneath tarmac surface*

Weight (kg):	8
Drop Height (mm):	575
Cone:	60 degrees; 20mm diameter
Test Procedure & Specification:	TRL Road Notes 8 & 3 TRL Dynamic Cone Penetrometer, Information Note (1986)
DCP / CBR Relationship:	$\text{Log}_{10}(\text{CBR}) = 2.480 - 1.057 \times \text{Log}_{10}(\text{penetration} / \text{mm})$ (after TRL Road Note 8)

Average CBR per blow = 60.92%

*Tarmac at surface 70mm thick. Anticipated surface level CBR% much higher.



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Earth Environmental & Geotechnical Ltd

Registered Office: Houldsworth Mill Business & Arts Centre, Houldsworth Street, Stockport, SK5 6DA

APPENDIX 10



2183

Final Report

Report No.: 19-19934-1

Initial Date of Issue: 20-Jun-2019

Client Pam Brown Associates

Client Address: Needwood House, Lancaster Park
Newborough Road
Needwood
Staffordshire
DE13 9PD

Contact(s): Alexander Tabb
Enquiries
Rudo Mafikeni

Project 1928-19 Wrexham

Quotation No.:	Date Received:	13-Jun-2019
Order No.:	Date Instructed:	14-Jun-2019
No. of Samples:		11
Turnaround (Wkdays):	Results Due:	20-Jun-2019
Date Approved:		20-Jun-2019

Approved By:



Details: Martin Dyer, Laboratory Manager

Results - Soil

Project: 1928-19 Wrexham

Client: Pam Brown Associates	Chemtest Job No.:				19-19934	19-19934	19-19934	19-19934	19-19934	19-19934	19-19934	19-19934	19-19934
Quotation No.:	Chemtest Sample ID.:				842355	842356	842357	842358	842359	842361	842362	842363	842364
	Sample Location:				WS1	WS1	WS1	WS2	WS2	WS3	WS3	WS3	WS4
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.09	0.26	1.00	0.13	0.35	0.09	0.50	0.95	0.12
	Bottom Depth (m):				0.26	0.50	1.50	0.35	0.80	0.40	0.95	1.50	0.40
	Date Sampled:				10-Jun-2019	10-Jun-2019	10-Jun-2019	10-Jun-2019	10-Jun-2019	10-Jun-2019	10-Jun-2019	10-Jun-2019	10-Jun-2019
	Asbestos Lab:				COVENTRY	COVENTRY		COVENTRY	COVENTRY	COVENTRY			COVENTRY
Determinand	Accred.	SOP	Units	LOD									
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
ACM Detection Stage	U	2192		N/A	-	-		-	-	-			-
Moisture	N	2030	%	0.020		9.5	11	3.2	3.0		6.1	5.8	9.8
pH	U	2010		N/A		7.9	8.2	8.7	8.7		8.6	8.7	8.8
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40		0.57	0.55	< 0.40	< 0.40		< 0.40	< 0.40	0.54
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010		0.35	0.12	0.013	< 0.010		0.010	< 0.010	0.034
Sulphur (Elemental)	U	2180	mg/kg	1.0		20	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Cyanide (Complex)	U	2300	mg/kg	0.50		< 0.50	< 0.50	< 0.50	< 0.50		< 0.50	< 0.50	< 0.50
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
Thiocyanate	U	2300	mg/kg	5.0		< 5.0	< 5.0	< 5.0	< 5.0		< 5.0	< 5.0	< 5.0
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50		2.9	0.96	0.72	0.68		1.1	0.79	0.98
Ammonium (Extractable)	U	2425	mg/kg	0.50		6.0	2.2	2.0	1.6		1.1	1.0	1.4
Sulphate (Total)	U	2430	%	0.010		0.26	0.059	0.64	0.46		0.078	0.013	0.81
Arsenic	U	2450	mg/kg	1.0		13	6.7	22	23		15	9.6	15
Cadmium	U	2450	mg/kg	0.10		0.33	0.11	0.13	0.19		0.38	0.37	0.41
Chromium	U	2450	mg/kg	1.0		16	14	6.0	8.7		16	15	12
Copper	U	2450	mg/kg	0.50		18	7.5	11	9.1		17	18	14
Mercury	U	2450	mg/kg	0.10		0.19	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Nickel	U	2450	mg/kg	0.50		19	11	12	13		23	24	19
Lead	U	2450	mg/kg	0.50		71	40	17	34		44	45	41
Selenium	U	2450	mg/kg	0.20		0.51	0.36	0.62	0.78		0.39	0.33	0.47
Zinc	U	2450	mg/kg	0.50		75	50	15	21		80	67	63
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		2.8	1.3	1.3	0.97		0.50	1.3	1.7
Aliphatic TPH >C5-C6	N	2680	mg/kg	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
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0		32	< 1.0	38	26		< 1.0	< 1.0	30
Aliphatic TPH >C35-C44	N	2680	mg/kg	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		32	< 5.0	38	26		< 5.0	< 5.0	30
Aromatic TPH >C5-C7	N	2680	mg/kg	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

Results - Soil

Project: 1928-19 Wrexham

Client: Pam Brown Associates	Chemtest Job No.:				19-19934	19-19934	19-19934	19-19934	19-19934	19-19934	19-19934	19-19934	19-19934
Quotation No.:	Chemtest Sample ID.:				842355	842356	842357	842358	842359	842361	842362	842363	842364
	Sample Location:				WS1	WS1	WS1	WS2	WS2	WS3	WS3	WS3	WS4
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.09	0.26	1.00	0.13	0.35	0.09	0.50	0.95	0.12
	Bottom Depth (m):				0.26	0.50	1.50	0.35	0.80	0.40	0.95	1.50	0.40
	Date Sampled:				10-Jun-2019	10-Jun-2019	10-Jun-2019	10-Jun-2019	10-Jun-2019	10-Jun-2019	10-Jun-2019	10-Jun-2019	10-Jun-2019
	Asbestos Lab:				COVENTRY	COVENTRY		COVENTRY	COVENTRY	COVENTRY			COVENTRY
Determinand	Accred.	SOP	Units	LOD									
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0		1.2	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0		130	< 1.0	120	47		< 1.0	< 1.0	29
Aromatic TPH >C35-C44	N	2680	mg/kg	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		130	< 5.0	120	47		< 5.0	< 5.0	29
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0		160	< 10	150	73		< 10	< 10	58
Naphthalene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Phenanthrene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Anthracene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Fluoranthene	U	2700	mg/kg	0.10		< 0.10	< 0.10	0.15	< 0.10		< 0.10	< 0.10	< 0.10
Pyrene	U	2700	mg/kg	0.10		< 0.10	< 0.10	0.17	< 0.10		< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Chrysene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0		< 2.0	< 2.0	< 2.0	< 2.0		< 2.0	< 2.0	< 2.0
Total Phenols	U	2920	mg/kg	0.30		< 0.30	< 0.30	< 0.30	< 0.30		< 0.30	< 0.30	< 0.30

