APPENDIX 5

Exploratory Hole Logs

GeoInvestigations
29 Greenlands Business Centre
Studley Road
Redditch
B98 7HD
paul@geoinvestigations.co.uk

Borehole Logging Record :WS1

GeoInvestigations

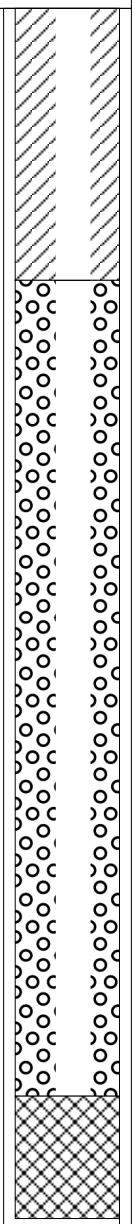
DRILLING DETAILS
Drilling Company: Exploration Ltd
Drilling Method: WS

Drilling Date: 7th July 2017
Location: Land North of Holbeach Road
Ground Elevation: (mAMSL)

Drilled Depth: (mBGL)
Bore Diameter: (mm)
TOC Elevation: (mAGL)

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	SPT (blows/300mm)	In Situ/ Lab Test
32		0.00		MG Brown, fine to coarse sandy gravel. Gravel is fine to coarse, angular concrete and limestone.		
WAC33		0.50		MG Dark brown, silty, slightly gravelly fine sand. Gravel is fine, angular brick and slate with frequent very thin black organic lenses.		
34		1.00		Medium dense, brown, silty, fine SAND. Becoming slightly clayey below 1.8m bgl. Wet below 1.0m bgl.		2,2,2,3,2,3 (10)
35		2.00		Very soft, brown, silty, slightly fine sandy CLAY.		0,0,0,0,1,2 (3)
36		2.50		Medium dense, brown, silty, fine SAND. Wet.		4,4,4,3,2,1 (10)
		3.00				
		3.50				
		4.00				4,4,5,4,4,4 (17)
		4.50				
		5.00				

Piezometer Construction Details And Groundwater Levels



Groundwater Observations:

Sample tubes wet below 1.0m. Standing water level at 1.92m bgl on 7th July 2017

GeoInvestigations
29 Greenlands Business Centre
Studley Road
Redditch
B98 7HD
paul@geoinvestigations.co.uk

Borehole Logging Record :WS2

GeoInvestigations

DRILLING DETAILS

Drilling Company: Exploration Ltd

Drilling Method: WS

Drilling Date: 7th July 2017

Location: Land North of Holbeach Road

Ground Elevation: (mAMSL)

Drilled Depth: (mBGL)

Bore Diameter: (mm)

TOC Elevation: (mAGL)

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	SPT (blows/300mm)	In Situ/ Lab Test	Piezometer Construction Details And Groundwater Levels
		0.00		MG Yellowish brown, fine to coarse sandy gravel. Gravel is fine to coarse, angular concrete, flint and limestone.			
38		0.50		MG Black mottled red, clayey, fine to medium, angular brick, ash, siltstone, flint and concrete. Dead electrical cable intercepted at 0.5m bgl.			
WAC37				MG Grey, fine to coarse, angular concrete gravel.			
39		1.00		Loose, brown, silty, fine SAND.		2,2,1,2,2,3 (8)	
42		1.50		Firm, grey mottled brown, silty, fine sandy CLAY.			
40		2.00				0,0,2,2,1,2 (7)	
43		2.50		Medium dense, brown, silty, fine to medium SAND. Wet.			
		3.00				0,0,4,3,4,2 (13)	
41		3.50					
		4.00				4,5,4,4,3,3 (14)	
		4.50					
		5.00					

Groundwater Observations:

Sample tubes wet below 2.50m.

GeoInvestigations
29 Greenlands Business Centre
Studley Road
Redditch
B98 7HD
paul@geoinvestigations.co.uk

Borehole Logging Record :WS3

GeoInvestigations

DRILLING DETAILS

Drilling Company: Exploration Ltd

Drilling Method: WS

Drilling Date: 7th July 2017

Location: Land North of Holbeach Road

Ground Elevation: (mAMSL)

Drilled Depth: (mBGL)

Bore Diameter: (mm)

TOC Elevation: (mAGL)

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	SPT (blows/300mm)	In Situ/ Lab Test
44		0.00		MG Grass over brown, slightly clayey, silty, fine sand. One gravel of brick at 0.6m bgl. Frequent roots and rootlets.		
		0.50				
45		1.00		Loose, brown, silty, fine SAND. Wet below 1.4m bgl.		2,2,1,1,3,2 (7)
		1.50				
		2.00				
				Soft, brown, silty, slightly fine sandy CLAY. Damp.		0,2,1,2,2,3 (8)
46		2.50		Medium dense, greyish brown, silty, fine SAND. Wet.		
		3.00				0,1,3,2,3,2 (10)
		3.50				
47		4.00				2,2,3,4,4,5 (16)
		4.50				
		5.00				

Piezometer Construction Details And Groundwater Levels

Groundwater Observations:

Sample tubes wet below 1.40m. Standing water level at 1.91m bgl on 7th July 2017

GeoInvestigations
29 Greenlands Business Centre
Studley Road
Redditch
B98 7HD
paul@geoinvestigations.co.uk

Borehole Logging Record :WS4

GeoInvestigations

DRILLING DETAILS

Drilling Company: Exploration Ltd

Drilling Method: WS

Drilling Date: 7th July 2017

Location: Land North of Holbeach Road

Ground Elevation: (mAMSL)

Drilled Depth: (mBGL)

Bore Diameter: (mm)

TOC Elevation: (mAGL)

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	SPT (blows/300mm)	In Situ/ Lab Test	Piezometer Construction Details And Groundwater Levels
48		0.00		Grass over dark brown, silty, fine SAND. Frequent rootlets. (TOPSOIL?)			
		0.50		Loose, brown, silty, fine SAND. Upper 200mm of strata are highly dessicated.			
49		1.00				2,2,2,2,2,2 (8)	
		1.50					
		2.00		Very loose, orangish brown mottled grey, slightly clayey, silty, fine SAND.		0,0,0,1,1,1 (3)	
50		2.50					
		3.00		Very loose, greyish brown, silty, fine SAND. Wet. Becoming medium dense below 4.0m bgl.		0,0,0,0,0,1 (1)	
		3.50					
51		4.00				0,0,2,3,4,4 (13)	
		4.50					
		5.00					

Groundwater Observations:

Sample tubes wet below 2.80m. Standing water level at 1.61m bgl on 7th July 2017

GeoInvestigations
29 Greenlands Business Centre
Studley Road
Redditch
B98 7HD
paul@geoinvestigations.co.uk

Borehole Logging Record :WS5

GeoInvestigations

DRILLING DETAILS
Drilling Company: Exploration Ltd
Drilling Method: WS

Drilling Date: 7th July 2017
Location: Land North of Holbeach Road
Ground Elevation: (mAMSL)

Drilled Depth: (mBGL)
Bore Diameter: (mm)
TOC Elevation: (mAGL)

Sample Reference	Sample Range	Depth (mBGL)	Soil or Rock Field Material Description	SPT (blows/300mm)	In Situ/ Lab Test
52		0.00	Dark brown, silty, fine SAND. Frequent rootlets. (TOPSOIL?)		
		0.50	Brown, silty, fine SAND. Occasional roots to 0.5m bgl.		
		1.00	Soft to firm, grey, silty CLAY.		2,3,3,2,2,2 (9)
53		1.50	Soft, brown, silty, slightly fine sandy CLAY		
		2.00			
		2.50	Loose, brown, silty, fine SAND.		2,3,1,1,2,1 (5)
		3.00			
54		3.50	Loose, grey mottled brown, slightly shelly, fine to medium SAND. Wet.		0,1,2,2,1,1 (6)
		4.00			0,0,0,1,3,4 (8)
		4.50			
		5.00			

SPT (blows/300mm) scale: 0 10 20 30 40 50 60 90

Piezometer Construction Details And Groundwater Levels

Groundwater Observations:

Sample tubes wet below 3.1m. Standing water level at 1.60m bgl on 7th July 2017

GeoInvestigations
29 Greenlands Business Centre
Studley Road
Redditch
B98 7HD
paul@geoinvestigations.co.uk

Borehole Logging Record :WS6

GeoInvestigations

DRILLING DETAILS

Drilling Company: Exploration Ltd

Drilling Method: WS

Drilling Date: 7th July 2017

Location: Land North of Holbeach Road

Ground Elevation: (mAMSL)

Drilled Depth: (mBGL)

Bore Diameter: (mm)

TOC Elevation: (mAGL)

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	SPT (blows/300mm)	In Situ/ Lab Test	Piezometer Construction Details And Groundwater Levels
55		0.00		Grass over dark brown, silty, fine SAND. Frequent rootlets.(TOPSOIL?)			
		0.50		Brown, silty, fine SAND			
		1.00		Firm, brown, silty, slightly fine sandy CLAY		2,2,2,3,3,2 (10)	
57		1.50					
		2.00					
		2.50		Loose, greyish brown, silty, fine SAND. Becoming very loose at 3.0m; medium dense below 4.0m.		0,1,2,2,2,2 (8)	
B56		3.00				0,0,1,1,1,1 (4)	
		3.50					
		4.00				0,0,2,3,4,4 (13)	
		4.50					
		5.00					

Groundwater Observations:

No groundwater observed upon completion.

