



Geo-Environmental

GROUND INVESTIGATION REPORT

for the site at

FORMER DAISYFIELDS CARAVAN PARK

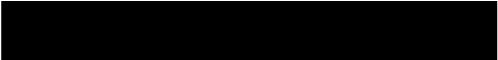
CORNFIELD CLOSE, LITTLEHAMPTON

WEST SUSSEX, BN17 6LD

on behalf of

THAKEHAM CLIENT LIMITED

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Report:	GROUND INVESTIGATION REPORT
Site:	FORMER DAISYFIELDS CARAVAN PARK, CORNFIELD CLOSE, LITTLEHAMPTON, WEST SUSSEX, BN17 6LD
Client:	THAKEHAM CLIENT LIMITED
Date:	05/11/2018
Reference:	<u>17106 - GAR/AP01/231018</u>
Version:	1.0
Prepared by:	 Anthony Potter MSc, BSc (Hons), FGS Senior Engineer
Reviewed by:	 Managing Director
Geo-Environmental Services Limited Unit 7, Danworth Farm, Cuckfield Road, Hurstpierpoint, West Sussex, BN6 9GL 	

EXECUTIVE SUMMARY		
Site Details	Site Address	The site comprised a generally flat and level grass covered former caravan and camp site.
	National Grid Reference	503370, 103260
	Form of Development	The proposed development is to consist of 77 residential units with private gardens, soft landscaping, amenity space, parking, roadways and associated infrastructure.
Encountered Conditions	Scope of works	The investigation included undertaking a number of phases of intrusive ground investigation, coupled with ground gas and groundwater monitoring and laboratory testing to inform a geotechnical and geo-environmental assessment.
	Ground Conditions	The ground conditions encountered within the exploratory holes comprised a thickness of superficial deposits (Topsoil, Made Ground and River Terrace Deposits) over the solid geology of the Lewes Nodular Chalk Formation. The Made Ground was found to be landfill within a historic brick pit.
	Groundwater	Groundwater was encountered within the Lewes Nodular Chalk Formation. Groundwater was recorded at depths between 5.95m and 7.10m below existing ground level with standpipes installed within the cable percussion boreholes.
Geotechnical Considerations	Foundations	Based on the ground and groundwater conditions encountered during the intrusive works, conventional foundations are not considered appropriate and a piled foundation scheme is therefore recommended with reinforced concrete ground beams and fully suspended slabs.
	Excavations	Shallow and deeper, longer excavations within the Made Ground are likely to be prone to instability and potential collapse. Such excavations will require some form of temporary support such as shoring or battering back to a safe angle of repose. All excavations taken below the groundwater table will require full support and dewatering Under no circumstances should personnel be permitted to enter unsupported excavations during construction or maintenance.
	Pavements	Whilst CBR values of between 1% and >30% were measured in-situ and by laboratory testing, a CBR value of 1% was considered appropriate for the pavement design, based on the variability of the engineering properties of the Made Ground at formation level.
	Soakaways	It is understood that a bespoke constructed crated soakaway is proposed for storm water attenuation and disposal and will be designed to discharge storm water into the natural soils only. The results of the soakage tests undertaken within the more granular parts of the River Terrace Deposits indicated good soakage potential in the area of the proposed soakaway.

	Buried Concrete	It is recommended that a design class of DS-2 and an ACEC class of AC-1s be applied to all sub-surface concrete.
Environmental Considerations	Human Health	A cover system of minimum thickness 650mm is proposed in gardens and soft landscaped areas. This is to be relaxed in areas of tree root protection.
	Groundwater	Groundwater monitoring has identified some marginal selenium, boron and PAH impact to groundwater. This is likely to be indicative of general background concentrations and the presence of landfill, and the surrounding urban environment. The development proposals are for the betterment of the site status in respect of potential groundwater contamination (including leachate) and therefore, based on the results and the development proposals it is considered that no specific remediation is required in this respect.
	Ground Gases	Based on the results of the spot monitoring and continuous monitoring the site is classified as CS2 and NHBC Amber 2, requiring high level ground gas protection as prescribed in BRE414.
	Radon Gas	No radon protection measures are required.
	Built Environment	The use of barrier pipe is likely to be required for potable water supply pipes on site, however the water company should be contacted to confirm their requirements. In line with best practice trenches should be backfilled with clean, inert granular fill (shingle).
	Waste Disposal	Ten representative samples were analysed for waste acceptance criteria testing. Three of the samples fell into the hazardous waste classification on account of marginal exceedances of TOC and loss on ignition (organic matter). It is possible that a receiving landfill operator will accept this material as non-hazardous, though this would require confirmation from the proposed operator. Four samples were classified as inert and three as non-hazardous waste. Any waste soils which include asbestos will require asbestos quantification analysis to be undertaken to determine their disposal classification. Where the concentration of free asbestos fibres exceed 0.1% the material would be deemed hazardous. Furthermore, any material containing fragments of ACM containing more than 0.1% asbestos would also be deemed hazardous.
Further Action: - LA approved Remediation Method Statement and Validation Report in respect to the recommended ground gas protection measures, soil cover system and use of barrier pipe for drinking water supply. - Ground gas membrane installation by a specialist contractor - Environment Agency consultation in respect of groundwater and Foundation Works Risk Assessment - A discovery strategy should be maintained during the development such that any abnormal conditions (not discovered during the SI) are identified and their potential impact on the proposed development assessed prior to determining any potential mitigation measures. <i>This Executive Summary is intended to provide a brief summary of the main findings and conclusions of the investigation. For detailed information, the reader is referred to the main report ref. GE17106-GIR/AP01/231018.</i>		

3.0 ENCOUNTERED CONDITIONS

A factual record of the conditions encountered during the physical investigation of the site is presented in the following sections.

For further details of encountered ground conditions, reference should be made to the engineer's logs presented in Appendix A, the geotechnical testing results in Appendix B, the contamination testing results in Appendix C, the ground gas and groundwater monitoring results within Appendix D with the continuous ground gas monitoring data presented in Appendix E, the desk study report in Appendix F and the initial baseline report and soakage testing report in Appendix G and H respectively.

The physical ground investigation works for the second phase of investigation were undertaken between 13th August and 24th August 2018. The contamination and geotechnical testing was undertaken by UKAS accredited laboratories.

Unless stated otherwise, all depths are reported as metres below ground level (m bgl).

3.1 Ground Conditions

According to the British Geological Survey, the ground conditions were anticipated to comprise Made Ground overlying River Terrace Deposits in turn overlying the Lewes Nodular Chalk Formation.

Within BH103-BH108 and BH110 and TP201-TP203, TP205, TP207-TP209 a capping of clayey sandy silt and silty sandy clay with brick and concrete fragments was encountered to depths of between 0.60m to 1.02m bgl.

Beneath the turf, hardstanding or capping material Made Ground, comprising landfilled material was encountered within all locations to depths of between 1.70m and 2.90m bgl and was of a mixed composition comprising sandy clay and silty sand with brick, glass, plastics, metal, china, ash, coal, concrete, black organic matter, shoes, fabric, timber, and flint gravel.

Underlying the Made Ground, River Terrace Deposits were encountered within all locations with the exception of TP207 to depths of between 2.0m and 7.0m bgl and generally comprised medium dense orange brown sandy clay becoming orange brown sand with flint gravel with slight traces of chalk at depth. Organic malodours were noted within BH105 only, at a depth of between 6.50m and 7.00m bgl. TP207 was advanced within the Made Ground only, which was terminated prematurely at a depth of 2.2mbgl.

