

4th February 2020

Our ref: GE18741/KOD01/200204



Tom Nelson
Linden Homes South
1A Guildford Business Park
Guildford
Surrey
GU2 8XG

Dear Tom,

RE: Boorley B6 Desiccation Assessment – Desiccation Report

Geo-Environmental Services Limited (Geo-Environmental) was instructed by Linden Homes South to undertake an investigation of the geotechnical factors pertaining to proposed development across part of the land at Boorley B6, Winchester Road, Southampton (herein referred to as 'the site'). The site's location is presented in Figure 1.

The purpose of this phase of site works was to provide an assessment of the possible indicators for desiccation in relation to plots 362-368, 374-378 & 440-441 which were previously located in an area proximal to trees/hedges.

An engineer from Geo-Environmental attended the site on Monday 6th and Tuesday 7th January 2020. At the time of the site works, the site comprised an open field bounded by heras fencing in all directions. Esso fuel lines were located along the western boundary of the site and were separated from the rest of the site by heras fencing. The ground surface on site was wet and soft underfoot. Photographs of the site are presented within Appendix A.

The scope of works comprised fourteen dynamic sampler boreholes to depths of up to 3.0m bgl. Due to time constraints and poor surface conditions due to wet weather, eleven of the fourteen holes were completed during the site works undertaken on the 6th and 7th January 2020. Samples were taken for geotechnical testing to inform the foundation design in this area.

The numbering on the trial pits was not sequential due to works on site being targeted to provide a coverage of the area within the investigation timescales allowed. As such the following boreholes were constructed: WS1-WS8, WS10 and WS13-WS14.

Figure 2 presented the locations of the exploratory holes constructed between the 6th and 7th January 2020.

Encountered Conditions

The ground conditions encountered were broadly consistent with published geological records and previous investigation across the wider site and comprised a thickness of Made Ground overlying clay, sand and gravel layers of the Wittering Formation. A generalised summary of the encountered conditions is presented in Table 1.

The Made Ground was generally encountered as a dark brown clay with a sand, gravel and cobble component and with roots and rootlets. The Wittering Formation comprised clay, gravel and sand in varying proportions with rootlets observed to a maximum depth of 1.80m bgl. The clay of the Wittering Formation was observed to generally range in consistency from soft to stiff.

Geo-Environmental Services Ltd
Unit 7 Danworth Farm, Cuckfield Road, Hurstpierpoint, West Sussex BN6 9GL
+44(0)1273 832972 www.gesl.net

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A summary of depths to which roots were observed within the additional investigation locations, with the exception of within Topsoil, is presented in Table 1 below.

Exploratory Hole	Maximum observed depth (m bgl)	Diameter (mm)
WS2	0.60	'Some rootlets'
WS3	0.65	'Some rootlets'
	1.30	'Rare rootlets'
WS4	0.80	'Frequent rootlets and some rotting rootlets'
	1.10	'Some rootlets'
	1.80	'Some rootlets, roots (1-2mm and some rotting rootlets)'
WS5	1.10	'Abundant rootlets'
	1.30	'Rare rootlets'
WS6	0.60	'Frequent rootlets'
	0.90	'Frequent rootlets and some rotting rootlets'
	1.20	'Some rootlets'
WS7	0.60	'Frequent rootlets'
	0.90	'Some rootlets'
WS8	0.70	'Frequent rootlets'
WS10	0.60	'Some rootlets'
	1.10	'Some rootlets'
WS14	0.90	'Rare rootlets'

Table 1 Summary of roots observed in recovered soils

With the exception of brick fragments and clinker a number of locations and a mild organic odour associated with black staining and organic material in WS1 and with rotting rootlets in WS6 no visual or olfactory evidence of contamination was encountered within the investigation positions on site.

For more detailed descriptions at specific locations, reference should be made to the exploratory hole logs presented in Appendix B.