GeoInvestigations
29 Greenlands Business Centre
Studley Road
Redditch
B98 7HD
paul@geoinvestigations.co.uk

Borehole Logging Record :WS7

GeoInvestigations

DRILLING DETAILS

Drilling Company: Exploration Ltd

Drilling Method: WS

Drilling Date: 7th July 2017

Location: Land North of Holbeach Road

Ground Elevation: (mAMSL)

Drilled Depth: (mBGL)

Bore Diameter: (mm)

TOC Elevation: (mAGL)

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	SPT (blows/300mm)	In Situ/ Lab Test	Piezometer Construction Details And Groundwater Levels
		0.00		Grass over dark brown, silty, fine SAND.			
58							
WAC59		0.50		Brown, silty, fine SAND.			
		1.00					
				Firm, orangish brown mottled grey, silty CLAY		3,1,2,2,1,1 (6)	
60		1.50					
		2.00					
				Loose, brown, slightly clayey, silty, fine SAND.		2,2,2,2,2,2 (8)	
61		2.50					
		3.00					
				Medium dense, brown, fine SAND		3,2,1,2,2,2 (7)	
		3.50					
		4.00				0,0,3,3,2,4	
		4.50					
		5.00					

Groundwater Observations:

No groundwater observed upon completion. Standing water level at 1.60m bgl on 7th July 2017

GeoInvestigations
29 Greenlands Business Centre
Studley Road
Redditch
B98 7HD
paul@geoinvestigations.co.uk

Borehole Logging Record :WS8

GeoInvestigations

DRILLING DETAILS
Drilling Company: Exploration Ltd
Drilling Method: WS

Drilling Date: 7th July 2017
Location: Land North of Holbeach Road
Ground Elevation: (mAMSL)

Drilled Depth: (mBGL)
Bore Diameter: (mm)
TOC Elevation: (mAGL)

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	SPT (blows/300mm)	In Situ/ Lab Test
62		0.00		Grass over dark brown, silty, fine SAND. Frequent rootlets. (TOPSOIL?)		
		0.50		Loose, brown, silty, fine SAND. Wet below 1.0m bgl.		
		1.00				2,2,2,1,2,3 (8)
		1.50				
B63		2.00		Soft, brown, silty CLAY.		
		2.50		Medium dense, greyish brown, silty, fine SAND. Wet.		2,1,2,2,3,3 (10)
		3.00				
		3.50		Loose, grey, slightly silty, fine SAND. Wet.		0,0,1,1,2,2 (6
		4.00				0,0,1,2,2,3 (8)
		4.50				
		5.00				

SPT (blows/300mm) scale: 0 10 20 30 40 50 60 90

Piezometer Construction Details And Groundwater Levels

Groundwater Observations:

Sample tubes wet below 2.00m. Standing water level at 1.59m bgl on 7th July 2017.

GeoInvestigations
29 Greenlands Business Centre
Studley Road
Redditch
B98 7HD
paul@geoinvestigations.co.uk

Trial Pit Logging Record :TP01

GeoInvestigations

DRILLING DETAILS

Drilling Company: Collett Plant Hire

Drilling Method: TP

Drilling Date: 6th July 2017

Location: Land North Of Holbeach Road

Ground Elevation: (mAMSL)

Drilled Depth: (mBGL)

Bore Diameter: 450 (mm)

TOC Elevation: (mAGL)

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	SPT (blows/300mm)	In Situ/ Lab Test	Piezometer Construction Details And Groundwater Levels
WAC1		0.00		MG Grass and roots over yellowish brown, fine to coarse sandy, cobbly gravel. Gravel and cobbles are angular limestone and rare brick.			
2		0.50		MG Greyish brown, silty, fine sand. Occasional pottery and brick fragments. (Reworked Natural Strata)			
B3		1.00					
		1.50		Brown mottled grey, silty, locally clayey, fine SAND.			
		2.00					
		2.50					
4		3.00					
		3.50					
		4.00					
		4.50					
		5.00					

SPT (blows/300mm): 0 10 20 30 40 50 60 90

Groundwater Observations:

No groundwater obsered upon completion. Pit sides periodically spalling during excavation.

GeoInvestigations
29 Greenlands Business Centre
Studley Road
Redditch
B98 7HD
paul@geoinvestigations.co.uk

Trial Pit Logging Record :TP02

GeoInvestigations

DRILLING DETAILS

Drilling Company: Collett Plant Hire

Drilling Method: TP

Drilling Date: 6th July 2017

Location: Land North Of Holbeach Road

Ground Elevation: (mAMSL)

Drilled Depth: (mBGL)

Bore Diameter: 450 (mm)

TOC Elevation: (mAGL)

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	SPT (blows/300mm)	In Situ/ Lab Test	Piezometer Construction Details And Groundwater Levels
WAC5		0.00		MG Dark brown, silty, gravelly, fine sand. Gravel is fine to coarse, angular brick. One kerbstone boulder.			
		0.50		Brown, slightly clayey, silty, fine SAND.			
6		1.00					
		1.50					
		2.00					
		2.50		Soft to firm, brown, silty, fine sandy CLAY. Wet.			
7							
B8		3.00		Grey, silty, fine SAND. Damp.			
		3.50					
		4.00					
		4.50					
		5.00					

Groundwater Observations:

Very slow seepage into base of base upon completion. Pit sides spalling below 2.3m.

GeoInvestigations
29 Greenlands Business Centre
Studley Road
Redditch
B98 7HD
paul@geoinvestigations.co.uk

Trial Pit Logging Record :TP03

GeoInvestigations

DRILLING DETAILS

Drilling Company: Collett Plant Hire

Drilling Method: TP

Drilling Date: 6th July 2017

Location: Land North Of Holbeach Road

Ground Elevation: (mAMSL)

Drilled Depth: (mBGL)

Bore Diameter: 450 (mm)

TOC Elevation: (mAGL)

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	SPT (blows/300mm) 0 10 20 30 40 50 60 90	In Situ/ Lab Test	Piezometer Construction Details And Groundwater Levels
9		0.00		MG Grass over dark brown, silty, fine sand. Occasional angular brick cobbles.			
		0.50		Brown, silty, fine SAND.			
11							
10							
		1.00					
B13		1.50					
		2.00		Dark grey, silty, fine SAND.			
				Soft, grey, silty, fine sandy CLAY.			
B12		2.50					
		3.00		Grey fine SAND.			
		3.50					
		4.00					
		4.50					
		5.00					

Groundwater Observations:

Very slow seepage into base of pit upon completion. Pit sides spalling below 3.0m.

GeoInvestigations
29 Greenlands Business Centre
Studley Road
Redditch
B98 7HD
paul@geoinvestigations.co.uk

Trial Pit Logging Record :TP04

GeoInvestigations

DRILLING DETAILS

Drilling Company: Collett Plant Hire

Drilling Method: TP

Drilling Date: 6th July 2017

Location: Land North Of Holbeach Road

Ground Elevation: (mAMSL)

Drilled Depth: (mBGL)

Bore Diameter: 450 (mm)

TOC Elevation: (mAGL)

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	SPT (blows/300mm)	In Situ/ Lab Test	Piezometer Construction Details And Groundwater Levels
TS14		0.00		Dark brown, silty, fine SAND. Frequent rootlets. (TOPSOIL?)			
15		0.50		Brown, silty, fine SAND.			
16		1.00					
		1.50					
		2.00		Soft to firm, greyish brown, silty, fine sandy CLAY. Occasional grey fine sand lenses (<100mm thickness).			
B17		2.50					
		3.00					
		3.50		Grey, silty, fine SAND.			
		4.00					
		4.50					
		5.00					

Groundwater Observations:

No groundwater observed upon completion. Pit sides spalling below 1.8m bgl.

GeoInvestigations
29 Greenlands Business Centre
Studley Road
Redditch
B98 7HD
paul@geoinvestigations.co.uk

Trial Pit Logging Record :TP05

GeoInvestigations

DRILLING DETAILS

Drilling Company: Collett Plant Hire

Drilling Method: TP

Drilling Date: 6th July 2017

Location: Land North Of Holbeach Road

Ground Elevation: (mAMSL)

Drilled Depth: (mBGL)

Bore Diameter: 450 (mm)

TOC Elevation: (mAGL)

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	SPT (blows/300mm)	In Situ/ Lab Test	Piezometer Construction Details And Groundwater Levels
18		0.00		Dark brown, silty, fine SAND. Frequent rootlets. (TOPSOIL?)			
19		0.50		Brown, silty, fine SAND.			
		1.00					
20		1.50		Firm to stiff, grey mottled brown, silty, fine sandy CLAY.			
B21		2.00		Soft, grey, silty CLAY.			
		2.50					
22		3.00		Grey, silty, fine SAND.			
		3.50					
		4.00					
		4.50					
		5.00					

SPT (blows/300mm): 0 10 20 30 40 50 60 90

Groundwater Observations:

Very slow seepage into base of pit upon completion. Pit sides spalling below 2.0m bgl.

GeoInvestigations
29 Greenlands Business Centre
Studley Road
Redditch
B98 7HD
paul@geoinvestigations.co.uk

Trial Pit Logging Record :TP06

GeoInvestigations

DRILLING DETAILS

Drilling Company: Collett Plant Hire

Drilling Method: TP

Drilling Date: 6th July 2017

Location: Land North Of Holbeach Road

Ground Elevation: (mAMSL)

Drilled Depth: (mBGL)

Bore Diameter: 450 (mm)

TOC Elevation: (mAGL)

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	SPT (blows/300mm)	In Situ/ Lab Test	Piezometer Construction Details And Groundwater Levels
24		0.00		Dark brown, silty, fine SAND. Frequent rootlets. (TOPSOIL?)			
		0.50		Brown, silty, fine SAND.			
				Brown mottled grey, very clayey, silty, fine SAND.			
B23		1.00					
		1.50					
		2.00					
		2.50					
				Grey, silty, fine SAND.			
		3.00					
		3.50					
		4.00					
		4.50					
		5.00					

SPT (blows/300mm): 0 10 20 30 40 50 60 90

Groundwater Observations:

No groundwater observed upon completion. Pit sides remained stable upon completion.

GeoInvestigations
29 Greenlands Business Centre
Studley Road
Redditch
B98 7HD
paul@geoinvestigations.co.uk

Trial Pit Logging Record :TP07

GeoInvestigations

DRILLING DETAILS

Drilling Company: Collett Plant Hire

Drilling Method: TP

Drilling Date: 6th July 2017

Location: Land North Of Holbeach Road

Ground Elevation: (mAMSL)

Drilled Depth: (mBGL)

Bore Diameter: 450 (mm)

TOC Elevation: (mAGL)

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	SPT (blows/300mm) 0 10 20 30 40 50 60 90	In Situ/ Lab Test	Piezometer Construction Details And Groundwater Levels
28		0.00		Dark brown, silty, fine SAND. Frequent rootlets. (TOPSOIL?)			
				Brown, silty, fine SAND.			
25		0.50					
		1.00					
27				Firm, orangish brown mottled grey, silty CLAY. Between 2.1m and 2.3m; becoming soft.			
B26		1.50					
		2.00					
29				Grey, silty, fine SAND.			
		2.50					
		3.00					
		3.50					
		4.00					
		4.50					
		5.00					

Groundwater Observations:

Very slow seepage into base of pit upon completion. Pit sides remained stable upon completion.