Underlying the River Terrace Deposits, the Lewes Nodular Chalk was encountered within the cable percussion boreholes to depths of between 10.00m and 15.00m bgl (maximum depth of the investigation) and was generally recovered as structureless CHALK composed of sub-angular to rounded gravel. Clasts are weak, medium, high and very high density, off-white within an off-white matrix. For further details of the ground conditions encountered, reference should be made to the information presented in Appendix A, which includes four sections across the site.

For further details, please refer to the intrusive logs within Appendix A.

3.2 Groundwater

Groundwater was encountered within the boreholes with strike depths between 7.50m and 9.00m bgl, after twenty minutes groundwater was standing at depths of between 7.00m and 9.00m bgl. During the return monitoring visits on 28th August 2018 and 19th October 2018, groundwater depths were recorded within the range of 6.00m and 7.10m bgl.

Changes in groundwater depth and/or level do occur for a number of reasons including seasonal effects and variations in drainage. Such fluctuations may only be recorded by the measurement of the groundwater level within a standpipe or piezometer.

The recorded groundwater levels during the intrusive investigation and return monitoring are summarised in Table 3.1, below.

Location	Water Strike Depth (m bgl)	Recorded Groundwater Monitoring Depth (28/08/18) (m bgl)	Recorded Groundwater Monitoring Depth (19/10/18) (m bgl)
BH101	7.50	7.00	6.80
BH102	7.50	6.33	6.40
BH103	9.00	6.60	6.43
BH104	9.00	6.55	6.65
BH105	7.50	6.80	6.90
BH106	7.50	6.00	5.95
BH107	7.50	6.48	6.60
BH108	7.50	7.10	7.00
BH109	7.50	6.30	6.44
BH110	9.00	6.22	6.15

Table 3.1 Summary of Groundwater Levels

3.3 Obstructions

No obstructions were encountered during the intrusive investigation although the previous phase of investigation recorded an obstruction at 2.00m bgl within TP6, which could possibly represent the floor to the former brick kiln. Given the highly heterogeneous nature of the landfilled material the presence of below ground obstructions elsewhere on site cannot be discounted.

3.4 Geochemical Analysis

In order to assess the general chemical quality of the strata encountered, samples of soils recovered from the exploratory holes were submitted for analysis of a range of potential contaminants selected on the basis of the findings of the Contamination Strategy Report and supported by the joint National House Building Council (NHBC), Environment Agency (EA) and Chartered Institute of Environmental Health (CIEH) publication, '*Guidance for the Safe Development of Housing on Land Affected by Contamination*' (2008).

Soil samples were placed into plastic containers for general inorganic analysis and into amber jars for organic analysis. Samples were stored in temperature controlled conditions from sampling until receipt at the laboratory from which time sample preparation and storage was determined by testing requirements and in line with the laboratory's protocols.

Thirty-four soil samples were submitted for analysis of a comprehensive suite of commonly occurring contaminants based upon determinants listed within the above guidance, augmented with speciated hydrocarbon analysis (CWG) and asbestos screening. Nine of these tests were used for leachate testing.

Ten additional samples were analysed for Volatile Organic Compounds (VOCs), Semi Volatile Organic Compounds (SVOCs), Polychlorinated Biphenyl (PCBs) and Ammoniacal Nitrogen. A further ten samples were analysed for Waste Acceptance Criteria tests.

Groundwater samples were taken for analysis during the monitoring visit, all waters taken were analysed for a comprehensive suite of commonly occurring contaminants, VOCs, SVOCs, Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), electrical conductivity, suspended solids and PCBs.

3.5 Geotechnical Testing

Soil samples were selected for geotechnical testing depending on the proposed end use of the given area. The main elements of geotechnical testing were:

- Strength/stiffness profiling (in-situ and laboratory testing)
- Soil classification
- Aggressive ground conditions
- California Bearing Ratio

The results of the geotechnical testing are summarised in Tables 3.2-3.4 below:

Characteristic/Parameter	Laboratory Value
SPT N values	3-24
pH	7.1-11.0
Water soluble sulphate (g/l)	0.02-1.42

Table 3.2 Geotechnical Test Results for Made Ground

Characteristic/Parameter	Laboratory Value
SPT N values	6 - 30
Grading	
Gravel%	0.3 - 53.0
Sand%	12.8 - 81.6
Clay/Silt/%	11.0 - 86.9
Plasticity Index (%)	6 - 21
Modified Plasticity Index (%)	4.38 - 20.16

Characteristic/Parameter	Laboratory Value
Volume Change Potential (NHBC)	Non-Shrinkable to Medium VCP
pH	7.53 - 7.74
Water soluble sulphate (g/ℓ)	0.09 - 0.47

Table 3.3 Geotechnical Test Results for River Terrace Deposits

Characteristic/Parameter	Laboratory Value
SPT N values	11 - 53
Saturation Moisture Content (%)	13 - 24
Bulk Density (Mg/m ³)	2.02 - 2.23
Dry Density (Mg/m ³)	1.63 - 2.01
pH	7.49 - 7.68
Water soluble sulphate (g/ℓ)	0.06 - 0.22

Table 3.4 Geotechnical test Results for Chalk

3.6 Ground Gases

Two dual purpose groundwater/ground gas monitoring wells were installed within each of the cable percussion boreholes to depths of 2.0mbgl and 15.0mbgl respectively. To assess potential risk posed by ground gases, continuous monitoring within the shallower standpipes within each of the boreholes (installed within the landfill area) was undertaken, together with a single round of spot monitoring within all of the standpipes, both shallow and deep. The results are discussed further in Section 5.1 and are presented within Appendix D and E.

4.0 ENGINEERING CONSIDERATIONS

Subsequent to intrusive investigation of the site and receipt of the laboratory results, the following interpretative assessments have been made with respect to engineering considerations.

4.1 Foundations

Based on the ground conditions encountered within the trial holes, it is considered that traditional strip or pad foundations are unsuitable for the proposed development. It is recommended that an alternative foundation solution such as piles be considered.

4.2 Piled Foundations

The construction of a piled foundation is a specialist job and the advice of a reputable contractor familiar with the type of ground and groundwater conditions encountered on this site should be sought prior to finalising the design. The actual working load for proposed piles will depend on the particular type of pile and method of installation adopted.

The site overlies a Secondary A Aquifer and a Principal Aquifer and as such the foundation solution adopted should not introduce migration pathways for potential mobile contaminants from the overlying landfill materials. The Environment Agency have a preference for CFA piles undertaken within geology designated as an aquifer, as this method prevents the formation of contamination pathways into protected water resources due to the pile shaft being supported by the flight auger throughout formation and the pile concrete being pumped in from the base of the pile bore as the flight auger is retracted, thereby forming an intimate interface between the pile shaft and surrounding ground. Should a piled foundation solution be adopted on site, it is possible that the Environment Agency will require a Foundation Works Risk Assessment to be undertaken prior to any foundation works being undertaken. Liaison with the Environment Agency will be required in this respect.

Piles should be taken at least five times the pile diameter into the founding strata. The construction of piles on the site could create vertical migration pathways and as such any piling solution on this site should take due account of the contamination assessment and the findings thereof.

Preliminary load capacities calculated for varying diameters of CFA piles taken into the chalk are given on the table below. The design should be used for preliminary purposes only as the actual working load is dependent on the type of pile and method of installation.