Project: 1928-19 Wrexham

Client: Pam Brown Associates	Chemtest Job No.:				19-19934	19-19934
Quotation No.:	Chemtest Sample ID.:				842365	842366
	Sample Location:				WS4	WS4
	Sample Type:				SOIL	SOIL
	Top Depth (m):				0.45	2.00
	Bottom Depth (m):				1.45	2.50
	Date Sampled:				10-Jun-2019	10-Jun-2019
	Asbestos Lab:				COVENTRY	
Determinand	Accred.	SOP	Units	LOD		
ACM Type	U	2192		N/A	-	
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	
ACM Detection Stage	U	2192		N/A	-	
Moisture	N	2030	%	0.020		11
pH	U	2010		N/A		8.6
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40		< 0.40
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010		< 0.010
Sulphur (Elemental)	U	2180	mg/kg	1.0		< 1.0
Cyanide (Complex)	U	2300	mg/kg	0.50		< 0.50
Cyanide (Free)	U	2300	mg/kg	0.50		< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50		< 0.50
Thiocyanate	U	2300	mg/kg	5.0		< 5.0
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50		1.0
Ammonium (Extractable)	U	2425	mg/kg	0.50		1.6
Sulphate (Total)	U	2430	%	0.010		0.040
Arsenic	U	2450	mg/kg	1.0		13
Cadmium	U	2450	mg/kg	0.10		0.64
Chromium	U	2450	mg/kg	1.0		16
Copper	U	2450	mg/kg	0.50		26
Mercury	U	2450	mg/kg	0.10		0.11
Nickel	U	2450	mg/kg	0.50		28
Lead	U	2450	mg/kg	0.50		67
Selenium	U	2450	mg/kg	0.20		0.33
Zinc	U	2450	mg/kg	0.50		120
Chromium (Hexavalent)	N	2490	mg/kg	0.50		< 0.50
Organic Matter	U	2625	%	0.40		1.0
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0		< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0		< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0		< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0		< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0		< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0		< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0		< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0		< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0		< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0		< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0		< 1.0

Project: 1928-19 Wrexham

Client: Pam Brown Associates	Chemtest Job No.:				19-19934	19-19934
Quotation No.:	Chemtest Sample ID.:				842365	842366
	Sample Location:				WS4	WS4
	Sample Type:				SOIL	SOIL
	Top Depth (m):				0.45	2.00
	Bottom Depth (m):				1.45	2.50
	Date Sampled:				10-Jun-2019	10-Jun-2019
	Asbestos Lab:				COVENTRY	
Determinand	Accred.	SOP	Units	LOD		
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0		< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0		< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0		< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0		< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0		< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0		< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0		< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0		< 10
Naphthalene	U	2700	mg/kg	0.10		< 0.10
Acenaphthylene	U	2700	mg/kg	0.10		< 0.10
Acenaphthene	U	2700	mg/kg	0.10		< 0.10
Fluorene	U	2700	mg/kg	0.10		< 0.10
Phenanthrene	U	2700	mg/kg	0.10		< 0.10
Anthracene	U	2700	mg/kg	0.10		< 0.10
Fluoranthene	U	2700	mg/kg	0.10		< 0.10
Pyrene	U	2700	mg/kg	0.10		< 0.10
Benzo[a]anthracene	U	2700	mg/kg	0.10		< 0.10
Chrysene	U	2700	mg/kg	0.10		< 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.10		< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10		< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10		< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10		< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10		< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10		< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0		< 2.0
Total Phenols	U	2920	mg/kg	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.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N-dimethyl-p-phenylenediamine.
2425	Extractable Ammonium in soils	Ammonium	Extraction with potassium chloride solution / analysis by 'Aquakem 600' Discrete Analyser using sodium salicylate and sodium dichloroisocyanurate.
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.
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
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.

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



2183

Final Report

Report No.:	19-19979-1		
Initial Date of Issue:	24-Jun-2019		
Client	Pam Brown Associates		
Client Address:	Needwood House, Lancaster Park Newborough Road Needwood Staffordshire DE13 9PD		
Contact(s):	Alexander Tabb Enquiries Rudo Mafikeni		
Project	1928-19 Wrexham		
Quotation No.:	Date Received:	14-Jun-2019	
Order No.:	Date Instructed:	14-Jun-2019	
No. of Samples:	3		
Turnaround (Wkdays):	Results Due:	24-Jun-2019	
Date Approved:	24-Jun-2019		
Approved By:			
Details:	Robert Monk, Technical Manager		

Results - 2 Stage WAC

Project: 1928-19 Wrexham

Chemtest Job No: 19-19979							Landfill Waste Acceptance Criteria		
Chemtest Sample ID: 842515							Limits		
Sample Ref:							Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID:									
Sample Location: WS1									
Top Depth(m): 0.26									
Bottom Depth(m): 0.50									
Sampling Date: 10-Jun-2019									
Determinand	SOP	Accred.	Units						
Total Organic Carbon	2625	U	%				0.93		
Loss On Ignition	2610	U	%				2.8		
Total BTEX	2760	U	mg/kg				< 0.010		
Total PCBs (7 Congeners)	2815	U	mg/kg				< 0.10		
TPH Total WAC (Mineral Oil)	2670	U	mg/kg				41		
Total (Of 17) PAH's	2700	N	mg/kg				< 2.0		
pH	2010	U					8.4		
Acid Neutralisation Capacity	2015	N	mol/kg	0.019			--	To evaluate	To evaluate
Eluate Analysis			2:1 mg/l	8:1 mg/l	2:1 mg/kg	Cumulative mg/kg 10:1	Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg		
Arsenic	1450	U	< 0.0010	0.0050	< 0.050	< 0.050	0.5	2	25
Barium	1450	U	0.027	0.014	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.5	10	70
Copper	1450	U	0.0026	0.0022	< 0.050	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.00050	< 0.0010	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.012	0.0096	< 0.050	0.10	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	0.0023	< 0.010	0.019	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.1	0.5	7
Zinc	1450	U	0.0057	0.0012	< 0.50	< 0.50	4	50	200
Chloride	1220	U	5.0	< 1.0	< 10	< 10	800	15000	25000
Fluoride	1220	U	0.62	0.49	1.2	5.1	10	150	500
Sulphate	1220	U	140	13	280	360	1000	20000	50000
Total Dissolved Solids	1020	N	270	98	540	1300	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	5.8	5.4	< 50	54	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	9.3

Leachate Test Information	
Leachant volume 1st extract/l	0.332
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.319

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 1928-19 Wrexham

Chemtest Job No: 19-19979							Landfill Waste Acceptance Criteria			
Chemtest Sample ID: 842516							Limits			
Sample Ref:							Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill	
Sample ID:										
Sample Location: WS2										
Top Depth(m): 0.35										
Bottom Depth(m): 0.80										
Sampling Date: 10-Jun-2019										
Determinand	SOP	Accred.	Units							
Total Organic Carbon	2625	U	%				1.2	3	5	6
Loss On Ignition	2610	U	%				2.5	--	--	10
Total BTEX	2760	U	mg/kg				< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg				< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg				< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg				< 2.0	100	--	--
pH	2010	U					8.7	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg				0.037	--	To evaluate	To evaluate
Eluate Analysis			2:1 mg/l	8:1 mg/l	2:1 mg/kg	Cumulative mg/kg 10:1	Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg			
Arsenic	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.5	2	25	
Barium	1450	U	0.017	0.0075	< 0.50	< 0.50	20	100	300	
Cadmium	1450	U	< 0.00010	< 0.00010	< 0.010	< 0.010	0.04	1	5	
Chromium	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.5	10	70	
Copper	1450	U	0.0019	< 0.0010	< 0.050	< 0.050	2	50	100	
Mercury	1450	U	< 0.00050	< 0.00050	< 0.0010	< 0.0050	0.01	0.2	2	
Molybdenum	1450	U	0.038	0.012	0.076	0.16	0.5	10	30	
Nickel	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.4	10	40	
Lead	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.5	10	50	
Antimony	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.06	0.7	5	
Selenium	1450	U	0.0017	< 0.0010	< 0.010	< 0.010	0.1	0.5	7	
Zinc	1450	U	0.0023	< 0.0010	< 0.50	< 0.50	4	50	200	
Chloride	1220	U	5.7	< 1.0	11	< 10	800	15000	25000	
Fluoride	1220	U	1.3	0.89	2.6	9.5	10	150	500	
Sulphate	1220	U	23	4.3	46	70	1000	20000	50000	
Total Dissolved Solids	1020	N	160	78	320	900	4000	60000	100000	
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-	
Dissolved Organic Carbon	1610	U	4.8	6.4	< 50	62	500	800	1000	

