

7.0 VERIFICATION

Verification is required to be undertaken throughout the course of the remediation works. The Verification Report will be submitted to the Client, NHBC and Local Authority for formal approval and Environment Agency if requested as part of any works completed under the Definition of Waste Code of Practice.

The Verification Report will refer to the works as set out within this RSVP and as required by any relevant planning conditions. The report will detail findings of any further investigation works (if undertaken on the site) and the remedial works undertaken within proposed private gardens and areas of managed soft landscaping, as well as include relevant site based information such as records from site inspections, locations where the impacted soils were excavated and re-used on site or disposed of and validation sampling where required.

The specification, installation and validation of gas mitigation measures within houses (including garages if applicable) and services will also be presented within the verification report.

Photographs of specific remedial or waste handling measures and an audit trail for any imported subsoil and Topsoil, including source, provenance, analytical results, placement location and thickness (should subsoil and/or Topsoil be imported).

A summary of verification proposals is presented in Table 5 below.

The remedial works will be inspected and validated by the Environmental Consultant (Geo-Environmental).



Reference	Principal requirements	Design or construction related	Site visit required by Qualified Geo-Environmental Engineer	Supporting documentation
1.0 Verification general principles	Geo-Environmental have been commissioned to supervise remedial works at Cornfield Close, Littlehampton. These works require excavations of impacted Made Ground and installation of a soil cover system within private gardens and areas of soft landscaping and the installation of gas protection measures. The aforementioned work is in line with the approach adopted for site investigation and risk assessment and previously undertaken by Geo-Environmental in respect of the development.	Construction	Yes – See below	Details of construction programme to be provided by client/contractor.
2.0 Excavation of Made Ground	Reduced dig exercise to excavate Made Ground or raise the site to a depth of 650mm to be verified by Geo-Environmental.	Construction	Yes – 5 days' notice required	Regular visits to site required to confirm works being undertaken validation sampling within the natural soils following removal of the impacted material.
3.0 Cover System	Cover system to be constructed by the ground workers and inspected by the Environmental Consultant	Construction	Yes - 5 days' notice required	Samples to be taken and chemical test results presented in the report. Thickness and construction of cover system to be verified.
4.0 Gas protection measures	Gas Protection Measures to be included within proposed development to protect against methane and Carbon Dioxide identified from the onsite (wider site) former landfill.	Design and Construction	Yes - 5 days' notice required	Regular visits to site required to confirm works being undertaken and to validate the various stages of installation across the site.



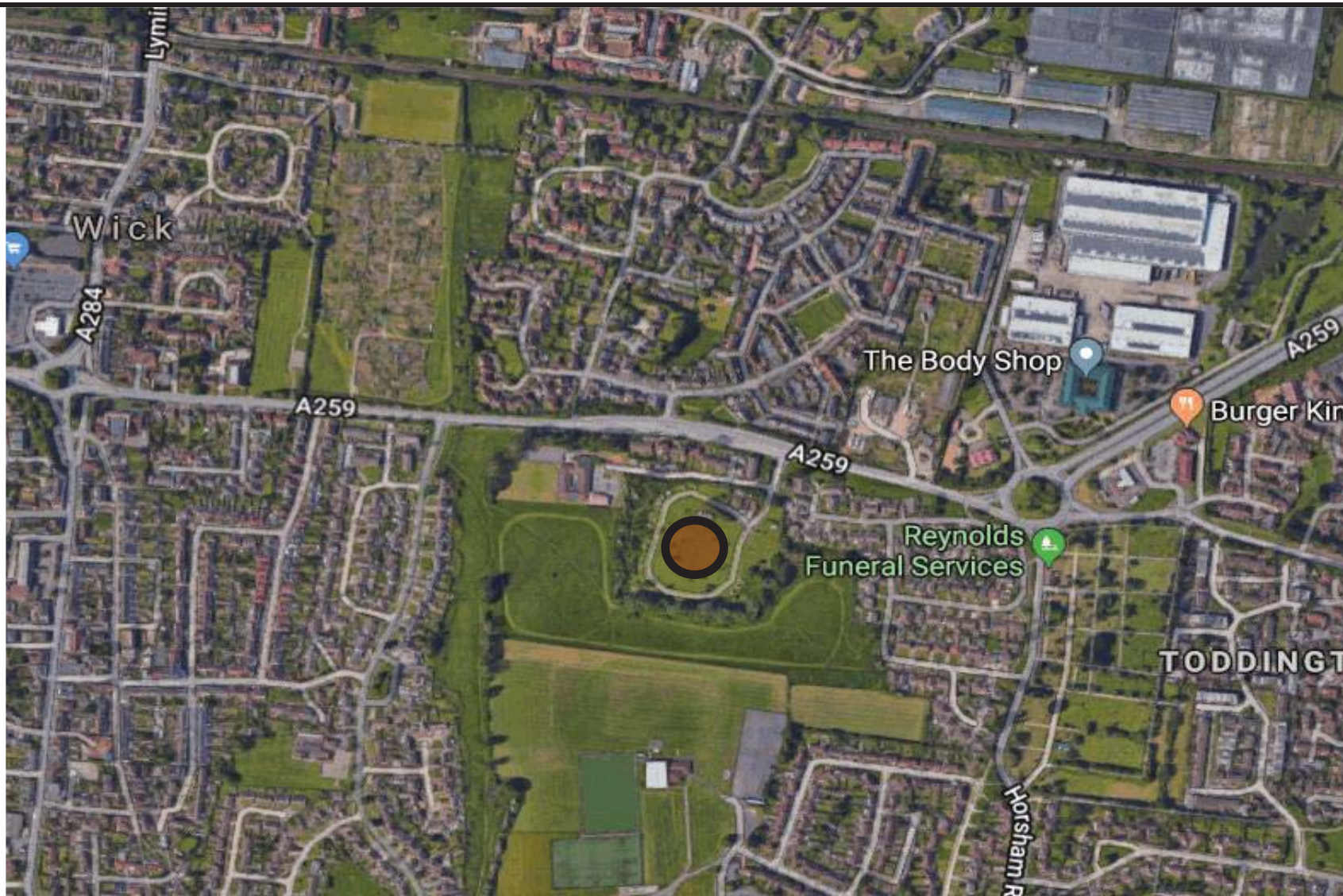
Reference	Principal requirements	Design or construction related	Site visit required by Qualified Geo-Environmental Engineer	Supporting documentation
5.0 Waste Management	Waste soils arisings from the site strip will be disposed of appropriately with WAC testing undertake once soils for disposal have been identified. The results should be presented to the landfill site prior to removal for confirmation of the classification.	Design and Construction	No (unless further testing required where 5 days' notice required)	Chemical test results (WAC)
	Waste tickets for the removal of arisings should be compiled for submission as part of the verification report for each phase of the development. The waste tickets will be required to demonstrate that the approximate amount of material being removed is equal to the summed volume on the waste tickets.			Waste tickets
	Where it is demonstrated that there is a need for materials to be re-used on site and that the risk is acceptable, soils may be re-used on site under the Definition of Waste Code of Practice under a Materials Management Plan for the site.			Records of material movements on site to be provided for inclusion in the validation report. (Assumed to be recorded by Ground workers, if not then independent inspections will be required.
6.0 Imported Soils	In-situ testing of any soils imported onto site for landscaping purposes will be carried out after placement at a frequency of one sample per 50m ³ or one sample per landscaped area (whichever is the smallest) with comparison of results to assessment criteria for residential end use.	Construction	Yes	Pre import certification verifying the chemical quality of the topsoil and subsoil to be provided to the Environmental Consultant for review prior to Importation.

Table 5 Details of verification visits required on site



FIGURES





Project:	Cornfield Close, Littlehampton			Title	Site Location Plan	
Client:	Thakeham Client			Geo-Environmental Services Ltd Unit 7 Danworth Farm, Cuckfield Road Hurstpierpoint, West Sussex BN6 9GL +44(0)1273 832972 www.gesl.net  Geo-Environmental		
Ref No:	GE17106	Revision:	v1			
Drawn:	AP	Date:	04/10/2018			
Figure:	1	Scale:	Not To Scale			

Project Title: Cornfield Close, Littlehampton

Location : Littlehampton, West Sussex

Project No. : GE17106

Client : Thakeham Client

Title : Figure 2 - Exploratory Hole Location Plan

Scale: 1:2000

Engineer: Anthony

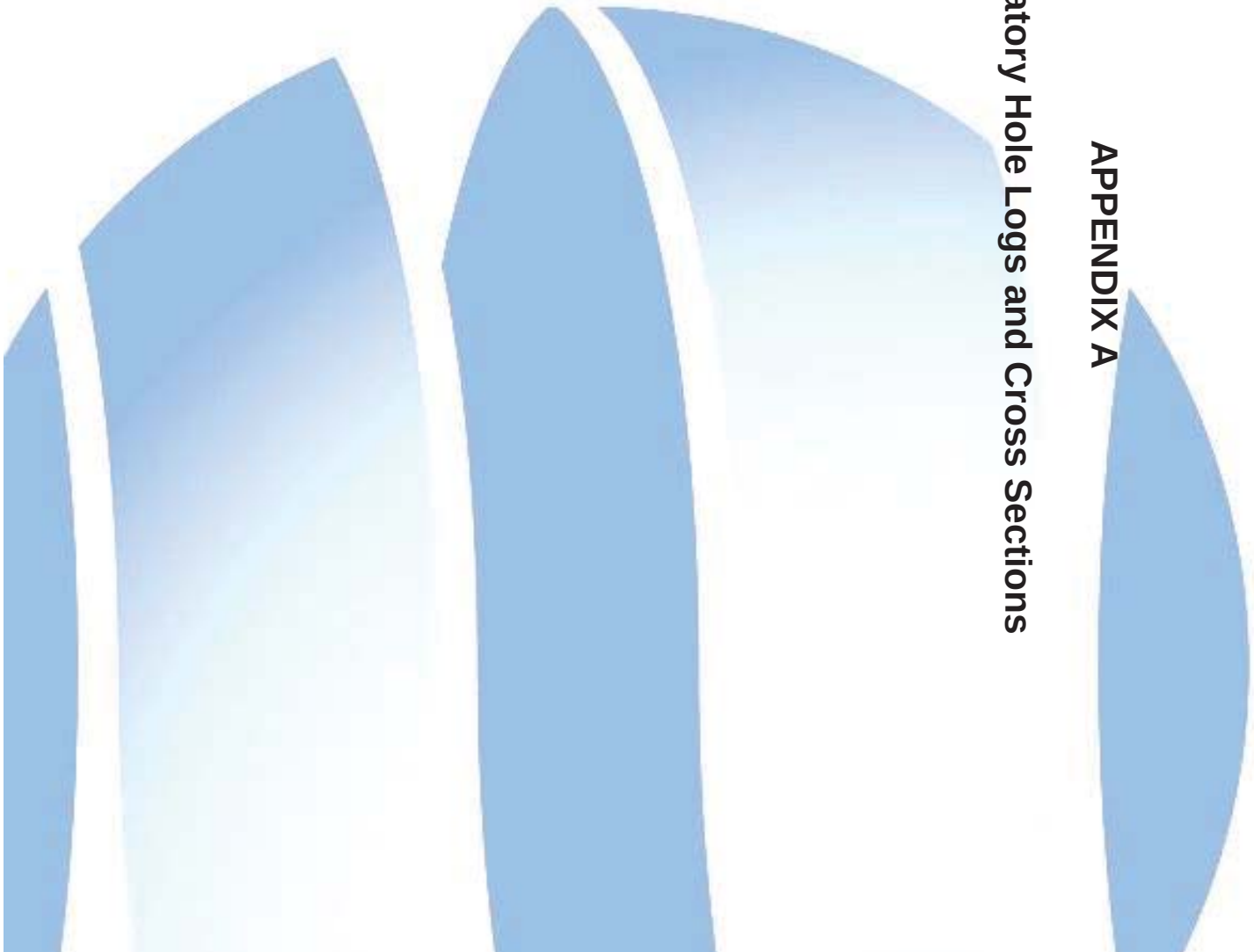


Geo-Environmental

Legend Key

- Locations By Type - Empty
- ⊕ Locations By Type - CP
- ⊕ Locations By Type - TP
- ⊕ Locations By Type - WLS
- ⊕ Locations By Type - DCP





APPENDIX A

Exploratory Hole Logs and Cross Sections



Unit 7, Danworth Farm
Hurspierpoint
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Borehole Log

Borehole No.