Obstructions

Obstructions were encountered within a number of boreholes, with WS2, WS4, WS7 and WS8 refusing on a hard layer assumed to be associated with variation within the natural geology beneath the site.

The presence of obstructions elsewhere on site cannot be completely discounted.

Groundwater

Groundwater was encountered within a number of holes as detailed in Table 2 during the investigation. In addition, a number of layers were described as having a notable water content as detailed in Table 3.

Location	Water Strike (m bgl)	Time Elapsed (min)	Depth to Water (m bgl)
WS4	2.75	20	2.75
WS5	2.90	20	2.13
WS6	2.10	20	2.61
WS8	-	20	1.60
WS10	3.00	20	2.45

Table 2 Groundwater conditions encountered

Location	Depth of Layer (m bgl)	Description	Geological description
WS2	2.10 – 2.50	'Damp'	Clayey SAND
WS3	2.10 – 2.20	'Wet'	SAND
WS3	2.40 – 3.00	'Damp'	SAND
WS5	2.80 – 3.00	'Wet'	SAND
WS6	2.10 – 2.80	'Wet'	Gravelly SAND
WS6	2.80 – 3.00	'Wet'	Gravelly SAND
WS10	1.10 – 2.80	'Wet'	Gravelly sandy CLAY
WS10	2.80 – 3.00	'Wet'	Clayey sandy GRAVEL
WS13	1.70 – 3.00	'Damp'	SAND

Table 3 Notable water content in encountered soils

Desiccation Assessment

Desiccation is a transient soil condition commonly related to seasonal fluctuation in soil moisture content in response to climatic conditions and moisture uptake from vegetation. The intrusive investigation was undertaken during a period of wet weather. The ground surface of the site was notably wet and soft underfoot.

The desiccation investigation targeted the area of the proposed plots 362-368, 374-378 & 440-441 which were previously located in an area of trees/hedges. It should be noted that where trees and shrubs are planted on site as part of the proposed development, this could result in future desiccation and could alter the assessment presented herein.

Geotechnical testing on soil samples recovered from the exploratory holes comprised moisture content testing and Atterberg Limit testing to depths of up to 3.0m bgl supplemented with strength indicator testing using a hand penetrometer.

A summary of desiccation indicators for the investigation is presented in Table 4 (geotechnical testing was undertaken within all locations). It should be noted that these are indicators of potential desiccation and whilst each method can have limitations, the assessment is based on using several lines of evidence to determine potential correlations and estimate the presence and depth of desiccation.

Exploratory Hole	Depth of Desiccation Indicator (m bgl)					
	Maximum observed depth of live roots (including rootlets)	w	w = PL	w < PL+2	w < 0.4LL	HP
WS1	-	-	-	-	1.25 1.75	-
WS2	0.60	-	-	0.75	1.50 ^c	-
WS3	1.30	-	-	0.75 (=)	-	-
WS4	1.80	-	-	2.00	0.50 ^b	-
WS5	1.30	-	-	0.75	2.25 ^c	3.0kg/cm ² at 0.50 2.8kg/cm ² at 0.75
WS6	1.20	-	-	0.50 (=)	0.50	-
WS7	0.90	1.00 ^{a,c} 1.25 ^{a,c} 1.50 ^{a,c}	-	0.50 1.00 ^{a,c}	0.50 (=) 1.00 ^{a,c}	-
WS8	0.70	1.25 ^b 2.00 ^b	-	0.50 (=) 0.75 (=)	-	-
WS10	1.10					2.6kg/cm ² at 0.50

Exploratory Hole	Depth of Desiccation Indicator (m bgl)					
	Maximum observed depth of live roots (including rootlets)	w	w = PL	w<PL+2	w <0.4LL	HP
WS13	-	0.50 ^a 1.00 ^c	1.00 ^c	0.50 ^a 1.00 ^c	0.25 1.00 ^c	-
WS14	0.90	-	-	-	-	-

NOTE: w – as received soil moisture content; PL – plastic limit; LL – liquid limit; HP – hand penetrometer strength; ^a - sample is a gravel i.e. not likely to be affected by desiccation; ^b - high gravel content – desiccation potential is reduced; ^c – underlain by granular soils – likely an under-drainage condition

Table 4 Soil Desiccation Depth Indicators

The roots observed in soils recovered from the exploratory holes varied in depth and diameter as summarised in Table 1 and described in the individual exploratory hole logs presented in Appendix B.