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	5.4

Leachate Test Information	
Leachant volume 1st extract/l	0.340
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.251

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 1928-19 Wrexham

Chemtest Job No: 19-19979							Landfill Waste Acceptance Criteria		
Chemtest Sample ID: 842517							Limits		
Sample Ref:							Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID:									
Sample Location: WS3									
Top Depth(m): 0.95									
Bottom Depth(m): 1.50									
Sampling Date: 10-Jun-2019									
Determinand	SOP	Accred.	Units						
Total Organic Carbon	2625	U	%				0.74		
Loss On Ignition	2610	U	%				2.4		
Total BTEX	2760	U	mg/kg				< 0.010		
Total PCBs (7 Congeners)	2815	U	mg/kg				< 0.10		
TPH Total WAC (Mineral Oil)	2670	U	mg/kg				< 10		
Total (Of 17) PAH's	2700	N	mg/kg				< 2.0		
pH	2010	U					8.8		
Acid Neutralisation Capacity	2015	N	mol/kg	0.020			--	To evaluate	To evaluate
Eluate Analysis			2:1 mg/l	8:1 mg/l	2:1 mg/kg	Cumulative mg/kg 10:1	Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg		
Arsenic	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.5	2	25
Barium	1450	U	0.020	0.0090	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.5	10	70
Copper	1450	U	< 0.0010	0.0013	< 0.050	< 0.050	2	50	100
Mercury	1450	U	0.00051	< 0.00050	0.0010	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0087	0.0033	< 0.050	< 0.050	0.5	10	30
Nickel	1450	U	0.0015	< 0.0010	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	0.0011	< 0.010	0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.06	0.7	5
Selenium	1450	U	0.0013	< 0.0010	< 0.010	< 0.010	0.1	0.5	7
Zinc	1450	U	0.0013	0.0022	< 0.50	< 0.50	4	50	200
Chloride	1220	U	2.7	2.0	< 10	21	800	15000	25000
Fluoride	1220	U	0.51	0.25	1.0	2.7	10	150	500
Sulphate	1220	U	34	6.5	68	88	1000	20000	50000
Total Dissolved Solids	1020	N	120	42	250	480	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	4.0	5.0	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	6.3

Leachate Test Information	
Leachant volume 1st extract/l	0.338
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.144

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
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.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
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; Dibenzo[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)
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.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
640	Characterisation of Waste (Leaching)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

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

APPENDIX 11

18th June 2019

Mr A Tabb
Pam Brown Associates Ltd
2 Needwood House
Newborough Road
Needwood
Burton -On-Trent
DE13 9PD

Environmental Site Sampling Ltd
94 Dillotford Avenue
Styvechale
Coventry
CV3 5DU

Tel/Fax: (024) 7669 0514

Mobile : 07971 664 118

e.mail: cosgrove_patrick@hotmail.com

Page 1 of 2

In-situ Analysis Report: PBA/5505

Dear Mr Tabb,

Please find enclosed a copy of the in-situ gas monitoring results undertaken at Plas Coch Road, Wrexham, LL11 2BA on 18th June 2019.

I trust you find these satisfactory. Should you have any queries please contact us.

Yours Sincerely,

Patrick Cosgrove

P V Cosgrove
Environmental Site Sampling Ltd



Environmental Site Sampling Ltd Registered in England & Wales No. 4431348
Registered Office: 94 Dillotford Avenue Coventry CV3 5DU

In-situ Analysis: PBA/5505

Client: Pam Brown Associates Ltd

Project: 1928-19, Plas Coch Road, Wrexham, LL11 2BA

18/06/19

Borehole	Gas Flow (l/hr)	Borehole Pressure (mb)	PID VOC (ppm)	Methane (%vol)		Methane (%LEL)		Carbon Dioxide (%vol)		Oxygen (%vol)		Other Gases (ppm)		Water Level (Meters)
			Peak	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	H ₂ S	CO	
WSDP1	<0.1	0.07	8.7	<0.1	<0.1	<2	<2	3.6	3.6	17.1	17.1	<1	<1	Dry 4.891m
WSDP2	<0.1	0.09	2.5	<0.1	<0.1	<2	<2	1.1	1.1	18.9	18.9	<1	<1	Dry 3.081m
WSDP4	<0.1	0.06	3.3	<0.1	<0.1	<2	<2	1.5	1.5	18.8	18.8	<1	<1	Dry 3.063m
Notes: Monitoring order is from left to right. Steady concentrations are measured up to 3 minutes.														

Additional Information	
Date Monitoring Undertaken:	18 th June 2019
Monitoring Undertaken By:	P Cosgrove
Equipment Used:	GA2000+ S/N 11567, Minirae 2000 PID S/N 110-003253
Atmospheric Pressure Wrexham a.m. (mb):	1014mb
Atmospheric Pressure On-site (mb):	1010mb
Atmospheric Pressure Wrexham p.m. (mb):	1009mb
Weather During Visit:	Overcast, Dry, Wind S, 1m/s, 12°C
Comments:	

25th June 2019

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Page 1 of 2

In-situ Analysis Report: PBA/5508

Dear Mr Tabb,

Please find enclosed a copy of the in-situ gas monitoring results undertaken at Plas Coch Road, Wrexham, LL11 2BA on 25th June 2019.

I trust you find these satisfactory. Should you have any queries please contact us.

Yours Sincerely,

Patrick Cosgrove

P V Cosgrove
Environmental Site Sampling Ltd

In-situ Analysis: PBA/5508

Client: Pam Brown Associates Ltd

Project: 1928-19, Plas Coch Road, Wrexham, LL11 2BA

25/06/19

Borehole	Gas Flow (l/hr)	Borehole Pressure (mb)	PID VOC (ppm)	Methane (%vol)		Methane (%LEL)		Carbon Dioxide (%vol)		Oxygen (%vol)		Other Gases (ppm)		Water Level (Meters)
			Peak	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	H ₂ S	CO	
WSDP1	<0.1	0.06	6.1	<0.1	<0.1	<2	<2	3.2	3.2	17.6	17.6	<1	<1	Dry 4.891m
WSDP2	<0.1	0.03	2.2	<0.1	<0.1	<2	<2	1.3	1.3	18.5	18.5	<1	<1	Dry 3.081m
WSDP4	<0.1	0.04	2.9	<0.1	<0.1	<2	<2	1.7	1.7	18.2	18.2	<1	<1	Dry 3.063m
Notes: Monitoring order is from left to right. Steady concentrations are measured up to 3 minutes.														