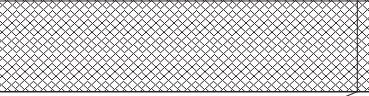
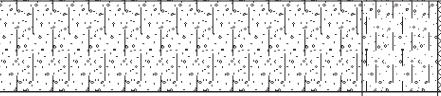
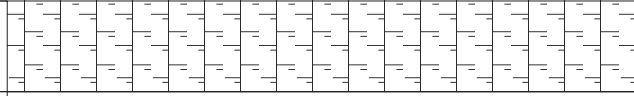
BH101

Sheet 1 of 1

Project Name:	Cornfield Close, Littlehampton	Project No.	GE171106	Co-ords:	503316E - 103288N	Hole Type	CP
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Location:	Littlehampton, West Sussex	Level:	8.03	Scale	1:50
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Client:	Thakeham Client	Dates:	15/08/2018	Logged By	AP
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30 0.30 0.50 0.80 1.00 1.00	B ES B ES B ES	N=4 (1.0/1.1, 1.1)	0.12	7.91		Grass overlying brown sandy silt. MADE GROUND Dark brown clay with brick, concrete, glass and ash. MADE GROUND	1
		1.50 - 1.95 1.50	D S						
		2.00	D						
		2.50	D						
		3.00 - 3.45 3.00	D S						
		3.50	D						
		4.00	D	N=27 (5.6/6.6, 7.8)	2.50	5.53		Brown and dark grey slightly sandy silty CLAY with rare fine gravel. RIVER TERRACE DEPOSITS	3
		4.50 - 4.95 4.50	D S						
		5.00	D						
		5.50	D						
		6.00 - 6.45 6.00	D S						
		6.50	D						
		7.00	D	N=43 (5.7/15.9, 10.9)	5.40	2.63		Recovered as structureless CHALK composed of sub-angular to rounded gravel. Clasts are weak, low to medium density, off-white within an off-white matrix. CHALK	5
		7.50 - 7.95 7.50	D S						
		8.00	D						
		8.50	D						
		9.00 - 9.45 9.00	D S						
		9.50	D						
10.00	D	N=42 (6.6/8.9, 11.14)	10.00	-1.97		End of Borehole at 10.00m	10		
Casing		Water Strikes (mbgl)	Chiselling (mbgl)	Remarks					
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to				
200	2.50	7.50	7.00						
150	10.00								







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Borehole Log

Borehole No.
BH102
Sheet 1 of 2

Project Name: Cornfield Close, Littlehampton

Project No.
GE171106

Co-ords: 503373E - 103317N

Hole Type
CP

Location: Littlehampton, West Sussex

Level: 7.85

Scale
1:50

Client: Thakeham Client

Dates: 13/08/2018

Logged By
AP

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	B	N=6 (2,2/1,1,1,3)	0.15	7.70		Grass overlying brown sandy silt. MADE GROUND Dark brown clay with brick, concrete, glass and ash. MADE GROUND	1
		0.30	ES						
		0.50	B						
		0.50	ES						
		1.00	B						
		1.00	ES						
		1.50 - 1.95	B	N=22 (4,4/5,5,5,7)	2.10	5.74		Recovered as structureless CHALK composed of sub-angular to rounded gravel. Clasts are weak, low to medium density, off-white within an off-white matrix. CHALK	2
		1.50 - 1.95	D						
		1.50 - 1.95	ES						
		1.50	C						
		2.00	D						
		2.50	D	N=18 (3,4/4,4,5,5)	2.30	5.54		3	
		3.00 - 3.45	D						
		3.00	S						
		3.50	D						
		4.00	D						
		4.50 - 4.95	D	N=18 (6,4/6,4,4,4)	3.80	4.04		4	
		4.50	S						
		5.00	D						
		6.00 - 6.45	D						
6.00	S								
6.50	D	N=53 (14, 10/9, 9, 18, 17)	4.04	4.04		5			
7.00	D								
7.50	U								
7.50 - 7.95	D								
8.00	D								
8.50	D	N=53 (14, 10/9, 9, 18, 17)	4.04	4.04		6			
9.00 - 9.45	D								
9.00	S								
9.50	D								
									7
									8
									9
									10

Casing					Remarks
Diameter	Depth (m)	Water Strikes (mhtgl)	Chiselling (mhtgl)		
		Depth Strike	Rose to	Depth from	
200	2.50	7.50	7.00		
150	15.00				

Continued on Next Sheet

Project Name: Cornfield Close, Littlehampton

Project No. GE17106

Co-ords: 503373E - 103317N

Hole Type CP

Location: Littlehampton, West Sussex

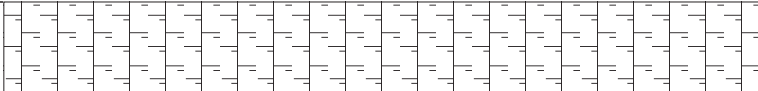
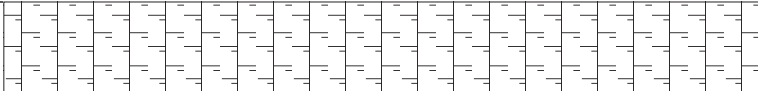
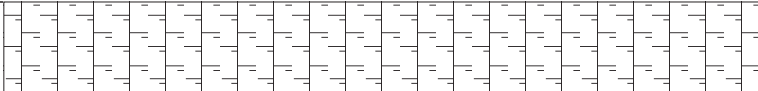
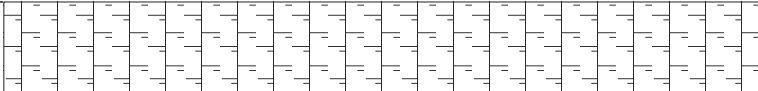
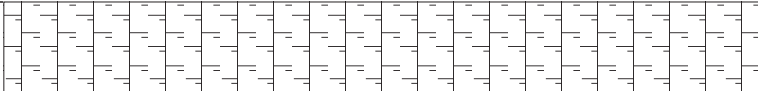
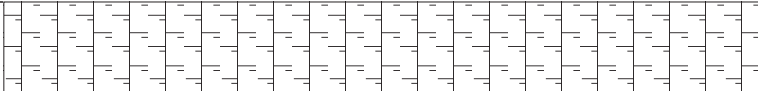
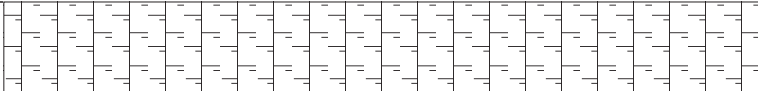
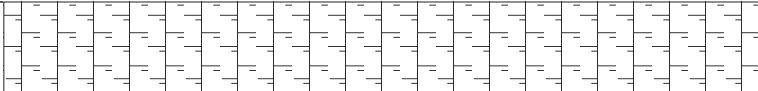
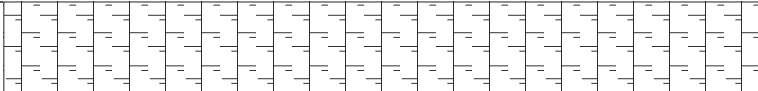
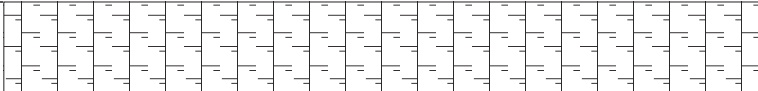
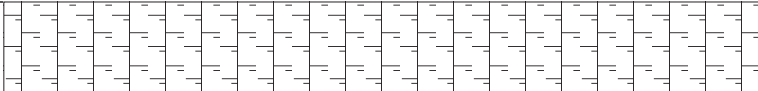
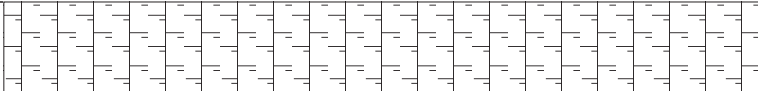
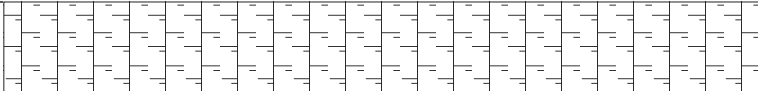
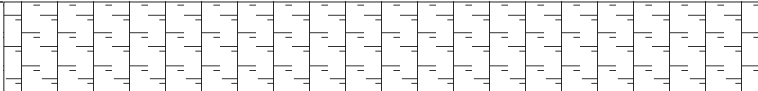
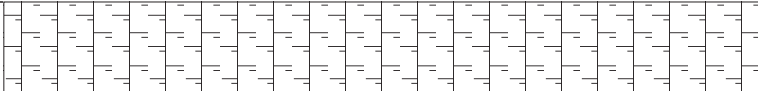
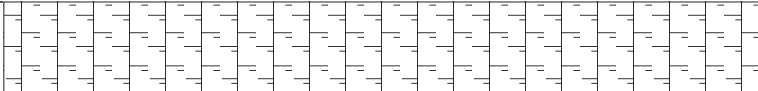
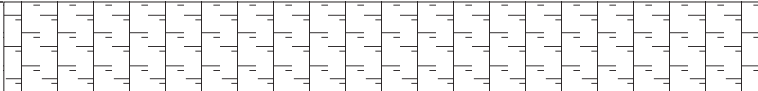
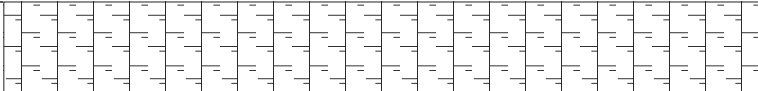
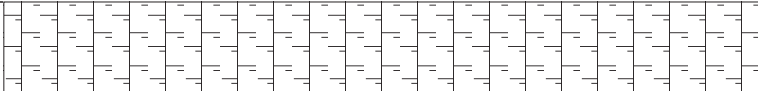
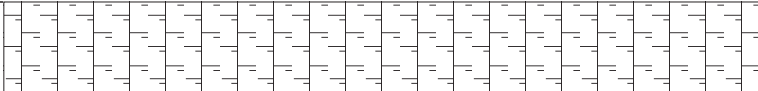
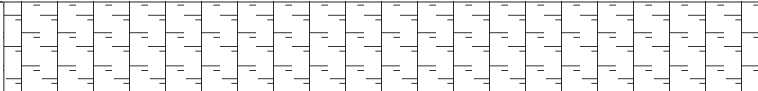
Level: 7.85

Scale 1:50

Client: Thakeham Client

Dates: 13/08/2018

Logged By AP

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		10.50	D	N=37 (8,8/7, 11, 10,9)				11		
		10.50 - 10.95	D							
		10.50	S							
		11.00	D							
										
		12.00 - 12.45	D	N=50 (7,6/12,20, 12,6)				12		
		12.00	S							
										
										
										
		13.00	D	N=50 (15,10/14, 15, 19, 2)				13		
										
		13.50 - 13.95	D							
		13.50	S							
										
		14.00	D	N=50 (10, 11/13, 13, 19, 5)				14		
										
		14.50	D							
		14.50 - 14.95	D							
		14.50	S							
15.00	D		15							



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Borehole Log

Borehole No.