GeoInvestigations
29 Greenlands Business Centre
Studley Road
Redditch
B98 7HD
paul@geoinvestigations.co.uk

Trial Pit Logging Record :TP08

GeoInvestigations

DRILLING DETAILS

Drilling Company: Collett Plant Hire

Drilling Method: TP

Drilling Date: 6th July 2017

Location: Land North Of Holbeach Road

Ground Elevation: (mAMSL)

Drilled Depth: (mBGL)

Bore Diameter: 450 (mm)

TOC Elevation: (mAGL)

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	SPT (blows/300mm)	In Situ/ Lab Test	Piezometer Construction Details And Groundwater Levels
		0.00		Dark brown, silty, fine SAND. Frequent rootlets. (TOPSOIL?)			
		0.50		Brown, silty, fine SAND.			
30		1.00					
		1.50		Firm to stiff, brown mottled grey, silty, fine sandy CLAY. Below 2.0m bgl; becoming soft to firm.			
31		2.00					
		2.50					
		3.00					
		3.50					
		4.00					
		4.50					
		5.00					

SPT (blows/300mm): 0 10 20 30 40 50 60 90

Groundwater Observations:

No groundwater observed to a depth of 2.0m bgl. Edge of pea gravel pipe surround clipped at 2.0m bgl; very fast seepage of groundwater from gravel surround into pit, slowing over time. Pea gravel spalled into pit to reveal a N-S trending, approximately 300mm diameter black pipe located 1.0m east of the pit.

GeoInvestigations
29 Greenlands Business Centre
Studley Road
Redditch
B98 7HD
paul@geoinvestigations.co.uk

Borehole Logging Record :CP1

GeoInvestigations

DRILLING DETAILS

Drilling Company: Tony Jones Drilling

Drilling Method: CP

Drilling Date: 21st June 2017

Location: Welland Hospital : Spalding

Ground Elevation: (mAMSL)

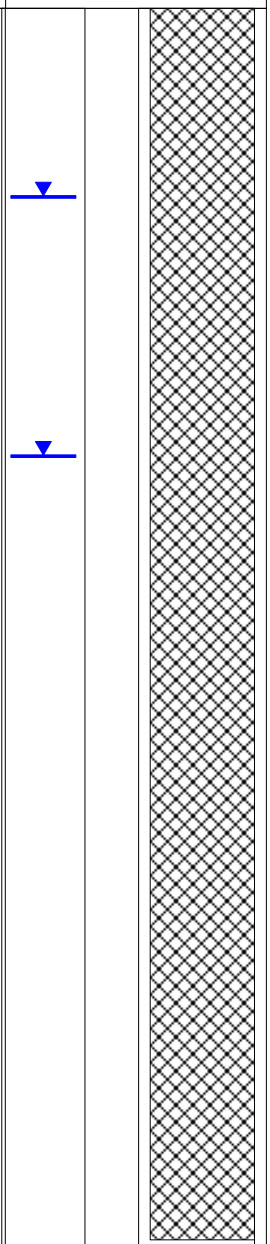
Drilled Depth: (mBGL)

Bore Diameter: 150 (mm)

TOC Elevation: (mAGL)

Sample Reference	Sample Range	Depth (mBGL)	Soil or Rock Field Material Description	SPT (blows/300mm)	In Situ/ Lab Test
D1		0.00 – 0.50	MG Dark brown, silty, slightly gravelly, fine sand. Gravel is fine to coarse, angular brick, concrete and limestone.		
D2		0.50 – 1.00			
D3		1.00 – 2.50	Very loose to loose, grey mottled brown, slightly clayey, silty fine SAND.		1,0,0,1,0,1 (2)
U1		2.50 – 3.00	Very soft to soft, grey mottled black, silty, slightly organic CLAY.		UT100: 5 blows/100 %
D4		3.00 – 3.50			
D5		3.50 – 5.50	Loose, grey, silty, fine SAND. Wet. Below 5.5m bgl; becoming medium dense.		1,2,1,1,1,1 (4)
D6		5.50 – 6.00			1,2,3,8,8,8 (27)
D7		6.00 – 7.00	Medium dense becoming dense, brownish grey, slightly shelly, fine to medium SAND. Wet.		
D8		7.00 – 8.50			4,6,8,10,12,13(43)
D9		8.50 – 10.00			10,15,23,30/75mm(>53)
D10		9.50 – 10.50			
D11		10.00 – 10.50			19,6/25mm,29,34/50mm(>63)

Piezometer Construction Details And Groundwater Levels



Groundwater Observations:

Groundwater struck at 3.8m bgl; Resting at 1.60m bgl the next day. Sand strata below 3.5m blowing back to 4.5m bgl.

GeoInvestigations
29 Greenlands Business Centre
Studley Road
Redditch
B98 7HD
paul@geoinvestigations.co.uk

Borehole Logging Record :CP2

GeoInvestigations

DRILLING DETAILS

Drilling Company: Tony Jones Drilling

Drilling Method: CP

Drilling Date: 22nd June 2017

Location: Welland Hospital : Spalding

Ground Elevation: (mAMSL)

Drilled Depth: (mBGL)

Bore Diameter: 150 (mm)

TOC Elevation: (mAGL)

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	SPT (blows/300mm)	In Situ/ Lab Test	Piezometer Construction Details And Groundwater Levels
B4	0.00 - 0.50	0.00		MG Bituminous bound surfacing.			
B3	0.50 - 1.00	0.50		MG Brown, fine to coarse sandy gravel. Gravel is fine to coarse, angular brick, limestone and concrete.			
		1.00		Soft, grey mottled brown, silty CLAY.			
D1	1.50 - 1.95	1.50				1,0,0,1,0,1 (2)	
B1	2.00 - 2.50	2.00				UT100: 5 blows/0%	
		2.50		Greyish brown, silty, fine SAND. Wet.			
D6	3.00 - 3.45	3.00				1,0,0,1,0,0 (1)	
D3	4.50 - 4.95	4.50				1,2,1,1,0,1 (3)	
B2	5.50 - 6.00	5.50					
D4	6.00 - 6.45	6.00				2,3,5,7,9,9 (30)	
		6.50		Greyish brown, slightly shelly, fine to medium SAND.			
D2	7.50 - 8.00	7.50				8,12,13,15 ,16,18(62)	
D8	8.50 - 8.95	8.50					
D7	9.00 - 9.45	9.00				19,6/25m m,24,25,2 9/75mm(> 78)	
B6	9.50 - 10.00	9.50					
B5	10.00 - 10.50	10.00					
D5	10.50 - 10.95	10.50				19,6/25m m,26,33/5 0mm(>53)	
		11.00					
		11.50					
		12.00					

Groundwater Observations:

Groundwater Struck at 2.80m bgl. Sand strata blowing back to 2.6m bgl.

APPENDIX 6

Chemical Contamination Test Certificates

Paul Palgrave
CSG Consulting Engineers Ltd
29 Greenlands Business Centre
Studley Road
Redditch
B98 7HD

QTS Environmental Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410
russell.jarvis@qtsenvironmental.com

QTS Environmental Report No: 17-61516

Site Reference:	Land Parcels 4 + 5 Spalding
Project / Job Ref:	728
Order No:	1926
Sample Receipt Date:	11/07/2017
Sample Scheduled Date:	13/07/2017
Report Issue Number:	1
Reporting Date:	19/07/2017

Authorised by:

Kevin Old
Associate Director of Laboratory

Authorised by:

Russell Jarvis
Associate Director of Client Services

QTSE is the trading name of DETS Ltd, company registration number 03705645

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate								
QTS Environmental Report No: 17-61516	Date Sampled	07/07/17	07/07/17	07/07/17	07/07/17	07/07/17		
CSG Consulting Engineers Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied		
Site Reference: Land Parcels 4 + 5 Spalding	TP / BH No	DH/Parcel 4 + 5/ TP01	DH/Parcel 4 + 5/ TP01	DH/Parcel 4 + 5/ TP02	DH/Parcel 4 + 5/ TP03	DH/Parcel 4 + 5/ TP04		
Project / Job Ref: 728	Additional Refs	WAC 1	2	WAC 5	11	15		
Order No: 1926	Depth (m)	0.20	0.60	0.20	0.70	0.50		
Reporting Date: 19/07/2017	QTSE Sample No	279338	279339	279340	279341	279342		

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	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		7.6	7.6	7.7	7.8
Total Cyanide	mg/kg	< 2	NONE			< 2		
Free Cyanide	mg/kg	< 2	NONE					< 2
Total Sulphate as SO_4	mg/kg	< 200	NONE			699		
Total Sulphate as SO_4	%	< 0.02	NONE			0.07		
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS		11		231	23
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS		0.01		0.23	0.02
Sulphide	mg/kg	< 5	NONE			< 5		
Organic Matter	%	< 0.1	MCERTS			2.4		0.7
Arsenic (As)	mg/kg	< 2	MCERTS			10		9
Barium (Ba)	mg/kg	< 5	NONE					77
Beryllium (Be)	mg/kg	< 0.5	NONE					< 0.5
W/S Boron	mg/kg	< 1	NONE			< 1		< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS			0.2		< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS			15		12
Chromium (hexavalent)	mg/kg	< 2	NONE			< 2		< 2
Copper (Cu)	mg/kg	< 4	MCERTS			12		5
Lead (Pb)	mg/kg	< 3	MCERTS			33		8
Mercury (Hg)	mg/kg	< 1	NONE			< 1		< 1
Nickel (Ni)	mg/kg	< 3	MCERTS			10		10
Selenium (Se)	mg/kg	< 3	NONE			< 3		< 3
Vanadium (V)	mg/kg	< 2	NONE					23
Zinc (Zn)	mg/kg	< 3	MCERTS			57		31
Total Phenols (monohydric)	mg/kg	< 2	NONE			< 2		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

Analysis carried out on the dried sample is corrected for the stone content

The samples have been examined to identify the presence of asbestiform minerals by polarising light microscopy and dispersion staining technique to In-House Procedures QTSE600 Determination of Asbestos in Bulk Materials; Asbestos in Soils/Sediments (fibre screening and identification)

This report refers to samples as received, and QTS Environmental Ltd, takes no responsibility for the accuracy or competence of sampling by others.

The material description shall be regarded as tentative and is not included in our scope of UKAS Accreditation.

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation.