Pile Type	Diameter (mm)	Depth (m bgl)	Working Load (kN)
CFA	200	7	60
	300	7	120
	450	7	250
CFA	200	10	90
	300	10	170
	450	10	330

Table 4.1 Preliminary Pile Design

These working loads have been calculated on the basis of the ground and groundwater conditions encountered within the borehole and assumes the following parameters:

- The contribution to the working load on the upper 3.00m has been ignored.
- A factor of safety of 3 was used on the skin friction and end bearing working loads.

The bearing values given are applicable to single vertically loaded piles. Where groups of piles are to be constructed, the bearing value of each individual pile should be reduced by a factor of 0.8 and a calculation made to check for the factor of safety against block failure.

The piling contractor should be aware that the boreholes were cased to depths of up to 15.00mbgl to prevent collapse as drilling progressed.

4.3 Ground Floor Slabs

Due to the variable depth of Made Ground, together with the recommendations in relation to ground gas protection (see section 5.1) suspended ground floor slabs must be adopted throughout the development.

4.4 Excavations

Shallow and deeper longer excavations within the Made Ground are likely to be prone to instability and potential collapse. Such excavations will require some form of temporary support such as shoring or battering back to a safe angle of repose.

All excavations taken below the groundwater table will require full support and dewatering.

The need for man entry into excavations should where possible be designed out. However, where this cannot be achieved it should only be permitted in accordance with an approved risk assessment, method statement and safe system of work.

4.5 Soakaways

Deep full scale soakage tests in general accordance with BRE365 were undertaken within TP201, TP205 and TP209, which were located within the area of a proposed bespoke constructed crated soakaway, designed to discharge storm water into the natural soils only. Soakage testing was undertaken within the more granular parts of the River Terrace Deposits with the Made Ground

removed and the sides of the pits banked to maintain stability. The results of the soakage testing gave rates in the range of 5.5×10^{-5} m/s and 7.7×10^{-6} m/s. A table of the encountered conditions (TP201, TP205 and TP209) is given below:-

Top m bg)	Base m bgl	Generalised Description	Groundwater encountered
(m AOD)	(m AOD)		
0.00 (0.00)	0.12 - 0.15 (7.79 - 8.24)	Topsoil/Made Ground: Grass over brown gravelly clayey sandy silt.	No
0.12 - 0.15 (7.79 - 8.24)	0.65 - 1.02 (7.21 - 7.54)	Made Ground: Brown sandy clayey silt with brick, flint gravel, concrete and plastic.	No
0.65 - 1.02 (7.21 - 7.54)	2.12 - 2.70 (5.21 - 6.24)	Made Ground: Dark grey to black clayey sand and sandy clay with ash, glass bottles, plastic, metal fragments, clay tile brick and concrete. Occasional fabric and rubber.	No
2.12 - 2.70 (5.21 - 6.24)	3.90 - 4.40 (3.78 - 4.16)	River Terrace Deposits (Clay): Orange brown very sandy silty CLAY.	No
3.90 - 4.40 (3.78 - 4.16)	4.40+ - 4.60+ (3.51+ - 3.86+)	River Terrace Deposits (Sand and Gravel): Orange brown slightly gravelly sand with occasional fine chalk fragments.	No

Table 4.5 Summary of Ground Conditions at the location of the soakaway (TP201, TP205 and TP209)

For soakaways to function effectively they must be taken into the more gravelly parts of the River Terrace Deposits.

It would be prudent to design drainage pipes and manholes to accommodate potential settlements within the Made Ground, i.e. by increasing the falls in pipework etc.

4.6 Pavement Design

The approximate locations of the tests, together with the test results and trial hole logs are attached. DCP tests were undertaken at 24 locations along the line of the proposed estate road. For correlation and comparative purposes, in-situ CBR tests were undertaken at 13 locations and Laboratory Soaked CBR's were undertaken on bulk samples taken from the in-situ CBR Locations.

CBR Location	Average CBR result between 0.7mbgl and 0.9m bgl from DCP tests. (%)	Average CBR result at a depth of 0.8mbgl from in-situ CBR test. (%)	Average CBR Result from Saturated BS Light Laboratory Test. Depth at 0.8mbgl. (%)
1	2		
2	3	2	12.7*

3	12		
4	5	2.1	8.25*
5	5		
6	6	8	9.8*
7	12	10	15.0*
8	26		
9	2		
10	8	9.8	12.4*
11	26		
12	2	3.5	16.0
13	6		
14	77	>30	17.5*
15	4	2.1	9.8
16	1		
17	30	2.4	18.2*
18	2		
19	25	13	10.0
20	10	12	8.5*
21	14	2.4	10.3*
22	33		
23	28		
24	7	3.3	6.8*

*Average not stated on certificate, as values from the top and base need to be +/- 10% of the mean value.

The Made Ground encountered across the site was noted to be of mixed composition. The engineering characteristics of such soils are variable and unpredictable. It would be prudent to assume the material to be deemed frost susceptible throughout, thus a minimum pavement thickness of 450mm would be appropriate.

Any hard spots in the formation level such as old foundations may induce reflective cracking in the pavement and allowance should be made for removing any slabs or other hard spots etc. that may be present.

It is understood that in order to accommodate the potential settlements within the Made Ground a geogrid system will be installed to support the construction and the design is based on a conservative CBR of 1% to take into account potential differential settlements and significant variation in engineering properties of the sub-grade.

It would be prudent to design drainage pipes and manholes to accommodate potential settlements within the Made Ground, i.e. by increasing the falls in pipework etc.

4.7 Sub-Surface Concrete

Forty pH and Sulphate tests were undertaken on samples of the Made Ground. The results for the Made Ground corresponded to design class DS-2 as defined within the BRE Special Digest 1 (2005). The pH analyses indicate the ACEC class to be AC-2. It is recommended that a design class of DS-2 and an ACEC class of AC-1s be applied to all sub-surface concrete within this stratum.

Fifteen pH and Sulphate tests were undertaken on samples of the River Terrace Deposits. The results for the River Terrace Deposits corresponded to design class DS-1 as defined within the BRE Special Digest 1 (2005). The pH analyses indicate the ACEC class to be AC-1. It is recommended that a design class of DS-1 and an ACEC class of AC-1 be applied to all sub-surface concrete within this stratum.

Twenty pH and Sulphate tests were undertaken on samples of the Chalk. The results for the Chalk corresponded to design class DS-1 as defined within the BRE Special Digest 1 (2005). The pH analyses indicate the ACEC class to be AC-1. It is recommended that a design class of DS-1 and an ACEC class of AC-1 be applied to all sub-surface concrete within this stratum.

It is recommended that the advice of this publication be taken for the design and specification of all sub-surface concrete within these strata.