The various comparison techniques applied and summarised in Table 4 have identified the potential presence of desiccation in a number of layers.

A number of desiccation indicators were present in WS5 at 0.75m bgl where abundant rootlets were observed, hand penetrometer results recorded a strength of 3.0km/cm² and natural moisture content was observed to be lower than PL+2. Despite this, foundations would likely pass through the affected layer.

Natural moisture content was recorded to be lower than PL+2 at 1.25m and 1.75m bgl within WS1. This layer was recorded as being underlain by interbedded sand and clay layers and is considered possibly to be under-drained. Under-drained strata are generally considered less prone to seasonally variable desiccation, or post desiccation heave due to long term drainage and hence reduced moisture content.

Several potential desiccation indicators were also identified in WS13 to c. 1.0m bgl but these soils were gravelly and thus have limited desiccation potential and were also underlain by granular strata and thus an under-drained condition may prevail.

Whilst the testing has not generally demonstrated the presence of several lines of evidence in which might indicate the onset of significant desiccation, the presence of roots may still require deepening on foundations beyond the minimum required based on volume change potential.

In addition, the presence of roots in excess of the likely minimum founding depth (based on volume change potential) is likely to require deepening of foundations across areas of the site. The depth of roots and rootlets encountered as part of the additional investigation works are presented in Table 1. It is considered that foundations should pass through and be located beneath areas where abundant rootlets have been recorded. However, foundations could potentially be located in areas where some or rare rootlets have been identified or where there is evidence of decaying rootlets subject to agreement with NHBC (or alternative Building Control provider).

Conventional Foundations

The results of the Atterberg Limit tests on samples recovered from the boreholes indicated the soils tested to vary from low to high volume change potential, as defined by NHBC Standards, Chapter 4.2. Whilst low to medium volume change potential were present in some locations, the absence of high volume change potential strata in proximity to these areas cannot be ruled out and thus a high volume change potential designation is recommended. Therefore, a minimum founding depth of 1.0m bgl is recommended where planting is outside of the zone of influence of trees. It is noted that this is a minimum depth based on volume change potential and

conventional foundations are often constructed to a depth of 1.2-1.5m bgl on many sites in order to accommodate services and the like.

Minimum recommended foundation depths have been derived taking into account observations, in-situ and laboratory testing results, including the desiccation indicator analysis. Indicative minimum foundation depths are presented in Table 5. The table also incorporates consideration of the reported strengths recorded for the soils recovered from the exploratory holes and assumes founding on a firm (or stronger) clay, or a sand/gravel stratum.

Location	Minimum recommended founding depth (m bgl)	Comments
WS1	1.2	No indicators, depth based on typical construction minimum.
WS2	1.2	No indicators, depth based on typical construction minimum.
WS3	1.2	No indicators, depth based on typical construction minimum.
WS4	2.2	Due to roots to 1.8m bgl and possible single indicator at 2.0m bgl.
WS5	1.5	Due to roots.
WS6	1.5	Due to roots.
WS7	1.2	Possible indicators at shallow depth, albeit possibly skewed by gravel.
WS8	1.2	Possible indicators at shallow depth, albeit possibly skewed by gravel.
WS10	-	Roots encountered to 1.1m bgl but underlain by very soft to soft gravelly clay to at least 2.8m bgl. Conventional foundations not considered suitable.
WS13	1.2	Possible indicators at shallow depth, albeit possibly skewed by gravel.
WS14	2.1	No indicators identified but clay at typical construction minimum depth was soft. Foundations would need to pass through soft clay and terminate in the underlying sand.

