



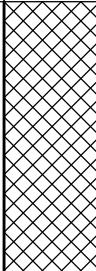
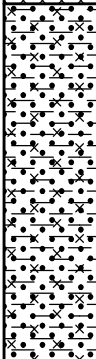
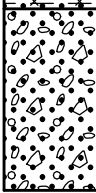
Ground and Environmental Services Limited

Unit 2 Montpelier Business Park
Dencora Way, Ashford
Kent TN23 4FG

Tel: 01233 646237

Trial Pit No. TP06

Sheet: 1 of 1

Equipment & Methods. JCB 3CXBackfill: Arisings				Project Name: Down Lane Park Project Location: Tottenham Hale, London Client: Ebsford Environmental		Job No: 12230		
Co-ordinates: E: N:				Ground Level (m):		Date Started:31/07/2019 Date Completed:31/07/2019		
Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result					
0.50- 0.70		TUB			MADE GROUND: Turf over brown slightly gravelly clay matrix. gravel comprising of fine to coarse brick and concrete fragments			(0.90)
1.50- 1.70		TUB			Soft (low strength) moist orangeish brown silty slightly sandy CLAY, No odor. No staining ...from 1.40 containing rare flint gravel	-0.90		0.90 (1.20)
2.50- 2.70		D			Loose to medium dense (low strength) moist to wet orangeish brown very sandy GRAVEL, gravel is fine to coarse subangular and sub rounded flint. Sand is medium to coarse. No odor. No staining	-2.10		2.10 (0.60)
						-2.70		2.70
						End of Trial Pit 2.70 m (Thickness of basal layer not proven)		
Remarks: Water ingress at base of excavation. Gravel collapsing at base						Logged By:		Checked By:
						PAD		CSS
						Scale: 1:25		Approved By:
						FIG No.		
Notes: For explanation of symbols and abbreviations, see Key Sheet.								



TP6



Ground and Environmental Services Limited

Unit 2 Montpelier Business Park
Dencora Way, Ashford
Kent TN23 4FG

Tel: 01233 646237

Trial Pit No. TP07

Sheet: 1 of 1

Equipment & Methods.
JCB 3CXBackfill: Arisings

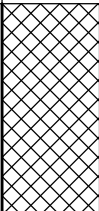
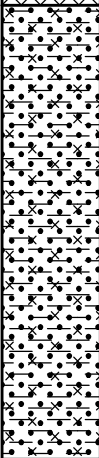
Project Name: Down Lane Park
Project Location: Tottenham Hale, London
Client: Ebsford Environmental

Job No:
12230

Co-ordinates:
E:
N:

Ground Level (m):

Date Started:31/07/2019
Date Completed:31/07/2019

Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result					
0.40		TUB			MADE GROUND: Turf over brown slightly gravelly clay matrix. gravel comprising of fine to coarse brick, tarmac and concrete fragments. Also containing frequent roots of up to 20mm			(0.70)
1.00- 1.10		TUB			Soft (low strength) moist orangeish brown silty sandy CLAY, No odor. No staining	-0.70		0.70
					...from 1.40 containing rare flint gravel			(1.50)
1.90- 2.00		D			Loose to medium dense (low strength) moist to wet orangeish brown silty very sandy GRAVEL, gravel is fine to coarse subangular and sub rounded. Sand is medium to coarse. No odor. No staining	-2.20		2.20
								(0.80)
2.90- 3.00		D				-3.00		3.00
						End of Trial Pit 3.00 m (Thickness of basal layer not proven)		
Remarks: Water ingress at base of excavation. Gravel collapsing at base						Logged By:		Checked By:
						PAD		CSS
						Scale: 1:25		Approved By:
Notes: For explanation of symbols and abbreviations, see Key Sheet.						FIG No.		



TP7



Ground and Environmental Services Limited

Unit 2 Montpelier Business Park
Dencora Way, Ashford
Kent TN23 4FG

Tel: 01233 646237

Trial Pit No. TP08

Sheet: 1 of 1

Equipment & Methods.
JCB 3CXBackfill: Arisings

Project Name: Down Lane Park
Project Location: Tottenham Hale, London
Client: Ebsford Environmental

Job No:
12230

Co-ordinates:
E:
N:

Ground Level (m):

Date Started:31/07/2019
Date Completed:31/07/2019

Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result					
0.50- 0.60		TUB			MADE GROUND: Turf over brown slightly gravelly clay matrix. gravel comprising of fine to coarse brick and concrete fragments			(0.80)
1.10- 1.20		TUB			Soft (low strength) moist orangeish brown silty slightly sandy CLAY, No odor. No staining	-0.80		0.80 (1.10)
2.00- 2.20		D			Loose to medium dense (low strength) moist to wet orangeish brown very sandy GRAVEL, gravel is fine to coarse subangular and sub rounded flint. Sand is medium to coarse. No odor. No staining	-1.90		1.90 (0.90)
2.70- 2.80		D				-2.80		2.80
						End of Trial Pit 2.80 m (Thickness of basal layer not proven)		

Remarks:
Water ingress at base of excavation. Gravel collapsing at base

Logged By: PAD
Checked By: CSS

Scale: 1:25
Approved By:

FIG No.

Notes: For explanation of symbols and abbreviations, see Key Sheet.



TP8



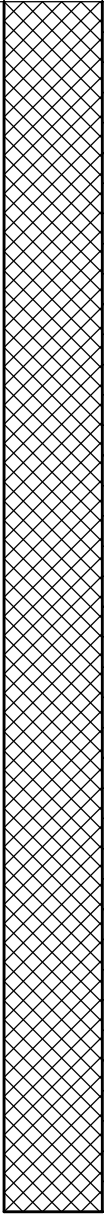
Ground and Environmental Services Limited

Unit 2 Montpelier Business Park
Dencora Way, Ashford
Kent TN23 4FG

Tel: 01233 646237

Trial Pit No. TP09

Sheet: 1 of 1

Equipment & Methods. JCB 3CXBackfill: Arisings				Project Name: Down Lane Park Project Location: Tottenham Hale, London Client: Ebsford Environmental		Job No: 12230			
Co-ordinates: E: N:				Ground Level (m):		Date Started:31/07/2019 Date Completed:31/07/2019			
Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)	
Depth (m)	No.	Type	Result						
0.30- 0.40		TUB			MADE GROUND: Turf over brown gravelly clay matrix. gravel comprising of frequent fine to coarse brick and concrete fragments and rare plastic and glass waste (MOUND MATERIAL)			(4.00)	
1.00- 1.20		TUB							
2.00- 2.20		TUB							
3.00- 3.20		TUB							
3.80- 4.00		TUB				-4.00		4.00	
						End of Trial Pit 4.00 m (Thickness of basal layer not proven)			
Remarks: Unable to progress excavation as maximum depth of excavator reached						Logged By:		Checked By:	
						PAD		CSS	
						Scale: 1:25		Approved By:	
Notes: For explanation of symbols and abbreviations, see Key Sheet.						FIG No.			



TP9



Ground and Environmental Services Limited

Unit 2 Montpelier Business Park
Dencora Way, Ashford
Kent TN23 4FG

Tel: 01233 646237

Trial Pit No. TP10

Sheet: 1 of 1

Equipment & Methods.
JCB 3CXBackfill: Arisings

Project Name: Down Lane Park
Project Location: Tottenham Hale, London
Client: Ebsford Environmental

Job No:
12230

Co-ordinates:
E:
N:

Ground Level (m):

Date Started:31/07/2019
Date Completed:31/07/2019

Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result					
0.40- 0.50		TUB			MADE GROUND: Turf over brown slightly gravelly clay matrix. Gravel comprising of fine to coarse brick and concrete fragments (BOTTOM OF MOUNDED MATERIAL)			(1.50)
1.00- 1.20		TUB						
2.00- 2.20		D			Soft (low strength) moist orangeish brown sandy very silty CLAY, No odor. No staining	-1.50		1.50
3.00- 3.10		D			Loose to medium dense (low strength) moist to wet orangeish brown very sandy GRAVEL, gravel is fine to coarse subangular and sub rounded flint. Sand is medium to coarse. No odor. No staining	-2.90		2.90
						-3.10		3.10
						End of Trial Pit 3.10 m (Thickness of basal layer not proven)		

Remarks:
Water ingress at base of excavation. Gravel collapsing at base

Logged By: PAD
Checked By: CSS

Scale: 1:25
Approved By:

FIG No.

Notes: For explanation of symbols and abbreviations, see Key Sheet.



TP10



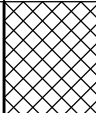
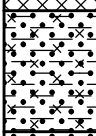
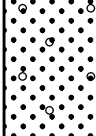
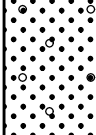
Ground and Environmental Services Limited

Unit 2 Montpelier Business Park
Dencora Way, Ashford
Kent TN23 4FG

Tel: 01233 646237

Trial Pit No. TP11

Sheet: 1 of 1

Equipment & Methods. JCB 3CXBackfill: Arisings				Project Name: Down Lane Park Project Location: Tottenham Hale, London Client: Ebsford Environmental		Job No: 12230		
Co-ordinates: E: N:				Ground Level (m):		Date Started:31/07/2019 Date Completed:31/07/2019		
Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result					
0.40- 0.50		TUB			MADE GROUND: Turf over brown slightly gravelly clay matrix. Gravel comprising of fine to coarse brick fragments	-0.40		(0.40)
					Soft (low strength) moist orangeish brown silty slightly sandy CLAY, No odor. No staining			
1.00- 1.10		TUB			Moist to wet orangeish brown very gravelly medium to coarse grained SAND. Gravel is subangular and sub rounded fine to coarse flint. No odor. No staining	-0.80		0.80
2.70- 2.80		TUB			Loose to medium dense (low strength) moist to wet orangeish brown very sandy GRAVEL, gravel is fine to coarse subangular and sub rounded flint. Sand is medium to coarse. No odor. No staining	-2.10		2.10
						-2.80		2.80
						End of Trial Pit 2.80 m (Thickness of basal layer not proven)		
Remarks: Water ingress at base of excavation. Gravel collapsing at base						Logged By:		Checked By:
						PAD		CSS
						Scale: 1:25		Approved By:
Notes: For explanation of symbols and abbreviations, see Key Sheet.						FIG No.		



TP11



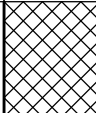
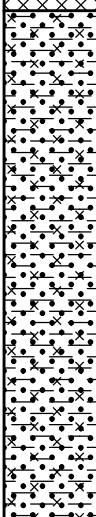
Ground and Environmental Services Limited

Unit 2 Montpelier Business Park
Dencora Way, Ashford
Kent TN23 4FG

Tel: 01233 646237

Trial Pit No. TP12

Sheet: 1 of 1

Equipment & Methods. JCB 3CXBackfill: Arisings				Project Name: Down Lane Park Project Location: Tottenham Hale, London Client: Ebsford Environmental		Job No: 12230		
Co-ordinates: E: N:				Ground Level (m):		Date Started:31/07/2019 Date Completed:31/07/2019		
Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result					
0.40		TUB			MADE GROUND: Turf over brown slightly gravelly clay matrix. Gravel comprising of fine to coarse brick fragments	-0.40		(0.40)
1.20- 1.30		TUB			Soft (low strength) moist orangeish brown sandy gravelly CLAY, Sand is medium to coarse. Gravel is fine and coarse sub angular ad sub rounded flint. No odor. No staining	-2.10		(1.70)
2.00- 2.20		TUB			Loose to medium dense (low strength) moist to wet orangeish brown very sandy GRAVEL, gravel is fine to coarse subangular and sub rounded flint. Sand is medium to coarse. No odor. No staining	-2.80		(0.70)
						End of Trial Pit 2.80 m (Thickness of basal layer not proven)		
Remarks: Water ingress at base of excavation. Gravel collapsing at base						Logged By:		Checked By:
						PAD		CSS
						Scale: 1:25		Approved By:
Notes: For explanation of symbols and abbreviations, see Key Sheet.						FIG No.		