Title : Figure 2 - Exploratory Hole Location Plan

Scale: 1:2000

Engineer: Anthony

Client : Thakeham Client

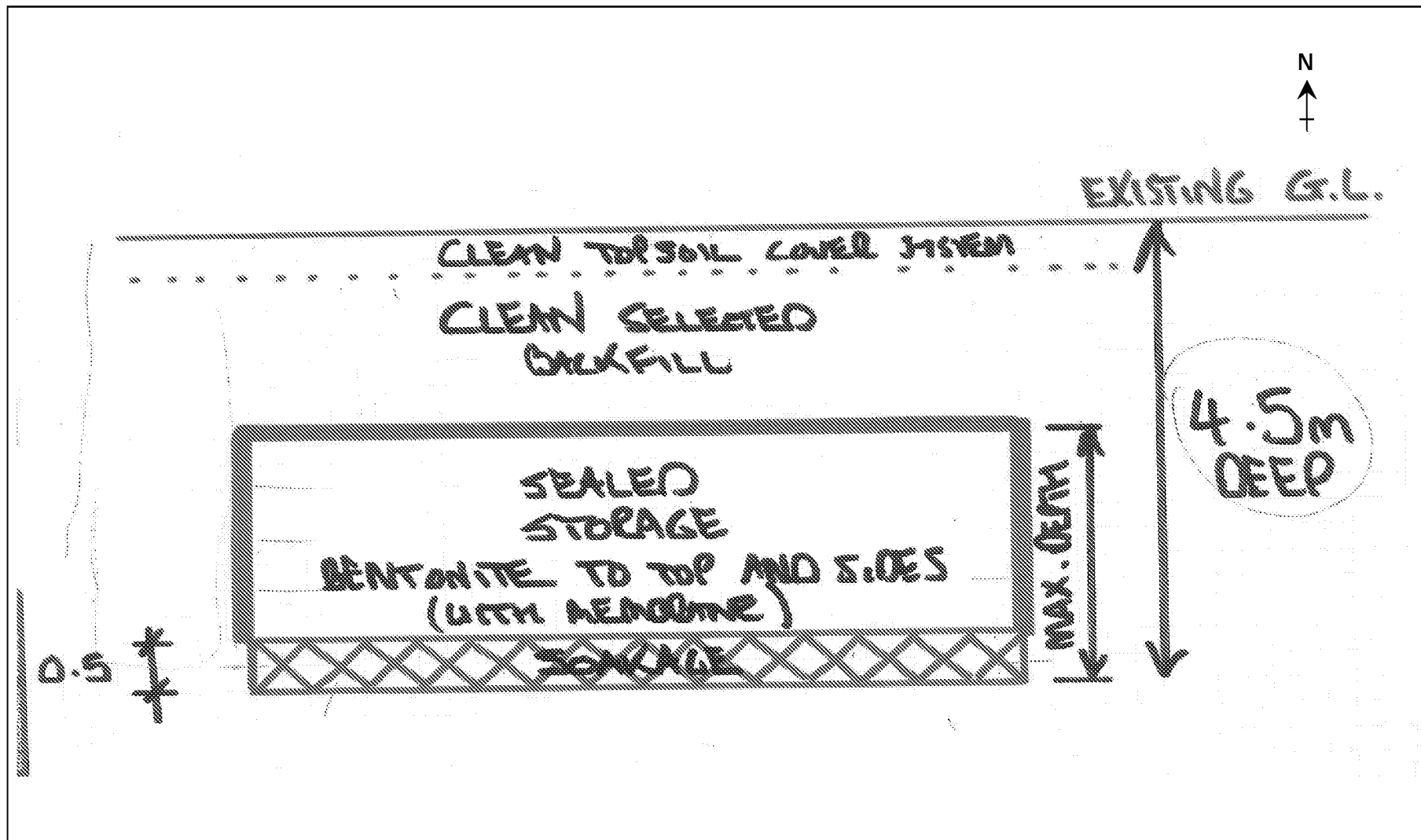


Geo-Environmental

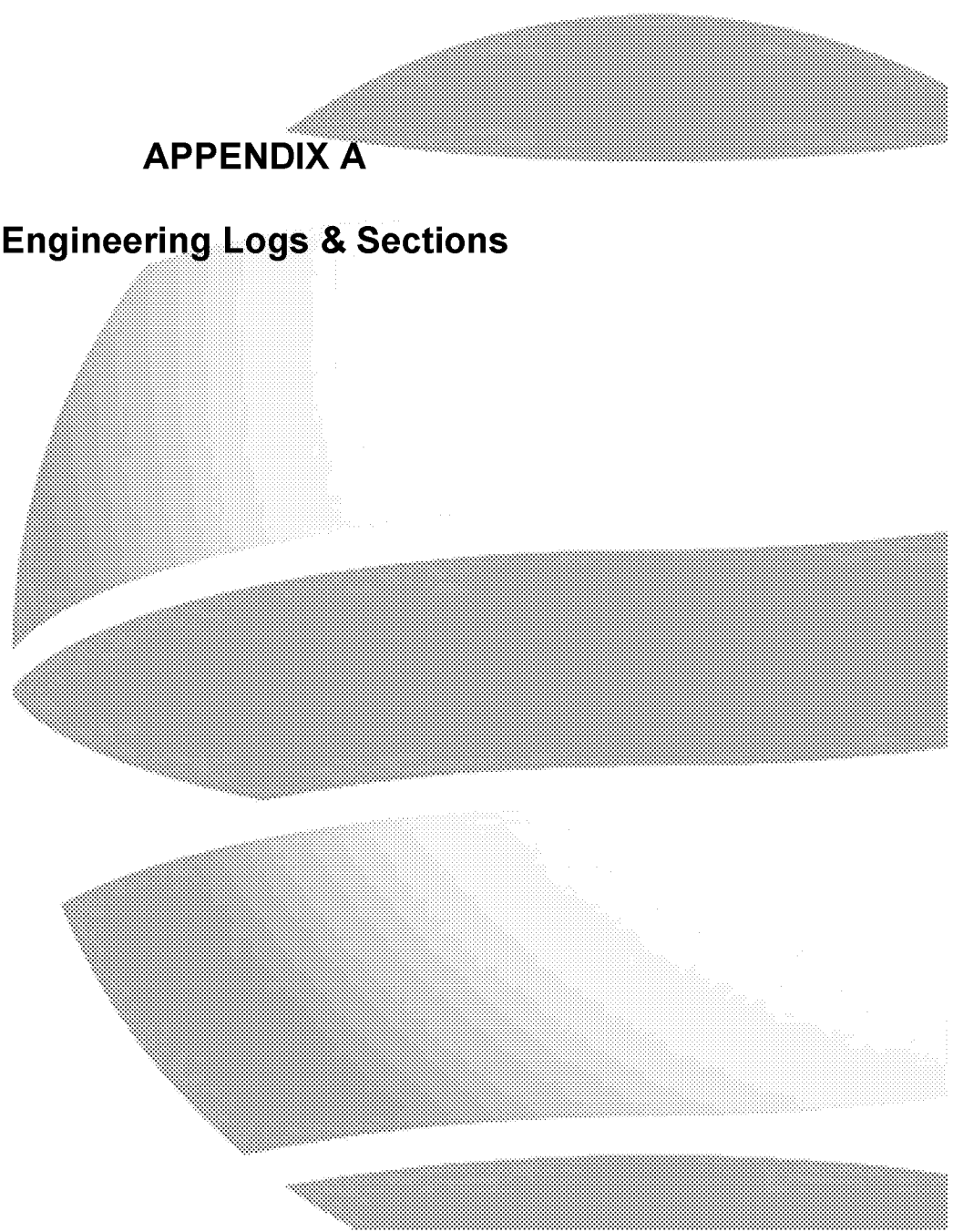
Legend Key

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





Project:	Cornfield Close, Littlehampton			Title	Preliminary Soakaway Construction Drawing	
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:	4	Scale:	Not To Scale			

A decorative background element consisting of several overlapping, wavy, light gray shapes that resemble stylized waves or clouds, positioned behind the main text.