Additional Information	
Date Monitoring Undertaken:	25 th June 2019
Monitoring Undertaken By:	P Cosgrove
Equipment Used:	GA2000+ S/N 11567, Minirae 2000 PID S/N 110-003253
Atmospheric Pressure Wrexham a.m. (mb):	1021mb
Atmospheric Pressure On-site (mb):	1010mb
Atmospheric Pressure Wrexham p.m. (mb):	1015mb
Weather During Visit:	Overcast, Dry, Wind NE, 3m/s, 17°C
Comments:	

Plas Coch Road, Wrexham

Records of Falling Head Test, 25th June 2019

Prepared by

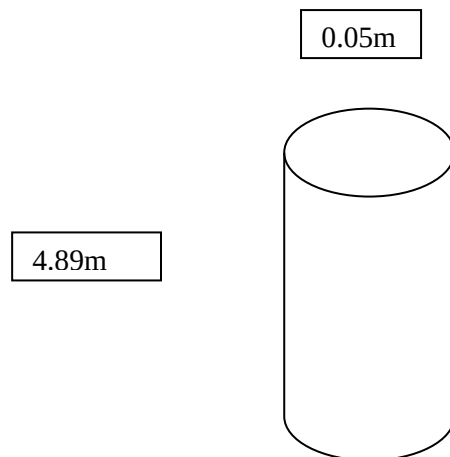
Environmental Site Sampling Ltd

Prepared For

Pam Brown Associates Ltd

WS DP1

Dimensions



Raw Data

<u>Time</u> (Minutes)	Depth Below Datum (Metres)	<u>Time</u> (Minutes)	Depth Below Datum (Metres)
0:00	0.00m	20:00	4.01m
1:00	2.25m	30:00	4.57m
2:00	2.70m	40:00	4.80m
3:00	2.79m	50:00	4.89m
4:00	2.88m	60:00	-
5:00	2.97m	70:00	-
6:00	3.06m	80:00	-
7:00	3.14m	90:00	-
8:00	3.22m	100:00	-
9:00	3.30m	110:00	-
10:00	3.37m	120:00	-

Remarks

Approximately 40 litres of water poured into well prior to measuring

18th July 2019

Mr A Tabb
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e.mail: cosgrove_patrick@hotmail.com

Page 1 of 2

In-situ Analysis Report: PBA/5525

Dear Mr Tabb,

Please find enclosed a copy of the in-situ gas monitoring results undertaken at Plas Coch Road, Wrexham, LL11 2BA on 18th July 2019.

I trust you find these satisfactory. Should you have any queries please contact us.

Yours Sincerely,

Patrick Cosgrove

P V Cosgrove
Environmental Site Sampling Ltd

In-situ Analysis: PBA/5525

Client: Pam Brown Associates Ltd

Project: 1928-19, Plas Coch Road, Wrexham, LL11 2BA

18/07/19

Borehole	Gas Flow (l/hr)	Borehole Pressure (mb)	PID VOC (ppm)	Methane (%vol)		Methane (%LEL)		Carbon Dioxide (%vol)		Oxygen (%vol)		Other Gases (ppm)		Water Level (Meters)
			Peak	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	H ₂ S	CO	
WSDP1	<0.1	0.07	4.3	<0.1	<0.1	<2	<2	3.6	3.6	17.1	17.1	<1	<1	Dry 4.891m
WSDP2	<0.1	0.05	2.6	<0.1	<0.1	<2	<2	1.8	1.8	17.8	17.8	<1	<1	Dry 3.081m
WSDP4	<0.1	0.04	1.7	<0.1	<0.1	<2	<2	2.1	2.1	18.0	18.0	<1	<1	Dry 3.063m
Notes: Monitoring order is from left to right. Steady concentrations are measured up to 3 minutes.														

Additional Information	
Date Monitoring Undertaken:	18 th July 2019
Monitoring Undertaken By:	P Cosgrove
Equipment Used:	GA2000+ S/N 11567, Minirae 2000 PID S/N 110-003253
Atmospheric Pressure Wrexham a.m. (mb):	1005mb
Atmospheric Pressure On-site (mb):	0999mb
Atmospheric Pressure Wrexham p.m. (mb):	1001mb
Weather During Visit:	Sunny, Dry, Wind W, 2m/s, 21°C
Comments:	

30th July 2019

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e.mail: cosgrove_patrick@hotmail.com

Page 1 of 2

In-situ Analysis Report: PBA/5537

Dear Mr Tabb,

Please find enclosed a copy of the in-situ gas monitoring results undertaken at Plas Coch Road, Wrexham, LL11 2BA on 30th July 2019.

I trust you find these satisfactory. Should you have any queries please contact us.

Yours Sincerely,

Patrick Cosgrove

P V Cosgrove
Environmental Site Sampling Ltd



Environmental Site Sampling Ltd Registered in England & Wales No. 4431348
Registered Office: 94 Dillotford Avenue Coventry CV3 5DU

In-situ Analysis: PBA/5537

Client: Pam Brown Associates Ltd

Project: 1928-19, Plas Coch Road, Wrexham, LL11 2BA

30/07/19

Borehole	Gas Flow (l/hr)	Borehole Pressure (mb)	PID VOC (ppm)	Methane (%vol)		Methane (%LEL)		Carbon Dioxide (%vol)		Oxygen (%vol)		Other Gases (ppm)		Water Level (Meters)
			Peak	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	H ₂ S	CO	
WSDP1	<0.1	0.03	2.9	<0.1	<0.1	<2	<2	4.7	4.7	18.3	18.3	<1	<1	Dry 4.891m
WSDP2	<0.1	0.04	1.6	<0.1	<0.1	<2	<2	2.9	2.9	16.8	16.8	<1	<1	Dry 3.081m
WSDP4	<0.1	0.06	1.1	<0.1	<0.1	<2	<2	3.1	3.1	16.4	16.4	<1	<1	Dry 3.063m
Notes: Monitoring order is from left to right. Steady concentrations are measured up to 3 minutes.														

Additional Information	
Date Monitoring Undertaken:	30 th July 2019
Monitoring Undertaken By:	P Cosgrove
Equipment Used:	GA2000+ S/N 11567, Minirae 2000 PID S/N 110-003253
Atmospheric Pressure Wrexham a.m. (mb):	1003mb
Atmospheric Pressure On-site (mb):	0998mb
Atmospheric Pressure Wrexham p.m. (mb):	0998mb
Weather During Visit:	Overcast, Dry, Wind SE, 3m/s, 19°C
Comments:	

APPENDIX 12



TEST REPORT

Client Earth Environmental & Geotechnical Ltd

Address Houldsworth Mills Business & Arts Centre
Houldsworth Street
Reddish
Stockport
SK5 6DA

Contract B0872 -
Plas Coch Road, Wrexham

Job Number MRN 3507/42
Date of Issue 27 June 2019
Page 1 of 8

Approved Signatories

S J Hutchings, O P Davies

Notes

- 1 All remaining samples and remnants from this contract will be disposed 28 days from the date of this report unless you notify us to the contrary.
- 2 Result certificates, in this report, not bearing a UKAS mark, are not included in our UKAS accreditation schedule.
- 3 Opinions and interpretations expressed herein are outside the scope of our UKAS accreditation
- 4 Certified that the samples have been examined and tested in accordance with the terms of the contract/order and unless otherwise stated conform to the standards/specifications quoted. This does not, however, guarantee the balance of the materials from which the tested samples have been taken to be of equal quality.