Asbestos Analyst: Javeed Malik

RL: Reporting Limit

Pinch Test: Where pinch test is positive it is reported "Loose Fibres - PT" with type(s).

Subcontracted analysis (S)

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate								
QTS Environmental Report No: 17-61516	**Date Sampled**	07/07/17	07/07/17	07/07/17	07/07/17	07/07/17
CSG Consulting Engineers Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Land Parcels 4 + 5 Spalding	**TP / BH No**	DH/Parcel 4 + 5/ TP05	DH/Parcel 4 + 5/ TP06	DH/Parcel 4 + 5/ TP07	DH/Parcel 4 + 5/ TP07	DH/Parcel 4 + 5/ WS1
Project / Job Ref: 728	**Additional Refs**	19	24	28	27	32
Order No: 1926	**Depth (m)**	0.50	0.10	0.10	1.30	0.10
Reporting Date: 19/07/2017	**QTSE Sample No**	279343	279344	279345	279346	279348

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025		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	7.5	7.4	8.1	8.3
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	3		< 2
Free Cyanide	mg/kg	< 2	NONE					
Total Sulphate as SO_4	mg/kg	< 200	NONE	419	708	696		779
Total Sulphate as SO_4	%	< 0.02	NONE	0.04	0.07	0.07		0.08
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	14			40	
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.01			0.04	
Sulphide	mg/kg	< 5	NONE	< 5	< 5	< 5		< 5
Organic Matter	%	< 0.1	MCERTS	1.6	4.6			0.9
Arsenic (As)	mg/kg	< 2	MCERTS	6	8	7		5
Barium (Ba)	mg/kg	< 5	NONE					
Beryllium (Be)	mg/kg	< 0.5	NONE					
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1		< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	< 0.2		< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	12	15	15		7
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2			
Copper (Cu)	mg/kg	< 4	MCERTS	6	16	13		7
Lead (Pb)	mg/kg	< 3	MCERTS	11	33	27		5
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	< 1		< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	10	10	11		6
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3		< 3
Vanadium (V)	mg/kg	< 2	NONE					
Zinc (Zn)	mg/kg	< 3	MCERTS	31	56	49		15
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2		< 2

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

Analysis carried out on the dried sample is corrected for the stone content

The samples have been examined to identify the presence of asbestiform minerals by polarising light microscopy and dispersion staining technique to In-House Procedures QTSE600 Determination of Asbestos in Bulk Materials; Asbestos in Soils/Sediments (fibre screening and identification)

This report refers to samples as received, and QTS Environmental Ltd, takes no responsibility for the accuracy or competence of sampling by others.

The material description shall be regarded as tentative and is not included in our scope of UKAS Accreditation.

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation.

Asbestos Analyst: Javeed Malik

RL: Reporting Limit

Pinch Test: Where pinch test is positive it is reported "Loose Fibres - PT" with type(s).

Subcontracted analysis (S)

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate							
QTS Environmental Report No: 17-61516	**Date Sampled**	07/07/17	07/07/17	07/07/17	07/07/17	07/07/17
CSG Consulting Engineers Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Land Parcels 4 + 5 Spalding	**TP / BH No**	DH/Parcel 4 + 5/ WS1	DH/Parcel 4 + 5/ WS2	DH/Parcel 4 + 5/ WS2	DH/Parcel 4 + 5/ WS2	DH/Parcel 4 + 5/ WS3
Project / Job Ref: 728	**Additional Refs**	WAC 33	WAC 37	39	40	44
Order No: 1926	**Depth (m)**	0.50	0.60	1.00	1.80	0.20 - 0.40
Reporting Date: 19/07/2017	**QTSE Sample No**	279349	279350	279351	279352	279353

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected	Detected			Not Detected
Sample Matrix (S)	Material Type	N/a	NONE		Fibre bundles in soil			
Asbestos Type (S)	PLM Result	N/a	ISO17025		Chrysotile			
pH	pH Units	N/a	MCERTS	8.1	8.2	9.1	8.3	
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2			
Free Cyanide	mg/kg	< 2	NONE					< 2
Total Sulphate as SO_4	mg/kg	< 200	NONE	602	1253			
Total Sulphate as SO_4	%	< 0.02	NONE	0.06	0.13			
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS		141	24	20	
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS		0.14	0.02	0.02	
Sulphide	mg/kg	< 5	NONE	< 5	< 5			
Organic Matter	%	< 0.1	MCERTS					1.6
Arsenic (As)	mg/kg	< 2	MCERTS	8	12			11
Barium (Ba)	mg/kg	< 5	NONE					82
Beryllium (Be)	mg/kg	< 0.5	NONE					< 0.5
W/S Boron	mg/kg	< 1	NONE	1.2	< 1			< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	0.3			< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	13	14			16
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2				
Copper (Cu)	mg/kg	< 4	MCERTS	26	31			16
Lead (Pb)	mg/kg	< 3	MCERTS	112	141			40
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1			< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	11	12			12
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3			< 3
Vanadium (V)	mg/kg	< 2	NONE					26
Zinc (Zn)	mg/kg	< 3	MCERTS	74	252			76
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C
Analysis carried out on the dried sample is corrected for the stone content

The samples have been examined to identify the presence of asbestiform minerals by polarising light microscopy and dispersion staining technique to In-House Procedures QTSE600 Determination of Asbestos in Bulk Materials; Asbestos in Soils/Sediments (fibre screening and identification)

This report refers to samples as received, and QTS Environmental Ltd, takes no responsibility for the accuracy or competence of sampling by others.

The material description shall be regarded as tentative and is not included in our scope of UKAS Accreditation.

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation.

Asbestos Analyst: Javeed Malik

RL: Reporting Limit

Pinch Test: Where pinch test is positive it is reported "Loose Fibres - PT" with type(s).

Subcontracted analysis (S)

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate							
QTS Environmental Report No: 17-61516	**Date Sampled**	07/07/17	07/07/17	07/07/17		
CSG Consulting Engineers Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Land Parcels 4 + 5 Spalding	**TP / BH No**	DH/Parcel 4 + 5/ WS4	DH/Parcel 4 + 5/ WS4	DH/Parcel 4 + 5/ WS7		
Project / Job Ref: 728	**Additional Refs**	48	51	WAC 59		
Order No: 1926	**Depth (m)**	0.10	4.00	0.40		
Reporting Date: 19/07/2017	**QTSE Sample No**	279354	279355	279356		

Determinand	Unit	RL	Accreditation					
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	8.2	8.3	8.2		
Total Cyanide	mg/kg	< 2	NONE	< 2				
Free Cyanide	mg/kg	< 2	NONE					
Total Sulphate as SO_4	mg/kg	< 200	NONE	736				
Total Sulphate as SO_4	%	< 0.02	NONE	0.07				
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS		36			
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS		0.04			
Sulphide	mg/kg	< 5	NONE	< 5				
Organic Matter	%	< 0.1	MCERTS					
Arsenic (As)	mg/kg	< 2	MCERTS	10		7		
Barium (Ba)	mg/kg	< 5	NONE			79		
Beryllium (Be)	mg/kg	< 0.5	NONE			< 0.5		
W/S Boron	mg/kg	< 1	NONE	< 1		< 1		
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2		< 0.2		
Chromium (Cr)	mg/kg	< 2	MCERTS	13		16		
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2				
Copper (Cu)	mg/kg	< 4	MCERTS	12		7		
Lead (Pb)	mg/kg	< 3	MCERTS	22		10		
Mercury (Hg)	mg/kg	< 1	NONE	< 1		< 1		
Nickel (Ni)	mg/kg	< 3	MCERTS	11		13		
Selenium (Se)	mg/kg	< 3	NONE	< 3		< 3		
Vanadium (V)	mg/kg	< 2	NONE			28		
Zinc (Zn)	mg/kg	< 3	MCERTS	71		41		
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2				

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

Analysis carried out on the dried sample is corrected for the stone content

The samples have been examined to identify the presence of asbestiform minerals by polarising light microscopy and dispersion staining technique to In-House Procedures QTSE600 Determination of Asbestos in Bulk Materials; Asbestos in Soils/Sediments (fibre screening and identification)

This report refers to samples as received, and QTS Environmental Ltd, takes no responsibility for the accuracy or competence of sampling by others.

The material description shall be regarded as tentative and is not included in our scope of UKAS Accreditation.

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation.

Asbestos Analyst: Javeed Malik

RL: Reporting Limit

Pinch Test: Where pinch test is positive it is reported "Loose Fibres - PT" with type(s).

Subcontracted analysis (S)

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate - Speciated PAHs							
QTS Environmental Report No: 17-61516	**Date Sampled**	07/07/17	07/07/17	07/07/17	07/07/17	07/07/17
CSG Consulting Engineers Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Land Parcels 4 + 5 Spalding	**TP / BH No**	DH/Parcel 4 + 5/ TP02	DH/Parcel 4 + 5/ TP04	DH/Parcel 4 + 5/ TP05	DH/Parcel 4 + 5/ TP06	DH/Parcel 4 + 5/ TP07
Project / Job Ref: 728	**Additional Refs**	WAC 5	15	19	24	28
Order No: 1926	**Depth (m)**	0.20	0.50	0.50	0.10	0.10
Reporting Date: 19/07/2017	**QTSE Sample No**	279340	279342	279343	279344	279345

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	0.12	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	0.37	< 0.1	< 0.1	0.24	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	0.33	< 0.1	< 0.1	0.22	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.17	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	0.22	< 0.1	< 0.1	0.14	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.28	< 0.1	< 0.1	0.16	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.15	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.20	< 0.1	< 0.1	0.12	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.12	< 0.1	< 0.1	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.14	< 0.1	< 0.1	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	2.1	< 1.6	< 1.6	< 1.6	< 1.6

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate - Speciated PAHs							
QTS Environmental Report No: 17-61516	**Date Sampled**	07/07/17	07/07/17	07/07/17	07/07/17	07/07/17
CSG Consulting Engineers Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Land Parcels 4 + 5 Spalding	**TP / BH No**	DH/Parcel 4 + 5/ WS1	DH/Parcel 4 + 5/ WS1	DH/Parcel 4 + 5/ WS2	DH/Parcel 4 + 5/ WS3	DH/Parcel 4 + 5/ WS4
Project / Job Ref: 728	**Additional Refs**	32	WAC 33	WAC 37	44	48
Order No: 1926	**Depth (m)**	0.10	0.50	0.60	0.20 - 0.40	0.10
Reporting Date: 19/07/2017	**QTSE Sample No**	279348	279349	279350	279353	279354