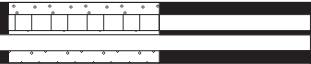
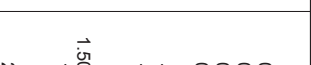
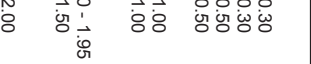
BH103

Sheet 1 of 1

Project Name: Cornfield Close, Littlehampton
Project No. GE171106
Co-ords: 503448E - 103254N
Hole Type CP

Location: Littlehampton, West Sussex
Level: 7.92
Scale 1:50

Client: Thakeham Client
Dates: 23/08/2018
Logged By

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
	0.30	B			0.12	7.80		Grass overlying brown sandy silt.	
	0.30	ES						MADE GROUND	
	0.50	B			0.60	7.32		Light brown clayey sandy silt with frequent brick and concrete fragments.	
	0.50	ES						MADE GROUND	
	1.00	B						Dark brown, dark grey and black silty clayey sand with frequent ash, glass, brick concrete, metal, plastic and timber.	
	1.00	ES						MADE GROUND	
	1.50 - 1.95	D							
	1.50	S		N=8 (2.2/2.2, 2.2)					
	2.00	D							
	2.50	B			2.40	5.52		Orange brown clayey SAND.	
	2.50	ES						RIVER TERRACE DEPOSITS	
	3.00 - 3.45	D			3.00	4.92		Medium dense brown slightly gravelly clayey SAND (gravels fine to medium and sub-angular).	
	3.00	S		N=30 (5.6/6.8, 8.8)				RIVER TERRACE DEPOSITS	
	3.50	D			3.50	4.42		Medium dense orangish brown very gravelly, very clayey SAND (gravel is fine to coarse and sub-angular).	
	4.00	D						RIVER TERRACE DEPOSITS	
	4.50 - 4.95	D							
	4.50	S		N=17 (3.3/4.4, 4.5)					
	5.00	D							
	5.50	D							
	6.00 - 6.45	D			6.20	1.72		Recovered as structureless CHALK composed of sub-angular to rounded gravel. Clasts are weak, low to medium density, off-white within an off-white matrix.	
	6.00	S		N=10 (2.2/2.3, 3.2)				CHALK	
	6.50	D							
	7.00	D							
	7.50 - 7.95	D							
	7.50	S		N=29 (4.5/7.7, 8.7)					
	8.00	D							
	8.50	D							
	9.00 - 9.45	D							
	9.00	S		N=30 (5.5/6.8, 7.9)					
	9.50	D							
	10.00	D			10.00	-2.08			
Casing					Remarks				
Diameter	Depth (m)	Water Strikes (mbgl)	Chiselling (mbgl)						
	Depth Strike	Rose to	Depth from	Depth to					
200	3.00	9.00							
150	10.00	9.00							





Borehole Log	Borehole No.
	BH104 Sheet 1 of 2

Borehole No.
BH104
Sheet 1 of 2

Project Name:	Cornfield Close, Littlehampton GE17 1UG	Project No.	Co-ords:	503345E - 103287N	Hole Type
					CP

Location:	Littlehampton, West Sussex	Level:	8. 13	Scale	1:50
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Client:	Thakeham Client	Dates:	14/08/2018	Logged By
				AP

Dates: 14/08/2018

Logged By
AP

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30 0.30 0.50 0.50 1.00 1.00	B ES B ES B ES		0.18	7.95		Grass overlying brown sandy silt. MADE GROUND Light brown clayey sandy silt with frequent brick and concrete fragments. MADE GROUND	1
		1.50 - 1.80 1.50	D S	N=12 (4,4/4,4,2,2)	1.60	6.53		Dark brown clay with brick, concrete, glass and ash. MADE GROUND	2
		2.00	D						
		2.50	D						
		3.00 - 3.45 3.00	D S	N=20 (1,3/4,5,5,6)	2.90	5.23		Medium dense brown very clayey SAND with rare fine gravel. RIVER TERRACE DEPOSITS	3
		3.50	D		3.50	4.63		Medium dense brown slightly clayey silty gravelly SAND (gravel is fine to medium and sub-angular). RIVER TERRACE DEPOSITS	4
		4.50 - 4.95 4.50	D S	N=30 (5,5/7,7,7,9)					5
		5.00	D						
		5.50	D		5.80	2.33			
		6.00 - 6.45 6.00	D S	N=35 (5,8/8,9,9,9)				Recovered as structureless CHALK composed of sub-angular to rounded gravel. Clasts are weak, low to medium density, off-white within an off-white matrix. CHALK	6
		6.50	D						
		7.00	D						7
		7.50 - 7.95 7.50	D S	N=33 (4,5/8,8,8,9)					8
		8.00	D						9
		9.00 9.00 - 9.45 9.00	D D S	N=47 (7,7/7,8,16,16)					10
	10.00	D							
Continued on Next Sheet									
Remarks									
Casing		Water Strikes (mbgl)	Chiselling (mbgl)						
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to				
200	3.00	9.00	9.00						
150	15.00								





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Borehole Log

Borehole No.
BH104
Sheet 2 of 2

Project Name: Cornfield Close, Littlehampton

Project No.
GE177106

Co-ords: 503345E - 103287N

Hole Type
CP

Location: Littlehampton, West Sussex

Level: 8.13

Scale
1:50

Client: Thakeham Client

Dates: 14/08/2018

Logged By
AP

[illegible]



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Hurspierpoint
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Borehole Log

Borehole No.
BH105
Sheet 1 of 1

Project Name:	Cornfield Close, Littlehampton	Project No. GE171106	Co-ords:	503410E - 103272N	Hole Type CP
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Location:	Littlehampton, West Sussex	Level:	8.39	Scale 1:50
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Client:	Thakeham Client	Dates:	22/08/2018	Logged By
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.30 0.30 0.50 0.50	B ES B ES		0.17	8.22		Grass overlying brown sandy silt. MADE GROUND		
		1.00 1.00	B ES		0.70	7.69		Light brown clayey sandy silt with frequent brick and concrete fragments. MADE GROUND		
		1.50 - 1.95 1.50	D S	N=24 (2,4/4,7,7,6)				Dark brown, dark grey and black silty clayey sand with frequent ash, glass, brick concrete, metal, plastic and timber. MADE GROUND		
		2.00	D							
		2.50	D		2.50	5.89		Orange brown sandy CLAY. RIVER TERRACE DEPOSITS		
		3.00 - 3.45 3.00	D S	N=12 (2,2/2,3,3,4)	2.90	5.49		Medium dense orange brown medium SAND. RIVER TERRACE DEPOSITS		
		3.50	D		3.50	4.89		Medium dense orangish brown gravelly clayey SAND (gravel is fine to coarse and sub-rounded to sub-angular). RIVER TERRACE DEPOSITS		
		4.00	D							
		4.50 - 4.95 4.50	D S	N=11 (2,2/3,2,3,3)				Medium dense orange brown clayey SAND with occasional flint gravel and rare chalk nodules. RIVER TERRACE DEPOSITS		
		5.00	D							
		5.50	D		5.80	2.59		Recovered as structureless CHALK composed of sub-angular to rounded gravel. Clasts are weak, low to medium density, off-white within an off-white matrix. CHALK		
		6.00 - 6.45 6.00	D S	N=29 (4,6/6,6,8,9)				Recovered as structureless CHALK composed of sub-angular to rounded gravel. Clasts are weak, low to medium density, off-white within an off-white matrix. CHALK		
		6.50	ES					Recovered as structureless CHALK composed of sub-angular to rounded gravel. Clasts are weak, low to medium density, off-white within an off-white matrix. CHALK		
		7.00 7.00	D ES		7.00	1.39		Recovered as structureless CHALK composed of sub-angular to rounded gravel. Clasts are weak, low to medium density, off-white within an off-white matrix. CHALK		
		7.50 - 7.95 7.50	D S	N=28 (3,4/9,6,6,7)				Recovered as structureless CHALK composed of sub-angular to rounded gravel. Clasts are weak, low to medium density, off-white within an off-white matrix. CHALK		
		8.00	D					Recovered as structureless CHALK composed of sub-angular to rounded gravel. Clasts are weak, low to medium density, off-white within an off-white matrix. CHALK		
		9.00 - 9.45 9.00	D S	N=50 (4,6/13,13,14,10)				Recovered as structureless CHALK composed of sub-angular to rounded gravel. Clasts are weak, low to medium density, off-white within an off-white matrix. CHALK		
		9.50	D					Recovered as structureless CHALK composed of sub-angular to rounded gravel. Clasts are weak, low to medium density, off-white within an off-white matrix. CHALK		
		10.00	D		10.00	-1.61		End of Borehole at 10.00m		
Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks				
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to					
200	3.00	7.50	7.50							
150	10.00									



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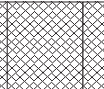
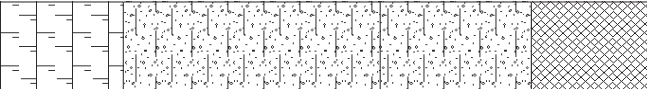
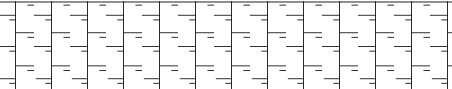
Borehole Log

Borehole No.
BH106
Sheet 1 of 1

Project Name:	Cornfield Close, Littlehampton	Project No. GE171106	Co-ords:	503423E - 103210N	Hole Type CP
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Location:	Littlehampton, West Sussex	Level:	7.60	Scale 1:50
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Client:	Thakeham Client	Dates:	22/08/2018	Logged By
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30 0.30 0.50 0.50	B ES B ES	N=7 (1,1/2,1,2,2)	0.15	7.45		Grass overlying brown sandy silt. MADE GROUND Light brown clayey sandy silt with frequent brick and concrete fragments. MADE GROUND Dark brown, dark grey and black silty clayey sand with frequent ash, glass, brick concrete, metal, plastic and timber. MADE GROUND	1
		1.00 1.00	B ES						
		1.50 - 1.95 1.50	D S						
		2.00	D						
		2.50	D						
		3.00 - 3.45 3.00	D S		2.80	4.80	Very soft orangish brown slightly gravelly sandy CLAY (gravel is fine to medium and sub-angular). RIVER TERRACE DEPOSITS	3	
		3.50	D						
		4.00	D		3.80	3.80	Loose orangish brown very clayey gravelly SAND (gravel is fine to coarse and sub-angular). RIVER TERRACE DEPOSITS	4	
		4.50 - 4.95 4.50	D S						
		5.00	D						
		5.50	D		5.50	2.10		Recovered as structureless CHALK composed of sub-angular to rounded gravel. Clasts are weak, low to medium density, off-white within an off-white matrix. CHALK	6
		6.00 - 6.45 6.00	D S						
		6.50	D						
		7.00	D						
		7.50 - 7.95 7.50	D S						
		8.00	D					8	
		8.50	D						
		9.00 - 9.45 9.00	D S						9
		9.50	D						
		10.00	D	10.00	-2.40		End of Borehole at 10.00m	10	
Remarks									
Casing		Water Strikes (mbgl)	Chiselling (mbgl)						
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to				
200	3.00	7.50	7.50						
150	10.00								

AGS





Borehole Log	Borehole No.
	BH107 Sheet 1 of 2

Project No. GE17106	Co-ords: 503335E - 103245N	Hole Type CP
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Level:	8.04	Scale
		1.50

Dates:	16/08/2018	Logged by	AD
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[illegible]



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Borehole Log

Borehole No.
BH107
Sheet 2 of 2

Project Name: Cornfield Close, Littlehampton

Project No.
GE177106

Co-ords: 503335E - 103245N

Hole Type
CP

Location: Littlehampton, West Sussex

Level: 8.04

Scale
1:50

Client: Thakeham Client

Dates: 16/08/2018

Logged By
AP

[illegible]