TEST CERTIFICATE
PARTICLE SIZE DISTRIBUTION
 BS 1377: PART 2: Clause 9.5: 1990

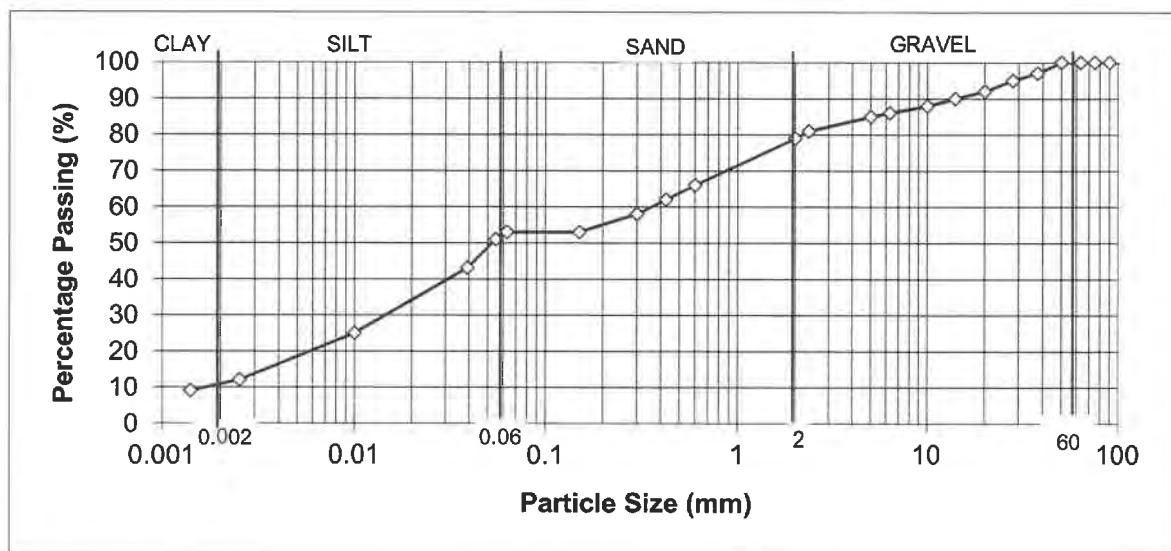
Determination of Moisture Content in accordance with BS 1377: PART 2: Clause 3: 1990 (Oven Dry)

CLIENT	Earth Environmental & Geotechnical Ltd
SITE	B0872 - Plas Coch Road, Wrexham
JOB NUMBER	MRN 3507/42

SAMPLE LABEL	WS1 L 1.70-2.2	DATE SAMPLED	Not advised
LAB SAMPLE No	83829	DATE RECEIVED	11-Jun-19
DATE TESTED	19-Jun-19	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY with frequent gravel
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		2.36	81	
90	100		2	79	
75	100		0.6	66	
63	100		0.425	62	
50	100		0.3	58	
37.5	97		0.15	53	
28	95		0.063	53	
20	92		0.055	51	
14	90		0.039	43	
10	88		0.01	25	
6.3	86		0.0025	12	
5	85		0.0014	9	



REMARKS

As received moisture content = 9.3%

SIGNED

NAME

O.P. Davies BA (Hons)
 (Laboratory Manager)

DATE

27-Jun-19

MURRAY RIX

UNIT 33C, VAUXHALL IND. ESTATE, GREG STREET
REDDISH, STOCKPORT, SK5 7BR
TEL 0161 475 0870 FAX 0161 475 0871

TEST CERTIFICATE

pH and Sulphate as SO₄
BS 1377: PART 3: 1990

CLIENT	Earth Environmental & Geotechnical Ltd
SITE	B0872 – Plas Coch Road, Wrexham
JOB NUMBER	MRN 3507/42

SAMPLE LABEL	WS1 L 1.70-2.2	DATE SAMPLED	Not advised
LAB SAMPLE No	83829	DATE RECEIVED	11 June 2019
DATE TESTED	19 June 2019	SAMPLED BY	Client

ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried

PH Value	7.0	g/l
Sulphate as SO ₄ (2:1 Water Extract)	0.19	

REMARKS

SIGNED



NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 27 June 2019

MURRAY RIX

33C Vauxhall Ind. Estate, Greg Street
Reddish, Stockport SK5 7BR
TEL 0161 475 0870 FAX 0161 475 0871



TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS 1377: PART 2: Clause 9.2: 1990

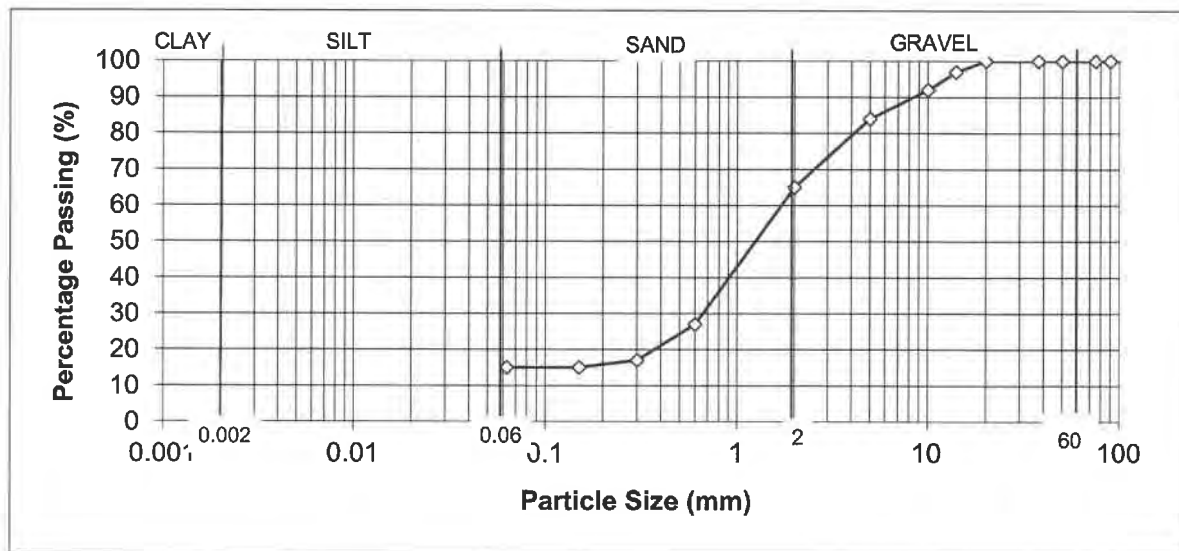
Determination of Moisture Content in accordance with BS 1377: PART 2: Clause 3: 1990 (Oven Dry)

CLIENT	Earth Environmental & Geotechnical Ltd
SITE	B0872 - Plas Coch Road, Wrexham
JOB NUMBER	MRN 3507/42

SAMPLE LABEL	WS1 L 0.80-1.3	DATE SAMPLED	Not Advised
LAB SAMPLE No	83830	DATE RECEIVED	11-Jun-19
DATE TESTED	19-Jun-19	SAMPLED BY	Client

MATERIAL	Brown grey silty fine to coarse SAND with abundant gravel
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		10	92	
90	100		5	84	
75	100		2	65	
50	100		0.6	27	
37.5	100		0.3	17	
20	100		0.15	15	
14	97		0.063	15	



REMARKS

As received moisture content = 2.5%

SIGNED

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 27-Jun-19

MURRAY RIX

UNIT 33C, VAUXHALL IND. ESTATE, GREG STREET
REDDISH, STOCKPORT, SK5 7BR
TEL 0161 475 0870 FAX 0161 475 0871

TEST CERTIFICATE

pH and Sulphate as SO₄
BS 1377: PART 3: 1990

CLIENT	Earth Environmental & Geotechnical Ltd
SITE	B0872 – Plas Coch Road, Wrexham
JOB NUMBER	MRN 3507/42