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	0.26	0.24	0.44	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.77	0.75	0.62	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.64	0.66	0.51	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.41	0.32	0.26	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	0.37	0.37	0.26	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.40	0.41	0.33	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.21	0.22	0.15	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.32	0.29	0.24	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.16	0.22	0.15	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	0.15	0.22	0.16	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	3.7	3.7	3.1	< 1.6

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate - Speciated PAHs							
QTS Environmental Report No: 17-61516	Date Sampled	07/07/17					
CSG Consulting Engineers Ltd	Time Sampled	None Supplied					
Site Reference: Land Parcels 4 + 5 Spalding	TP / BH No	DH/Parcel 4 + 5/ WS7					
Project / Job Ref: 728	Additional Refs	WAC 59					
Order No: 1926	Depth (m)	0.40					
Reporting Date: 19/07/2017	QTSE Sample No	279356					

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1				
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1				
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1				
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1				
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1				
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1				
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1				
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1				
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1				
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1				
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1				
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6				

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate - EPH Banded (Type F)							
QTS Environmental Report No: 17-61516	**Date Sampled**	07/07/17	07/07/17	07/07/17	07/07/17	
CSG Consulting Engineers Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Land Parcels 4 + 5 Spalding	**TP / BH No**	DH/Parcel 4 + 5/ TP01	DH/Parcel 4 + 5/ WS1	DH/Parcel 4 + 5/ WS1	DH/Parcel 4 + 5/ WS2	
Project / Job Ref: 728	**Additional Refs**	WAC 1	32	WAC 33	WAC 37	
Order No: 1926	**Depth (m)**	0.20	0.10	0.50	0.60	
Reporting Date: 19/07/2017	**QTSE Sample No**	279338	279348	279349	279350	

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**	< 1	< 1	< 1	< 1	
EPH (>C16 - C21)	mg/kg	< 1	**MCERTS**	< 1	< 1	< 1	5	
EPH (>C21 - C40)	mg/kg	< 6	**MCERTS**	< 6	22	17	121	
EPH (C8 - C40)	mg/kg	< 6	**MCERTS**	< 6	22	17	126	

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate - Sample Descriptions	
QTS Environmental Report No: 17-61516	
CSG Consulting Engineers Ltd	
Site Reference: Land Parcels 4 + 5 Spalding	
Project / Job Ref: 728	
Order No: 1926	
Reporting Date: 19/07/2017	

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
279338	DH/Parcel 4 + 5/ TP01	WAC 1	0.20	7.7	Brown sandy gravel with stones
279339	DH/Parcel 4 + 5/ TP01	2	0.60	16.2	Brown sandy clay
279340	DH/Parcel 4 + 5/ TP02	WAC 5	0.20	9.3	Brown sandy clay
279341	DH/Parcel 4 + 5/ TP03	11	0.70	18.5	Brown sandy clay
279342	DH/Parcel 4 + 5/ TP04	15	0.50	16.8	Brown sandy clay
279343	DH/Parcel 4 + 5/ TP05	19	0.50	11.2	Brown sandy clay
279344	DH/Parcel 4 + 5/ TP06	24	0.10	13.7	Brown sandy clay with vegetation
279345	DH/Parcel 4 + 5/ TP07	28	0.10	13.4	Brown sandy clay with vegetation
279346	DH/Parcel 4 + 5/ TP07	27	1.30	17.3	Brown clay
279348	DH/Parcel 4 + 5/ WS1	32	0.10	4.4	Brown sandy clay with stones
279349	DH/Parcel 4 + 5/ WS1	WAC 33	0.50	14.5	Brown sandy clay with stones
279350	DH/Parcel 4 + 5/ WS2	WAC 37	0.60	9.6	Brown sandy clay
279351	DH/Parcel 4 + 5/ WS2	39	1.00	18.9	Brown sandy clay with stones
279352	DH/Parcel 4 + 5/ WS2	40	1.80	18.2	Brown sandy clay with stones
279353	DH/Parcel 4 + 5/ WS3	44	0.20 - 0.40	8.1	Brown sandy clay
279354	DH/Parcel 4 + 5/ WS4	48	0.10	11	Brown sandy clay with vegetation
279355	DH/Parcel 4 + 5/ WS4	51	4.00	21.1	Brown sandy clay
279356	DH/Parcel 4 + 5/ WS7	WAC 59	0.40	10.4	Brown sandy clay

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

Insufficient Sample I/S

Unsuitable Sample U/S

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate - Methodology & Miscellaneous Information
QTS Environmental Report No: 17-61516
CSG Consulting Engineers Ltd
Site Reference: Land Parcels 4 + 5 Spalding
Project / Job Ref: 728
Order No: 1926
Reporting Date: 19/07/2017

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

Paul Palgrave
CSG Consulting Engineers Ltd
29 Greenlands Business Centre
Studley Road
Redditch
B98 7HD

QTS Environmental Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410
russell.jarvis@qtsenvironmental.com

QTS Environmental Report No: 17-61699

Site Reference:	Land Parcels 4 + 5 Spalding
Project / Job Ref:	728
Order No:	1926
Sample Receipt Date:	11/07/2017
Sample Scheduled Date:	17/07/2017
Report Issue Number:	1
Reporting Date:	21/07/2017

Authorised by:

Kevin Old
Associate Director of Laboratory

Authorised by:

Dave Ashworth
Deputy Quality Manager

QTSE is the trading name of DETS Ltd, company registration number 03705645

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate							
QTS Environmental Report No: 17-61699	Date Sampled	07/07/17					
CSG Consulting Engineers Ltd	Time Sampled	None Supplied					
Site Reference: Land Parcels 4 + 5 Spalding	TP / BH No	DH/Parcel 4 + 5/ WS2					
Project / Job Ref: 728	Additional Refs	41					
Order No: 1926	Depth (m)	3.50					
Reporting Date: 21/07/2017	QTSE Sample No	280047					

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	MCERTS	8.0				
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	38				
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.04				

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than $30^{O}C$

Analysis carried out on the dried sample is corrected for the stone content

Subcontracted analysis (S)

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate - Sample Descriptions	
QTS Environmental Report No: 17-61699	
CSG Consulting Engineers Ltd	
Site Reference: Land Parcels 4 + 5 Spalding	
Project / Job Ref: 728	
Order No: 1926	
Reporting Date: 21/07/2017	

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
280047	DH/Parcel 4 + 5/ WS2	41	3.50	22.3	Brown sand

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

Insufficient Sample I/S

Unsuitable Sample U/S

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate - Methodology & Miscellaneous Information
QTS Environmental Report No: 17-61699
CSG Consulting Engineers Ltd
Site Reference: Land Parcels 4 + 5 Spalding
Project / Job Ref: 728
Order No: 1926
Reporting Date: 21/07/2017

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 7

Geotechnical Laboratory Test Certificates

TERRA TEK
SITE INVESTIGATION & LABORATORY SERVICES

CSG Consulting Engineers Limited
31 Greenlands Business Centre
Studley Road
Redditch
B98 7HD

For the attention of Paul Palgrave

Report No: B20943
Issue No 01

LABORATORY TEST REPORT

Project Name	**728 LAND PARCELS 4+5, SPALDING**		
Project Number	**B20943**	Date samples received	10/07/2017
Your Ref		Date written instructions received	13/07/2017
Purchase Order	728/1925	Date testing commenced	13/07/2017

Please find enclosed the results as summarised below

Figure / Table	Test Quantity	Description	ISO 17025 Accredited
1	~	Summary of Geotechnical Tests	See Report
2 - 5	4	Atterberg Limit	Yes
6 - 8	3	Particle Size Distribution	Yes
9	3	Hand Vane	No
10 - 11	2	One Dimensional Consolidation	Yes

Remarks :

Issued by : Stephen Langman Date of Issue : 25/07/2017

Approved Signatories : S. Langman 27/07/2017

G Wilson (JMD/Laboratories Director), S Langman (Laboratory Coordinator)

Key to symbols used in this report
S/C : Testing was sub-contracted

Unless we are notified to the contrary, samples will be disposed after a period of one month from this date.
The results reported relate to samples received in the laboratory only.
All results contained in this report are provisional unless signed by an approved signatory
This report should not be reproduced except in full without the written approval of the laboratory.
Under multisite accreditation the testing contained in this report may have been performed at another Terra Tek laboratory.
The enclosed results remain the property of Terra Tek Limited and we reserve the right to withdraw
our report if we have not received cleared funds in accordance with our standard terms and conditions
Only those results indicated in this report are UKAS accredited and any opinions or interpretations expressed are outside the scope of UKAS accreditation.
Feedback on the this report may be left via our website www.terratek.co.uk/contact-us

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME
UKAS TESTING 0126
25 YEARS 1990-2015

Moor Lane, Witton, Birmingham, B6 7HG
Tel: +44 (0)121 344 4838 Fax: +44 (0)121 356 3599
birmingham@terratek.co.uk
www.terratek.co.uk
Terra Tek Ltd is registered in Scotland No. 121594
Offices in Airdrie, Birmingham, Belfast and Chesham
Head Office : 62 Rochsolloch Road, Airdrie, ML6 9BG

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site: 728 LAND PARCELS 4+5, SPALDING

Client:

Engineer:

Contract No B20943

Sample Identification							Atterberg limits						Density		Total Stress			
Exploratory Hole	Depth m	Sample Ref	Sample Type	Lab Sample ID	Non Engineering Sample Description	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	Percentage retained 425µm %	Atterberg Classification	Particle Density Mg/m³	Bulk Mg/m³	Dry Mg/m³	Shear Strength kPa	Apparent Cohesion C kPa	Angle of Shearing Resistance Phi	Other Tests
TP01	1.50		B	421352	Brown clayey very sandy SILT.													PSD
TP02	2.50		ET	421330	Brown silty CLAY	30												
TP02	2.60		B	421353	Brown SILT.	28		non plastic	~	0			2.01	1.57				Oed,Shear Vane
TP03	1.50		B	421354														PSD
TP03	2.60		B	421355	Brown mottled gray sandy silty CLAY.	43	49	26	23	0	CI							
Notes: Opinions and interpretations are outside the scope of UKAS accreditation					UKAS Accredited Test Y/N	Test details are given on the 'Notes on Laboratory Procedures' sheet: Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	See individual report sheets