APPENDIX A

Engineering Logs & Sections

 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log		Borehole No. BH101 Sheet 1 of 1	
Project Name: Cornfield Close, Littlehampton		Project No. GE17106		Co-ords: 503316E - 103288N	
Location: Littlehampton, West Sussex		Level: 8.03		Hole Type CP	
Client: Thakeham Client		Dates: 15/08/2018		Scale 1:50	
Logged By AP					

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.12	7.91		Grass overlying brown sandy silt. MADE GROUND	
	0.30	B						Dark brown clay with brick, concrete, glass and ash. MADE GROUND	
	0.30	ES							
	0.50	B							
	0.80	ES							
	1.00	B							
	1.00	ES							
	1.50 - 1.95	D							
	1.50	S	N=4 (1,0/1,1,1,1)						
	2.00	D							
	2.50	D			2.50	5.53		Brown and dark grey slightly sandy silty CLAY with rare fine gravel. RIVER TERRACE DEPOSITS	
	3.00 - 3.45	D			3.00	5.03		Medium dense brown slightly gravelly, very clayey SAND (gravel is fine to medium and sub-angular). RIVER TERRACE DEPOSITS	
	3.00	S	N=17 (3,4/4,4,4,5)						
	3.50	D							
	4.00	D							
	4.50 - 4.95	D							
	4.50	S	N=27 (5,6/6,6,7,8)						
	5.00	D							
	5.50	D			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	
	6.00 - 6.45	D							
6.00	S	N=43 (5,7/15,9,10,9)							
6.50	D								
7.00	D								
7.50 - 7.95	D								
7.50	S	N=25 (4,5/5,8,6,6)							
8.00	D								
8.50	D								
9.00 - 9.45	D								
9.00	S	N=42 (6,6/8,9,11,14)							
9.50	D								
10.00	D			10.00	-1.97		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	2.50	7.50	7.00			
150	10.00					



 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log		Borehole No. BH102 Sheet 1 of 2	
Project Name: Cornfield Close, Littlehampton		Project No. GE17106		Co-ords: 503373E - 103317N	
Location: Littlehampton, West Sussex		Level: 7.85		Hole Type CP	
Client: Thakeham Client		Dates: 13/08/2018		Scale 1:50	
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	1	
	0.30	ES							
	0.50	B							
	0.50	ES							
	1.00	B							
	1.00	ES							
	1.50 - 1.95	B							
	1.50 - 1.95	D							
	1.50 - 1.95	ES							
	1.50	C							
	2.00	D							
	2.10			N=22 (4,4/5,5,5,7)	2.10	5.74	 Grey brown medium sand. MADE GROUND	2	
	2.30								
	2.50	D							
	3.00 - 3.45	D							
	3.00	S							
	3.50	D							
	4.00	D							
	4.50 - 4.95	D							
	4.50	S							
5.00	D								
3.80			N=18 (3,4/4,4,5,5)	4.04	 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	4			
4.50	S								
5.00	D								
6.00 - 6.45	D								
6.00	S								
6.50	D								
7.00	D								
7.50	U								
7.50 - 7.95	D								
8.00	D								
8.50	D								
9.00 - 9.45	D								
9.00	S								
9.50	D								

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	15.00						



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Unit 7, Danworth Farm
Hurstpierpoint
BN6 9GL
www.gesl.net

Borehole Log

Borehole No.

BH102

Sheet 2 of 2

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

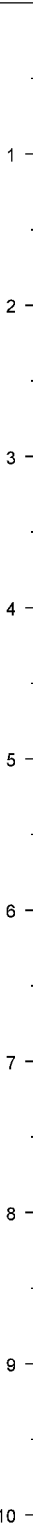
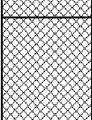
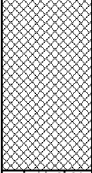
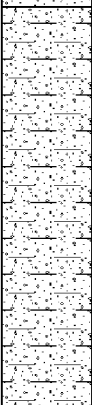
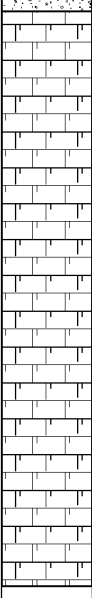
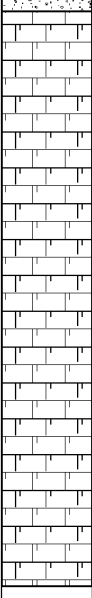
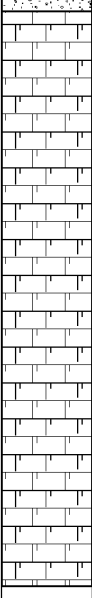
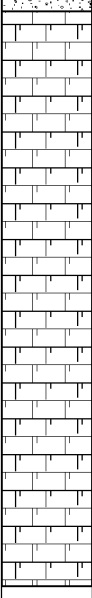
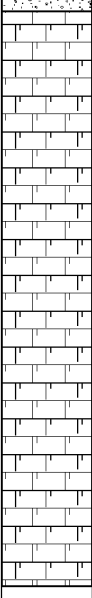
Dates: 13/08/2018

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)	15.00	-7.16					
		10.50 - 10.95	D								
		10.50	S								
		11.00	D								
		12.00 - 12.45	D	N=50 (7,6/12,20,12,6)							
		12.00	S								
		13.00	D								
		13.50 - 13.95	D							N=50 (15,10/14,15,19,2)	
		13.50	S								
		14.00	D								
		14.50	D	N=50 (10,11/13,13,19,5)							
		14.50 - 14.95	D								
		14.50	S								
		15.00	D								
End of Borehole at 15.00m											
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	15.00										



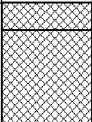
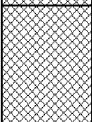
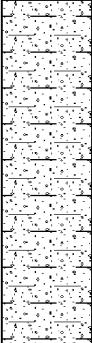
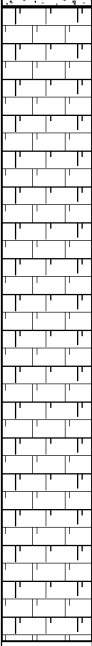
 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log		Borehole No. BH103 Sheet 1 of 1	
Project Name: Cornfield Close, Littlehampton		Project No. GE17106		Co-ords: 503448E - 103254N	
Location: Littlehampton, West Sussex		Level: 7.92		Hole Type CP	
Client: Thakeham Client		Dates: 23/08/2018		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						
		0.12			0.12	7.80		Grass overlying brown sandy silt.		
								MADE GROUND		
		0.30	B		0.60	7.32		Light brown clayey sandy silt with frequent brick and concrete fragments.		
		0.30	ES							
		0.50	B							
		0.50	ES							
		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							
		1.50 - 1.95	D							
		1.50	S	N=8 (2,2/2,2,2,2)						
		2.00	D					Orange brown clayey SAND. RIVER TERRACE DEPOSITS		
		2.50	B		2.40	5.52				Medium dense brown slightly gravelly clayey SAND (gravels fine to medium and sub-angular). RIVER TERRACE DEPOSITS
		2.50	ES							
		3.00 - 3.45	D		3.00	4.92				Medium dense orangish brown very gravelly, very clayey SAND (gravel is fine to coarse and sub-angular). RIVER TERRACE DEPOSITS
		3.00	S	N=30 (5,6/6,8,8,8)						
		3.50	D		3.50	4.42		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		
		4.00	D							
		4.50 - 4.95	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. CHALK		
		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. CHALK			
	6.00	S	N=10 (2,2/2,3,3,2)							
	6.50	D								
	7.00	D								
	7.50 - 7.95	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. CHALK			
	7.50	S	N=29 (4,5/7,7,8,7)							
	8.00	D								
	8.50	D								
	9.00 - 9.45	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. CHALK			
	9.00	S	N=30 (5,5/6,8,7,9)							
	9.50	D								
	10.00	D								
				10.00	-2.08		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	3.00	9.00	9.00			
150	10.00					