SAMPLE LABEL	WS2 L 0.80-1.3	DATE SAMPLED	Not advised
LAB SAMPLE No	83830	DATE RECEIVED	11 June 2019
DATE TESTED	19 June 2019	SAMPLED BY	Client

ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried

PH Value	7.0	g/l
Sulphate as SO ₄ (2:1 Water Extract)	0.25	

REMARKS

SIGNED



NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 27 June 2019

MURRAY RIX

33C Vauxhall Ind. Estate, Greg Street
Reddish, Stockport SK5 7BR
TEL 0161 475 0870 FAX 0161 475 0871



TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS 1377: PART 2: Clause 9.2: 1990

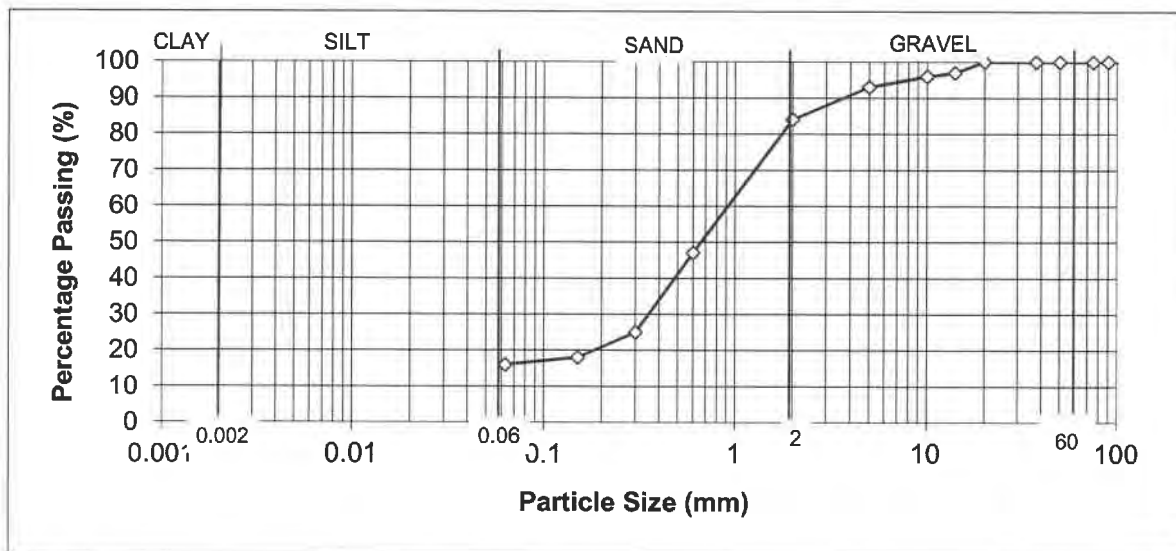
Determination of Moisture Content in accordance with BS 1377: PART 2: Clause 3: 1990 (Oven Dry)

CLIENT	Earth Environmental & Geotechnical Ltd
SITE	B0872 - Plas Coch Road, Wrexham
JOB NUMBER	MRN 3507/42

SAMPLE LABEL	WS3 L 2.30-3.60	DATE SAMPLED	Not Advised
LAB SAMPLE No	83831	DATE RECEIVED	11-Jun-19
DATE TESTED	19-Jun-19	SAMPLED BY	Client

MATERIAL	Brown grey silty fine to coarse SAND with occasional gravel
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		10	96	
90	100		5	93	
75	100		2	84	
50	100		0.6	47	
37.5	100		0.3	25	
20	100		0.15	18	
14	97		0.063	16	



REMARKS

As received moisture content = 11%

SIGNED

NAME

O.P. Davies BA (Hons)
(Laboratory Manager)

DATE

27-Jun-19

MURRAY RIX

33C Vauxhall Ind. Estate, Greg Street
Reddish, Stockport SK5 7BR
TEL 0161 475 0870 FAX 0161 475 0871



TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS 1377: PART 2: Clause 9.2: 1990

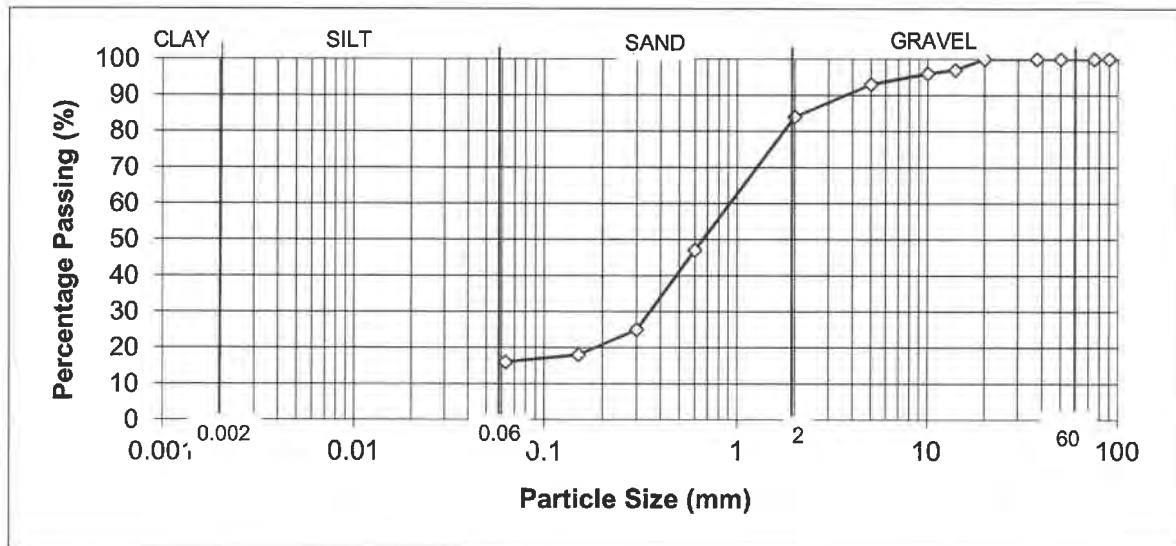
Determination of Moisture Content in accordance with BS 1377: PART 2: Clause 3: 1990 (Oven Dry)

CLIENT	Earth Environmental & Geotechnical Ltd
SITE	B0872 - Plas Coch Road, Wrexham
JOB NUMBER	MRN 3507/42

SAMPLE LABEL	WS4 L 1.45-1.80	DATE SAMPLED	Not Advised
LAB SAMPLE No	83832	DATE RECEIVED	11-Jun-19
DATE TESTED	19-Jun-19	SAMPLED BY	Client

MATERIAL	Brown grey silty fine to coarse SAND with occasional gravel
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		10	96	
90	100		5	93	
75	100		2	84	
50	100		0.6	47	
37.5	100		0.3	25	
20	100		0.15	18	
14	97		0.063	16	



REMARKS

As received moisture content = 9.4%

SIGNED

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 27-Jun-19

MURRAY RIX

UNIT 33C, VAUXHALL IND. ESTATE, GREG STREET
REDDISH, STOCKPORT, SK5 7BR
TEL 0161 475 0870 FAX 0161 475 0871

TEST CERTIFICATE

pH and Sulphate as SO₄
BS 1377: PART 3: 1990

CLIENT	Earth Environmental & Geotechnical Ltd
SITE	B0872 – Plas Coch Road, Wrexham
JOB NUMBER	MRN 3507/42