Originator	Approved
ME	S. Langman 27/07/2017

SUMMARY OF GEOTECHNICAL TESTS

Figure 1

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site: 728 LAND PARCELS 4+5, SPALDING

Client:

Engineer:

Contract No B20943

Sample Identification							Atterberg limits						Density		Total Stress			
Exploratory Hole	Depth m	Sample Ref	Sample Type	Lab Sample ID	Non Engineering Sample Description	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	Percentage retained 425µm %	Atterberg Classification	Particle Density Mg/m³	Bulk Mg/m³	Dry Mg/m³	Shear Strength kPa	Apparent Cohesion C kPa	Angle of Shearing Resistance Phi	Other Tests
TP04	2.00-3.00		B	421356	Brown SILT.	33		non plastic	~	0			1.88	1.41				Oed
TP06	1.00-1.50		B	421357	Brown clayey very sandy SILT.													PSD
TP07	1.40		B	421358	Brown CLAY.	27	49	19	30	0	CI							

Notes: Opinions and interpretations are outside the scope of UKAS accreditation

Test details are given on the 'Notes on Laboratory Procedures' sheet

See individual report sheets

UKAS Accredited Test Y/N	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y

Originator	Approved
ME	S. Langman 27/07/2017

SUMMARY OF GEOTECHNICAL TESTS

Figure 1

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site 728 LAND PARCELS 4+5, SPALDING

Client

Engineer

Contract No. B20943

Hole ID TP02
Sample Ref
Depth (m) 2.60
Sample Type B

Non Engineering Description : Brown SILT.

Preparation : Sample as received

Sample was determined to be Non-Plastic after preparation

Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990) 28 %
Percentage retained on 425µm sieve : 0 %

Equivalent moisture content of material passing 425µm sieve : 28 %

Originator	Checked & Approved
KP	S. Langman 27/07/2017

Plastic Limit
BS 1377:Part 2:Clause 5:1990

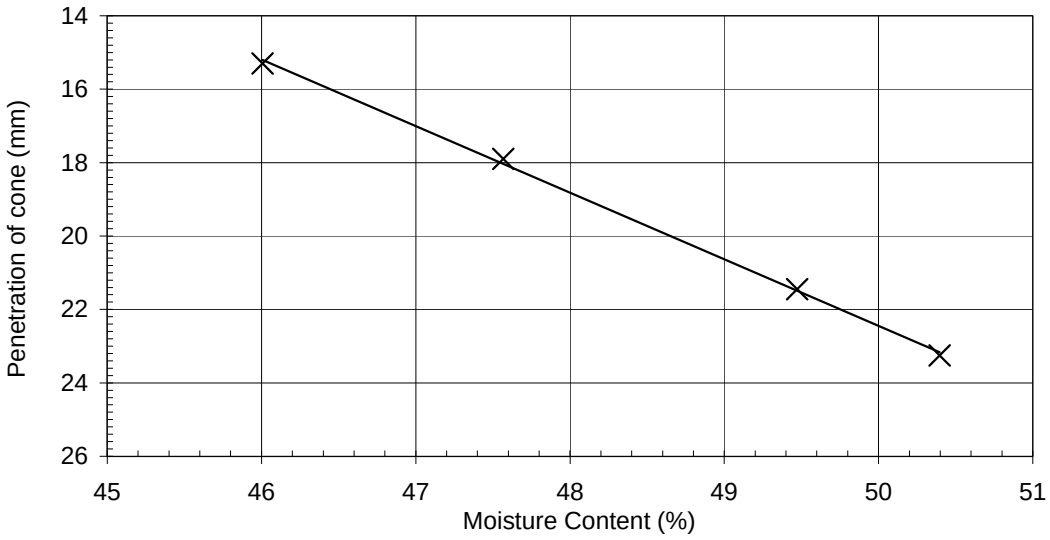
Figure 2

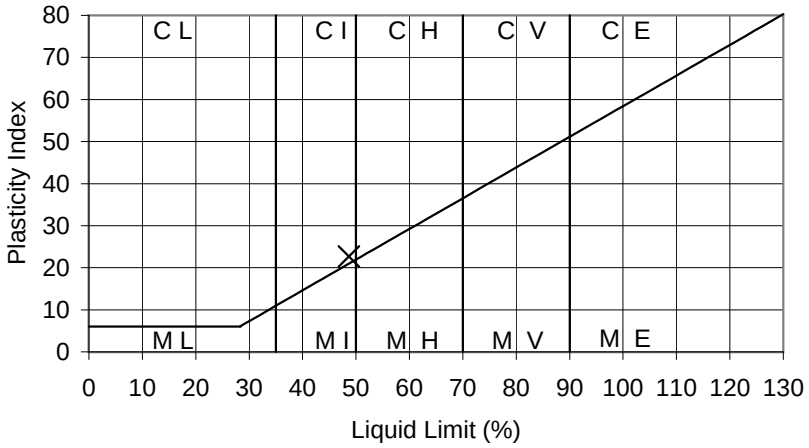
Sheet 1 of 1

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES	Site 728 LAND PARCELS 4+5, SPALDING	**Contract No. B20943**
	Client	Hole ID TP03
	Engineer	Sample Ref Depth (m) 2.60 Sample Type B

Non Engineering Description : Brown mottled gray sandy silty CLAY.

Preparation : Sample as received





Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990)	43 %
Percentage retained on 425µm sieve :	0 %
Liquid Limit :	49 %
Plastic Limit :	26 %
Plasticity Index :	23
Equivalent moisture content of material passing 425µm sieve :	43 %
Liquidity Index :	0.74

Originator	Checked & Approved	**Liquid Limit (Four Point Cone Penetrometer Method)** **Plastic Limit, Plasticity Index & Liquidity Index** BS 1377:Part 2:Clause 4.3:1990 BS 1377:Part 2:Clause 5:1990	**Figure 3**
KP	S. Langman 27/07/2017		Sheet 1 of 1

TERRA TEK
SITE INVESTIGATION AND LABORATORY SERVICES

Site 728 LAND PARCELS 4+5, SPALDING

Client

Engineer

Contract No. B20943

Hole ID TP04
Sample Ref
Depth (m) 2.00-3.00
Sample Type B

Non Engineering Description : Brown SILT.

Preparation : Sample as received

Sample was determined to be Non-Plastic after preparation

Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990)	24	%
Percentage retained on 425µm sieve :	0	%
Equivalent moisture content of material passing 425µm sieve :	24	%

Originator	Checked & Approved
KP	27/07/2017

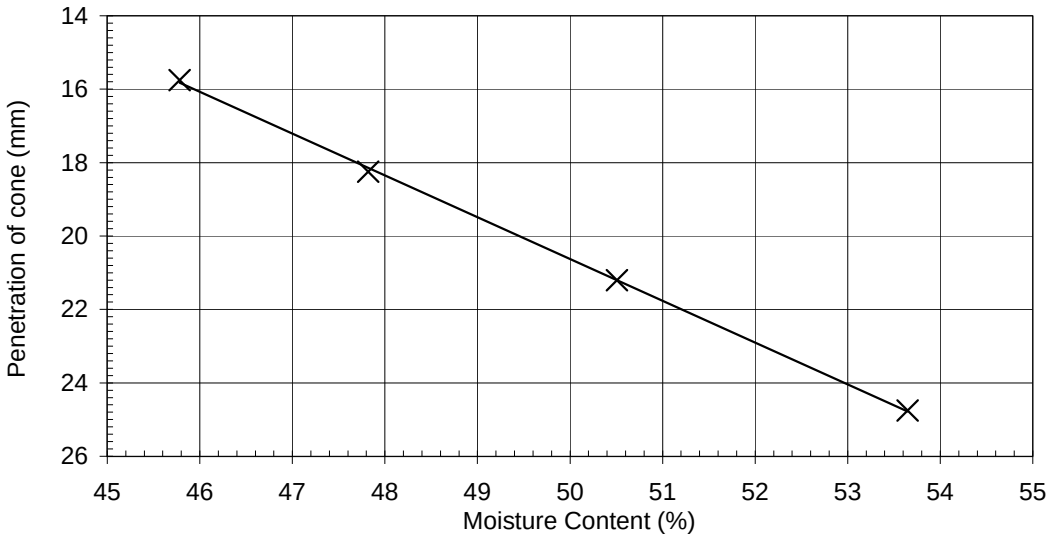
Plastic Limit
BS 1377:Part 2:Clause 5:1990

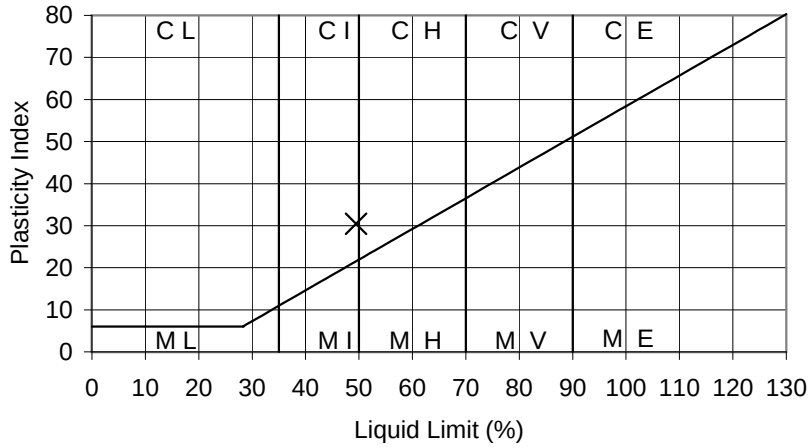
Figure 4

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES	Site 728 LAND PARCELS 4+5, SPALDING	**Contract No. B20943**
	Client	Hole ID TP07
	Engineer	Sample Ref Depth (m) 1.40 Sample Type B

Non Engineering Description : Brown CLAY.