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Borehole Log

Borehole No. **BH108**
Sheet 1 of 2

Project Name: Cornfield Close, Littlehampton

Project No.
GE177106

Co-ords: 503297E - 103196N

Hole Type
CP

Location: Littlehampton, West Sussex

Level: 8.34

Scale
1:50

Client: Thakeham Client

Dates: 20/08/2018

Logged By
AP

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30 0.30 0.50 0.50 1.00 1.00	B ES B ES B ES		0.15 0.70 8.19 7.64	 MADE GROUND Light brown clayey sandy silt with frequent brick and concrete fragments. MADE GROUND Dark brown and dark grey clayey sand with frequent ash, brick, concrete, fabric, metal, timber and glass. MADE GROUND		1	
		1.50 - 1.95 1.50 - 1.95 1.50 2.00	B ES C D	N=3 (1, 1/1, 1, 0, 1)	2.40 5.94	 Very soft brown mottled dark grey slightly gravelly silty sandy CLAY (gravel is fine to medium and sub-angular). RIVER TERRACE DEPOSITS		2	
		3.00 - 3.45 3.00	D S	N=6 (1, 1/1, 2, 2, 1)	3.10 5.24		Loose orange brown medium SAND. RIVER TERRACE DEPOSITS	3	
		3.50 4.00	D D					4	
		4.50 - 4.95 4.50	D S	N=6 (1, 1/1, 2, 2, 1)	4.50 3.84	 Loose light brown and orange brown slightly clayey SAND with frequent flint gravel. RIVER TERRACE DEPOSITS		5	
		5.00 5.50	D D						
		6.00 - 6.45 6.00	D S	N=7 (1, 1/1, 2, 2, 2)	6.00 2.34		Recovered as structureless CHALK composed of sub-angular to rounded gravel. Clasts are weak, low to medium density, off-white within an off-white matrix. CHALK	6	
		6.50 7.00	D D					7	
		7.50 - 7.95 7.50	D S	N=23 (6, 7/6, 6, 5, 6)				8	
		8.00 8.50	D D						
		9.00 - 9.45 9.00	D S	N=29 (9, 11/7, 7, 7, 8)				9	
		9.50 10.00	D D						
									10
	Continued on Next Sheet								
	Remarks								
Casing	Depth (m)	Water Strikes (mbgl)	Depth Strike	Rose to	Chiselling (mbgl)	Depth to			
Diameter	3.00	7.50		7.50					
200	15.00								
150									



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Borehole Log

Borehole No.
BH108
Sheet 2 of 2

Project Name: Cornfield Close, Littlehampton

Project No.
GE177106

Co-ords: 503297E - 103196N

Hole Type	CP
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Location: Littlehampton, West Sussex

Level: 8.34

Scale
1:50

Client: Thakeham Client

Dates: 20/08/2018

Logged By
AP

[illegible]



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Borehole Log

Borehole No.
BH109
Sheet 1 of 1

Project Name:	Cornfield Close, Littlehampton	Project No. GE171106	Co-ords: 503368E - 103217N	Hole Type CP
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Location:	Littlehampton, West Sussex	Level: 7.91	Scale 1:50
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Client:	Thakeham Client	Dates: 16/08/2018	Logged By AP
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description					
		Depth (m)	Type	Results									
		0.30	B	N=9 (1.3/3.2, 2.3, 1)	0.12		Grass overlying brown sandy silt. MADE GROUND Dark brown clay with brick, concrete, glass and ash. MADE GROUND	1					
		0.30	ES										
		0.50	B										
		0.50	ES										
		1.00	B										
		1.00	ES										
		1.50 - 1.95	B	N=7 (3.3/2.2, 2.2, 1)	2.80		Loose brown gravelly clayey SAND (gravel is fine to medium and sub-angular to sub-rounded). RIVER TERRACE DEPOSITS	3					
		1.50 - 1.95	ES										
		1.50	C										
		2.00	D										
		2.50	D										
		3.00 - 3.45	D	N=14 (2.3/3.3, 3.4, 4)	3.80		Soft brown slightly gravelly sandy CLAY (Gravel is fine to medium and sub-angular). RIVER TERRACE DEPOSITS	4					
		3.00	S										
		3.50	D										
		4.00	D										
		4.50 - 4.95	D										
		4.50	S	N=21 (3.4/4.5, 5.5, 7)	5.50		Orange brown medium SAND and flint gravel. RIVER TERRACE DEPOSITS	5					
		5.00	D										
		5.50	D										
		6.00 - 6.45	D										
		6.00	S										
6.50	D	N=43 (4.8/8, 8.8, 9)	5.70		Recovered as structureless CHALK composed of sub-angular to rounded gravel. Clasts are weak, low to medium density, off-white within an off-white matrix. CHALK	6							
7.00	D												
7.50 - 7.95	D												
7.50	S												
8.00	D												
8.50	D												
9.00 - 9.45	D												
9.00	S												
9.50	D												
10.00	D												
Remarks								7					
End of Borehole at 10.00m								8					
Casing								9					
Diameter	Depth (m)	Water Strikes (mbgl)	Depth Strike	Rose to	Chiselling (mbgl)	Depth from	Depth to	10					
200	3.00	7.50	7.50										
150	10.00												





Borehole Log	Borehole No.
	BH110
	Sheet 1 of 2

Project No. GE17106	Co-ords: 503393E - 103181N	Hole Type CP
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Level:	7.83	Scale	1:50
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		Logged By AP
Dates:	21/08/2018	

Well	Water Stikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30 0.30 0.50 0.50	B ES B ES		0.17	7.66		Grass overlying brown sandy silt. MADE GROUND	1
		1.00 1.00	B ES		0.70	7.13		Light brown clayey sandy silt with frequent brick and concrete fragments. MADE GROUND	
		1.50 - 1.95 1.50	D S	N=4 (1,0/1,1,1,1)				Dark brown and dark grey clayey sand with frequent ash, brick, concrete, fabric, metal, timber and glass. MADE GROUND	
		2.00	D						
		2.50	D		2.50	5.33			2
		3.00 - 3.45 3.00	D S	N=6 (1,1/1,2,1,2)	3.00	4.83		Greenish grey and grey mottled slightly gravelly silty sandy CLAY (gravel is fine to medium and sub-angular to sub-rounded). RIVER TERRACE DEPOSITS	
		3.50	D					Loose to medium dense light brown and orange brown slightly clayey SAND with frequent flint gravel. RIVER TERRACE DEPOSITS	
		4.00	D						3
		4.50 - 4.95 4.50	D S	N=11 (2,2/2,3,3,3)	4.60	3.23			
		5.00	D						
		5.50	D						4
		6.00 - 6.45 6.00	D S	N=38 (3,3/9,8,11,10)				Recovered as structureless CHALK composed of sub-angular to rounded gravel. Clasts are weak, low to medium density, off-white within an off-white matrix. CHALK	
		6.50	D						
		7.00	D						5
		7.50 - 7.95 7.50	D S	N=25 (4,5/5,6,7,7)					
		8.00	D						
		8.50	D						6
		9.00 - 9.45 9.00	D S	N=29 (6,6/6,8,7,8)					
		9.50	D						
	10.00	D						7	
								8	
								9	
								10	
Casing		Water Stikes (mbgl)	Chiselling (mbgl)	Remarks					
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to				
200	3.00	9.00	9.00						
150	15.00								
AGS									



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Borehole Log

Borehole No.
BH110
Sheet 2 of 2

Project Name: Cornfield Close, Littlehampton

Project No.
GE171106

Co-ords: 503393E - 103181N

Hole Type
CP

Location: Littlehampton, West Sussex

Level: 7.83

Scale
1:50

Client: Thakeham Client

Dates: 21/08/2018

Logged By
AP

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		10.50 - 10.95 10.50	D S	N=28 (12,12/7,6,6,9)					11
		11.00	D						
		11.50	D						
		12.00 - 12.45 12.00	D S	N=32 (6,14/6,8,8,10)					
		12.50	D						
		13.00	D						
		13.50 - 13.95 13.50	D S	50 (15,10/50 for 150mm)					
		14.00	D						
		14.50 - 14.95 14.50	D S	N=32 (8,10/9,9,6,8)					
		15.00	D						
					15.00	-7.17		End of Borehole at 15.00m	15
									16
									17
									18
									19
									20

Casing Diameter Depth (m) Water Strikes (mbgl) Depth Strike Rose to Chiselling (mbgl) Depth from Depth to

200 3.00 150 9.00 9.00





Trial Pit Log

TrialPit No
DCP14
Sheet 1 of 1

○

Trial Pit Log

Project No.	Co-ords: 503320.39 - 103212.94
GE17106	Level: 8.40

Date
15/08/2018

Dimensions
(m):

Scale
1:25Depth
0.60Logge
AP

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10			0.10	8.30		Grass overlying dark brown sandy silt. MADE GROUND
							Light brown very sandy silt with brick and concrete fragments. MADE GROUND
	0.60			0.60	7.80		End of Pit at 0.60m
	</						



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Trial Pit Log

TrialPit No
DCP15
Sheet 1 of 1

Project Cornfield Close, Littlehampton
Name:

Project No.
GE17106

Co-ords: 503317.81 - 103236.41
Level: 8.08

Date
15/08/2018

Location: Littlehampton, West Sussex

Dimensions

(m):

Depth
0.60

Scale
1:25

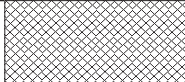
Logged
AP

Client: Thakeham Client

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					

0.60

7.48



Dark brown and black silty sand with brick, concrete and glass.
MADE GROUND

End of Pit at 0.60m

1
2
3
4
5

Version 3.0 12/16

Remarks

Stability





Trial Pit Log

TrialPit No
DCP17
Sheet 1 of 1

C

Trial Pit Log

Project No.	Co-ords: 5033322.07 - 103280.53
GE17106	Level: 8.21

Co-ords: 503322.07 - 103280.53
Level: 8.21

Date
15/08/2018

Dimensions (m):

Scale
1:25

Depth 0.60

1881

[illegible]



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Trial Pit Log

TrialPit No
DCP19
Sheet 1 of 1

Project Cornfield Close, Littlehampton
Name:

Project No.
GE17106

Co-ords: 5033325.48 - 103308.59
Level: 7.76

Date
15/08/2018

Location: Littlehampton, West Sussex

Dimensions
(m):

Depth
0.60

Scale
1:25
Logged
AP

Client: Thakeham Client

Samples & In Situ Testing

Water
Strike

Depth

Type

Results

Depth
(m)

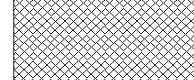
Level
(m)

Legend

Stratum Description

Dark brown and black silty sand with brick, concrete and
glass.
MADE GROUND

End of Pit at 0.60m



0.60

7.16

1
2
3
4
5

Version 3.0 (Rev 1)

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Remarks

Stability





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Trial Pit Log

Trial Pit No
DCP2
Sheet 1 of 1

Project Cornfield Close, Littlehampton
Name:

Project No.
GE171106

Co-ords: 503444.94 - 103290.96
Level: 7.60

Date
15/08/2018

Location: Littlehampton, West Sussex

Dimensions
(m):

Depth
0.60

Scale
1:25
Logged
AP

Client: Thakeham Client

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.12	7.48		Grass overlying dark brown sandy silt. MADE GROUND	
							Light brown very sandy silt with brick and concrete fragments. MADE GROUND	
				0.58 0.60	7.02 7.00		Dark brown and black silty sand with brick, concrete and glass. MADE GROUND	
							End of Pit at 0.60m	

Remarks

Stability





Trial Pit Log

TrialPit No
DCP20
Sheet 1 of 1

○

Trial Pit Log

Project No:	Co-ords: 503345.35 - 103296.07
GE17106	Level: 8.10

Co-ords: 503345.35 - 103296.07
Level: 8.10

Date
15/08/2018

Dimensions (m):

Scale
1:25

Depth 0.60

146

Logged
AP

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.15	7.94		Grass overlying dark brown sandy silt. MADE GROUND
							Light brown very sandy silt with plastic, brick and concrete fragments.
							MADE GROUND
				0.60	7.50		
							End of Pit at 0.60m
Open Shovel Water Struck Remarks Stability							
AGS							



Trial Pit Log

TrialPit No
DCP21
Sheet 1 of 1

○

Trial Pit Log

Date
15/08/2018

Co-ords: 503377.57 - 103287.96
Level: 7.94

Date
15/08/2018

Dimensions
(m):

Depth
0.60

Logged
AP

[illegible]



Trial Pit Log

Trial Pit No
DCP24
Sheet 1 of 1

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Project Name: Cornfield Close, Littlehampton

Project No.
GE17106

Co-ords: 503416.89 - 103280.00
Level: 8.25

Date
15/08/2018

Location: Littlehampton, West Sussex

Dimensions
(m):

Client: Thakeham Client

0.60

188

Logged
AP

Samples & In Situ Testing

Stratum Description

Water	
Strike	

Type

Re

Depth (m)

Level
(m)

Legend

Grass overlying dark brown sandy silt.
MADE GROUND

Dark brown very sandy silt with brick and concrete fragments.
MADE GROUND

End of Pit at 0.60m

Remarks

	Water Surface	
Depth Station		

Depth Strike

Water Surveys	
Depth (m)	Pressure (mb)
0	0.0
10	1.0
20	2.0
30	3.0
40	4.0
50	5.0
60	6.0
70	7.0
80	8.0
90	9.0
100	10.0