SAMPLE LABEL	WS4 L 1.45-1.80	DATE SAMPLED	Not advised
LAB SAMPLE No	83832	DATE RECEIVED	11 June 2019
DATE TESTED	19 June 2019	SAMPLED BY	Client

ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried

PH Value	7.1	g/l
Sulphate as SO ₄ (2:1 Water Extract)	0.17	

REMARKS

SIGNED



NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 27 June 2019

APPENDIX 13

Plas Coch Road, Wrexham

Records of Falling Head Test, 25th June 2019

Prepared by

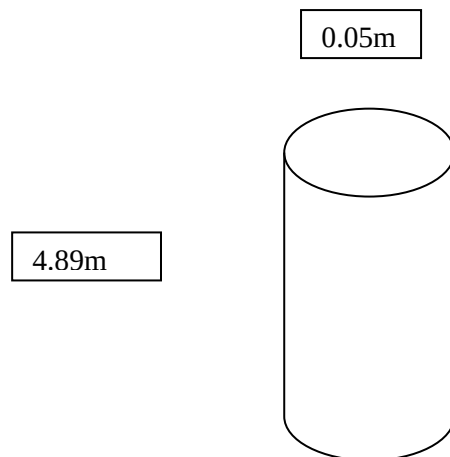
Environmental Site Sampling Ltd

Prepared For

Pam Brown Associates Ltd

WS DP1

Dimensions



Raw Data

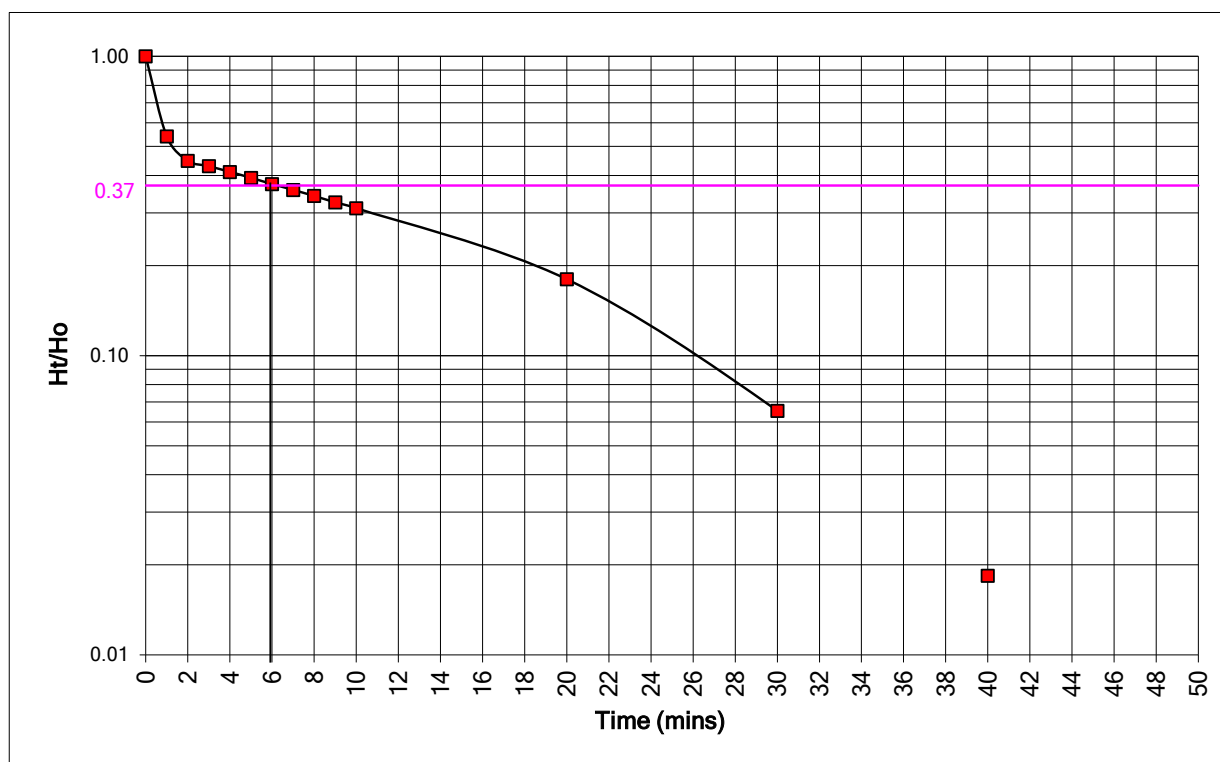
<u>Time</u> (Minutes)	Depth Below Datum (Metres)	<u>Time</u> (Minutes)	Depth Below Datum (Metres)
0:00	0.00m	20:00	4.01m
1:00	2.25m	30:00	4.57m
2:00	2.70m	40:00	4.80m
3:00	2.79m	50:00	4.89m
4:00	2.88m	60:00	-
5:00	2.97m	70:00	-
6:00	3.06m	80:00	-
7:00	3.14m	90:00	-
8:00	3.22m	100:00	-
9:00	3.30m	110:00	-
10:00	3.37m	120:00	-

Remarks

Approximately 40 litres of water poured into well prior to measuring

INSITU FALLING HEAD PERMEABILITY TEST		Site Name			
See BS 5930:1999 Para. 25.4		Wrexham			
Pam Brown Associates		Job No.			
		1928-19			
Borehole number..... WSDP1		TIME	DEPTH	Ht	Ht/Ho
Test number..... 1		(min)	(m)	(m)	
Date..... 25-Jun-19					
Diameter of borehole..... 0.05 [m]		0	0.00	4.89	1.00
Depth of borehole..... 4.89 [m]		1	2.25	2.64	0.54
Depth of casing..... [m]		2	2.70	2.19	0.45
Height of casing above ground level..... 0.00 [m]		3	2.79	2.10	0.43
Ground water level..... 4.89 [m]		4	2.88	2.01	0.41
Borehole (E)xtended or (F)lush ?..... F		5	2.97	1.92	0.39
		6	3.06	1.83	0.37
Initial head of water (Ho)..... 4.89 [m]		7	3.14	1.75	0.36
		8	3.22	1.67	0.34
Time lag of test (Ht/Ho = 0.37)		9	3.30	1.59	0.33
Intake factor F (Case d - BS 5930:1999 page 50)		10	3.37	1.52	0.31
		20	4.01	0.88	0.18
		30	4.57	0.32	0.07
PERMEABILITY k		40	4.80	0.09	0.02
3.97E-05 [m/s]		50	4.89	0.00	0.00
5.823390083					
Notes: GWL, depth of borehole and depth of casing all measured from GL					
All other test depths measured from top of casing					

NB: Time lag of test estimated from slope of graph - true permeability may be lower than that indicated.