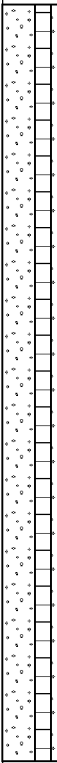
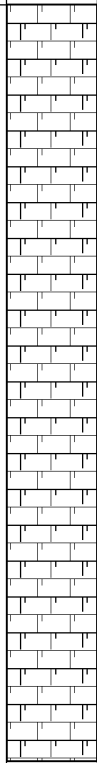
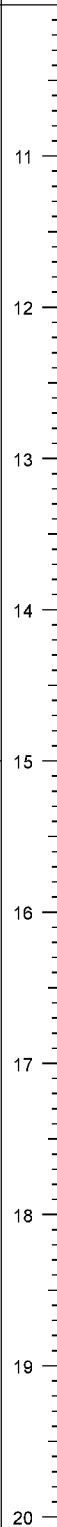
 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log			Borehole No. BH104 Sheet 1 of 2	
Project Name: Cornfield Close, Littlehampton		Project No. GE17106		Co-ords: 503345E - 103287N		Hole Type CP
Location: Littlehampton, West Sussex				Level: 8.13		Scale 1:50
Client: Thakeham Client				Dates: 14/08/2018		Logged By AP

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	B	N=12 (4,4/4,4,2,2)	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	
	0.30	ES							
	0.50	B							
	0.50	ES							
			1.00	B		1.60	6.53	 Dark brown clay with brick, concrete, glass and ash. MADE GROUND	2
	1.00	ES							
	1.50 - 1.80	D							
	1.50	S							
			2.00	D	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
	2.50	D							
	3.00 - 3.45	D							
	3.00	S							
			3.50	D	N=30 (5,5/7,7,7,9)	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	D							
	4.50	S							
	5.00	D							
			5.50	D	N=35 (5,8/8,9,9,9)	5.80	2.33	 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
	6.00 - 6.45	D							
6.00	S								
6.50	D								
		7.00	D	N=33 (4,5/8,8,8,9)				6	
7.50 - 7.95	D								
7.50	S								
8.00	D								
		9.00	D	N=47 (7,7/7,8,16,16)				7	
9.00 - 9.45	D								
9.00	S								
10.00	D								
		10.00	D					8	
								9	
								10	
Continued on Next Sheet									

Casing		Water Strikes (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					



 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log				Borehole No. BH104 Sheet 2 of 2	
Project Name: Cornfield Close, Littlehampton		Project No. GE17106		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	

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=46 (6,8/9,11,13,13)	15.00	-6.87			
		11.00	D						
		11.50	D						
		12.00 - 12.45 12.00	D S	N=49 (6,10/11,11,13,14)					
		12.50	D						
		13.00	D						
		13.50 - 13.95 13.50	D S	N=48 (5,9/12,12,11,13)					
		14.00	D						
		14.50 14.50 - 14.95 14.50	D D S	N=50 (8,8/9,10,10,21)					
		15.00	D						
End of Borehole at 15.00m									

Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to	
200 150	3.00 15.00	9.00	9.00			



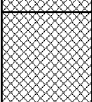
 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log			Borehole No. BH105 Sheet 1 of 1	
Project Name: Cornfield Close, Littlehampton		Project No. GE17106		Co-ords: 503410E - 103272N		Hole Type CP
Location: Littlehampton, West Sussex				Level: 8.39		Scale 1:50
Client: Thakeham Client				Dates: 22/08/2018		Logged By

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	B		0.17	8.22	 Grass overlying brown sandy silt.  MADE GROUND  Light brown clayey sandy silt with frequent brick and concrete fragments.  MADE GROUND		
	0.30	ES							
	0.50	B							
	0.50	ES							
			1.00	B	N=24 (2,4/4,7,7,6)	0.70	7.69	 Dark brown, dark grey and black silty clayey sand with frequent ash, glass, brick concrete, metal, plastic and timber.  MADE GROUND	1
	1.00	ES							
	1.50 - 1.95	D							
	1.50	S							
			2.00	D				 Orange brown sandy CLAY.  RIVER TERRACE DEPOSITS	2
	2.50	D							
	3.00 - 3.45	D							
	3.00	S							
			3.50	D	N=12 (2,2/2,3,3,4)	2.90	5.49	 Medium dense orange brown medium SAND.  RIVER TERRACE DEPOSITS	3
	4.00	D							
	4.50 - 4.95	D							
	4.50	S							
			5.00	D	N=11 (2,2/3,2,3,3)	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
	5.50	D							
	6.00 - 6.45	D							
	6.00	S							
		6.50	ES	N=29 (4,6/6,6,8,9)	5.80	2.59	 Medium dense orange brown clayey SAND with occasional flint gravel and rare chalk nodules.  RIVER TERRACE DEPOSITS <i>...with dark blue staining and a slight hydrocarbon malodour between 6.5m and 7.0m bgl.</i>	6	
7.00	D								
7.00	ES								
7.50 - 7.95	D								
		7.50	S	N=28 (3,4/9,6,6,7)	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	
8.00	D								
9.00 - 9.45	D								
9.00	S								
		9.50	D	N=50 (4,6/13,13,14,10)			 End of Borehole at 10.00m	9	
10.00	D								
		10.00	D		10.00	-1.61			10

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					



 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log		Borehole No. BH106 Sheet 1 of 1	
Project Name: Cornfield Close, Littlehampton		Project No. GE17106		Co-ords: 503423E - 103210N	
Location: Littlehampton, West Sussex		Level: 7.60		Hole Type CP	
Client: Thakeham Client		Dates: 22/08/2018		Scale 1:50	
Client: Thakeham Client		Dates: 22/08/2018		Logged By	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.15			0.15	7.45	 Grass overlying brown sandy silt. MADE GROUND		
	0.30	B							
			0.30	ES				 Light brown clayey sandy silt with frequent brick and concrete fragments. MADE GROUND	
	0.50	B							
			0.50	ES				 Dark brown, dark grey and black silty clayey sand with frequent ash, glass, brick concrete, metal, plastic and timber. MADE GROUND	
	1.00	B							
			1.00	ES					
	1.50 - 1.95	D							
			1.50	S	N=7 (1,1/2,1,2,2)				
	2.00	D							
			2.50	D					
	3.00 - 3.45	D							
			3.00	S	N=9 (1,2/3,2,2,2)	2.80	4.80	 Very soft orangish brown slightly gravelly sandy CLAY (gravel is fine to medium and sub-angular). RIVER TERRACE DEPOSITS	
	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	
	4.50 - 4.95	D							
			4.50	S	N=9 (2,2/3,1,1,4)				
	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	
	6.00 - 6.45	D							
		6.00	S	N=24 (4,8/5,5,6,8)					
6.50	D								
		7.00	D						
7.50 - 7.95	D								
		7.50	S	N=37 (11,14/8,8,10,11)					
8.00	D								
		8.50	D						
9.00 - 9.45	D								
		9.00	S	N=32 (3,5/6,8,8,10)					
9.50	D								
		10.00	D		10.00	-2.40	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					