TP12



APPENDIX 4

DG365 SOAKAGE TEST RESULTS



SOAKAWAY TESTING

Test in accordance with BRE 365 Guidelines

Project Reference Number: 12230 Client: Ebsford Environmental
Site: Down Lane Park
Location: Tottenham Hale, London

TP 1 Test
1 / 1

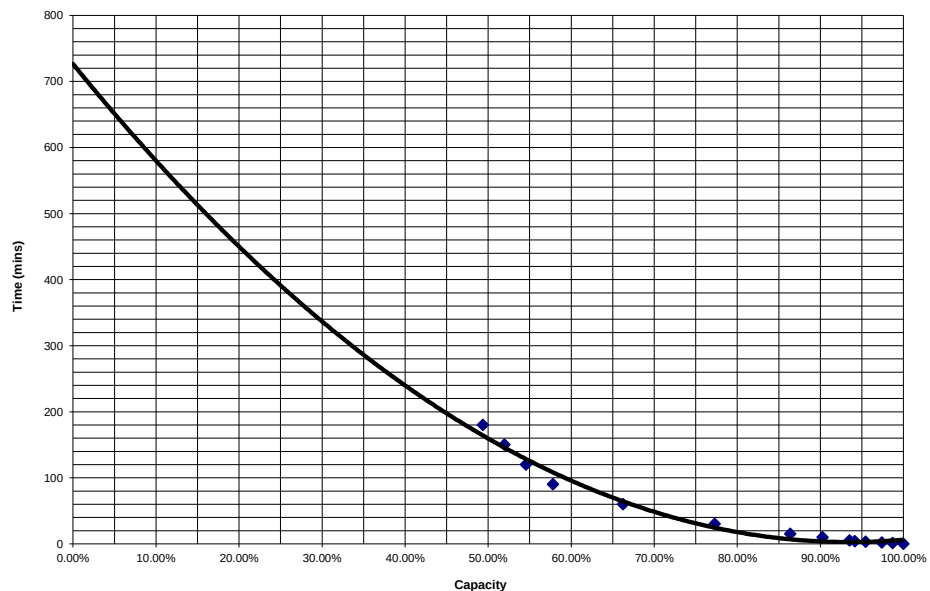
Weather: Intermittent Rainfall
Date of Test: 30th July 2019

TRIAL PIT DIMENSIONS

Width (m): 0.45 Length (m): 1.5
Depth (m): 2.5 Invert Depth (m): 0.96
Drainage time of test (mins): 180 (50% Drained)

SOAKAGE RESULTS

Depth	(%)	Time
0.96	100.00%	0
0.98	98.70%	1
1	97.40%	2
1.03	95.45%	3
1.05	94.16%	4
1.06	93.51%	5
1.11	90.26%	10
1.17	86.36%	15
1.31	77.27%	30
1.48	66.23%	60
1.61	57.79%	90
1.66	54.55%	120
1.7	51.95%	150
1.74	49.35%	180
2.5		



INFILTRATION RATE

Depth (B.G.L) (m)	Infiltration Rate (m/s)
0.96 - 2.50	6.63E-06

Departures from the specified test method: None

Remarks: Low to Moderate Soakage Potential - Infiltration Rate based on extrapolation of data.
Groundwater ingress at base of excavation.

Authorised Signatory: P. A. B. Payne Date: 06/08/2019



SOAKAWAY TESTING

Test in accordance with BRE 365 Guidelines

Project Reference Number: 12230 Client: Ebsford Environmental
Site: Down Lane Park
Location: Tottenham Hale, London

TP 2 Test
1 / 1

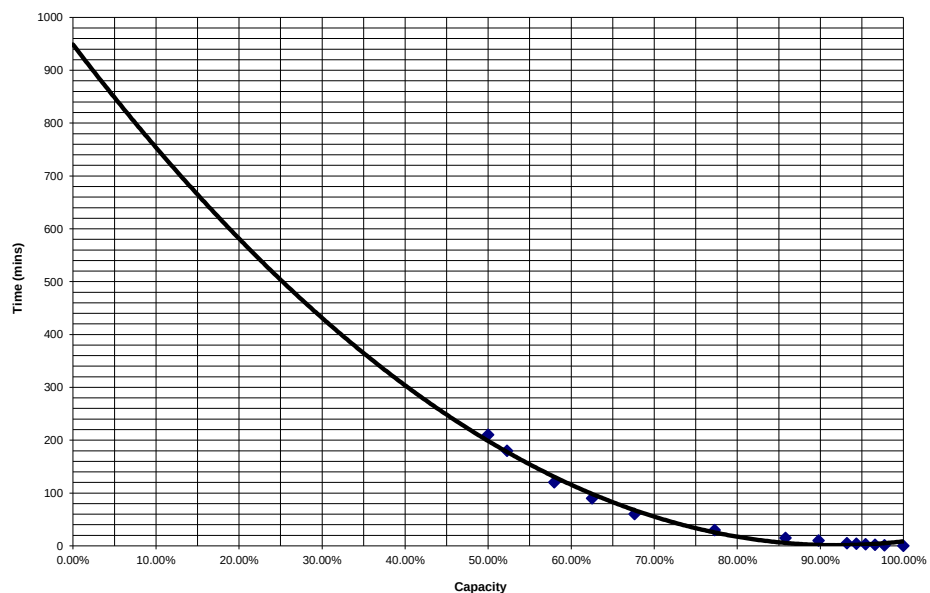
Weather: Intermittent Rainfall
Date of Test: 30th July 2019

TRIAL PIT DIMENSIONS

Width (m): 0.45 Length (m): 1.8
Depth (m): 2.7 Invert Depth (m): 0.94
Drainage time of test (mins): 210 (50% Drained)

SOAKAGE RESULTS

Depth	(%)	Time
0.94	100.00%	0
0.98	97.73%	1
1	96.59%	2
1.02	95.45%	3
1.04	94.32%	4
1.06	93.18%	5
1.12	89.77%	10
1.19	85.80%	15
1.34	77.27%	30
1.51	67.61%	60
1.6	62.50%	90
1.68	57.95%	120
1.78	52.27%	180
1.82	50.00%	210
2.7		



INFILTRATION RATE

Depth (B.G.L) (m)	Infiltration Rate (m/s)
0.94 - 2.70	5.36E-06

Departures from the specified test method: None

Remarks: Low to Moderate Soakage Potential - Infiltration Rate based on extrapolation of data.
Groundwater ingress at base of excavation.

Authorised Signatory: P. A. B. Payne Date: 06/08/2019



SOAKAWAY TESTING

Test in accordance with BRE 365 Guidelines

Project Reference Number: 12230 Client: Ebsford Environmental
Site: Down Lane Park
Location: Tottenham Hale, London

TP 3 Test
1 / 1

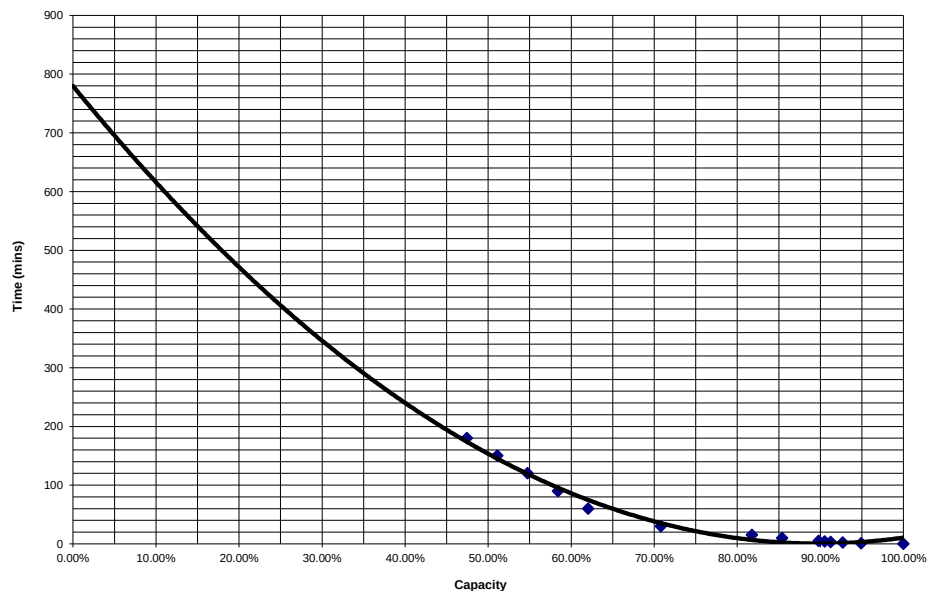
Weather: Intermittent Rainfall
Date of Test: 30th July 2019

TRIAL PIT DIMENSIONS

Width (m): 0.45 Length (m): 1.6
Depth (m): 2.4 Invert Depth (m): 1.03
Drainage time of test (mins): 180 (52% Drained)

SOAKAGE RESULTS

Depth	(%)	Time
1.03	100.00%	0
1.1	94.89%	1
1.13	92.70%	2
1.15	91.24%	3
1.16	90.51%	4
1.17	89.78%	5
1.23	85.40%	10
1.28	81.75%	15
1.43	70.80%	30
1.55	62.04%	60
1.6	58.39%	90
1.65	54.74%	120
1.7	51.09%	150
1.75	47.45%	180
2.4		



INFILTRATION RATE

Depth (B.G.L.) (m)	Infiltration Rate (m/s)
1.03 - 2.40	6.05E-06

Departures from the specified test method: None

Remarks: Low to Moderate Soakage Potential - Infiltration Rate based on extrapolation of data.
Groundwater ingress at base of excavation.

Authorised Signatory: P. A. B. Payne Date: 06/08/2019



SOAKAWAY TESTING

Test in accordance with BRE 365 Guidelines

Project Reference Number: 12230 Client: Ebsford Environmental
Site: Down Lane Park
Location: Tottenham Hale, London

TP 4 Test
1 / 1

Weather: Intermittent Rainfall
Date of Test: 30th July 2019

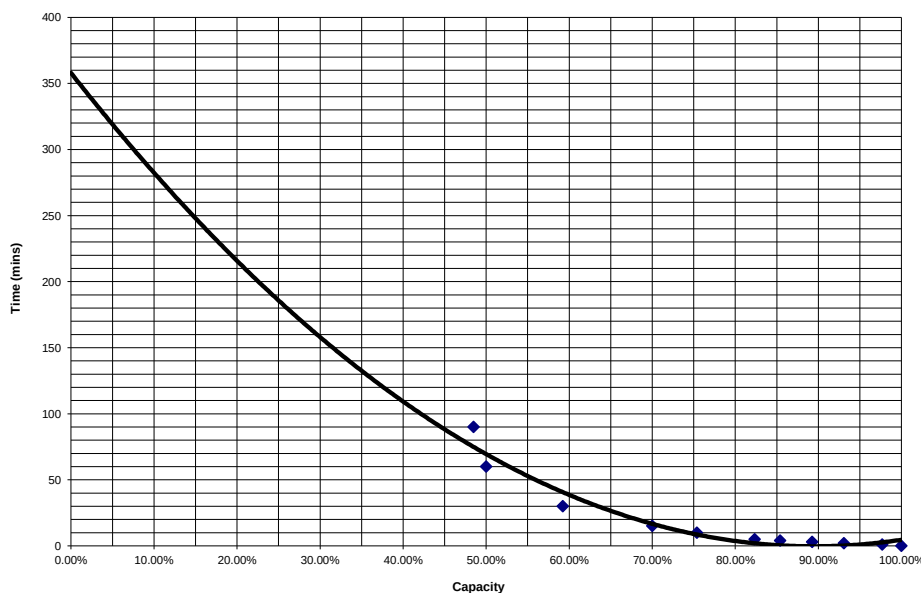
TRIAL PIT DIMENSIONS

Width (m): 0.45 Length (m): 1.6
Depth (m): 2.3 Invert Depth (m): 1
Drainage time of test (mins): 0 (52% Drained)

SOAKAGE RESULTS

Depth	(%)	Time
1	100.00%	0
1.03	97.69%	1
1.09	93.08%	2
1.14	89.23%	3
1.19	85.38%	4
1.23	82.31%	5
1.32	75.38%	10
1.39	70.00%	15
1.53	59.23%	30
1.65	50.00%	60
1.67	48.46%	90

2.3



INFILTRATION RATE

Depth (B.G.L) (m)	Infiltration Rate (m/s)
1.00 - 2.30	1.32E-05

Departures from the specified test method: None

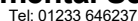
Remarks: Moderate Soakage Potential - Infiltration Rate based on extrapolation of data.
Groundwater ingress at base of excavation.

Authorised Signatory: P. A. B. Payne Date: 06/08/2019



APPENDIX 5

WINDOW SAMPLE LOGS AND INSTALLATION DETAILS



Sheet: 1 of 1

Job No:
12230

Date Started:31/07/2019
Date Completed:31/07/2019

Notes: For explanation of symbols and abbreviations, see Key Sheet.



Ground and Environmental Services Limited

Unit 2 Montpelier Business Park
Dencora Way, Ashford
Kent TN23 4FG

Tel: 01233 646237

Window Sampler Log No. WS 1A

Sheet: 1 of 1

Equipment & Methods. Premier Compact 110 WS rig Backfill: Arisings				Project Name: Down Lane Park Project Location: Tottenham Hale, London Client: Ebsford Environmental		Job No: 12230		
Co-ordinates: E: N:				Ground Level (m):		Date Started:31/07/2019 Date Completed:31/07/2019		
Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result					
0.60- 0.80		TUB		2,4/2,2,2,2	MADE GROUND : Overgrown grass and topsoil	-0.10		(0.10)
					MADE GROUND : Loose brown gravelly sand matrix of brick and concrete			
1.30- 1.50		D	CN=8	1,1/2,5,6,9	Soft brown mottled light grey slightly gravelly sandy CLAY. Sand is fine to medium. Gravel is subangular fine to coarse flint	-1.30		1.30
1.60- 1.80		TUB						
			CN=22	10,10/9,10,11,11	...from 2.20 becoming wet			
2.40- 3.00		D			Orange brown very sandy fine to coarse GRAVEL of flint. Sand is medium to coarse.	-2.40		2.40
			CN=41					(0.60)
						-3.00		3.00
						End of W/S 3.00 m (Thickness of basal layer not proven)		
Remarks: Hole collapsed at 3m on loose gravel Water level at 2.3m						Logged By:		Checked By:
						STP		CSS
						Scale: 1:25		Approved By:
						FIG No.		
Notes: For explanation of symbols and abbreviations, see Key Sheet.								