Stability





Trial Pit Log

TrialPit No
DCP7
Sheet 1 of 1

○

Trial Pit Log

Project No:	Co-ords: 503418.01 - 103200.40
GE17106	Level: 7.56

Date
15/08/2018

Dimensions (m):

Scale
1:25

Depth 0.60

156

Logged
AP

[illegible]



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Trial Pit Log

Trial Pit No
TP101
Sheet 1 of 1

Project Cornfield Close, Littlehampton
Name:

Project No.
GE171106

Co-ords: 503457.00 - 103291.00
Level:

Date
12/04/2018

Location: Littlehampton, West Sussex

Dimensions
(m):
Depth 2.90

Scale
1:25
Logged
WH

Client: Thakeham Client

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.70			Turf over soft brown slightly sandy slightly gravelly silt with abundant rootlets (to 0.2m). Gravel is fine to coarse fragments of flint, brick, glass, nail, concrete, and tiles MADE GROUND	1
				1.50			LANDFILL: Dark brown to black including sand, fragments of brick and concrete, metal, fabric, glass bottles and plastic. With frequent roots. MADE GROUND	2
				2.40			Brownish yellow slightly silty gravelly SAND. Gravel is fine to medium rounded to sub-angular flint. RIVER TERRACE DEPOSITS	3
				2.90			Soft to firm brownish yellow and orange mottled slightly gravelly sandy CLAY. Gravel is fine to medium rounded to sub-angular flint. RIVER TERRACE DEPOSITS	4
							End of Pit at 2.90m	5
Remarks Groundwater not encountered. Soakage test carried out within natural material.								
Stability Unstable within the landfill								





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BN6 9GL
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Trial Pit Log

Trial Pit No
TP102
Sheet 1 of 1

Project Cornfield Close, Littlehampton
Name:

Project No.
GE171106

Co-ords: 503422.00 - 103179.00
Level:

Date
12/04/2018

Location: Littlehampton, West Sussex

Dimensions
(m):

Depth 3.00

0.50

2.30

Scale
1:25

Logged
WH

Client: Thakeham Client

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.25			Turf over brown slightly sandy gravelly silt. Gravel is fine to coarse fragments of flint, brick, glass, and concrete. MADE GROUND	1
				2.10			LANDFILL: Dark brown to black including sand, fragments of brick and concrete, metal, fabric, glass bottles, plastic and wood. With occasional roots. MADE GROUND	2
				3.00			Soft orangeish brown and grey mottled sandy fissured CLAY with occasional red staining. RIVER TERRACE DEPOSITS	3
							End of Pit at 3.00m	4
								5

Remarks Groundwater not encountered. Soakage test carried out within natural material.

Stability Unstable within the landfill





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Trial Pit Log

Trial Pit No
TP103
Sheet 1 of 1

Project Name: Cornfield Close, Littlehampton

Project No.
GE17106

Co-ords: 503450.00 - 103224.00
Level:

Date
12/04/2018

Location: Littlehampton, West Sussex

Dimensions (m):
Depth 3.00

Scale
1:25
Logged
WH

Client: Thakeham Client

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.25			Turf over brown gravelly slightly sandy clay with frequent rootlets. Gravel is fine to medium rounded to sub-angular flint. MADE GROUND	1
				2.30			Orange and yellow clayey slightly gravelly SAND. Gravel is fine to medium rounded to sub-angular flint. RIVER TERRACE DEPOSITS	2
				3.00			End of pit at 3.00m	3
								4
								5



Depth Scale
1.90 2.50

Remarks
Black malodorous water encountered at 1.9m bgl. Filled pit to 2.5m bgl after 60 minutes. Soakage test abandoned due to perched water.

Stability
Unstable within the landfill





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Trial Pit Log

Trial Pit No
TP201
Sheet 1 of 1

Project Cornfield Close, Littlehampton
Name:

Project No.
GE17106

Co-ords: 5033390.54 - 103230.52
Level: 7.91

Date
13/08/2018

Location: Littlehampton, West Sussex

Dimensions
(m):

Depth
4.40

Scale
1:25
Logged
AP

Client: Thakeham Client

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.12			0.12	7.79		Grass overlying dark brown slightly sandy clayey silt. MADE GROUND	1
	0.70			0.70	7.21		Brown slightly clayey sandy silt with brick and concrete fragments. MADE GROUND	2
	1.80 1.80	B ES					Dark brown clayey silty sand with frequent glass, occasional timber, fabric, brick, concrete, plastic and metal cable. MADE GROUND	3
	2.70			2.70	5.21		Orange brown very sandy friable CLAY. RIVER TERRACE DEPOSITS	4
	3.90			3.90	4.01		Dark yellow and orange brown SAND with occasional fine to coarse sub-rounded flint gravel. RIVER TERRACE DEPOSITS	5
	4.40			4.40	3.51		End of Pit at 4.40m	
Remarks Groundwater not encountered, backfilled with arisings.								
Stability								





Trial Pit No
TP202
Sheet 1 of 1

Sheet 1 of 1

Project No.
GE17106

Date
13/08/2018

Dimensions (m):

Scale 1:25

Depth
2.20

Logged





Trial Pit Log

TrialPit No
TP203
Sheet 1 of 1

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Project Name: Cornfield Close, Littlehampton

Project No.
GE17106

Co-ords: 503414.27 - 103301.30
Level: 8.09

Date
14/08/2018

Location: Littlehampton, West Sussex

Dim: (m):

Client: Thakeham Client

Depth
2.00

1003

Scale 1:25
Logged

[illegible]



Unit 7, Danworth Farm
Hurstpierpoint
BN6 9GL
Geo-Environmentalwww.gesi.net

Trial Pit Log

Trial Pit No
TP205
Sheet 1 of 1

Project Cornfield Close, Littlehampton
Name:

Project No.
GE17106

Co-ords: 503404.75 - 103259.25
Level: 8.19

Date
14/08/2018

Location: Littlehampton, West Sussex

Dimensions
(m):

Depth
4.60

Scale
1:25
Logged
AP

Client: Thakeham Client

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
0.10		ES		0.15	8.04		Grass overlying dark brown slightly sandy clayey silt. MADE GROUND	
0.50		ES		0.65	7.54		Brown sandy silt/silty sand with frequent brick and concrete fragments and rare pieces of metal. MADE GROUND	
1.00		ES					Dark grey, black and dark brown clayey sand, sandy clay with frequent ash and glass and occasional plastic, metal, clay tile, brick, concrete, fabric and sandy clay bands. MADE GROUND	1
1.50		ES						
2.00		ES		2.10	6.08		Dark grey friable sandy clay with a slight organic malodour. MADE GROUND	2
2.50		ES		2.70	5.48		Orange brown very sandy CLAY. RIVER TERRACE DEPOSITS	
3.00		ES					Orange brown medium SAND. RIVER TERRACE DEPOSITS	
				4.60	3.58		End of Pit at 4.60m	
								5

Remarks Groundwater not encountered, backfilled with arisings.

Stability





TP206

Sheet 1 of 1

Project No.	Co-ords: 503410.61 - 103171.35
GE17106	Level: 7.34

Date
14/08/2018

Dimensions (m):

Scale
1:25

Depth 2.20

Logged AP

[illegible]



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Trial Pit Log

Trial Pit No
TP207
Sheet 1 of 1

Project Cornfield Close, Littlehampton
Name:

Project No.
GE17106

Co-ords: 503351.83 - 103180.74
Level: 8.04

Date
14/08/2018

Location: Littlehampton, West Sussex

Dimensions
(m):

Depth
2.20

Scale
1:25
Logged
AP

Client: Thakeham Client

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES		0.10	7.94		Grass overlying dark brown slightly sandy clayey silt. MADE GROUND	
	0.50	ES		0.60	7.44		Brown slightly clayey, sandy silt with frequent brick, concrete and flint gravel, rare tarmacadam and roots (<5mm diameter). MADE GROUND	
	1.00	ES					Brown, dark brown and dark grey slightly clayey very silty sand with frequent glass, plastic, concrete, brick and ash. MADE GROUND	1
	1.50	ES						
	2.00	ES		2.00	6.04			2
				2.20	5.84		Dark grey brown slightly clayey, sandy silt. MADE GROUND	
							End of Pit at 2.20m	
								3
								4
								5
Remarks Groundwater not encountered, backfilled with arisings.								
Stability								





Trial Pit Log	TrialPit No TP208 Sheet 1 of 1
------------------------	--------------------------------------

TrialPit No
TP208
Sheet 1 of 1

Project No.	Co-ords: 503313.94 - 103187.17	Date
GE17106	Level: 8.20	14/08/2018

Co-ords: 503313.94 - 103187.17	Date
Level: 8.20	14/08/2018
Dimensions (m):	Scale 1:25

Dimensions (m):	Scale
	Depth 2.30





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Hurstpierpoint
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Trial Pit Log

Trial Pit No
TP209
Sheet 1 of 1

Project Cornfield Close, Littlehampton
Name:

Project No.
GE171106

Co-ords: 5033393.87 - 103262.44
Level: 8.36

Date
14/08/2018

Location: Littlehampton, West Sussex

Dimensions
(m):

Depth
4.50

Scale
1:25
Logged
AP

Client: Thakeham Client

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.12	8.24		Grass overlying dark brown slightly sandy clayey silt. MADE GROUND	1
				1.02	7.34		Light brown very sandy silt with frequent fine to coarse sub-rounded flint gravel, rare brick, concrete and plastic. MADE GROUND	2
	1.50 1.50	B ES					Dark brown, dark grey silty sand with abundant ash, frequent glass, occasional fabric, plastic, rare metal, paper and rubber. MADE GROUND	3
				2.12	6.24		Orange brown sandy CLAY. RIVER TERRACE DEPOSITS	4
							Dark yellow and orange brown SAND with occasional fine to coarse sub-rounded flint gravel. RIVER TERRACE DEPOSITS	5
				4.40	3.96		Light brown slightly chalky SAND. RIVER TERRACE DEPOSITS	
				4.50	3.86		End of Pit at 4.50m	
Remarks Groundwater not encountered, backfilled with arisings.								
Stability								



Project Id: GE17106
Project Title: Cornfield Close, Littlehampton
Location: Littlehampton, West Sussex
Client: Thakeham Client