Preparation : Sample as received





Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990)	27 %
Percentage retained on 425µm sieve :	0 %
Liquid Limit :	49 %
Plastic Limit :	19 %
Plasticity Index :	30
Equivalent moisture content of material passing 425µm sieve :	27 %
Liquidity Index :	0.27

Originator	Checked & Approved	**Liquid Limit (Four Point Cone Penetrometer Method)** **Plastic Limit, Plasticity Index & Liquidity Index** BS 1377:Part 2:Clause 4.3:1990 BS 1377:Part 2:Clause 5:1990	**Figure 5**
KP	S. Langman 27/07/2017		Sheet 1 of 1

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site 728 LAND PARCELS 4+5, SPALDING

Client

Engineer

Contract No B20943

Hole TP01
Sample Ref
Depth (m) 1.50
Sample Type B

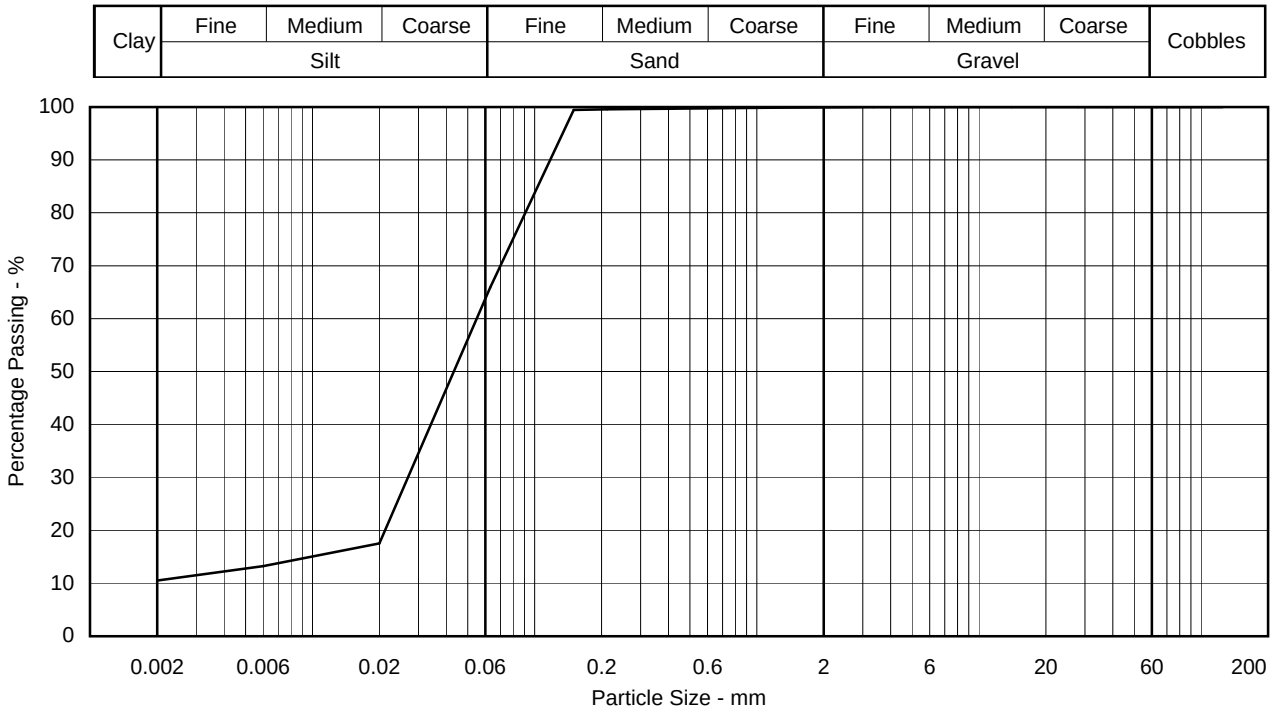
Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	100
425 µm	100
300 µm	100
212 µm	100
150 µm	99
63 µm	66
20 µm	17
6 µm	13
2 µm	10

Non Engineering Description
Brown clayey very sandy SILT.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.1
Sand	37.4
Silt	52.1
Clay	10.4

Particle Diameter - mm	
D100	3.4
D60	0.055
D10	
Uniformity Coefficient	N/A

Notes
Sedimentation sample not pre-treated



Originator	Checked & Approved
NS	S. Longmore 27/07/2017

PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990 Clause 9.2 - Wet Sieving
BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

Figure 6

Moor Lane, Witton, Birmingham, B6 7HG

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site 728 LAND PARCELS 4+5, SPALDING

Client

Engineer

Contract No B20943

Hole TP03
Sample Ref
Depth (m) 1.50
Sample Type B

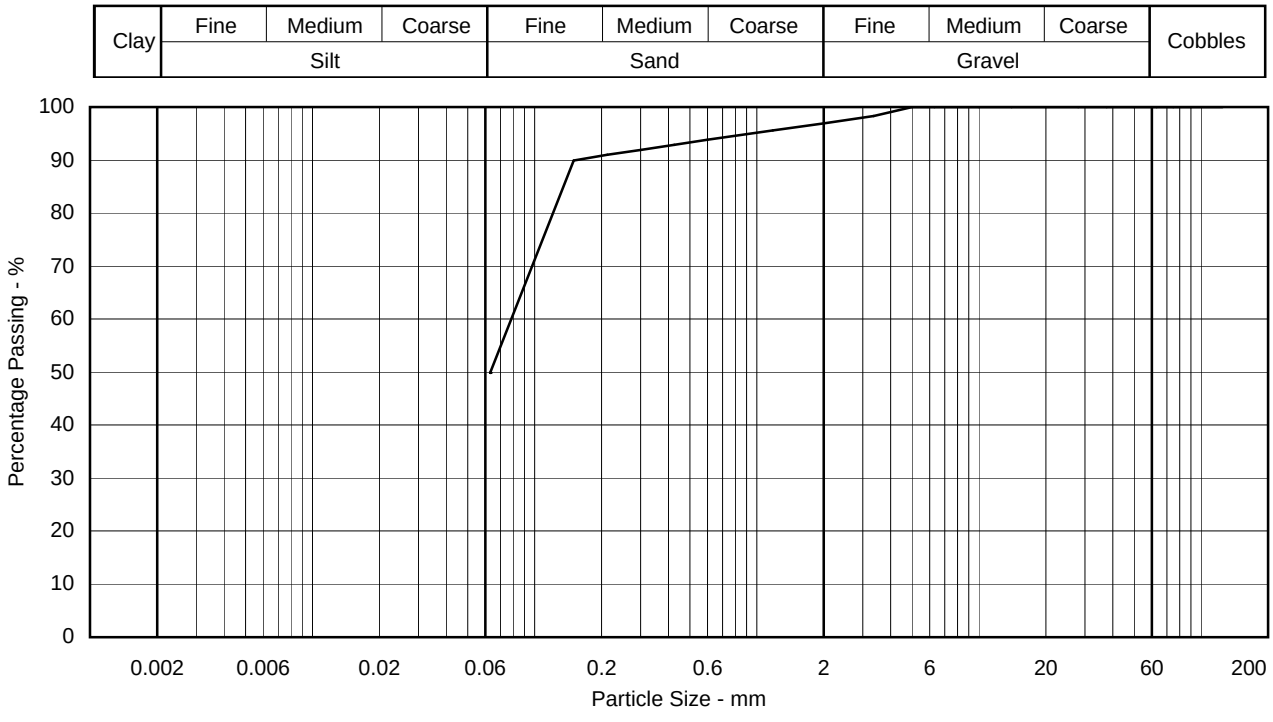
Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	98
2.00 mm	97
1.18 mm	96
600 µm	94
425 µm	93
300 µm	92
212 µm	91
150 µm	90
63 µm	50

Non Engineering Description
Brown very sandy very silty CLAY with occasional gravel. Gravel is fine.

Sample Proportions - %	
Cobbles	0.0
Gravel	3.1
Sand	47.1
Silt & Clay	49.9

Particle Diameter - mm	
D100	5.0
D60	0.078
D10	
Uniformity Coefficient	N/A

Notes



Originator	Checked & Approved
NS	S. Longmore 27/07/2017

PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990 Clause 9.2 - Wet Sieving

Figure 7

Moor Lane, Witton, Birmingham, B6 7HG

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site 728 LAND PARCELS 4+5, SPALDING

Client

Engineer

Contract No B20943

Hole TP06
Sample Ref
Depth (m) 1.00-1.50
Sample Type B

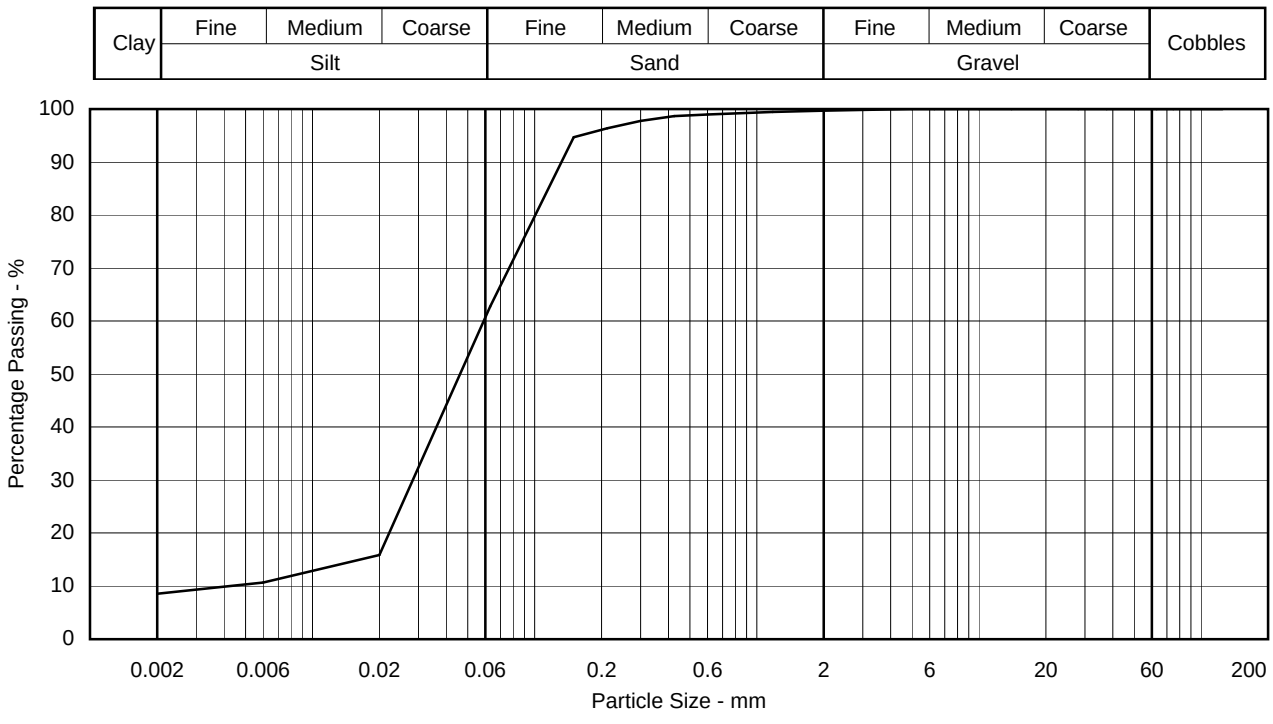
Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	99
425 µm	99
300 µm	98
212 µm	96
150 µm	95
63 µm	63
20 µm	16
6 µm	11
2 µm	8