APPENDIX 14

Soil Assessment Criteria for land under COMMERCIAL /INDUSTRIAL USE

Parameters	Soil Guideline Values ¹ (mg kg ⁻¹)	Suitable for Use Levels ² (mg kg ⁻¹)		
Antimony	-	7500 ³		
Arsenic (inorganic)	640	640		
Barium	-	22000 ³		
Beryllium	-	12		
Boron	-	240000		
Cadmium	230	190		
Chromium	5000	8600 ⁽³⁺⁾ 33 ⁽⁶⁺⁾		
Copper	-	68000		
Lead	2300 ⁴	-		
Mercury (inorganic)	3600	1100		
Molybdenum	-	17000 ³		
Nickel	1800	980		
Selenium	13000	12000		
Zinc	-	730000		
Vanadium	-	9000		
Petroleum Hydrocarbons		1%SOM	2.5%SOM	6%SOM
TPH aliphatic >C5-C6		3200	5900	12000
TPH aliphatic >C6-C8		7800	17000	40000
TPH aliphatic >C8-C10		2000	4800	11000
TPH aliphatic >C10-C12		9700	23000	47000
TPH aliphatic >C12-C16		59000	82000	90000
TPH aliphatic >C16-C35		1600000	1700000	1800000
TPH aliphatic >C35-C44		1600000	1700000	1800000
TPH aromatic >C5-C7		26000	46000	86000
TPH aromatic >C7-C8		56000	110000	180000
TPH aromatic >C8-C10		3500	8100	17000
TPH aromatic >C10-12		16000	28000	34000
TPH aromatic >C12-C16		36000	37000	38000
TPH aromatic >C16-C21		28000	28000	28000
TPH aromatic >C21-C35		28000	28000	28000
TPH aromatic >C35-C44		28000	28000	28000
Polyaromatic Hydrocarbons				
Napthalene		190	460	1100
Acenaphthylene		83000	97000	100000
Acenaphthene		84000	97000	100000
Fluorene		63000	68000	71000
Phenanthrene		22000	22000	23000
Anthracene		520000	540000	540000
Fluoranthene		23000	23000	23000
Pyrene		54000	54000	54000
Benz[a]anthracene		170	170	180
Chrysene		350	350	350
Benzo[b]fluoranthene		44	44	45
Benzo[k]fluoranthene		1200	1200	1200
Benzo[a]pyrene		35	35	36
Dibenz[a,h]anthracene		3.5	3.6	3.6
Indeno[1,2,3c-d]pyrene		500	510	510
Benzo[g,h,i]perylene		3900	4000	4000

Parameters	Soil Guideline Values ¹ (mg kg ⁻¹)	Suitable for Use Levels ² (mg kg ⁻¹) Generic Assessment Criteria ³ (mg kg ⁻¹)		
		1% SOM	2.5% SOM	6% SOM
BTEX				
Benzene	95	27	47	90
Toluene	4400(6% SOM)	56000	110000	180000
Ethylbenzene	2800(6% SOM)	5700	13000	27000
m-xylene	3500	6200	14000	31000
p-xylene	3200	5900	14000	30000
o-xylene	2600	6600	15000	33000
Phenol and Chlorophenols				
Phenols	3200(6% SOM)	760	1500	3200
Chlorophenols (4 congeners)		3500	4000	4300
Pentachlorophenol		400	400	400
Volatile Organic Compounds				
1,2-Dichloroethane		0.67	0.97	1.7
1,1,1-Trichloroethane		660	1300	3000
1,1,2,2 Tetrachloroethane		270	550	1100
1,1,1,2 Tetrachloroethane		110	250	560
Tetrachloroethene		19	42	95
Tetrachloromethane (carbon tetrachloride)		2.9	6.3	14
Trichloroethene (TCE)		1.2	2.6	5.7
Trichloromethane (chloroform)		99	170	350
Chloroethene (vinyl chloride)		0.059	0.077	0.12
1,1,2, Trichloroethane		94	190	400
1,1-Dichloroethane		280	450	850
1,1-Dichloroethene		26	46	92
1,2,4-Trimethylbenzene		42	99	220
1,2-Dichloropropane		3.3	5.9	12
2,4-Dimethylphenol		16000	24000	30000
2,4-Dinitrotoluene		3700	3700	3800
2,6-Dinitrotoluene		1900	1900	1900
2-Chloronaphthalene		390	960	2200
Biphenyl		18000	33000	48000
Bis (2-ethylhexyl) phthalate		85000	86000	86000
Bromobenzene		97	220	520
Bromodichloromethane		2.1	3.7	7.6
Bromoform		760	1500	3100
Butyl benzyl phthalate		940000	940000	950000
Carbon Disulphide		11	22	47
Chlorobenzene		56	130	290
Chloroethane		960	1300	2100
Chloromethane		1.0	1.2	1.6
Cis 1,2 Dichloroethene		14	24	47
Dichloromethane		270	360	560
Diethyl Phthalate		150000	220000	290000
Di-n-butyl phthalate		15000	15000	15000
Di-n-octyl phthalate		89000	89000	89000
Hexachlorobutadiene		31	66	120
Hexachloroethane		22	53	120
Isopropylbenzene		1400	3300	7700
Methyl <i>tert</i> -butyl ether		7900	13000	24000
Propylbenzene		4100	9700	21000
Styrene		3300	6500	11000

Values in italics are provisional
Updated: May 2015

Parameters	Soil Guideline Values ¹ (mg kg ⁻¹)	Suitable for Use Levels ² (mg kg ⁻¹) Generic Assessment Criteria ³ (mg kg ⁻¹)		
		1% SOM	2.5% SOM	6% SOM
Total Cresols (2-,3-&4-methylphenol)		160000	180000	180000
<i>Trans</i> 1,2 Dichloroethene		22	40	81
Tributyl tin oxide		130	180	200
Chlorobenzenes				
Chlorobenzene		56	130	290
1,2-Dichlorobenzene		2000	4800	11000
1,3-Dichlorobenzene		30	73	170
1,4-Dichlorobenzene		4400	10000	25000
1,2,3-Trichlorobenzene		102	250	590
1,2,4-Trichlorobenzene		220	530	1300
1,3,5-Trichlorobenzene		23	55	130
1,2,3,4-Tetrachlorobenzene		1700	3080	4400
1,2,3,5-Tetrachlorobenzene		49	120	240
1,2,4,5-Tetrachlorobenzene		42	72	96
Pentachlorobenzene		640	770	830
Hexachlorobenzene		110	120	120
Polychlorinated Biphenyls	0.24			
Explosives				
2,4,6 Trinitrotoluene (TNT)		1000	1000	1000
RDX		210000	210000	210000
HMX		110000	110000	110000
Pesticides				
Aldrin		170	170	170
Dieldrin		170	170	170
Atrazine		9300	9400	9400
Dichlorvos		140	140	140
Alpha-Endosulfan		5600	7400	8400
Beta-Endosulfan		6300	7800	8700
Alpha-Hexachlorocyclohexane		170	180	180
Beta-Hexachlorocyclohexane		65	65	65
Gamma-Hexachlorocyclohexane (including Lindane)		67	69	70

References

- ¹ Environment Agency (2009) 'Soil Guideline Values for 'Arsenic', 'Cadmium', 'Mercury', 'Nickel', 'Selenium', 'Benzene', 'Ethylbenzene', 'Toluene', 'Xylenes', 'Phenol', 'Dioxins, Furans and Dioxin-like PCBs in soil'. Science Report SC050021. UK.
- ² Nathanail, C.P., McCaffrey, C., Gillett, A.G., Ogden, R.C. and Nathanail, J.F. 2015. The LQM/CIEH S4ULs for Human Health Risk Assessment. Land Quality Press, Nottingham.
- ³ EIC/AGS/CL:AIRE (2009) 'Soil Generic Assessment Criteria for Human Health Risk Assessment'. UK.
- ⁴ CL:AIRE (2014) SP1010-Development of Category 4 Screening Levels for assessment of Land Affected by Contamination. Final Project Report (Revision 2). Appendix H Provisional C4SL.

*Note for xylenes the most health protective value in each scenario is highlighted in **bold** see ref 1, section 16.5 para 28 for further detail.*