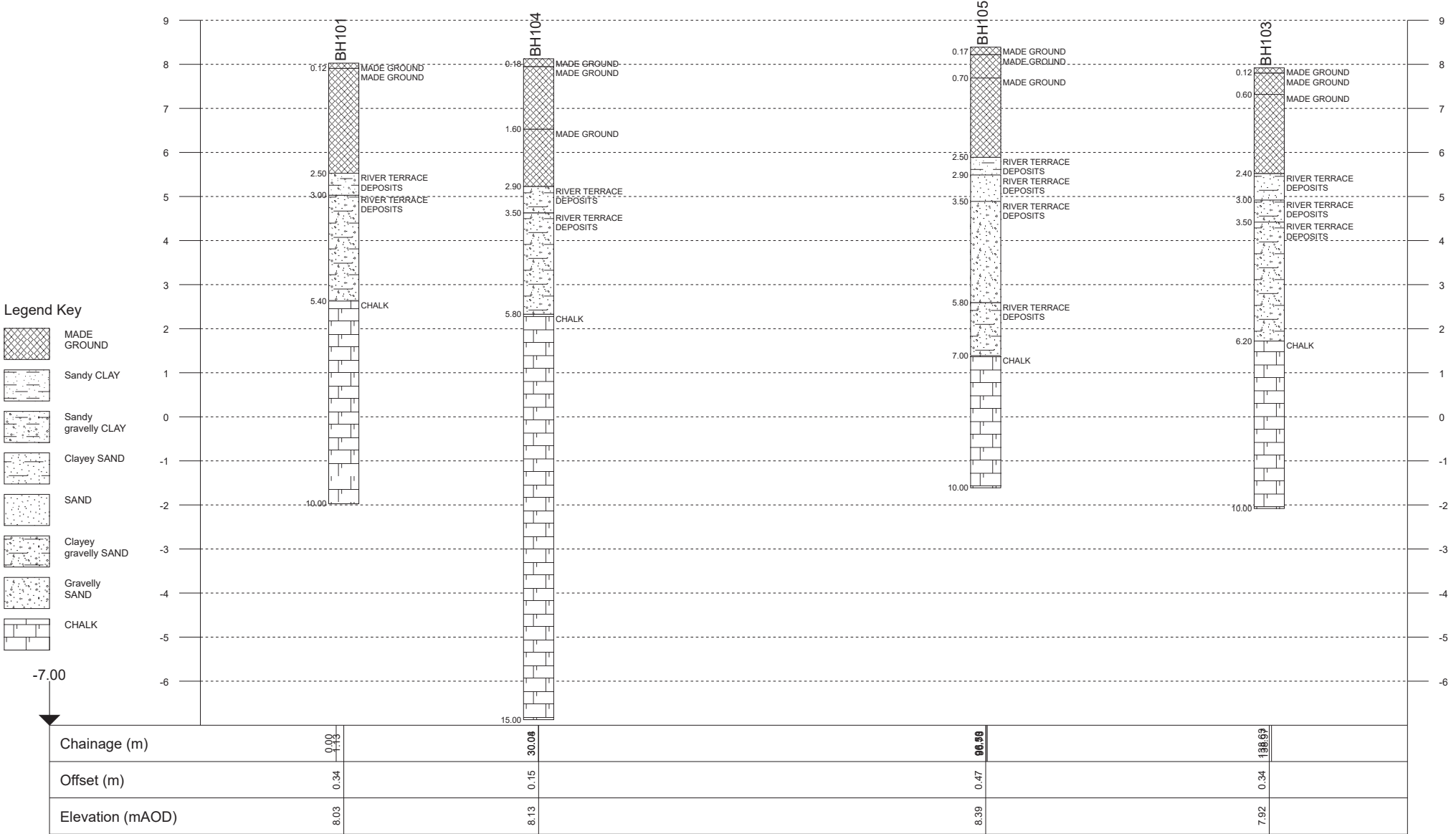
Title: Section line 1
Vertical Scale: 1:131
Horizontal Scale: 1:396
Engineer: Anthony



Chainage (m)	0.00	2.63	65.99	68.34
Offset (m)		0.53	0.05	
Elevation (mAOD)	8.03		7.85	

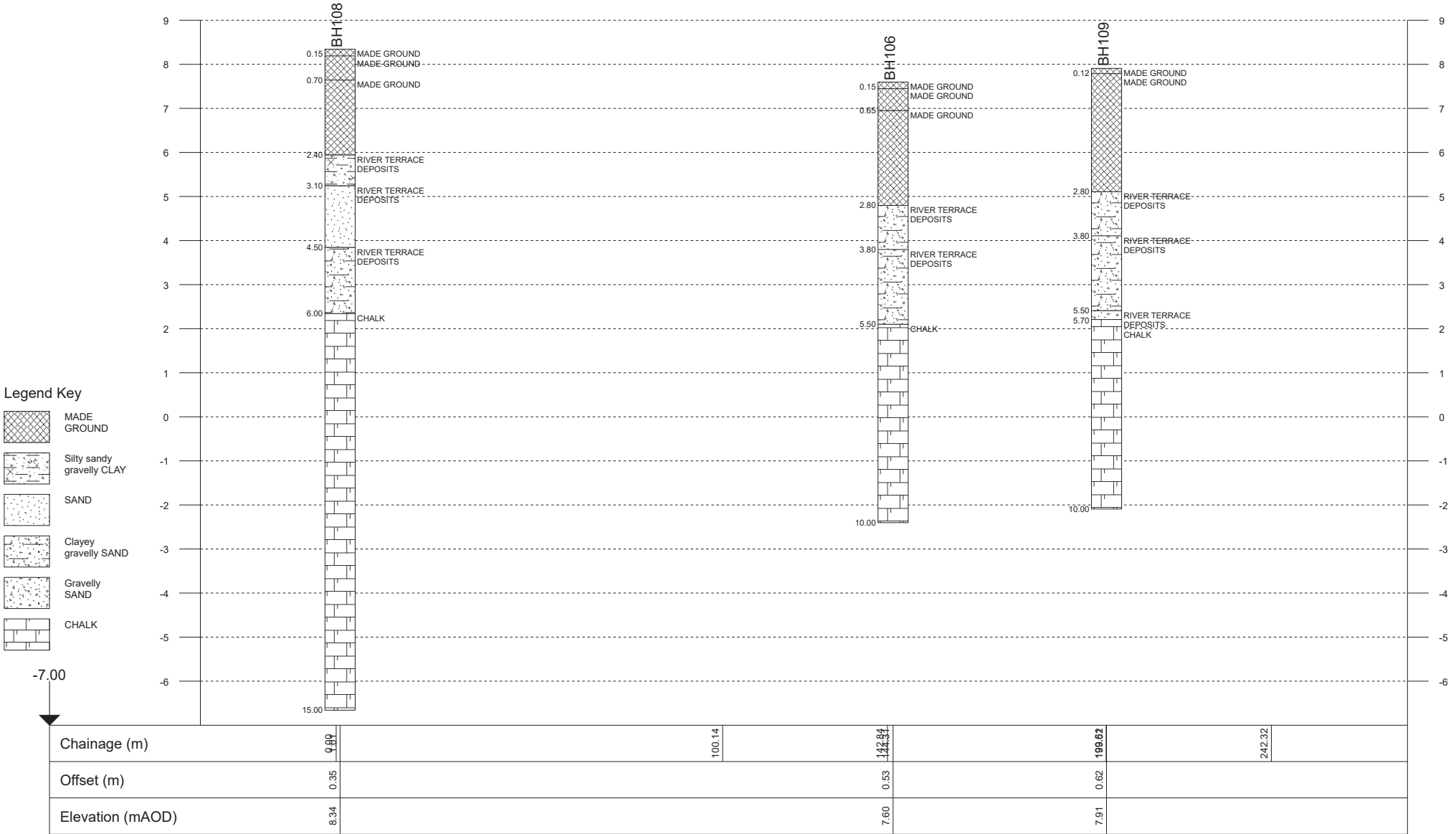
Project Id: GE17106
Project Title: Cornfield Close, Littlehampton
Location: Littlehampton, West Sussex
Client: Thakeham Client

Title: Section line 2
Vertical Scale: 1:123
Horizontal Scale: 1:805
Engineer: Anthony



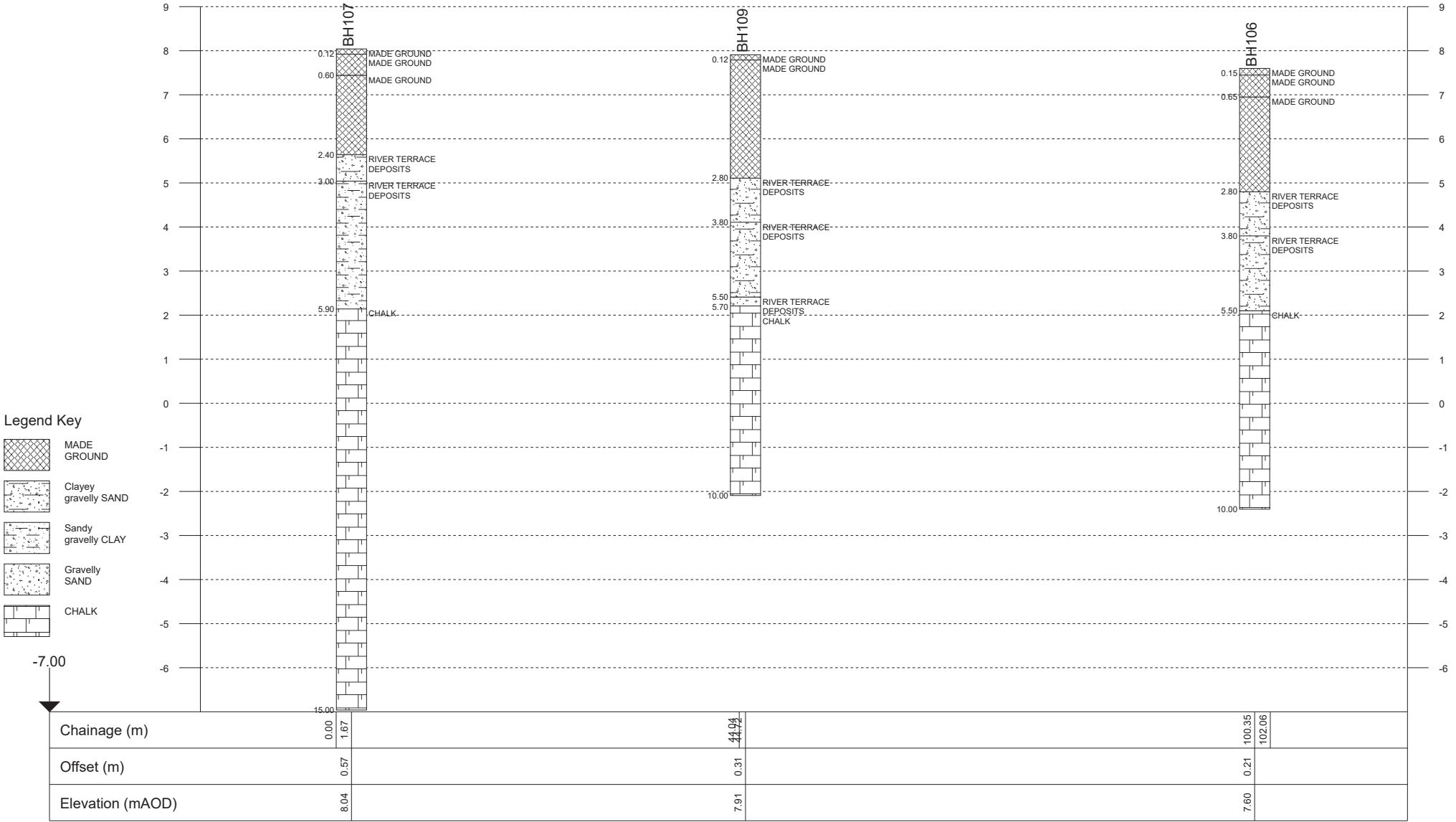
Project Id: GE17106
Project Title: Cornfield Close, Littlehampton
Location: Littlehampton, West Sussex
Client: Thakeham Client

Title: Section line 3
Vertical Scale: 1:123
Horizontal Scale: 1:1404
Engineer: Anthony