Non Engineering Description
Brown clayey very sandy SILT.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.3
Sand	40.2
Silt	51.0
Clay	8.5

Particle Diameter - mm	
D100	5.0
D60	0.059
D10	0.0044
Uniformity Coefficient	13.4

Notes
Sedimentation sample not pre-treated



Originator	Checked & Approved
NS	S. Longmore 27/07/2017

PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990 Clause 9.2 - Wet Sieving
BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

Figure 8

T:\Project\ 01.xls

TERRA TEK
Site Investigation & Laboratory Services

Site 728 LAND PARCELS 4+5, SPALDING

Client

Engineer

Contract No B20943

Sample Identification				Lab Sample ID	Reading 1 kPa	Reading 2 kPa	Reading 3 kPa	Mean kPa	Notes
Exploratory Hole	Depth m	Sample Ref	Sample Type						
TP02	2.00-3.00		B	421353	19	12	12	12	
TP03	2.60		B	421355	9	11	11	10	
TP04	2.00-3.00		B	421356	7	9	11	9.0	

Notes Opinions and interpretations are outside the scope of UKAS accreditation

UKAS Accredited Test No

Originator	Approved
ME	SPL

HAND VANE TEST

Figure 9

Sheet 1 of 1

Moor Lane, Witton, Birmingham, B6 7HG
Lab Project No B20943 : 25/07/2017 13:35:27

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site 728 LAND PARCELS 4+5, SPALDING

Client

Engineer

Contract No B20943

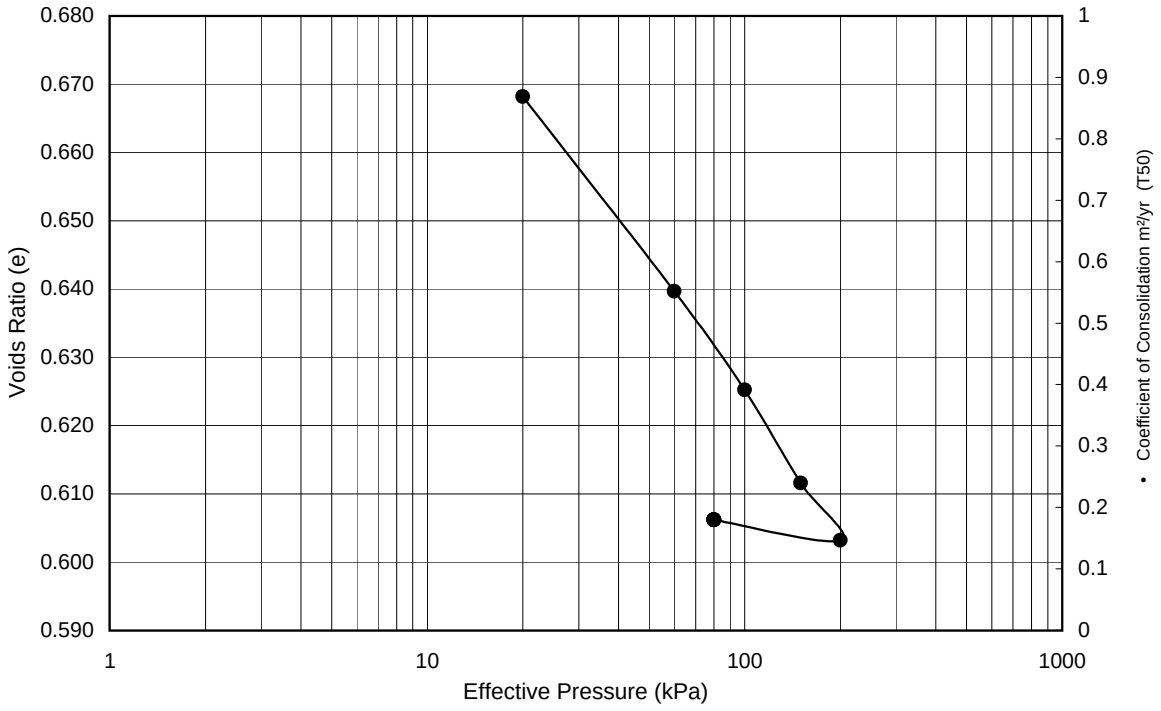
Hole ID TP02
Sample Ref
Depth (m) 2.60
Sample Type B

Non Engineering Description: Brown clayey SILT with fine sand.

Initial Moisture Content	28 %	Final Moisture Content	23 %	
Initial Voids Ratio	0.750	Final Voids Ratio	0.606	
Initial Bulk Density	2.01 Mg/m³	Particle Density	2.75 Mg/m³	Assumed
Initial Dry Density	1.57 Mg/m³	Degree of saturation	103 %	
Specimen Dimensions	19.91mm x 75.01mm dia			
Laboratory temperature	20±2°C			

Specimen taken 50mm below top of (U100) tube by vertical extrusion with horizontal orientation

Pressure Range kPa	M_v m²/MN	C_v (root time) m²/year	C_v (log time) m²/year	Voids ratio (e)	C_{sec}	Duration days
2 - 20	2.592	3.06	2.52	0.668		1
20 - 60	0.428	5.62	5.42	0.640		1
60 - 100	0.220	4.43	3.74	0.625		1
100 - 150	0.167	3.22	1.13	0.612		1
150 - 200	0.105	4.37	0.31	0.603		1
200 - 80	0.016	unable to assess	unable to assess	0.606		1



Originator	Checked & Approved
MUF	S. Langrish 27/07/2017

ONE DIMENSIONAL CONSOLIDATION
BS1377:PART 5:1990

Figure 10

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site 728 LAND PARCELS 4+5, SPALDING

Client

Engineer

Contract No B20943

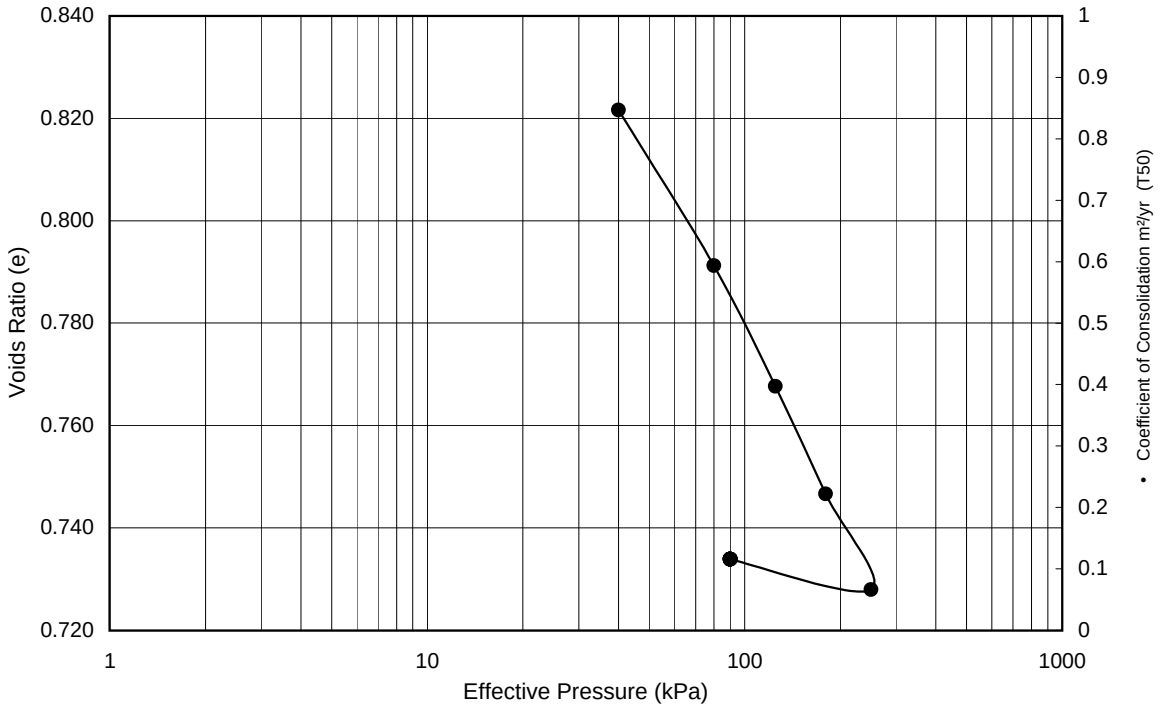
Hole ID TP04
Sample Ref
Depth (m) 2.00-3.00
Sample Type B

Non Engineering Description: Brown very sandy silty CLAY.

Initial Moisture Content	33 %	Final Moisture Content	26 %	
Initial Voids Ratio	0.942	Final Voids Ratio	0.734	
Initial Bulk Density	1.88 Mg/m³	Particle Density	2.75 Mg/m³	Assumed
Initial Dry Density	1.42 Mg/m³	Degree of saturation	97 %	
Specimen Dimensions	20.32mm x 75.17mm dia			
Laboratory temperature	20±2°C			

Specimen taken 50mm below top of (U100) tube by vertical extrusion with horizontal orientation

Pressure Range kPa	M_v m²/MN	C_v (root time) m²/year	C_v (log time) m²/year	Voids ratio (e)	C_{sec}	Duration days
2 - 40	1.635	2.99	2.58	0.822		1
40 - 80	0.417	3.96	2.73	0.791		1
80 - 125	0.293	4.53	2.73	0.768		1
125 - 180	0.216	3.87	0.86	0.747		1
180 - 250	0.153	4.31	1.21	0.728		1
250 - 90	0.022	1.61	unable to assess	0.734		1



Originator	Checked & Approved
MUF	S. Langrish 27/07/2017

ONE DIMENSIONAL CONSOLIDATION
BS1377:PART 5:1990

Figure 11