Ground and Environmental Services Limited

Unit 2 Montpelier Business Park
Dencora Way, Ashford
Kent TN23 4FG

T: 01233 646237

Hole ID. WS 1A

Installation Details & Readings

Sheet: 1 of 1

Equipment & Methods.
Premier Compact 110 WS rig
_Backfill: Arisings

Project Name: Down Lane Park
Project Location: Tottenham Hale, London
Client: Ebsford Environmental

Job No:
12230

Co-ordinates:
E:
N:

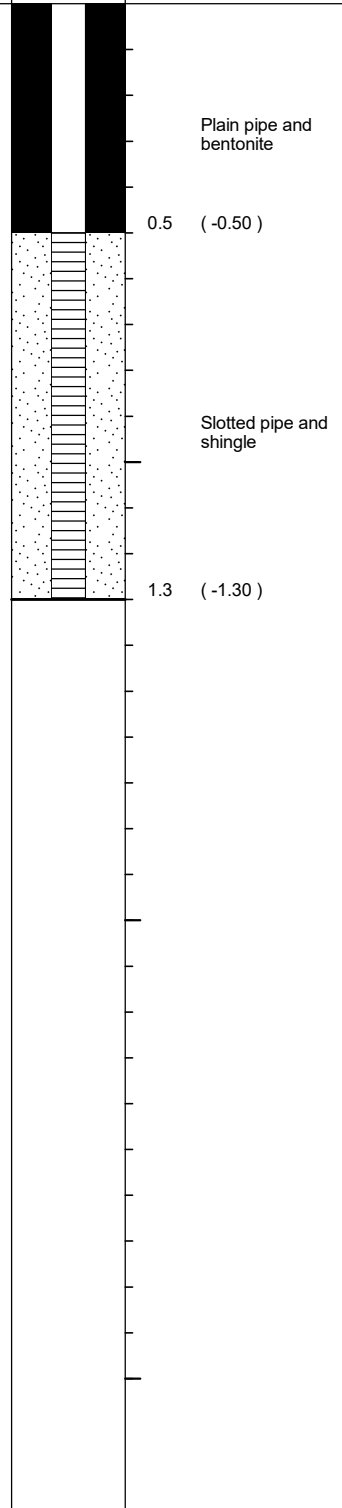
Ground Level (m):

Date Started:31/07/2019
Date Completed:31/07/2019

Installation Date : 31/07/2019 Depth to TOP Response Zone : 0.5 (m)
Installation Type : SP Depth to BASE Response Zone : 1.3 (m)

Installation Diagram

Depth Related
Remarks
(Elevation)



Plain pipe and bentonite

0.5 (-0.50)

Slotted pipe and shingle

1.3 (-1.30)

Compiled By: STP	Checked By: CSS
Scale:	Approved By:
FIG No.	

STP

Checked By:
CSS

Scale:

Approved By:

FIG No.

Notes: For explanation of symbols and abbreviations, see Key Sheet.



Ground and Environmental Services Limited

Unit 2 Montpelier Business Park
Dencora Way, Ashford
Kent TN23 4FG

Tel: 01233 646237

Window Sampler Log No. WS 2

Sheet: 1 of 1

Equipment & Methods. Premier Compact 110 WS rig _Backfill: Standpipe installed				Project Name: Down Lane Park Project Location: Tottenham Hale, London Client: Ebsford Environmental		Job No: 12230			
Co-ordinates: E: N:				Ground Level (m):		Date Started:31/07/2019 Date Completed:31/07/2019			
Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)	
Depth (m)	No.	Type	Result						
0.30-0.40		TUB		4,4/5,5,5,4	MADE GROUND : Grass over topsoil	-0.10		(0.10)	
0.80-1.00		D			MADE GROUND : Loose brown sandy gravel with rare fine roots. Gravel is subangular to subrounded fine to coarse of flint, asphalt, concrete and brick				(1.00)
					...from 0.65 rare 10mm root				
					...from 0.90 rare glass and shale				
1.90-2.00		TUB		2,3/3,3,7,9	MADE GROUND : Firm grey brown and brown slightly sandy very gravelly clay. Gravel is subangular fine to coarse of brick and concrete. Rare metal fragments	-1.10		1.10	
									(0.80)
					Stiff grey mottled orange brown slightly gravelly sandy CLAY. Gravel is subangular fine to medium flint	-1.90		1.90	
								(0.40)	
2.40-2.80		D		3,7/9,8,8,9	Brown very sandy fine to coarse GRAVEL of flint	-2.30		2.30	
									(0.70)
					...from 2.80 water seepage				
						-3.00		3.00	
						End of W/S 3.00 m (Thickness of basal layer not proven)			
Remarks: Window sample hole drilled through mound Hole collapsed at 3m on loose gravel Water level at 2.8m						Logged By:		Checked By:	
						STP		CSS	
						Scale: 1:25		Approved By:	
						FIG No.			
Notes: For explanation of symbols and abbreviations, see Key Sheet.									



Ground and Environmental Services Limited

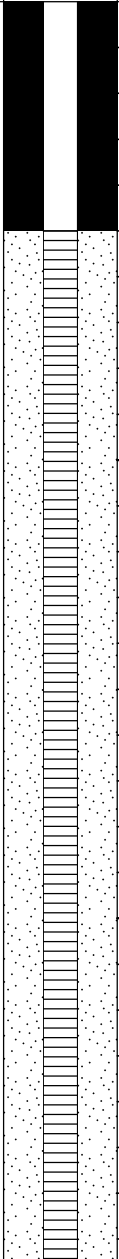
Unit 2 Montpelier Business Park
Dencora Way, Ashford
Kent TN23 4FG

T: 01233 646237

Hole ID. WS 2

Installation Details & Readings

Sheet: 1 of 1

Equipment & Methods. Premier Compact 110 WS rig _Backfill: Standpipe installed		Project Name: Down Lane Park Project Location: Tottenham Hale, London Client: Ebsford Environmental		Job No: 12230					
Co-ordinates: E: N:		Ground Level (m):		Date Started: 31/07/2019 Date Completed: 31/07/2019					
Installation Date : 31/07/2019 Depth to TOP Response Zone : 0.5 (m) Installation Type : SP Depth to BASE Response Zone : 2.75 (m)				Installation Diagram		Depth Related Remarks (Elevation)			
						Plain pipe and bentonite 0.5 (-0.50)			
						Slotted pipe and shingle 2.75 (-2.75)			
						Compiled By:		Checked By:	
						STP		CSS	
						Scale:		Approved By:	
						FIG No.			

Notes: For explanation of symbols and abbreviations, see Key Sheet.



Ground and Environmental Services Limited

Unit 2 Montpelier Business Park
Dencora Way, Ashford
Kent TN23 4FG

Tel: 01233 646237

Window Sampler Log No. WS 3

Sheet: 1 of 1

Equipment & Methods. Premier Compact 110 WS rig _Backfill: Arisings				Project Name: Down Lane Park Project Location: Tottenham Hale, London Client: Ebsford Environmental		Job No: 12230		
Co-ordinates: E: N:				Ground Level (m):		Date Started:31/07/2019 Date Completed:31/07/2019		
Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result					
0.40- 0.60		TUB		2,2/4,4,4,6	MADE GROUND : Grass over topsoil	-0.12		(0.12) 0.12
					MADE GROUND : Dark brown slightly clayey fine to coarse gravelly fine to coarse sand with occasional fine roots. Gravel is subangular to subrounded fine to coarse flint, brick and concrete			(0.68)
0.80- 1.00		D						
1.20- 1.40		TUB	CN=18	2,2/3,3,3,4	MADE GROUND : Firm dark grey brown slightly gravelly very sandy clay. Gravel is subangular to subrounded fine to coarse of flint with rare fine brick	-0.80		0.80
					...from 1.20 with some coal deposits and asphalt fragments			
					...from 1.55 occasional to many bricks			
1.80- 2.00		D		CN=13	...from 1.80 rare plastic			
2.60- 2.80		D		7,7/6,7,11,13	Firm to stiff grey mottled orange brown slightly gravelly sandy clay. Gravel is subangular fine to coarse flint	-2.20		2.20
3.40- 3.80		D	CN=37		...from 3.20 becoming very gravelly	-3.40		3.40
					Orange brown fine to coarse sandy GRAVEL. Gravel is subangular to subrounded fine to coarse flint			(0.60)
						-4.00		4.00
						End of W/S 4.00 m (Thickness of basal layer not proven)		
Remarks: Window sample hole drilled through mound Hole collapsed at 4m on loose gravel						Logged By:		Checked By:
						STP		CSS
						Scale: 1:25		Approved By:
						FIG No.		
Notes: For explanation of symbols and abbreviations, see Key Sheet.								



Ground and Environmental Services Limited

Unit 2 Montpelier Business Park
Dencora Way, Ashford
Kent TN23 4FG

Tel: 01233 646237

Window Sampler Log No. WS 4

Sheet: 1 of 1

Equipment & Methods. Premier Compact 110 WS rig _Backfill: Standpipe installed				Project Name: Down Lane Park Project Location: Tottenham Hale, London Client: Ebsford Environmental		Job No: 12230		
Co-ordinates: E: N:				Ground Level (m):		Date Started:31/07/2019 Date Completed:31/07/2019		
Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result					
0.30-0.40		TUB		3,5/4,3,3,7	MADE GROUND : Grass over topsoil	-0.15		(0.15) 0.15
0.80-1.00		D			MADE GROUND : Loose brown slightly gravelly clayey fine to medium sand with occasional to rare fine roots. Gravel is subangular to angular fine to coarse brick, concrete and flint ...from 0.90 with rare metal fragments and foam pieces			(1.05)
1.60-1.80		TUB	CN=17		MADE GROUND : Dark grey brown gravelly sandy clay. Gravel is subangular fine to coarse of flint, brick and concrete. Rare concrete cobbles ...from 1.60 with some coal deposits	-1.20		1.20 (0.60)
2.40-2.60		D		1,1/1,1,2,2	MADE GROUND : Firm brown slightly gravelly fine to medium sandy clay. Gravel is subangular fine to coarse of flint and rare fine brick	-1.80		1.80 (0.50)
3.10-3.50		D	CN=63		Firm brown and orange brown slightly gravelly sandy CLAY. Gravel is subangular to angular fine to medium flint and silt nodules	-2.30		2.30 (0.75)
				1,3/3,11,25,27	Orange brown medium to coarse sandy GRAVEL. Gravel is subangular to subrounded fine to coarse flint	-3.05		3.05 (0.50)
						-3.55		3.55
						End of W/S 3.55 m (Thickness of basal layer not proven)		
Remarks: Window sample hole drilled through mound Terminated at 3.55m on dense gravel Water level at 3.4m						Logged By:		Checked By:
						STP		CSS
						Scale: 1:25		Approved By:
						FIG No.		
Notes: For explanation of symbols and abbreviations, see Key Sheet.								



Ground and Environmental Services Limited

Unit 2 Montpelier Business Park
Dencora Way, Ashford
Kent TN23 4FG

T: 01233 646237

Hole ID. WS 4

Installation Details & Readings

Sheet: 1 of 1

Equipment & Methods. Premier Compact 110 WS rig _Backfill: Standpipe installed		Project Name: Down Lane Park Project Location: Tottenham Hale, London Client: Ebsford Environmental		Job No: 12230	
Co-ordinates: E: N:		Ground Level (m):		Date Started: 31/07/2019 Date Completed: 31/07/2019	
Installation Date : 31/07/2019 Depth to TOP Response Zone : 1.0 (m) Installation Type : SP Depth to BASE Response Zone : 3.55 (m)				Installation Diagram	Depth Related Remarks (Elevation)
					Plain pipe and bentonite
					1 (-1.00)
					Slotted pipe and shingle
					End of Hole 3.55 m (-3.55)
Notes: For explanation of symbols and abbreviations, see Key Sheet.				Compiled By: STP	Checked By: CSS
				Scale:	Approved By:
				FIG No.	