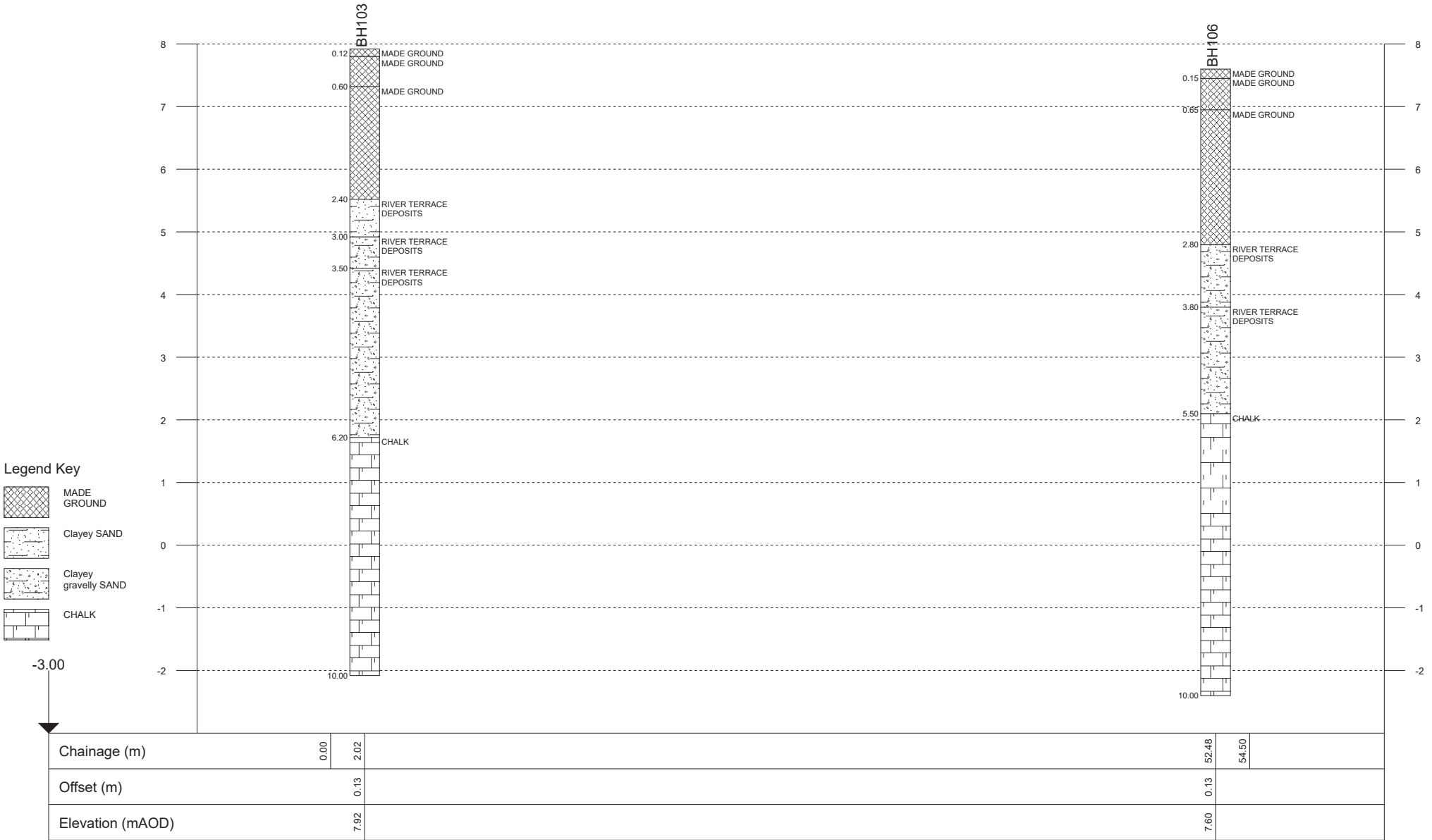
Project Id: GE17106
Project Title: Cornfield Close, Littlehampton
Location: Littlehampton, West Sussex
Client: Thakeham Client

Title: Section line 3
Vertical Scale: 1:123
Horizontal Scale: 1:592
Engineer: Anthony



Project Id: GE17106
Project Title: Cornfield Close, Littlehampton
Location: Littlehampton, West Sussex
Client: Thakeham Client

Title: Section line 3
Vertical Scale: 1:85
Horizontal Scale: 1:316
Engineer: Anthony



Project Id: GE17106
Project Title: Cornfield Close, Littlehampton
Location: Littlehampton, West Sussex
Client: Thakeham Client

Title: Section line 4
Vertical Scale: 1:123
Horizontal Scale: 1:562
Engineer: Anthony



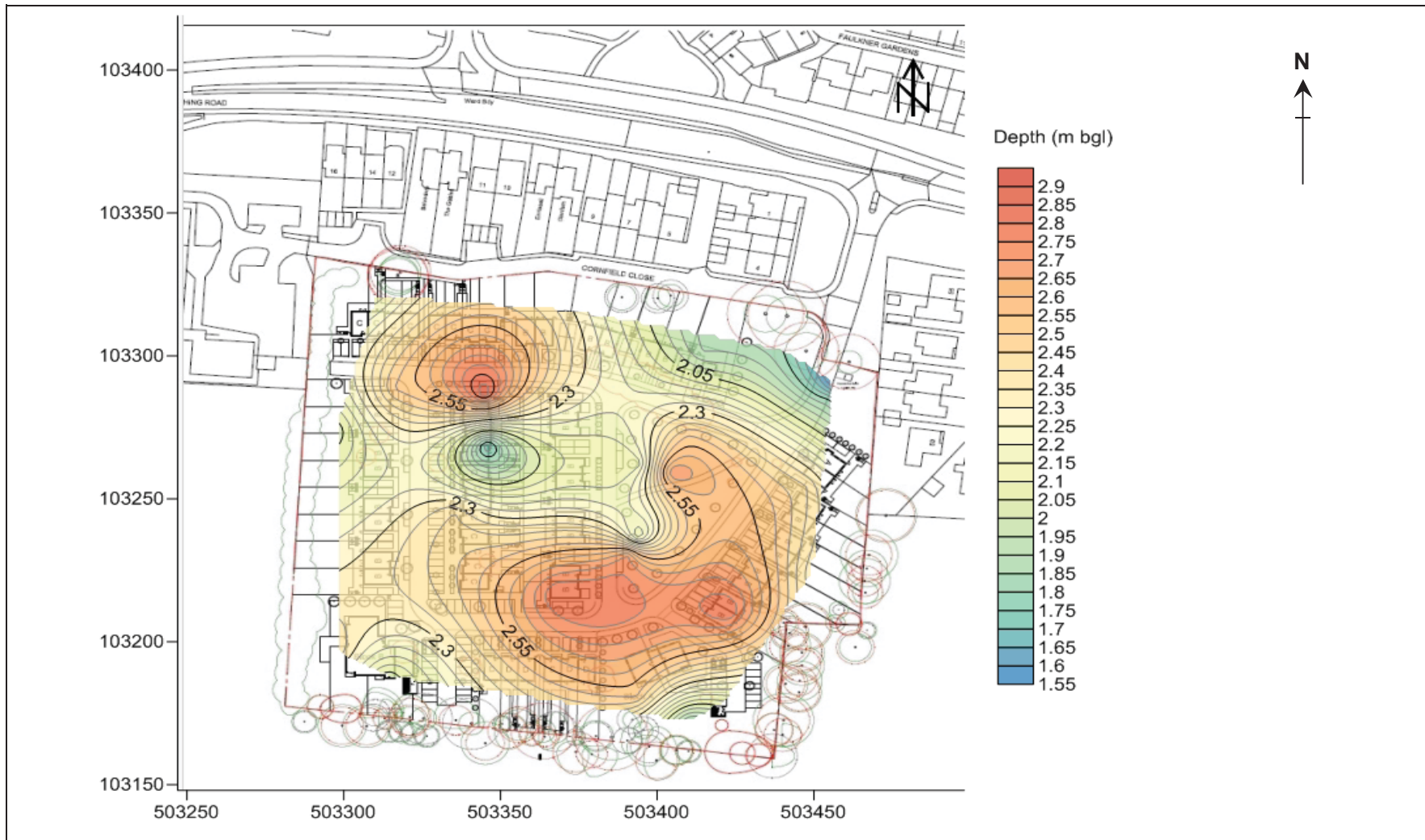
Legend Key

- MADE GROUND
- Silty sandy gravelly CLAY
- Sandy gravelly CLAY
- SAND
- Clayey gravelly SAND
- CHALK

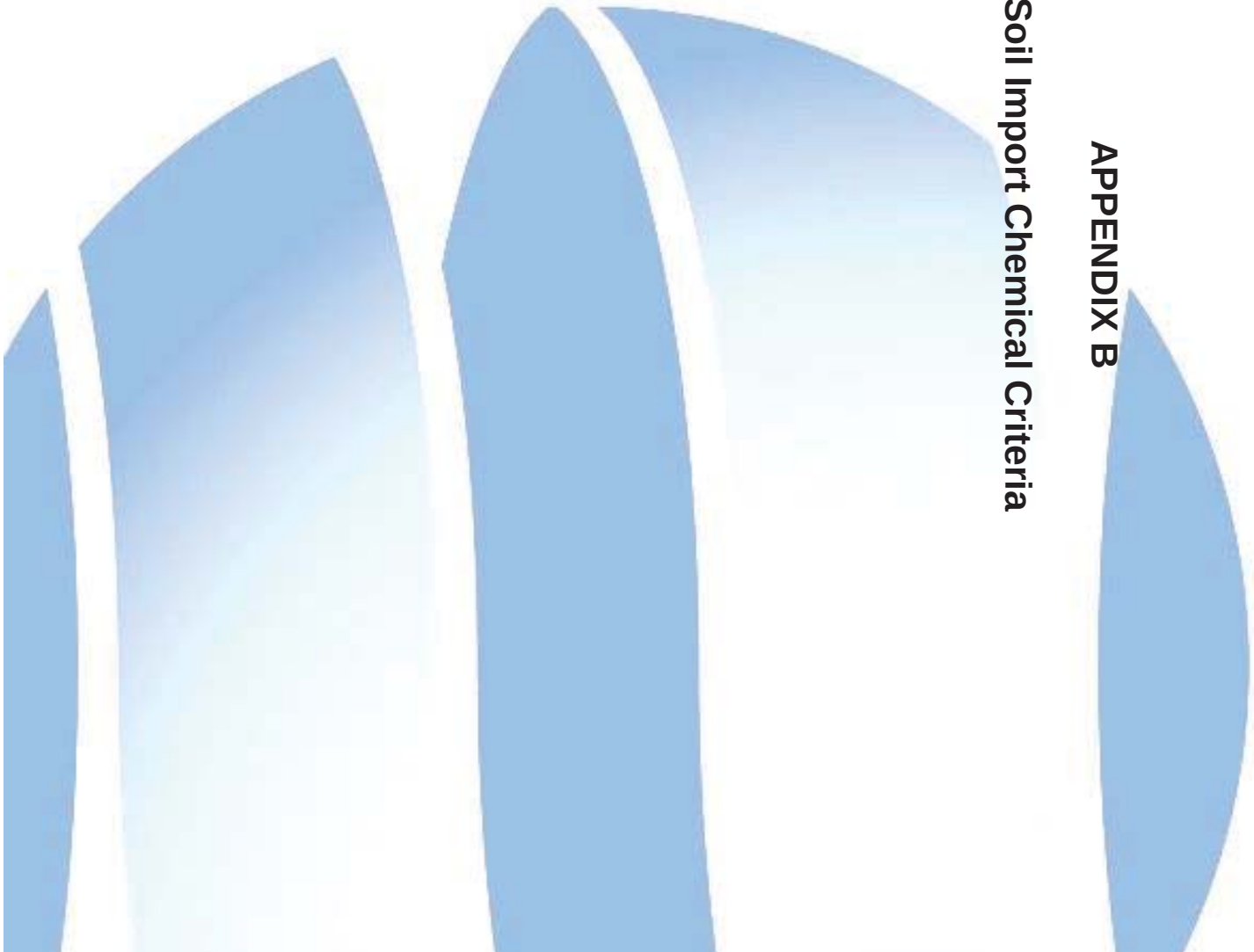
-7.00



Chainage (m)	0.00	2.05	95.91	96.93
Offset (m)		0.26	0.38	
Elevation (mAOD)	8.03		8.34	



Project:	Cornfield Close, Littlehampton			Title	Plot of Made Ground	
Client:	Thakeham Client			Geo-Environmental Services Ltd Unit 7 Danworth Farm, Cuckfield Road Hurstpierpoint, West Sussex BN6 9GL +44(0)1273 832972 www.gesl.net	 Geo-Environmental	
Ref No:	GE17106	Revision:	v1			
Drawn:	AP	Date:	05/11/2018			
Figure:		Scale:	Not To Scale			



APPENDIX B

Soil Import Chemical Criteria



Geo-Environmental

**IMPORTED SOIL SPECIFICATION
for the site at
FORMER DAISYFIELDS CARAVAN PARK
CORNFIELD CLOSE, LITTLEHAMPTON
WEST SUSSEX, BN17 6LD
on behalf of
THAKEHAM CLIENT LIMITED**



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2.0	Chemical Composition	1
3.0	Nutritional Composition	5
4.0	Physical Composition	5
5.0	Source Requirements	6
6.0	Testing Rates and Compliance	6



1.0 Introduction

This document sets out the requirements for imported subsoil and Topsoil materials for any project undergoing redevelopment or other works where capping work is required.

Within the specification reference has been made to topsoil and subsoil. Topsoil relates to the top layer of natural soil that can support healthy vegetation growth. Subsoil relates to the layer of soil immediately below the topsoil to the depth of the underlying broken rock or geological parent material.