 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log		Borehole No. BH107 Sheet 1 of 2	
Project Name: Cornfield Close, Littlehampton		Project No. GE17106		Co-ords: 503335E - 103245N	
Location: Littlehampton, West Sussex		Level: 8.04		Hole Type CP	
Client: Thakeham Client		Dates: 16/08/2018		Scale 1:50 Logged By AP	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.12	7.92		Grass overlying brown sandy silt.	
								MADE GROUND	
		0.30	B					Light brown clayey sandy silt with frequent brick and concrete fragments.	
		0.30	ES					MADE GROUND	
		0.50	B		0.60	7.44		Dark brown and dark grey clayey sand with frequent ash, brick, concrete, fabric, metal, timber and glass.	
		0.50	ES					MADE GROUND	
		1.00	B						1
		1.00	ES						
		1.50 - 1.95	D						
		1.50	C	N=6 (1,1/2,1,2,1)					
		2.00	D						2
		2.50	D		2.40	5.64		Loose orangish brown gravelly silty very clayey SAND (gravel is fine to coarse and sub-angular). RIVER TERRACE DEPOSITS	
		3.00 - 3.45	D		3.00	5.04		Medium dense orangish brown sandy CLAY with rare fine sub-angular gravel. RIVER TERRACE DEPOSITS	
		3.00	S	N=8 (1,2/2,1,3,2)					3
		3.50	D						
		4.00	D						4
		4.50 - 4.95	D						
		4.50	S	N=11 (2,3/3,3,2,3)					
		5.00	D						5
		5.50	D						
	6.00 - 6.45	D		5.90	2.14		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	S	N=18 (3,3/4,4,5,5)					6	
	6.50	D							
	7.00	D						7	
	7.50 - 7.95	D							
	7.50	S	N=30 (6,7/7,8,8,7)						
	8.00	D						8	
	8.50	D							
	9.00 - 9.45	D							
	9.00	S	N=25 (3,5/5,6,6,8)					9	
	9.50	D							
	10.00	D						10	
								Continued on Next Sheet	

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	15.00					

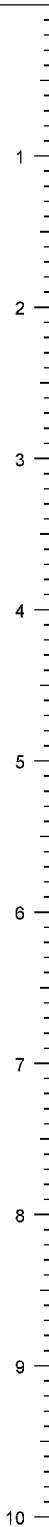


Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log				Borehole No. BH107 Sheet 2 of 2	
		Project Name: Cornfield Close, Littlehampton		Project No. GE17106		Co-ords: 503335E - 103245N	
Location: Littlehampton, West Sussex				Level: 8.04		Scale 1:50	
Client: Thakeham Client				Dates: 16/08/2018		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=26 (4,5/6,6,7,7)	15.00	-6.96			
		11.00	D						
		11.50	D						
		12.00 - 12.45 12.00	D S	N=44 (8,9/12,11,9,12)					
		12.50	D						
		13.00	D						
		13.50 - 13.95 13.50	D S	N=44 (7,10/12,11,9,12)					
		14.00	D						
		14.50 14.50 - 14.95 14.50	D D S	N=45 (6,8/8,9,13,15)					
		15.00	D						
End of Borehole at 15.00m									

Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to	
200 150	3.00 15.00	7.50	7.50			

 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log		Borehole No. BH108 Sheet 1 of 2	
Project Name: Cornfield Close, Littlehampton		Project No. GE17106		Co-ords: 503297E - 103196N	
Location: Littlehampton, West Sussex		Level: 8.34		Hole Type CP	
Client: Thakeham Client		Dates: 20/08/2018		Scale 1:50	
Logged By AP					

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.15			0.15	8.19		Grass overlying brown sandy silt.	
								MADE GROUND	
		0.30	B					Light brown clayey sandy silt with frequent brick and concrete fragments.	
		0.30	ES					MADE GROUND	
		0.50	B					Dark brown and dark grey clayey sand with frequent ash, brick, concrete, fabric, metal, timber and glass.	
		0.50	ES					MADE GROUND	
		1.00	B						
		1.00	ES						
		1.50 - 1.95	B						
		1.50 - 1.95	ES						
		1.50	C	N=3 (1,1/1,1,0,1)					
		2.00	D						
		2.50	D		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	
		3.00 - 3.45	D						
		3.00	S	N=6 (1,1/1,2,2,1)	3.10	5.24		Loose orange brown medium SAND. RIVER TERRACE DEPOSITS	
		3.50	D						
		4.00	D						
		4.50 - 4.95	D						
		4.50	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	
		5.00	D						
	5.50	D							
	6.00 - 6.45	D							
	6.00	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		
	6.50	D							
	7.00	D							
	7.50 - 7.95	D							
	7.50	S	N=23 (6,7/6,6,5,6)						
	8.00	D							
	8.50	D							
	9.00 - 9.45	D							
	9.00	S	N=29 (9,11/7,7,7,8)						
	9.50	D							
	10.00	D							
Continued on Next Sheet									

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	15.00					



		Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log			Borehole No. BH108 Sheet 2 of 2	
Project Name: Cornfield Close, Littlehampton		Project No. GE17106		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					
		10.50 - 10.95 10.50	D S	N=44 (4,7/13,11,11,9)	15.00	-6.66			
		11.00	D						
		11.50	D						
		12.00 - 12.45 12.00	D S	N=45 (8,7/9,9,14,13)					
		12.50	D						
		13.00	D						
		13.50 - 13.95 13.50	D S	50 (10,10/50 for 225mm)					
		14.00	D						
		14.50 14.50 - 14.95 14.50	D D S	N=50 (6,8/11,13,22,4)					
		15.00	D						
End of Borehole at 15.00m									

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	15.00					

 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log		Borehole No. BH109 Sheet 1 of 1	
Project Name: Cornfield Close, Littlehampton		Project No. GE17106		Co-ords: 503368E - 103217N	
Location: Littlehampton, West Sussex		Level: 7.91		Hole Type CP	
Client: Thakeham Client		Dates: 16/08/2018		Scale 1:50	
Logged By AP					

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.12			0.12	7.79		Grass overlying brown sandy silt. MADE GROUND		
		0.30	B					Dark brown clay with brick, concrete, glass and ash. MADE GROUND		
		0.30	ES							
		0.50	B							
		0.50	ES							
		1.00	B							
		1.00	ES							
		1.50 - 1.95	B							
		1.50 - 1.95	ES							
		1.50	C	N=9 (1,3/3,2,3,1)						
		2.00	D							
		2.50	D							
		3.00 - 3.45	D			2.80	5.11		Loose brown gravelly clayey SAND (gravel is fine to medium and sub-angular to sub-rounded). RIVER TERRACE DEPOSITS	
		3.00	S	N=7 (3,3/2,2,2,1)						
		3.50	D							
		4.00	D			3.80	4.11		Soft brown slightly gravelly sandy CLAY (Gravel is fine to medium and sub-angular). RIVER TERRACE DEPOSITS	
		4.50 - 4.95	D							
		4.50	S	N=14 (2,3/3,3,4,4)						
		5.00	D							
		5.50	D			5.50	2.41		Orange brown medium SAND and flint gravel. RIVER TERRACE DEPOSITS	
	6.00 - 6.45	D			5.70	2.21		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	S	N=21 (3,4/4,5,5,7)							
	6.50	D								
	7.00	D								
	7.50 - 7.95	D								
	7.50	S	N=33 (4,6/8,8,8,9)							
	8.00	D								
	8.50	D								
	9.00 - 9.45	D								
	9.00	S	N=43 (4,8/8,12,12,11)							
	9.50	D								
	10.00	D			10.00	-2.09		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					

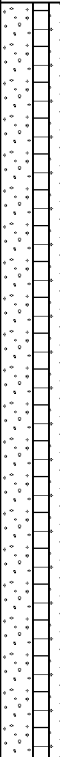
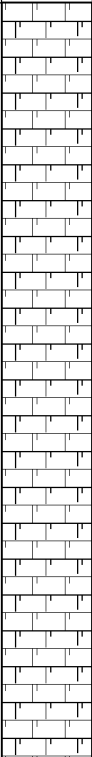
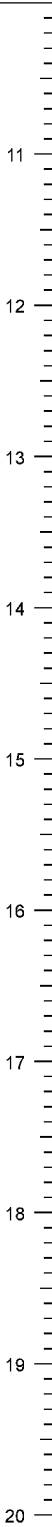