Ground and Environmental Services Limited

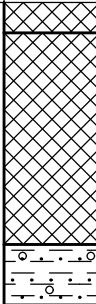
Unit 2 Montpelier Business Park
Dencora Way, Ashford
Kent TN23 4FG

Tel: 01233 646237

Window Sampler Log No. WS 5

Sheet: 1 of 1

Equipment & Methods. Premier Compact 110 WS rig _Backfill: Arisings				Project Name: Down Lane Park Project Location: Tottenham Hale, London Client: Ebsford Environmental		Job No: 12230		
Co-ordinates: E: N:				Ground Level (m):		Date Started:31/07/2019 Date Completed:31/07/2019		
Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result					
0.30- 0.40		TUB			MADE GROUND : Grass over topsoil	-0.15		(0.15)
					MADE GROUND : Loose grey brown slightly gravelly fine to medium sand with occasional to many roots to 3mm diameter. Gravel is subangular fine to coarse of brick, plastic and flint			0.15
0.80- 1.00		D			Stiff brown and orange brown slightly gravelly sandy CLAY. Gravel is subangular fine to coarse flint	-0.55		0.55
								(0.55)
1.60- 1.80		D			Firm brown and orange brown very sandy CLAY with occasional fine roots	-1.10		1.10
								(0.80)
					Brown very sandy GRAVEL. Sand is medium to coarse. Gravel is subangular to subrounded fine to coarse flint	-1.90		1.90
						-2.00		(0.10) 2.00
						End of W/S 2.00 m (Thickness of basal layer not proven)		
Remarks:						Logged By:		Checked By:
						STP		CSS
						Scale: 1:25		Approved By:
						FIG No.		
Notes: For explanation of symbols and abbreviations, see Key Sheet.								

 Ground and Environmental Services Limited Unit 2 Montpellier Business Park Dencora Way, Ashford Kent TN23 4FG Tel: 01233 646237					Window Sampler Log No. WS 6 Sheet: 1 of 1						
Equipment & Methods. Premier Compact 110 WS rig _Backfill: Arisings					Project Name: Down Lane Park Project Location: Tottenham Hale, London Client: Ebsford Environmental					Job No: 12230	
Co-ordinates: E: N:					Ground Level (m):		Date Started: 31/07/2019 Date Completed: 31/07/2019				
Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)			
Depth (m)	No.	Type	Result								
0.30- 0.40		TUB			MADE GROUND : Grass over topsoil	-0.10		(0.10)			
					MADE GROUND : Loose grey brown sandy gravel with rare fine roots. Sand is fine to medium. Gravel is subangular to angular fine to coarse of flint, brick and glass			(0.70)			
0.80- 1.00		TUB			Hard light brown and brown slightly gravelly very sandy CLAY. Sand is fine to medium. Gravel is subangular fine to coarse flint	-0.80 -1.00		0.80 (0.20) 1.00			
					End of W/S 1.00 m (Thickness of basal layer not proven)						
Remarks:							Logged By: STP		Checked By: CSS		
							Scale: 1:25		Approved By:		
							FIG No.				
Notes: For explanation of symbols and abbreviations, see Key Sheet.											



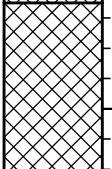
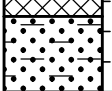
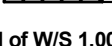
Ground and Environmental Services Limited

Unit 2 Montpellier Business Park
Dencora Way, Ashford
Kent TN23 4FG

Tel: 01233 646237

Window Sampler Log No. WS 7

Sheet: 1 of 1

Equipment & Methods. Premier Compact 110 WS rig _Backfill: Arisings				Project Name: Down Lane Park Project Location: Tottenham Hale, London Client: Ebsford Environmental		Job No: 12230		
Co-ordinates: E: N:				Ground Level (m):		Date Started: 31/07/2019 Date Completed: 31/07/2019		
Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result					
0.30- 0.40		TUB			MADE GROUND : Grass over topsoil	-0.15		(0.15) 0.15
					MADE GROUND : Loose grey brown sandy gravel with rare fine roots. Sand is fine to medium. Gravel is subangular to angular fine to coarse of flint, brick and glass			(0.60)
0.80- 1.00		TUB			Light brown and brown slightly clayey fine to medium SAND with occasional fine roots	-0.75		0.75 (0.25)
						-1.00		1.00
						End of W/S 1.00 m (Thickness of basal layer not proven)		
Remarks:						Logged By: STP		Checked By: CSS
						Scale: 1:25		Approved By:
						FIG No.		
Notes: For explanation of symbols and abbreviations, see Key Sheet.								



Ground and Environmental Services Limited

Unit 2 Montpelier Business Park
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Kent TN23 4FG

Tel: 01233 646237

Window Sampler Log No. WS 8

Sheet: 1 of 1

Equipment & Methods. Premier Compact 110 WS rig Backfill: Standpipe installed				Project Name: Down Lane Park Project Location: Tottenham Hale, London Client: Ebsford Environmental		Job No: 12230		
Co-ordinates: E: N:				Ground Level (m):		Date Started: 31/07/2019 Date Completed: 31/07/2019		
Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result					
0.30-0.40		TUB			MADE GROUND : Grass over topsoil MADE GROUND : Loose dark brown slightly gravelly clayey fine to medium sand with occasional roots to 3mm diameter	-0.08		(0.08) (0.57)
0.80-1.00		D			Stiff light brown and brown very sandy CLAY with occasional to rare roots to 3mm diameter	-0.65		0.65 (0.55)
1.70-1.85		TUB			Orange brown and brown slightly clayey sandy GRAVEL. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of flint	-1.20		1.20 (0.50)
					Soft grey brown slightly gravelly fine to coarse sandy CLAY	-1.70		1.70 (0.15)
2.60-3.00		D			Brown very sandy fine to coarse GRAVEL of flint	-1.85		1.85 (1.15)
						-3.00		3.00
						End of W/S 3.00 m (Thickness of basal layer not proven)		
Remarks: Hole collapsed at 3m on loose gravel Water level at 1.9m						Logged By: STP		Checked By: CSS
						Scale: 1:25		Approved By:
						FIG No.		
Notes: For explanation of symbols and abbreviations, see Key Sheet.								



Ground and Environmental Services Limited

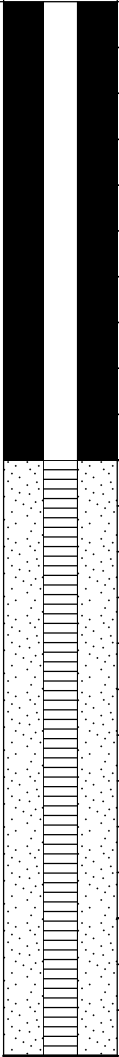
Unit 2 Montpelier Business Park
Dencora Way, Ashford
Kent TN23 4FG

T: 01233 646237

Hole ID. WS 8

Installation Details & Readings

Sheet: 1 of 1

Equipment & Methods. Premier Compact 110 WS rig _Backfill: Standpipe installed		Project Name: Down Lane Park Project Location: Tottenham Hale, London Client: Ebsford Environmental		Job No: 12230					
Co-ordinates: E: N:		Ground Level (m):		Date Started: 31/07/2019 Date Completed: 31/07/2019					
Installation Date : 31/07/2019 Depth to TOP Response Zone : 1 (m) Installation Type : SP Depth to BASE Response Zone : 2.3 (m)				Installation Diagram		Depth Related Remarks (Elevation)			
						Plain pipe and bentonite			
						1 (-1.00)			
						Slotted pipe and shingle			
						2.3 (-2.30)			
						Compiled By:		Checked By:	
						STP		CSS	
						Scale:		Approved By:	
						FIG No.			

Notes: For explanation of symbols and abbreviations, see Key Sheet.



APPENDIX 6
SOIL GAS MONITORING RESULTS



SOIL GAS SURVEY

Project:	Down Lane Park			Date:	02/08/2019					GA 5000/Dipmeter	
Location:	London			Weather:	Sunny, 2/8 cloud						
Job No.	12230			Temp:	21°C						
Monitoring Point No.	Time	O2 (% v/v)	CO2 (% v/v)	CH4 (% v/v)	H2S (PPM)	CO (PPM)	PID (PPM)	Flow (l/hr)	Water (mbgl)	Site Observations/ Comments	
										Time	Barometric Pressure
WS2	10:40	19.6	1.9	0	0	0	<10	0	2.17		
WS4	10:52	19.4	1.3	0	0	0	<10	0	3.45	10:40	1018mbar
WS1A	11:00	20.3	0.1	0	0	0	<10	0	DRY	Datum:	
WS8	11:10	18.6	3.4	0	0	0	<10	0	1.94		

Tested by: SW

Checked by: PAD

Ground and Environmental Services Limited

Accuracy and range of Gas Analyser 5000 (GA5000)				
Accuracy			Range	
Gas	Gas Concentrations			
	0-5%	5-15%	0-FS	
CH ₄	+/-0.5%	+/-3%		0-70% to specification, 0-100% reading
CO ₂	+/-0.5%	+/-3%		0-40% to specification, 0-100% reading
O ₂	+/-1%	+/-1%		0-25%
CO			+/-10%FS	0-500ppm
H ₂ S			+/-10%FS	0-200ppm
B.P.	+/- 5 mBar			700-1200 mBar
Flow:				

Notes:

CH₄: methane in percent volume per volume (% v/v)

CO₂: carbon dioxide in %v/v

O₂: oxygen in % v/v

H₂S: hydrogen sulphide in part per million (ppm)

CO: carbon monoxide in ppm

B.P.: Barometric pressure in mBar

Flow: Gas flow in litre per hour (l/h)



SOIL GAS SURVEY

Project:	Down Lane Park			Date:	13/08/2019					GA 5000/Dipmeter	
Location:	London			Weather:	Sunny, 1/8 cloud						
Job No.	12230			Temp:	20°C						
Monitoring Point No.	Time	O2 (% v/v)	CO2 (% v/v)	CH4 (% v/v)	H2S (PPM)	CO (PPM)	PID (PPM)	Flow (l/hr)	Water (mbgl)	Site Observations/ Comments	
										Time	Barometric Pressure
WS 1A	10:37	20.1	0.2	0	0	0	<10	0	Dry		
WS 2	10:20	19.6	2.5	0	0	0	<10	0	2.73	10:20	1016mbar
WS 4	10:27	18.4	3.1	0	0	0	<10	0	3.42	Datum:	
WS 8	10:44	18.3	3.0	0	0	0	<10	0	2.07		

Tested by: STP

Checked by: PAD

Ground and Environmental Services Limited

Accuracy and range of Gas Analyser 5000 (GA5000)				
Accuracy			Range	
Gas	Gas Concentrations			
	0-5%	5-15%	0-FS	
CH ₄	+/-0.5%	+/-3%		0-70% to specification, 0-100% reading
CO ₂	+/-0.5%	+/-3%		0-40% to specification, 0-100% reading
O ₂	+/-1%	+/-1%		0-25%
CO			+/-10%FS	0-500ppm
H ₂ S			+/-10%FS	0-200ppm
B.P.	+/- 5 mBar			700-1200 mBar
Flow:				

Notes:

CH₄: methane in percent volume per volume (% v/v)

CO₂: carbon dioxide in %v/v

O₂: oxygen in % v/v

H₂S: hydrogen sulphide in part per million (ppm)

CO: carbon monoxide in ppm

B.P.: Barometric pressure in mBar

Flow: Gas flow in litre per hour (l/h)



Tested by: STP
Checked by: PAD

Ground and Environmental Services Limited

Accuracy and range of Gas Analyser 5000 (GA5000)					Notes: CH4: methane in percent volume per volume (% v/v) CO2: carbon dioxide in %v/v O2: oxygen in % v/v H2S: hydrogen sulphide in part per million (ppm) CO: carbon monoxide in ppm B.P.: Barometric pressure in mBar Flow: Gas flow in litre per hour (l/h)
Accuracy				Range	
Gas	Gas Concentrations				
	0-5%	5-15%	0-FS		
CH ₄	+/-0.5%	+/-3%		0-70% to specification, 0-100% reading	
CO ₂	+/-0.5%	+/-3%		0-40% to specification, 0-100% reading	
O ₂	+/-1%	+/-1%		0-25%	
CO			+/-10%FS	0-500ppm	
H ₂ S			+/-10%FS	0-200ppm	
B.P.	+/- 5 mBar			700-1200 mBar	
Flow:					



APPENDIX 7
LABORATORY TEST RESULTS



Ground and Environmental Services Limited
Unit 2 Montpelier Business Park
Dencora Way
Ashford
Kent
TN23 4FG

www.genvs.com
E: info@genvs.com
T: 01233 646237

Client: Ebsford Environmental

Project No: 12230

Site: Down Lane Park

Date 20/08/2019

Date Received: 09/08/2019

Date Tested: 16/08/2019

Test Results

Location ID	Depth (m)	MC (%)	LL (%)	PL (%)	PI (%)	% passing 425 µm sieve	Classification	Sample type
WS 1A	1.3-1.5	31	32	23	9	85	CL	D
WS 3	2.6-2.8	23	67	22	45	95	CH	D
WS 4	2.4-2.6	24	49	19	30	95	CI	D