The specification considers the chemical, nutritional and physical properties of soils that are to be imported onto site, in order to ensure materials used are suitable for their intended use and do not introduce any new hazard or pollutant linkage on to the site.

Where there is any discrepancy between this specification and BS3882:2015 or BS8601:2013, the latter documents shall take precedence unless otherwise formally confirmed by the relevant regulator.

2.0 Chemical Composition

The chemical criteria listed below are based on published CLEA Soil Guideline Values (SGVs), generic assessment criteria calculated using UK policy compliant software or by reference to current guidance and best practice. From time to time these values may change in line with regulatory or UK policy changes. Such changes will require revision and re-issue of this document.

At the time of preparation, where SGVs have not been published, generic assessment criteria (GAC) have been generated using the Contaminated Land Exposure Assessment (CLEA) model v1.06 published by the Environment Agency, or the Category 4 Screening Levels (C4SLs) published by DEFRA have been used. Although the C4SLs were released for Part 2A use, the associated policy companion document for the C4SLs indicated that they may also be used for planning. Although the C4SLs represent a marginally higher risk level than the SSACs (low risk rather than minimal risk) it is considered that the risk levels remain very low. Therefore, the final C4SLs are considered to be suitable to assess soils under the planning regime. Where SGVs or GAC are published for a range of Soil Organic Matter (SOM) values, these ranges and their respective SOM values have been presented and would be considered when assessing compliance with this Specification.

2.1 Method of Analysis

Samples should be analysed using UKAS or MCERTS accredited laboratories. For TPH analysis sample preparation must not include air drying.

2.1.1 Poly Aromatic Hydrocarbon (PAH)

The PAH analysis must include the EPA priority 16.

2.1.2 Total Petroleum Hydrocarbons (TPH)

The analysis for TPH should be undertaken on the 'as received' sample and not be subject to any pre-treatment and include aliphatic and aromatic carbon banding split.



2.2 Topsoil (0-300 mm depth)

Table 1 provides a list of the maximum acceptable concentrations for imported topsoil.

Parameter	Maximum concentration (mg/kg)
Inorganic	
Arsenic (total)	<32
Boron (water soluble)	<291
Cadmium (total)	10 (SOM=6%)
Chromium (total)	<130
Copper (total)	<2330
Cyanide (total)	<250
Lead (total)	<200
Mercury (total inorganic)	<8
Nickel (total)	<130 (SOM=6%)
pH	5.5 – 7.8
Selenium (total)	<350 (SOM=6%)
Sulphate (total)	<2000
Zinc (total)	<3750
Asbestos	Absent
Organic	
Soil Organic Matter (SOM)	
Phenols (total)	<420 (SOM=6%)
Poly Aromatic Hydrocarbon (speciated)	See Table 1a
Total Petroleum Hydrocarbon (speciated)	See Table 1b

Table 1 Chemical Specification for Topsoil

Determinant	Maximum Concentration (mg/kg)		
	1% SOM	2.5% SOM	5% SOM
Acenaphthene	210	480	1000
Acenaphthylene	170	400	850
Anthracene	2300	4900	9200
Benz(a)anthracene	3.1	4.7	5.9
Benzo(a)pyrene	0.83	0.94	1.0
Benzo(b)fluoranthene	5.6	6.5	7.0
Benzo(ghi)perylene	44	46	47
Benzo(k)fluoranthene	8.5	9.6	10
Chrysene	6.0	8.0	9.3
Dibenz(ah)anthracene	0.76	0.86	0.9
Fluoranthene	260	460	670
Fluorene	160	380	780
Indeno(1,2,3CD)pyrene	3.2	3.9	4.2
Naphthalene	1.5	3.7	8.7
Phenanthrene	92	200	380
Pyrene	560	1000	1600

Table 1a Topsoil Specification for Speciated PAH



Determinant	Maximum Concentration (mg/kg)		
	1% SOM	2.5% SOM	5% SOM
Aliphatic			
EC 5-6	30	55	110
EC >6-8	73	160	370
EC >8-10	19	46	110
EC >10-12	93	230	540
EC >12-16	740	1700	3000
EC >16-35	45000	64000	76000
EC >35-44	45000	64000	76000
Aromatic			
EC 5-7 (benzene)	65	130	280
EC >7-8 (toluene)	120	270	611
EC >8-10	27	65	151
EC >10-12	69	160	346
EC >12-16	140	310	593
EC >16-21	250	480	770
EC >21-35	890	1100	1230
EC >35-44	890	1100	1230
Aliphatic and Aromatic			
EC >44-70	1200	1300	1300

Table 1b Topsoil Specification for Speciated TPH

Determinant	Phytotoxicity GAC (mg/kg)		
	pH <6.0	pH 6.0-7.0	pH >7.0
Zinc	200	200	300
Copper	100	135	200
Nickel	60	75	110

Table 1c Topsoil Specification for phytotoxicity

2.3 Subsoil (300-1000mm depth)

Table 2 provides a list of the maximum acceptable concentrations for imported subsoil.

Parameter	Maximum concentration (mg/kg)
Inorganic	
Arsenic (total)	<32
Boron (water soluble)	<291
Cadmium (total)	10 (SOM=6%)
Chromium (total)	<130
Copper (total)	<2330
Cyanide (total)	<250
Lead (total)	<200
Mercury (total inorganic)	<8
Nickel (total)	<130 (SOM=6%)
pH	5.5 – 7.8



Parameter	Maximum concentration (mg/kg)
Inorganic	
Selenium (total)	<350 (SOM=6%)
Sulphate (total)	<2000
Zinc (total)	<3750
Asbestos	Absent
Organic	
Soil Organic Matter (SOM)	
Phenols (total)	<420 (SOM=6%)
Poly Aromatic Hydrocarbon (speciated)	See Table 1a
Total Petroleum Hydrocarbon (speciated)	See Table 1b

Table 2 Chemical Specification for Subsoil

Determinant	Maximum Concentration (mg/kg)		
	1% SOM	2.5% SOM	5% SOM
Acenaphthene	210	480	1000
Acenaphthylene	170	400	850
Anthracene	2300	4900	9200
Benz(a)anthracene	3.1	4.7	5.9
Benz(a)pyrene	0.83	0.94	1.0
Benz(b)fluoranthene	5.6	6.5	7.0
Benz(ghi)perylene	44	46	47
Benzo(k)fluoranthene	8.5	9.6	10
Chrysene	6.0	8.0	9.3
Dibenz(ah)anthracene	0.76	0.86	0.9
Fluoranthene	260	460	670
Fluorene	160	380	780
Indeno(1,2,3CD)pyrene	3.2	3.9	4.2
Naphthalene	1.5	3.7	8.7
Phenanthrene	92	200	380
Pyrene	560	1000	1600

Table 2a Subsoil Specification for Speciated PAH

Determinant	Maximum Concentration (mg/kg)		
	1% SOM	2.5% SOM	5% SOM
Aliphatic			
EC 5-6	30	55	110
EC >6-8	73	160	370
EC >8-10	19	46	110
EC >10-12	93	230	540
EC >12-16	740	1700	3000
EC >16-35	45000	64000	76000
EC >35-44	45000	64000	76000
Aromatic			
EC 5-7 (benzene)	65	130	280



Determinant	Maximum Concentration (mg/kg)		
	1% SOM	2.5% SOM	5% SOM
EC >7-8 (toluene)	120	270	611
EC >8-10	27	65	151
EC >10-12	69	160	346
EC >12-16	140	310	593
EC >16-21	250	480	770
EC >21-35	890	1100	1230
EC >35-44	890	1100	1230
Aliphatic and Aromatic			
EC >44-70	1200	1300	1300

Table 2b Subsoil Specification for Speciated TPH

Determinant	Phytotoxicity GAC (mg/kg)		
	pH <6.0	pH 6.0-7.0	pH >7.0
Zinc	200	200	300
Copper	100	135	200
Nickel	60	75	110

Table 2c Subsoil Specification for phytotoxicity

3.0 Nutritional Composition

The nutritional criteria listed below are based on BS3882:2015 for topsoil and BS8601:2013 for subsoil. In the absence of published criteria, current guidance and best practice has been applied to derive appropriate criteria.

3.1 Topsoil & Subsoil

Table 3 details the minimum acceptable concentrations for imported topsoil and subsoil.

Topsoil/Subsoil	Parameter	Concentration
Topsoil	Phosphorous	16 – 140 mg/l
	Potassium	121 – 1500 mg/l
	Magnesium	51 – 600 mg/l
	Nitrogen	0.15 % m/m
	Carbon:nitrogen ratio	<20:1
Subsoil	Phosphorous	16 mg/l
	Potassium	121 mg/l
	Magnesium	51 mg/l
	Nitrogen	0.15 %
	Carbon:nitrogen ratio	<20:1

Table 3 Nutritional Specification for Topsoil and Subsoil

4.0 Physical Composition

The physical criteria listed below are based on BS 3882:1994 Specification for Topsoil. In the absence of published criteria, current guidance and best practice has been applied to derive appropriate criteria.



4.1 Topsoil

Table 4 details requirements for imported topsoil and subsoil.

Topsoil/Subsoil	Parameter	Specification requirements
Topsoil	Textural Classification	Sandy clay loam, sandy loam, loamy sand, sandy silt loam (as defined in BS 3882, Figure 1)
	Loss on Ignition	3 - 20% (for 5-20% clay soil) 5 -20% (for 20-35% clay soil)
	Maximum Stone content:	>2mm = 30% >20mm = 10% >50mm = 0%
Subsoil	Textural Classification	Refer to BS8601 Figure 1
	Loss on Ignition	2%
	Maximum Stone content:	>2mm = 40% >20mm = 20% >75mm = 0%

NB: Topsoil and Subsoil must be free from glass, brick fragments, asbestos and other deleterious materials.

Table 4 Physical Specification for Topsoil & Subsoil

5.0 Source Requirements

5.1 Topsoil and Subsoil

The following will be provided with all soils imported to site:

- Location of site which is clean and has no history of potentially contaminative uses.
- A site plan detailing the location and address of the source site.

5.2 Manufactured soils

Where natural soils are unavailable manufactured soils may be utilised the following should be provided:

- Details of the soil manufacturing process, including criteria for received soils, quality control procedure and validation protocol.
- Soils should be tested at a minimum ratio of one sample per 50m³.

6.0 Testing Rates and Compliance

Sampling shall be undertaken in accordance with BS3882:2015 and BS8601:2013.

6.1 Topsoil

Where natural sourcing is proposed, the provenance of the material shall be determined by confirmation of the source site's history to confirm no previous potentially contaminative use, coupled with analysis of soils at a minimum rate of 3No. samples per source site (up to 250m³) and 1 sample per 250m³ thereafter.

Where Topsoil is derived from a manufactured source, testing would be undertaken at a rate of 1 sample per 50m³.



With regards to physical and nutritional composition and minimum testing regime of 1 sample per 250m³ is recommended for either source.

6.2 Subsoil

Where the source of the material is known and a due diligence review has established no previous contaminative use associated with the proposed subsoil, validation sampling should be undertaken at a minimum rate of 3 sample per source (up to 250m³) and 1 sample per 250m³ thereafter.

Where the source of the material is not known the validation sampling should be undertaken at a minimum of 1 sample per 50m³.

6.3 Manufactured soils

Soils should be tested at a minimum ratio of one sample per 50m³.

6.4 Sample failure

In the event that a sample fails to meet the specified criteria for any parameter the Environmental Consultant should be contacted for advice on the suitability of the materials.

Further testing may be required to provide reassurance that the exceedances are not representative of the soil.

6.5 Timing

Sampling and analysis undertaken by a manufactured topsoil supplier shall be no earlier than two weeks from the date of import, any results which are older than two weeks will be deemed not to be representative of the soils to be imported and rejected. Results showing consistency of batching shall may be requested.

Imported soil suppliers and groundworks contractors are required to take reasonably practicable measures to ensure that compliance with this Specification does not hinder formal completion of individual plots or developments.

6.6 General Compliance

All analytical suites shall correspond with the chemical and nutritional compliance criteria (as set out in Tables 1 to 3). The soil supplier shall ensure that the analytical limits of detection are equal or lower than the compliance values presented within this Specification. Where either testing suites or limits of detection do not comply with this Specification, the entire set of results shall be rejected.