 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log		Borehole No. BH110 Sheet 1 of 2	
Project Name: Cornfield Close, Littlehampton		Project No. GE17106		Co-ords: 503393E - 103181N	
Location: Littlehampton, West Sussex		Level: 7.83		Hole Type CP	
Client: Thakeham Client		Dates: 21/08/2018		Scale 1:50	
Logged By AP					

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.17			0.17	7.66	 Grass overlying brown sandy silt. MADE GROUND		
	0.30	B							
			0.30	ES				 Light brown clayey sandy silt with frequent brick and concrete fragments. MADE GROUND	
	0.50	B							
			0.50	ES				 Dark brown and dark grey clayey sand with frequent ash, brick, concrete, fabric, metal, timber and glass. MADE GROUND	1
	1.00	B							
			1.00	ES					
	1.50 - 1.95	D							
	1.50	S	N=4 (1,0/1,1,1,1)						
			2.00	D				2	
	2.50	D							
			2.50	D		2.50	5.33	 Greenish grey and grey mottled slightly gravelly silty sandy CLAY (gravel is fine to medium and sub-angular to sub-rounded). RIVER TERRACE DEPOSITS	
	3.00 - 3.45	D							
			3.00	S	N=6 (1,1/1,2,1,2)	3.00	4.83	 Loose to medium dense light brown and orange brown slightly clayey SAND with frequent flint gravel. RIVER TERRACE DEPOSITS	3
	3.50	D							
			4.00	D				4	
	4.50 - 4.95	D							
			4.50	S	N=11 (2,2/2,3,3,3)	4.60	3.23	 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
	5.00	D							
			5.50	D				6	
6.00 - 6.45	D								
		6.00	S	N=38 (3,3/9,8,11,10)					
6.50	D								
		7.00	D				7		
7.50 - 7.95	D								
		7.50	S	N=25 (4,5/5,6,7,7)					
8.00	D								
		8.50	D				8		
9.00 - 9.45	D								
		9.00	S	N=29 (6,6/6,8,7,8)					
9.50	D								
		10.00	D				9		
							10		

Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks	
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to		
200	3.00	9.00	9.00				

 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log				Borehole No. BH110 Sheet 2 of 2	
Project Name: Cornfield Close, Littlehampton		Project No. GE17106		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)	15.00	-7.17			
		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						
End of Borehole at 15.00m									

Casing		Water Strikes (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					





Unit 7, Danworth Farm
Hurstpierpoint
BN6 9GL

Geo-Environmental www.gesl.net

Trial Pit Log

Trial Pit No

TP201

Sheet 1 of 1

Project Name: Cornfield Close, Littlehampton

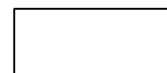
Project No.
GE17106

Co-ords: 503390.54 - 103230.52
Level: 7.91

Date
13/08/2018

Location: Littlehampton, West Sussex

Dimensions
(m):



Scale
1:25

Client: Thakeham Client

Depth
4.40

Logged
AP

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





Unit 7, Danworth Farm
Hurstpierpoint
BN6 9GL

Geo-Environmental www.gesl.net

Trial Pit Log

Trial Pit No

TP205

Sheet 1 of 1

Project Name: Cornfield Close, Littlehampton

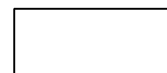
Project No.
GE17106

Co-ords: 503404.75 - 103259.25
Level: 8.19

Date
14/08/2018

Location: Littlehampton, West Sussex

Dimensions
(m):



Scale
1:25

Client: Thakeham Client

Depth
4.60

Logged
AP

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
	3.00	ES						
				4.40	3.78		Orange brown medium SAND. RIVER TERRACE DEPOSITS	4
				4.60	3.58		End of Pit at 4.60m	5
Water Strike								
Depth Strike								
		Remarks	Groundwater not encountered, backfilled with arisings.					
		Stability						





Unit 7, Danworth Farm
Hurstpierpoint
BN6 9GL

Geo-Environmental www.gesl.net

Trial Pit Log

Trial Pit No

TP209

Sheet 1 of 1

Project Name: Cornfield Close, Littlehampton

Project No.
GE17106

Co-ords: 503393.87 - 103262.44
Level: 8.36

Date
14/08/2018

Location: Littlehampton, West Sussex

Dimensions
(m):

Scale
1:25

Client: Thakeham Client

Depth
4.50

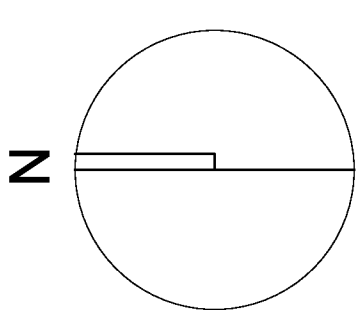
Logged
AP

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	
							Light brown very sandy silt with frequent fine to coarse sub-rounded flint gravel, rare brick, concrete and plastic. MADE GROUND	
	1.50 1.50	B ES		1.02	7.34		Dark brown, dark grey silty sand with abundant ash, frequent glass, occasional fabric, plastic, rare metal, paper and rubber. MADE GROUND	1
				2.12	6.24		Orange brown sandy CLAY. RIVER TERRACE DEPOSITS	2
				4.20	4.16		Dark yellow and orange brown SAND with occasional fine to coarse sub-rounded flint gravel. RIVER TERRACE DEPOSITS	
				4.40	3.96		Light brown slightly chalky SAND. RIVER TERRACE DEPOSITS	
				4.50	3.86		End of Pit at 4.50m	
								5
Water Strike		Remarks		Groundwater not encountered, backfilled with arisings.				
Depth Strike		Stability						



Appendix D
Proposed Site Layout

Notes



Please refer to Landscape Architect's information for hard and soft landscaping and planting.

2018.10.24 Issued for Planning.

Rev	Date + notes	Drawn	Chkd
-----	--------------	-------	------

r h partnership architects
30-31 Foundry Street Brighton BN1 4AT
T 01273 645220
www.rhpartnership.co.uk
brighton@rhpartnership.co.uk

Project
Land south of Cornfield Close
Littlehampton

Proposed Site Plan

Planning

Status

Job Ref

P0516

Dwg No

2000

Revision

00

Scale(s)

A1:1:500@A1

Size

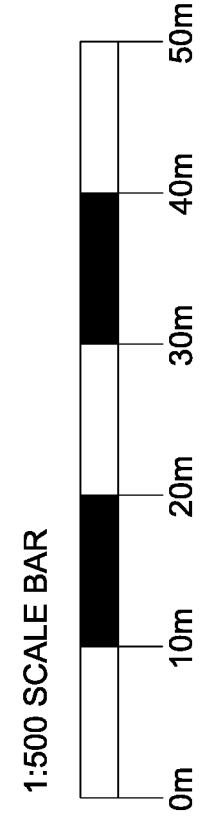
A1

Drawn

TW

Chkd

SH



Appendix E
Fluvial Flood Zone Map

Flood map for planning

Your reference
FloodZoneMap

Location (easting/northing)
503374/103247

Created
13 Sep 2018 2:55

Your selected location is in flood zone 1, an area with a low probability of flooding.

This means:

- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage problems

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

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<https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>