Visual Descriptions

Location ID	Depth	Description
WS 1A	1.3-1.5	Brown mottled light grey slightly gravelly sandy CLAY
WS 3	2.6-2.8	Brown mottled light grey slightly gravelly sandy CLAY
WS 4	2.4-2.6	Brown and orange brown slightly gravelly sandy CLAY



PARTICLE SIZE DISTRIBUTION

BS 1377 : Part 2 : 1990 : Clause 9

Job Ref

12230

Borehole / Pit
No

WS 1A

Project

Down Lane Park

Sample No

Depth

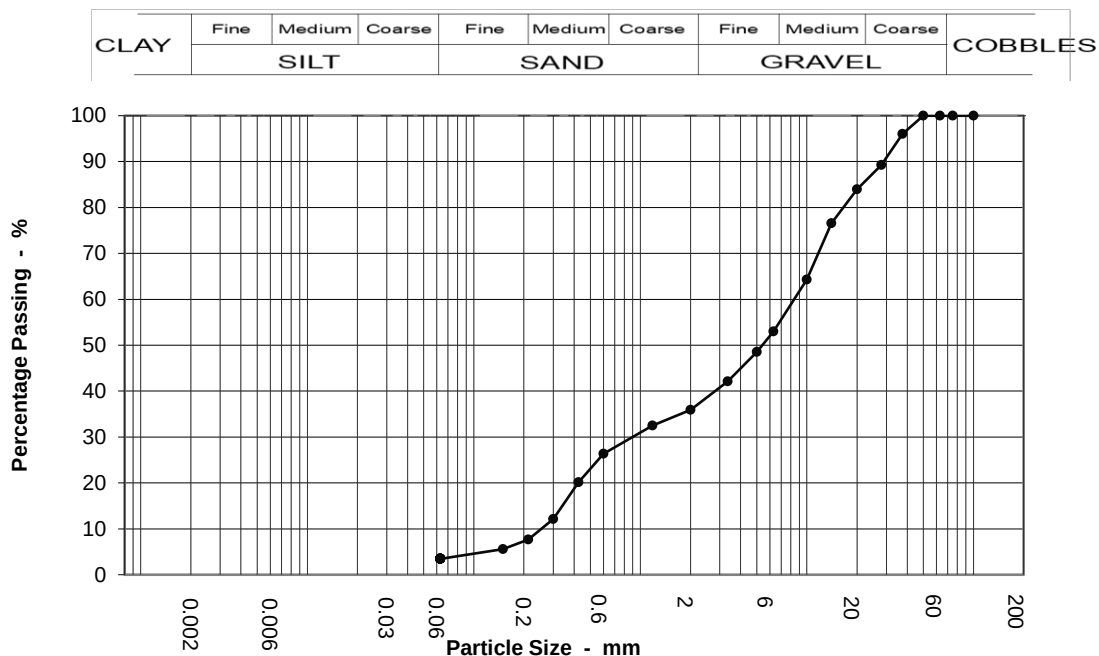
2.4-3.0 m

Soil Description

Brown very sandy fine to coarse GRAVEL. Sand is fine to coarse

Sample type

B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100		
63	100		
50	100		
37.5	96		
28	89		
20	84		
14	77		
10	64		
6.3	53		
5	49		
3.35	42		
2	36		
1.18	32		
0.6	26		
0.425	20		
0.3	12		
0.212	8		
0.15	6		
0.063	3		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	N/A

Sample Proportions	
Cobbles	0.0
Gravel	64.1
Sand	32.5
Silt & Clay	3.5

Grading Analysis	
D100	50.0
D60	8.595
D10	0.258
Uniformity Coefficient	33

Operator

Checked

Approved

Remarks

STP

CSS

CSS



PARTICLE SIZE DISTRIBUTION

BS 1377 : Part 2 : 1990 : Clause 9

Job Ref

12230

Borehole / Pit
No

WS 2

Project

Down Lane Park

Sample No

Depth

2.4-2.8

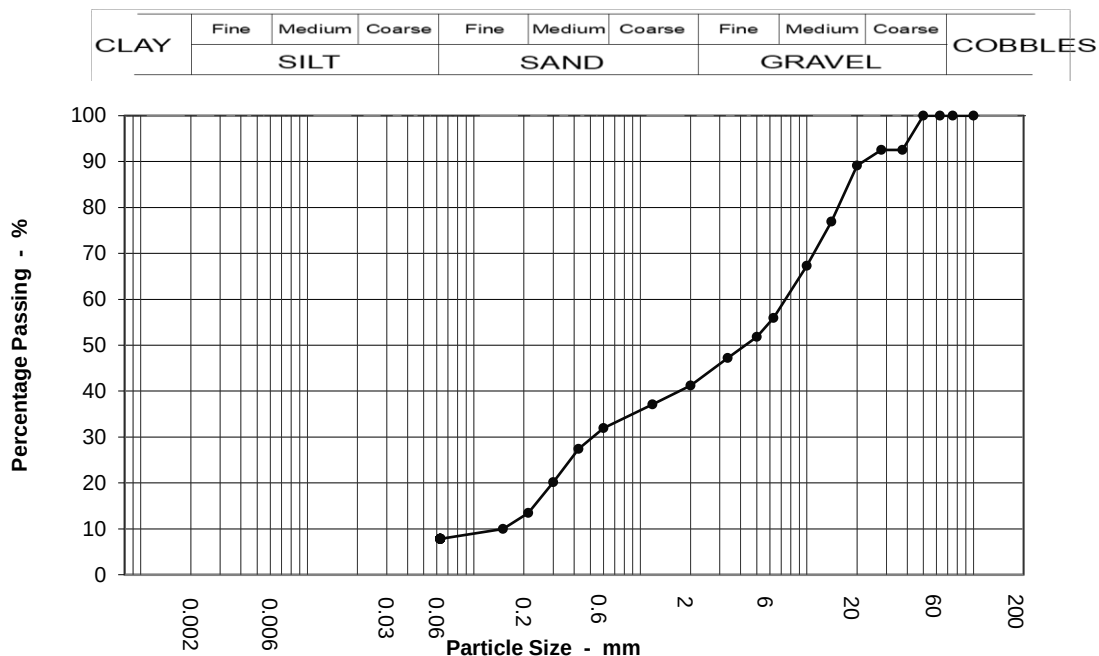
m

Soil Description

Orange brown and brown very sandy fine to coarse
GRAVEL. Sand is fine to coarse

Sample type

D



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100		
63	100		
50	100		
37.5	93		
28	93		
20	89		
14	77		
10	67		
6.3	56		
5	52		
3.35	47		
2	41		
1.18	37		
0.6	32		
0.425	27		
0.3	20		
0.212	13		
0.15	10		
0.063	8		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	N/A

Sample Proportions	
Cobbles	0.0
Gravel	58.8
Sand	33.4
Silt & Clay	7.8

Grading Analysis	
D100	50.0
D60	7.623
D10	0.151
Uniformity Coefficient	51

Operator	Checked	Approved	Remarks	
STP	CSS	CSS		



PARTICLE SIZE DISTRIBUTION

BS 1377 : Part 2 : 1990 : Clause 9

Job Ref

12230

Borehole / Pit
No

WS 3

Project

Down Lane Park

Sample No

Depth

3.4-3.8

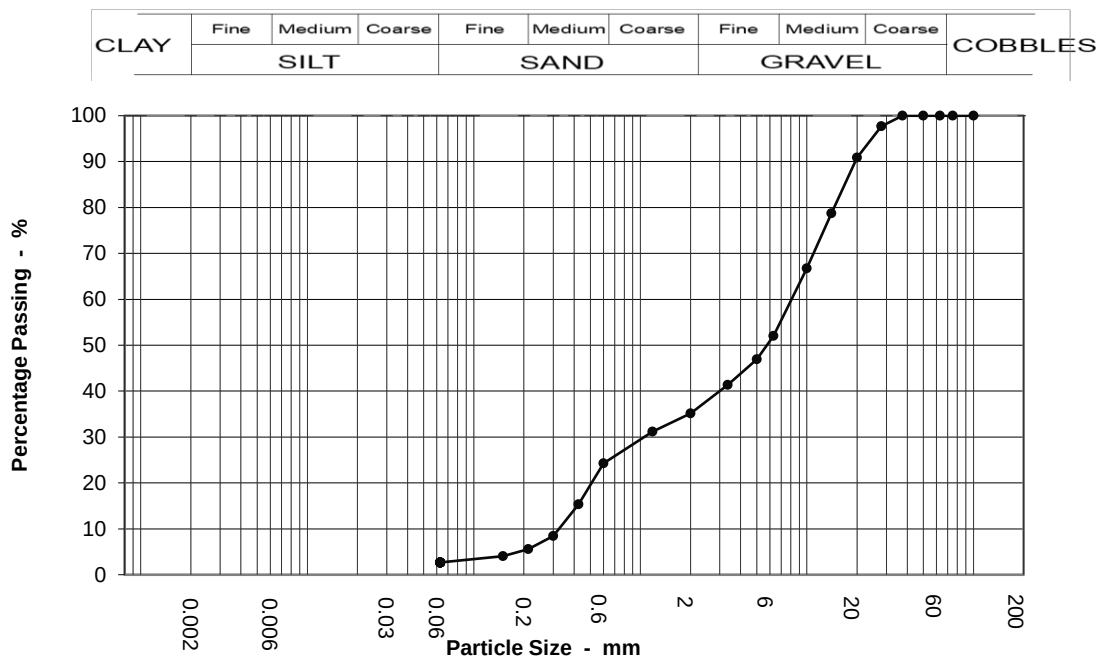
m

Soil Description

Brown very sandy fine to coarse GRAVEL. Sand is fine to coarse

Sample type

B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100		
63	100		
50	100		
37.5	100		
28	98		
20	91		
14	79		
10	67		
6.3	52		
5	47		
3.35	41		
2	35		
1.18	31		
0.6	24		
0.425	15		
0.3	8		
0.212	6		
0.15	4		
0.063	3		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	N/A

Sample Proportions	
Cobbles	0.0
Gravel	64.8
Sand	32.5
Silt & Clay	2.7

Grading Analysis	
D100	37.5
D60	8.308
D10	0.328
Uniformity Coefficient	25

Operator

Checked

Approved

Remarks

STP

CSS

CSS



PARTICLE SIZE DISTRIBUTION

BS 1377 : Part 2 : 1990 : Clause 9

Job Ref

12230

Borehole / Pit
No

WS 4

Project

Down Lane Park

Sample No

Depth

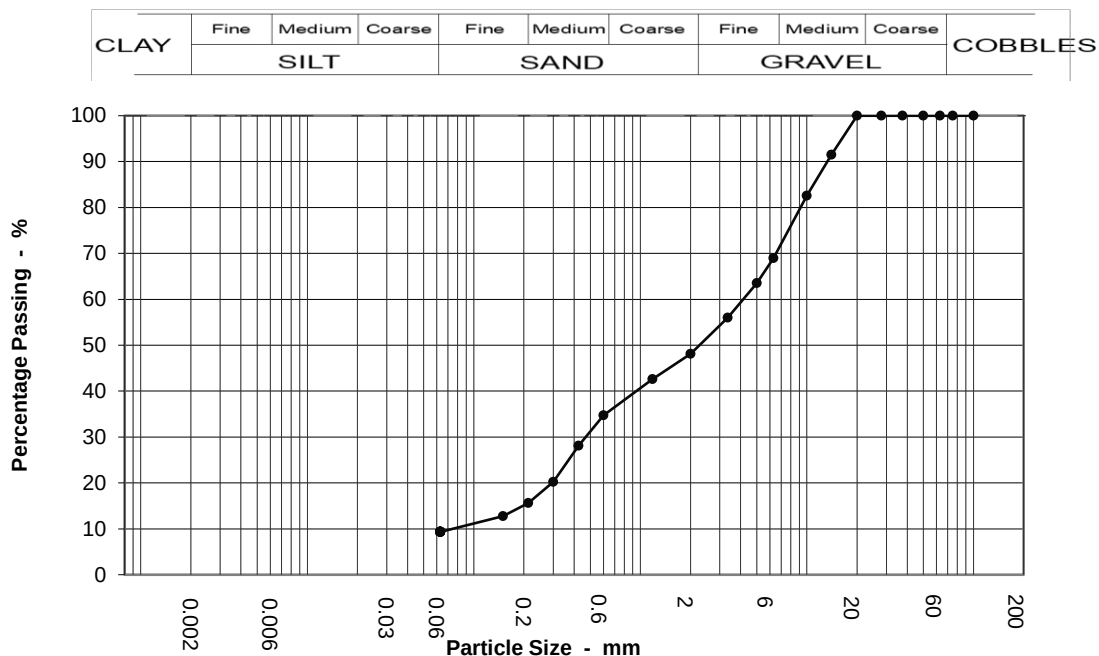
3.1-3.5 m

Soil Description

Brown very sandy fine to medium GRAVEL. Sand is fine to coarse

Sample type

D



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	92		
10	83		
6.3	69		
5	64		
3.35	56		
2	48		
1.18	43		
0.6	35		
0.425	28		
0.3	20		
0.212	16		
0.15	13		
0.063	9		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	N/A

Sample Proportions	
Cobbles	0.0
Gravel	51.9
Sand	38.8
Silt & Clay	9.3

Grading Analysis	
D100	20.0
D60	4.222
D10	0.080
Uniformity Coefficient	53

Operator

Checked

Approved

Remarks

STP

CSS

CSS



APPENDIX 8
ANALYTICAL TEST RESULTS



Paolo Di Pasquale
Ground & Environmental Services Ltd
Unit 2
Montpelier Business Park
Dencora Way
Ashford
Kent
TN23 4FG

DETS Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 19-11100

Site Reference: Down Lane Park, Park View Road, Tottenham Hale, London

Project / Job Ref: 12230

Order No: GES/3658.12230

Sample Receipt Date: 05/08/2019

Sample Scheduled Date: 05/08/2019

Report Issue Number: 1

Reporting Date: 12/08/2019

Authorised by:

A handwritten signature in black ink, appearing to read "Dave Ashworth".

Dave Ashworth
Technical Manager

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Soil Analysis Certificate						
DETS Report No: 19-11100	Date Sampled	31/07/19	31/07/19	31/07/19	31/07/19	31/07/19
Ground & Environmental Services Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Down Lane Park, Park View Road, Tottenham Hale, London	TP / BH No	TP1	TP4	TP5	TP6	TP7
Project / Job Ref: 12230	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GES/3658.12230	Depth (m)	0.60	0.50	0.40	0.50 - 0.70	0.40
Reporting Date: 12/08/2019	DETS Sample No	425640	425641	425642	425643	425644

Determinand	Unit	RL	Accreditation					
Stone Content	%	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix ^(S)	Material Type	N/a	NONE					
Asbestos Type ^(S)	PLM Result	N/a	ISO17025					
pH	pH Units	N/a	MCERTS	7.9	7.4	7.4	7.4	7.4
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	26	< 10	26	44	14
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.03	< 0.01	0.03	0.04	0.01
Organic Matter	%	< 0.1	MCERTS	2.4	2.3	3.4	2.1	3.6
Arsenic (As)	mg/kg	< 2	MCERTS	16	11	20	17	20
Barium (Ba)	mg/kg	< 5	NONE	170	102	229	175	274
Beryllium (Be)	mg/kg	< 0.5	NONE	1	1	1.3	1.1	1.3
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	1.1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	0.5	0.3	0.5
Chromium (Cr)	mg/kg	< 2	MCERTS	20	24	27	22	24
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	61	42	124	70	103
Lead (Pb)	mg/kg	< 3	MCERTS	735	177	581	316	730
Mercury (Hg)	mg/kg	< 1	NONE	3.3	< 1	1.1	< 1	1.2
Nickel (Ni)	mg/kg	< 3	MCERTS	14	15	22	17	19
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
Vanadium (V)	mg/kg	< 2	NONE	38	42	52	41	47
Zinc (Zn)	mg/kg	< 3	MCERTS	159	161	364	224	374
Mineral Oil (C10 - C40)	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	27

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C
Subcontracted analysis (S)



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Soil Analysis Certificate						
DETS Report No: 19-11100	Date Sampled	31/07/19	31/07/19	31/07/19	31/07/19	31/07/19
Ground & Environmental Services Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Down Lane Park, Park View Road, Tottenham Hale, London	TP / BH No	TP9	TP9	TP10	TP11	WS1a
Project / Job Ref: 12230	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GES/3658.12230	Depth (m)	1.00 - 1.20	3.00 - 3.20	0.40 - 0.50	0.40 - 0.50	0.60 - 0.80
Reporting Date: 12/08/2019	DETS Sample No	425645	425646	425647	425648	425649

Determinand	Unit	RL	Accreditation					
Stone Content	%	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Detected	Not Detected	Not Detected	Not Detected
Sample Matrix ^(S)	Material Type	N/a	NONE		Amosite present in bundles			
Asbestos Type ^(S)	PLM Result	N/a	ISO17025		Amosite			
pH	pH Units	N/a	MCERTS	7.5	7.4	7.5	6.8	8.4
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	30	475	30	15	157
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.03	0.48	0.03	0.02	0.16
Organic Matter	%	< 0.1	MCERTS	3.6	3.6	3.4	2	2.6
Arsenic (As)	mg/kg	< 2	MCERTS	16	19	19	11	16
Barium (Ba)	mg/kg	< 5	NONE	248	284	299	100	148
Beryllium (Be)	mg/kg	< 0.5	NONE	1.1	1.1	1.3	0.9	1
W/S Boron	mg/kg	< 1	NONE	1.5	2.4	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.6	0.4	0.6	< 0.2	0.3
Chromium (Cr)	mg/kg	< 2	MCERTS	24	21	23	20	21
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	90	83	115	45	58
Lead (Pb)	mg/kg	< 3	MCERTS	512	593	471	165	267
Mercury (Hg)	mg/kg	< 1	NONE	1.1	1.1	1.3	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	20	20	20	11	14
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
Vanadium (V)	mg/kg	< 2	NONE	42	42	41	38	39
Zinc (Zn)	mg/kg	< 3	MCERTS	353	287	468	148	183
Mineral Oil (C10 - C40)	mg/kg	< 10	MCERTS	24	< 10	< 10	< 10	99

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C
Subcontracted analysis (S)



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Soil Analysis Certificate						
DETS Report No: 19-11100	Date Sampled	31/07/19	31/07/19	31/07/19	31/07/19	31/07/19
Ground & Environmental Services Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Down Lane Park, Park View Road, Tottenham Hale, London	TP / BH No	WS4	WS6	WS7	WS8	Grass Mound Composite
Project / Job Ref: 12230	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GES/3658.12230	Depth (m)	0.30 - 0.40	0.30 - 0.40	0.80 - 1.00	0.30 - 0.40	GL - 4.00
Reporting Date: 12/08/2019	DETS Sample No	425650	425651	425652	425653	425654

Determinand	Unit	RL	Accreditation					
Stone Content	%	< 0.1	NONE	36.3	< 0.1	< 0.1	< 0.1	
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix ^(S)	Material Type	N/a	NONE					
Asbestos Type ^(S)	PLM Result	N/a	ISO17025					
pH	pH Units	N/a	MCERTS	7.8	7.7	7.4	7.2	
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	63	15	12	< 10	
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.06	0.01	0.01	< 0.01	
Organic Matter	%	< 0.1	MCERTS	1.7	2.6	0.7	3.6	
Arsenic (As)	mg/kg	< 2	MCERTS	19	45	9	17	15
Barium (Ba)	mg/kg	< 5	NONE	347	808	86	177	159
Beryllium (Be)	mg/kg	< 0.5	NONE	1.4	3.4	0.6	1.4	0.9
W/S Boron	mg/kg	< 1	NONE	< 1	1	< 1	< 1	1.4
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.3	0.7	< 0.2	0.4	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	17	32	19	21	22
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	
Copper (Cu)	mg/kg	< 4	MCERTS	172	504	29	77	46
Lead (Pb)	mg/kg	< 3	MCERTS	453	992	64	493	279
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	< 1	1.2	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	19	46	11	16	19
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
Vanadium (V)	mg/kg	< 2	NONE	31	55	33	41	41
Zinc (Zn)	mg/kg	< 3	MCERTS	273	721	111	258	184
Mineral Oil (C10 - C40)	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C
Subcontracted analysis (S)



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Soil Analysis Certificate						
DETS Report No: 19-11100	Date Sampled	31/07/19	31/07/19	31/07/19	31/07/19	31/07/19
Ground & Environmental Services Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Down Lane Park, Park View Road, Tottenham Hale, London	TP / BH No	Southern Section Composite	WS1a	WS2	WS3	WS4
Project / Job Ref: 12230	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GES/3658.12230	Depth (m)	GL - 0.50	1.30 - 1.50	1.90 - 2.00	2.60 - 2.80	2.40 - 2.60
Reporting Date: 12/08/2019	DETS Sample No	425655	425656	425657	425658	425659

Determinand	Unit	RL	Accreditation				
Stone Content	%	< 0.1	NONE				
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected			
Sample Matrix ^(S)	Material Type	N/a	NONE				
Asbestos Type ^(S)	PLM Result	N/a	ISO17025				
pH	pH Units	N/a	MCERTS	7.9	7.2	7.2	7.4
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	189	337	217	132
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.19	0.34	0.22	0.13
Organic Matter	%	< 0.1	MCERTS				
Arsenic (As)	mg/kg	< 2	MCERTS	35			
Barium (Ba)	mg/kg	< 5	NONE	604			
Beryllium (Be)	mg/kg	< 0.5	NONE	2.4			
W/S Boron	mg/kg	< 1	NONE	< 1			
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.7			
Chromium (Cr)	mg/kg	< 2	MCERTS	29			
Chromium (hexavalent)	mg/kg	< 2	NONE				
Copper (Cu)	mg/kg	< 4	MCERTS	365			
Lead (Pb)	mg/kg	< 3	MCERTS	1030			
Mercury (Hg)	mg/kg	< 1	NONE	< 1			
Nickel (Ni)	mg/kg	< 3	MCERTS	35			
Selenium (Se)	mg/kg	< 3	NONE	< 3			
Vanadium (V)	mg/kg	< 2	NONE	49			
Zinc (Zn)	mg/kg	< 3	MCERTS	617			
Mineral Oil (C10 - C40)	mg/kg	< 10	MCERTS				

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C
Subcontracted analysis (S)



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 19-11100	Date Sampled	31/07/19	31/07/19	31/07/19	31/07/19	31/07/19
Ground & Environmental Services Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Down Lane Park, Park View Road, Tottenham Hale, London	TP / BH No	TP1	TP4	TP5	TP6	TP7
Project / Job Ref: 12230	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GES/3658.12230	Depth (m)	0.60	0.50	0.40	0.50 - 0.70	0.40
Reporting Date: 12/08/2019	DETS Sample No	425640	425641	425642	425643	425644

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	0.48	< 0.1	0.12	0.12	0.16
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.12	0.24	0.20
Acenaphthene	mg/kg	< 0.1	MCERTS	0.17	< 0.1	< 0.1	0.38	0.23
Fluorene	mg/kg	< 0.1	MCERTS	0.17	< 0.1	0.15	0.42	0.28
Phenanthrene	mg/kg	< 0.1	MCERTS	2.17	0.21	1.40	5.97	5.44
Anthracene	mg/kg	< 0.1	MCERTS	0.48	< 0.1	0.32	1.08	1.44
Fluoranthene	mg/kg	< 0.1	MCERTS	4.31	0.44	3.48	9.52	8.61
Pyrene	mg/kg	< 0.1	MCERTS	3.62	0.39	3.17	8.02	7.19
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	2.05	0.48	1.73	4.09	3.78
Chrysene	mg/kg	< 0.1	MCERTS	1.93	0.20	1.77	3.94	3.68
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	2.18	0.54	2.21	4.99	4.65
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.86	0.21	0.89	1.89	1.71
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	1.92	0.24	1.78	4.68	4.29
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	1.14	0.23	1.27	3.19	2.89
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	0.14	< 0.1	< 0.1	0.34	0.32
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.94	0.26	1.08	2.53	2.32
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	22.6	3.2	19.5	51.4	47.2

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 19-11100	Date Sampled	31/07/19	31/07/19	31/07/19	31/07/19	31/07/19
Ground & Environmental Services Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Down Lane Park, Park View Road, Tottenham Hale, London	TP / BH No	TP9	TP9	TP10	TP11	WS1a
Project / Job Ref: 12230	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GES/3658.12230	Depth (m)	1.00 - 1.20	3.00 - 3.20	0.40 - 0.50	0.40 - 0.50	0.60 - 0.80
Reporting Date: 12/08/2019	DETS Sample No	425645	425646	425647	425648	425649

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	0.24	0.16	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	0.15	0.17	0.17	< 0.1	0.12
Acenaphthene	mg/kg	< 0.1	MCERTS	0.17	0.56	0.17	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	0.18	0.87	0.21	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	2.10	6.73	4	0.18	0.65
Anthracene	mg/kg	< 0.1	MCERTS	0.58	1.75	0.90	< 0.1	0.21
Fluoranthene	mg/kg	< 0.1	MCERTS	5.85	9.83	7.32	0.33	1.66
Pyrene	mg/kg	< 0.1	MCERTS	5.20	8.35	6.27	0.30	1.44
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	2.88	4.60	3.76	0.43	1.02
Chrysene	mg/kg	< 0.1	MCERTS	2.98	3.94	3.50	0.14	0.82
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	4.14	4.63	4.46	0.44	1.29
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	1.55	1.74	1.65	0.17	0.50
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	3.86	4.16	4.03	0.17	1.07
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	2.80	2.33	2.66	0.17	0.90
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	0.34	0.31	0.32	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	2.32	1.71	2.10	0.21	0.87
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	35.1	51.9	41.7	2.5	10.5

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 19-11100	Date Sampled	31/07/19	31/07/19	31/07/19	31/07/19	
Ground & Environmental Services Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Down Lane Park, Park View Road, Tottenham Hale, London	TP / BH No	WS4	WS6	WS7	WS8	
Project / Job Ref: 12230	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: GES/3658.12230	Depth (m)	0.30 - 0.40	0.30 - 0.40	0.80 - 1.00	0.30 - 0.40	
Reporting Date: 12/08/2019	DETS Sample No	425650	425651	425652	425653	

Determinand	Unit	RL	Accreditation				
Naphthalene	mg/kg	< 0.1	MCERTS	0.19	0.22	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	0.31	0.36	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	1.67	1.51	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	1.84	1.24	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	33	26.80	< 0.1	0.19
Anthracene	mg/kg	< 0.1	MCERTS	8.72	4.94	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	41	28.70	< 0.1	0.43
Pyrene	mg/kg	< 0.1	MCERTS	33.20	22.30	< 0.1	0.38
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	16.80	11.60	< 0.1	0.48
Chrysene	mg/kg	< 0.1	MCERTS	14.40	8.37	< 0.1	0.23
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	15.60	8.50	< 0.1	0.57
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	5.64	2.98	< 0.1	0.21
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	13.10	6.19	< 0.1	0.25
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	8.33	2.79	< 0.1	0.27
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	1	0.42	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	5.74	1.85	< 0.1	0.28
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	200	129	< 1.6	3.3

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



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Tel : 01622 850410



Soil Analysis Certificate - EPH Banded (Type D)						
DETS Report No: 19-11100	Date Sampled	31/07/19	31/07/19	31/07/19	31/07/19	31/07/19
Ground & Environmental Services Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Down Lane Park, Park View Road, Tottenham Hale, London	TP / BH No	TP1	TP4	TP5	TP6	TP7
Project / Job Ref: 12230	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GES/3658.12230	Depth (m)	0.60	0.50	0.40	0.50 - 0.70	0.40
Reporting Date: 12/08/2019	DETS Sample No	425640	425641	425642	425643	425644

Determinand	Unit	RL	Accreditation					
EPH (>C8 - C10)	mg/kg	< 1	MCERTS	2	< 1	< 1	< 1	< 1
EPH (>C10 - C12)	mg/kg	< 1	MCERTS	1	< 1	< 1	< 1	< 1
EPH (>C12 - C16)	mg/kg	< 1	MCERTS	4	< 1	2	6	5
EPH (>C16 - C21)	mg/kg	< 1	MCERTS	26	3	21	59	62
EPH (>C21 - C35)	mg/kg	< 6	MCERTS	81	15	63	171	166
EPH (C8 - C35)	mg/kg	< 6	MCERTS	115	18	86	237	234

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



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Soil Analysis Certificate - EPH Banded (Type D)						
DETS Report No: 19-11100	Date Sampled	31/07/19	31/07/19	31/07/19	31/07/19	31/07/19
Ground & Environmental Services Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Down Lane Park, Park View Road, Tottenham Hale, London	TP / BH No	TP9	TP9	TP10	TP11	WS1a
Project / Job Ref: 12230	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GES/3658.12230	Depth (m)	1.00 - 1.20	3.00 - 3.20	0.40 - 0.50	0.40 - 0.50	0.60 - 0.80
Reporting Date: 12/08/2019	DETS Sample No	425645	425646	425647	425648	425649

Determinand	Unit	RL	Accreditation					
EPH (>C8 - C10)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
EPH (>C10 - C12)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
EPH (>C12 - C16)	mg/kg	< 1	MCERTS	4	12	5	< 1	10
EPH (>C16 - C21)	mg/kg	< 1	MCERTS	37	78	57	1	51
EPH (>C21 - C35)	mg/kg	< 6	MCERTS	147	163	201	9	95
EPH (C8 - C35)	mg/kg	< 6	MCERTS	188	254	264	10	155

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



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Soil Analysis Certificate - EPH Banded (Type D)						
DETS Report No: 19-11100	Date Sampled	31/07/19	31/07/19	31/07/19	31/07/19	
Ground & Environmental Services Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Down Lane Park, Park View Road, Tottenham Hale, London	TP / BH No	WS4	WS6	WS7	WS8	
Project / Job Ref: 12230	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: GES/3658.12230	Depth (m)	0.30 - 0.40	0.30 - 0.40	0.80 - 1.00	0.30 - 0.40	
Reporting Date: 12/08/2019	DETS Sample No	425650	425651	425652	425653	

Determinand	Unit	RL	Accreditation				
EPH (>C8 - C10)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1
EPH (>C10 - C12)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1
EPH (>C12 - C16)	mg/kg	< 1	MCERTS	23	23	< 1	< 1
EPH (>C16 - C21)	mg/kg	< 1	MCERTS	256	161	< 1	4
EPH (>C21 - C35)	mg/kg	< 6	MCERTS	503	243	< 6	21
EPH (C8 - C35)	mg/kg	< 6	MCERTS	782	427	< 6	26

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3

DETS Report No: 19-11100		Date Sampled	31/07/19			Landfill Waste Acceptance Criteria Limits		
Ground & Environmental Services Ltd		Time Sampled	None Supplied			Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Site Reference: Down Lane Park, Park View Road, Tottenham Hale, London		TP / BH No	Southern Section Composite					
Project / Job Ref: 12230		Additional Refs	None Supplied					
Order No: GES/3658.12230		Depth (m)	GL - 0.50					
Reporting Date: 12/08/2019		DETS Sample No	425655					
Determinand	Unit	MDL						
TOC ^{MU}	%	< 0.1	1.7			3%	5%	6%
Loss on Ignition	%	< 0.01	4.60			--	--	10%
BTEX ^{MU}	mg/kg	< 0.05	< 0.05			6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1			1	--	--
Mineral Oil ^{MU}	mg/kg	< 10	< 10			500	--	--
Total PAH ^{MU}	mg/kg	< 1.7	40.4			100	--	--
pH ^{MU}	pH Units	N/A	7.3			--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	< 1			--	To be evaluated	To be evaluated
Eluate Analysis			2:1 mg/l	8:1 mg/l		Cumulative 10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)	
Arsenic ^U		< 0.01	< 0.01		< 0.2	0.5	2	25
Barium ^U		< 0.02	< 0.02		0.1	20	100	300
Cadmium ^U		< 0.0005	< 0.0005		< 0.02	0.04	1	5
Chromium ^U		< 0.005	< 0.005		< 0.20	0.5	10	70
Copper ^U		0.02	0.01		< 0.5	2	50	100
Mercury ^U		< 0.005	< 0.005		< 0.01	0.01	0.2	2
Molybdenum ^U		0.016	0.006		< 0.1	0.5	10	30
Nickel ^U		< 0.007	< 0.007		< 0.2	0.4	10	40
Lead ^U		< 0.005	< 0.005		< 0.2	0.5	10	50
Antimony ^U		0.019	0.010		0.11	0.06	0.7	5
Selenium ^U		< 0.005	< 0.005		< 0.1	0.1	0.5	7
Zinc ^U		< 0.005	< 0.005		< 0.2	4	50	200
Chloride ^U		3	2		17	800	15000	25000
Fluoride ^U		1.1	0.7		7.3	10	150	500
Sulphate ^U		11	4		41	1000	20000	50000
TDS		127	79		829	4000	60000	100000
Phenol Index		< 0.01	< 0.01		< 0.5	1	-	-
DOC		10.6	7.9		81.2	500	800	1000
Leach Test Information								
Sample Mass (kg)		0.19						
Dry Matter (%)		92.4						
Moisture (%)		8.2						
Stage 1								
Volume Eluate L2 (litres)		0.34						
Filtered Eluate VE1 (litres)		0.14						

Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and DETS Ltd cannot be held responsible for any discrepancies with current legislation
 M Denotes MCERTS accredited test
 U Denotes ISO17025 accredited test



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Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 19-11100	
Ground & Environmental Services Ltd	
Site Reference: Down Lane Park, Park View Road, Tottenham Hale, London	
Project / Job Ref: 12230	
Order No: GES/3658.12230	
Reporting Date: 12/08/2019	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
425640	TP1	None Supplied	0.60	9.8	Brown sandy clay with stones
425641	TP4	None Supplied	0.50	8.4	Brown sandy clay with stones
425642	TP5	None Supplied	0.40	17.9	Black loamy sand with stones
425643	TP6	None Supplied	0.50 - 0.70	5.8	Brown sandy gravel with stones and concrete
425644	TP7	None Supplied	0.40	7.2	Brown sandy gravel with stones and concrete
425645	TP9	None Supplied	1.00 - 1.20	6.3	Brown sandy clay with brick and concrete
425646	TP9	None Supplied	3.00 - 3.20	12.8	Brown sandy clay with brick
425647	TP10	None Supplied	0.40 - 0.50	5.8	Brown sandy gravel with brick and concrete
425648	TP11	None Supplied	0.40 - 0.50	6.1	Brown sandy clay with stones
425649	WS1a	None Supplied	0.60 - 0.80	7.7	Brown sandy clay with stones and concrete
425650	WS4	None Supplied	0.30 - 0.40	4.1	Brown sandy gravel with stones and concrete
425651	WS6	None Supplied	0.30 - 0.40	4.4	Brown sandy gravel with stones and concrete
425652	WS7	None Supplied	0.80 - 1.00	7.3	Brown sandy clay
425653	WS8	None Supplied	0.30 - 0.40	6.3	Brown sandy clay with stones
425654	Grass Mound Composite	None Supplied	GL - 4.00	14.3	Brown loamy sand with stones
425655	Southern Section Composite	None Supplied	GL - 0.50	7.6	Brown sandy clay with stones
425656	WS1a	None Supplied	1.30 - 1.50	22.4	Brown loamy clay
425657	WS2	None Supplied	1.90 - 2.00	11.2	Brown loamy sand
425658	WS3	None Supplied	2.60 - 2.80	13.7	Brown sandy clay
425659	WS4	None Supplied	2.40 - 2.60	15.9	Brown loamy sand

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample ^{I/S}

Unsuitable Sample ^{U/S}



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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 19-11100

Ground & Environmental Services Ltd

Site Reference: Down Lane Park, Park View Road, Tottenham Hale, London

Project / Job Ref: 12230

Order No: GES/3658.12230

Reporting Date: 12/08/2019

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO ₄) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO ₄) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO ₄) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCS	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received



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DETS Report No: 19-11518

Site Reference: Down Lane Park, Park View Road, Tottenham Hale, London

Project / Job Ref: 12230

Order No: None Supplied

Sample Receipt Date: 12/08/2019

Sample Scheduled Date: 12/08/2019

Report Issue Number: 1

Reporting Date: 16/08/2019

Authorised by:

A handwritten signature in black ink, appearing to read "Dave Ashworth".

Dave Ashworth
Technical Manager

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Soil Analysis Certificate						
DETS Report No: 19-11518	Date Sampled	31/07/19				
Ground & Environmental Services Ltd	Time Sampled	None Supplied				
Site Reference: Down Lane Park, Park View Road, Tottenham Hale, London	TP / BH No	TP9				
Project / Job Ref: 12230	Additional Refs	None Supplied				
Order No: None Supplied	Depth (m)	3.00 - 3.20				
Reporting Date: 16/08/2019	DETS Sample No	427232				

Determinand	Unit	RL	Accreditation				
Asbestos Quantification ^(S)	%	< 0.001	ISO17025	0.002			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C
Subcontracted analysis (S)



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Soil Analysis Certificate - Methodology & Miscellaneous Information	
DETS Report No: 19-11518	
Ground & Environmental Services Ltd	
Site Reference: Down Lane Park, Park View Road, Tottenham Hale, London	
Project / Job Ref: 12230	
Order No: None Supplied	
Reporting Date: 16/08/2019	

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received



APPENDIX 9
GUIDELINES ON CONTAMINANT LEVELS

Guidelines on Contamination Levels.

Human Health

CLEA Soil Guideline values (SGV)

The UK's primary contaminated land guidance is contained within the Contaminated Land Exposure Assessment (CLEA) framework. Within this framework a number of Soil Guideline Values (SGVs) were published for key contaminants along with toxicological guideline values relating to intake thresholds. The soil guideline values provided by the CLEA model represent intervention values for end uses based upon potential human exposure and soil concentrations of a contaminant above these values might represent an unacceptable risk to the health of the site users. The Environment Agency had an ongoing programme of SGV publication with associated toxicological information for key contaminants. Where SGVs are available then they should be used as the basis for any human health risk assessment.

All CLEA SGVs were withdrawn for use by the Environment Agency in 2008 whilst they are under review and pending the availability of new toxicological data. To date, new SGV values have been set for benzene, toluene, ethylbenzene and xylene and mercury and selenium. In the absence of the new SGVs and toxicological report data, GES have used appropriate screening tools or Generic Assessment Criteria Levels as assessment criteria guidelines for those determinands not currently assigned SGVs. It should be noted that the former SGVs for metals were in general agreement with those site specific levels generated by RBCA and other similar computer model based risk assessment tools.

The GES screening assessment of contaminants within samples has been carried out using these model generated values in the absence of any other values or guidelines. The version of the CLEA model, v1.06, was used. The published SGVs are shown below. Nickel SGV has been withdrawn (2015) pending an assessment of the toxicological data used in the model for nickel. Published SGV values:

Land use	Soil Guideline Value (mg kg ⁻¹)		
	Residential	Allotment	Commercial
Inorganic arsenic	32	43	640
Nickel	130	230	1,800
Cadmium	10	1.8	230
Phenol	420	280	3200
Elemental Hg	1	26	26
Inorganic Hg	170	80	3600
Methyl Hg	11	8	410
Selenium	350	120	13,000
Benzene	0.33	0.07	95
Toluene	610	120	4400
Ethylbenzene	350	90	2800
o-Xylene	250	160	2600
r-Xylene	240	180	3500
m-Xylene	230	160	3200

Based on a sandy loam soil as defined in Environment Agency (2009b) and 6% SOM.

Guidelines on Contamination Levels.

DEFRA Category four screening level (C4SL)

In addition to the SGVs, guideline screening values proposed in the DEFRA document SP1010-Development of Category 4 Screening Levels for Assessment of Land affected by Contamination Final Project Report (C4SL) are considered along with the suitable for use levels (S4USL) derived by the Chartered Institute of Environmental Health (CIEH) in partnership with the Land Quality Management Organization (LQM). The screening levels are given for residential, commercial, allotment or public open space end uses.

PARAMETER	Residential		Commercial	Allotment	Public open Space near residential POS _{resi}	Public park land POS _{park}	Sources
	With Plant uptake	Without Plant uptake					
Inorganics - mg/kg unless stated							
Arsenic (inorganic)	37	40	640	49	79	170	DEFRA C4SL
Beryllium	1.7	1.7	12	35	2.2	63	LQM/S4USL
Boron	290	11,000	240,000	45	21,000	46,000	LQM/CIEH
Cadmium	22	150	410	3.9	220	880	LQM/S4USL
Chromium III	910	910	8,600	18,000	1,500	33,000	LQM/CIEH
Chromium VI	21	21	49	170	21	250	LQM/S4USL
Copper	2,400	7,100	68,000	520	12,000	44,000	LQM/CIEH
lead	200	310	2,300	80	630	1,300	DEFRA C4SL
Mercury (Inorganic)	40	56	1,100	19	120	240	LQM/CIEH
Nickel	180	180	980	230	230	3,400	LQM/CIEH
Selenium	250	430	12,000	88	1,100	1,800	LQM/CIEH
Vanadium	410	1,200	9,000	91	2,000	5,000	LQM/CIEH
Zinc	3,700	40,000	730,000	620	81,000	170,000	LQM/CIEH
Total sulphate	2400	2400	2400	2400	2400	2400	BRE (2005)
Water-soluble sulphate (g/l)	0.5	0.5	0.5	0.5	0.5	0.5	BRE (2005)
pH	<5	<5	<5	<5	<5	<5	-

CLEA does not currently provide guidance for total Polycyclic Aromatic Hydrocarbons (PAHs). A standalone Defra C4SL for benzo(a)pyrene has been assigned and is shown below. In addition, the Chartered Institute of Environmental Health (CIEH) in partnership with the Land Quality Management Organization (LQM) used CLEA software to derive Generic Assessment Criteria (GAC) and Assessment Sub Criteria (ASC) for the following PAH compounds.



Guidelines on Contamination Levels.

PARAMETER	Residential						Commercial			Allotment			PO S resi	PO S park	Source
	With Plant uptake			Without Plant uptake											
	SOM %	1	2.5	6	1	2.5	6	1	2.5	6	1	2.5			
Organics - mg/kg unless stated															
Acenaphthene	200	490	1080	2000	3600	5200	75000	92000	100000	34	85	202			CLEA/LQM CIEH
Acenaphthylene	170	400	900	2000	3600	5200	76000	92000	100000	28	68	163			CLEA/LQM CIEH
Anthracene	2300	5400	10700	30000	34000	36000	520000	530000	540000	380	947	2230			CLEA/LQM CIEH
Benzo(a)anthracene	7.5	11	13	12	14	15	170	170	180	2.9	6.5	13			CLEA/LQM CIEH
Benzo(a)pyrene C4SL			5			5.3			77			5.7	10	21	DEFRA C4SL
Benzo(a)pyrene	2.2	2.7	3	3.2	3.2	3.2	3.6	3.7	3.7	35	35	36			CLEA/LQM CIEH
Benzo(b)fluoranthene	2.6	3.3	3.7	3.9	4	4	44	45	45	1	2.2	3.9			CLEA/LQM CIEH
Benzo(g,h,i)perylene	315	340	350	360	360	360	3900	4000	4000	290	480	646			CLEA/LQM CIEH
Benzo(k)fluoranthene	77	93	100	110	110	110	1200	1200	1200	37	76	129			CLEA/LQM CIEH
Chrysene	15	22	27	30	31	32	350	350	350	4.1	9.5	19			CLEA/LQM CIEH
Dibenzo(a,h)anthracene	0.24	0.28	0.3	0.31	0.32	0.32	3.5	3.6	3.6	0.14	0.27	0.44			CLEA/LQM CIEH
Fluoranthene	280	560	890	1500	1600	1600	23000	23000	23000	52	127	288			CLEA/LQM CIEH
Fluorene	165	390	850	2200	3400	4200	60000	67000	70000	27	67	158			CLEA/LQM CIEH
Indeno(1,2,3-cd)pyrene	27	36	41	45	46	46	500	510	510	9.5	21	40			CLEA/LQM CIEH
Naphthalene	1	2.3	5.5	1	2.4	6	100	260	600	4	9.8	23			CLEA/LQM CIEH
Phenanthrene	95	220	440	1300	1400	1500	22000	22000	23000	15	38	90			CLEA/LQM CIEH
Pyrene	620	1200	2000	3700	3800	3800	54000	54000	55000	11	271	620			CLEA/LQM CIEH

Petroleum Hydrocarbons represent a complex situation being a mixture of a range of compounds, the relative concentrations of which may change over time.

As discussed above, Generic Assessment Criteria (GAC) for total petroleum hydrocarbons according to both their molecular weight and chemical structure and also for a range of soil organic matter (SOM) content values have been derived using CLEA software.

The LQM CIEH GACs are again presented according to their soil organic matter content and proposed end use of the land. The generic assessment criteria for a 1%, 2.5% and 6% SOM content are tabulated below and presented according to the proposed end use.



Guidelines on Contamination Levels.

	LQM CIEH Generic Assessment Criteria (mg/kg dry weight soil)													
	Residential						Allotment Land Use			Commercial Land Use				
	With Plant Uptake			Without Plant Uptake										
SOM %	1	2.5	6	1	2.5	6	1	2.5	6	1	2.5	6		
Aliphatic														
EC 5 – 6	24	40	80	24	40	80	752	1730	3900	2400	4000	8000		
EC > 6 – 8	52	110	250	52	110	250	2304	5580	13000	5200	11000	25000		
EC > 8 – 10	13	30	70	13	30	70	321	770	1700	1300	3000	7000		
EC > 10 – 12	60	150	360	60	150	360	2153	4300	7150	6000	15000	32000		
EC > 12 – 16	500	1200	2600	500	1200	2600	10800	12400	13200	42000	72000	90000		
EC > 16 – 35	41000	69000	94000	41000	69000	94000	240000	260000	260000	140000	160000	180000		
EC > 35 – 44	41000	69000	94000	41000	69000	94000	240000	260000	260000	140000	160000	180000		
Aromatic														
EC 5 – 7 (benzene)	50	110	240	155	300	630	12	25	57	15000	28000	55000		
EC > 7 – 8 (toluene)	100	240	550	370	800	1800	21	50	117	33000	68000	130000		
EC > 8 – 10	20	50	110	20	53	125	8.6	21	50	2000	5000	120000		
EC > 10 – 12	63	150	340	120	280	650	12.5	31	74	11000	22000	31000		
EC > 12 – 16	140	320	660	1100	1900	2300	23	57	134	35000	37000	38000		
EC > 16 – 21	260	540	930	1800	1900	1900	47	112	260	28000	28000	28000		
EC > 21 – 35	1100	1400	1700	1900	1900	1900	370	820	1500	28000	28000	28000		
EC > 35 – 44	1100	1400	1700	1900	1900	1900	370	820	1500	28000	28000	28000		
													POS _{resi}	POS _{park}
Benzene DEFRA C4SL	0.06	0.13	0.3 (0.87)	0.16	0.3	0.64 (3.3)	0.016	0.033	0.073 (0.18)	15	28	57 (98)	140	230
Toluene	104	240	550	370	830	1800	22	50	117	33000	68000	130000		
Ethylbenzene	30	62	150	34	81	190	16	38	91	3200	7000	16000		
o-xylene	30	70	170	40	90	200	28	67	160	3700	8000	19000		
m-xylene	30	70	160	34	80	190	30	74	170	3400	8000	18000		
p-xylene	30	70	160	33	80	180	28	69	160	3200	8000	17000		

TPH values calculated using CLEA v1.06 with parameter changes in accord with DEFRA (2014) C4SL and LQM/CIEH (2015)

Guidelines on Contamination Levels.

Risks to Plants

The CLEA framework does not provide a method for the assessment of phytotoxic risks to plants. However maximum permissible concentrations have been published in the Sludge (Use in Agriculture) Regulations 1989 (SI 1989, No. 1263). This legislation enforces the provisions of the EC Directive 86/278/EEC for potentially toxic elements (PTEs) on soils for agricultural use where sewage sludge has been applied (see table below). These limits relate to the potential risk to plants and not human health for which CLEA is the overriding risk assessment model.

Maximum permissible concentration in agricultural soils following sewage sludge application (mg/kg).				
	pH 5.0<5.5	pH 5.5<6.0	pH 6.0-7.0	pH >7.0
Zinc	200	250	300	450
Copper	80	100	135	200
Nickel	50	60	75	110

Risks to buried concrete

The potential risks to buried concrete can be assessed by reference to the BRE Special Digest 1 (SD1) entitled 'Concrete in Aggressive Ground'. This document provides a methodology for the specification of concrete based on the ground conditions encountered and is based upon chemical analysis and associated factors (e.g. groundwater). The guidance provides a Design Sulphate Class (DS) based upon the ground conditions and it is considered that a low concentration of sulphate and pH (i.e. DS – 1 and DS – 2) is considered to represent a low risk to buildings.

Risks to buried services

In addition, where water is supplied in plastic pipes which could come into contact with contaminated ground then this can lead to premature failures, resulting in leakage and loss of water quality. Risks to water supply pipes are assessed using guidance published by the UK Water Industry Research (UKWIR) entitled '*Guidance for the Selection of Water Pipes to be used in Brownfield Sites*' (Report Ref. No. 10/WM/03/21). This is known as the UKWIR guidance.

Previous guidance from WRAS has been withdrawn but may still be in use by certain water supply companies. In general water companies have adopted a common set of guidelines as given in the ***Contaminated Land Assessment Guidance from January 2014***.

Guidelines on Contamination Levels.

Additional threshold values for determining pipe material have also been published by certain water supply companies. If these threshold values are exceeded then consideration should be given to the selection of pipe material or to the use of barrier pipes. The UKWIR threshold values, together with those of certain water supply companies are presented in the table below for a range of potential hazards.

Substance ⁽¹⁾	Water UK Guidance	Thames Water
Total VOC	0.5	-
Total BTEX & MTBE	0.1	0.1 of either
Total SVOC	2	-
EC5-EC10 aliphatic and aromatic hydrocarbons	2	-
EC5-EC12 aliphatic hydrocarbons		0.5
EC5-EC12 aromatic hydrocarbons		0.5
EC10-EC16 aliphatic and aromatic hydrocarbons	10	-
EC12-EC21 aliphatic hydrocarbons		10
EC12-EC21 aromatic hydrocarbons		10
EC16-EC40 aliphatic and aromatic hydrocarbons	500	-
EC21-EC35 aliphatic hydrocarbons		500
EC21-EC35 aromatic hydrocarbons		500
Phenols	2	5*
Cresols and chlorinated phenols	2	2
Naphthalene	-	5
Ethers	0.5	-
Nitrobenzene	0.5	-
Ketones	0.5	-
Aldehydes	0.5	-
Amines	0	-
Corrosives pH and EC	#	
	##	

All units mg kg⁻¹ in soil;

pH <7 for wrapped steel, pH <5 wrapped ductile iron and copper and ##EC >400µS/cm;

*Phenol limit at 2mg/kg in presence of BTEX.



APPENDIX 10

PAH SOURCE INDICATOR RATIO SHEET

Potential Sources of PAH Contamination Based on PAH Ratios