Table 5 Summary of foundation depth recommendations

It should be noted that groundwater was recorded close to the potential foundation base depth in WS4. It is possible that if groundwater is encountered during excavation for foundations, this could adversely impact the stability of trenches and constructability of conventional foundations in this area. As such, it may be prudent to excavate a trial trench (off alignment) prior to construction of the foundations to plots around WS4. The same approach should also be utilised around WS14, as although groundwater was not encountered during the investigation, its presence during construction could adversely impact constructability of conventional foundations in this area of the site. If adverse conditions prevail, it may be necessary to revise the foundation solution such as to construct piled foundations, dewater or otherwise revise the construction method.

It is considered that conventional foundations could be suitable for the proposed low-rise development as indicated in Table 5, albeit taken through any Made Ground, soft clay, root or desiccated zones, or disturbed ground to terminate in the firm, or stiff clay, or sand of the Wittering Formation.

Where foundations are proposed to be constructed within the zone of influence of trees, it is possible that foundations would need to be deepened to account for the presence and influence of trees. It is possible that foundation bases would require to be stepped and as such, it is recommended that steps do not exceed 0.50m in height at any point and are at least 1.0m (lateral distance) away from any corner or node point on the foundations. Where this cannot be accommodated, the foundation should be formed at the greater depth.

Foundations which are proposed in proximity to trees (remaining, removed or proposed) should be designed in accordance with NHBC Standards Chapter 4.2, and design approaches 4.2B and 4.2C, which incorporate the water demand of trees and the distance of the tree from the nearest portion of foundation.

Based on the ground conditions encountered, a net allowable bearing capacity of 90kPa is recommended for the firm clay of the Wittering Formation. Total settlement should remain within tolerable limits for the recommended allowable bearing capacity.

Heave protection measures in accordance with NHBC Standards will be required where foundation depths exceed 1.50m and where foundations pass through desiccated ground.

It is recommended that foundation excavations be concreted or blinded as soon after excavation as possible. Where concreting could take place the following day it is recommended that excavations are not taken to full depth overnight and that the final 0.50m of cover is only removed immediately prior to concreting.

Excavations

Excavations within the clay soils at the site are likely be stable in the short to medium term. Large scale excavations and those left unsupported for long time periods are likely to be less stable. The stability of excavations will also be reduced where sand lenses are present and where exposed to surface water.

Closure

We trust we have interpreted your request correctly and provide sufficient information for your current requirements. If you have any questions or queries in relation the information provided at this stage please do not hesitate to contact the undersigned.

Yours sincerely
For and on Behalf of Geo-Environmental



Katie O'Dea BSc (Hons), MSc, FGS
Consulting Engineer
katie.odea@gesl.net

Enc	Figure 1	Site Location Plan
	Figure 2	Exploratory Hole Location Plan
	Figure 3	Moisture Content Vs Depth
	Figure 4	Hand Penetrometer Vs Depth
	Appendix A	Exploratory Hole Logs
	Appendix B	Geotechnical Testing Results



FIGURES



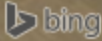
Project Title: Boorley B6 Linden - Desiccation
Assessment
Location : Winchester Road, Southampton
Project No. : GE18741
Client : Linden Homes South

Title : Figure 1 - Site Location Plan
Scale: 1:7000
Engineer: GR



Legend Key

 Site location



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Project Title: Boorley B6 Linden - Desiccation
Assessment
Location : Winchester Road, Southampton
Project No. : GE18741
Client : Linden Homes South

Title : Figure 2 - Exploratory Hole Location Plan
Scale: 1:800
Engineer: GR



- Legend Key
- Locations By Type - Empty
 - Locations By Type - WLS



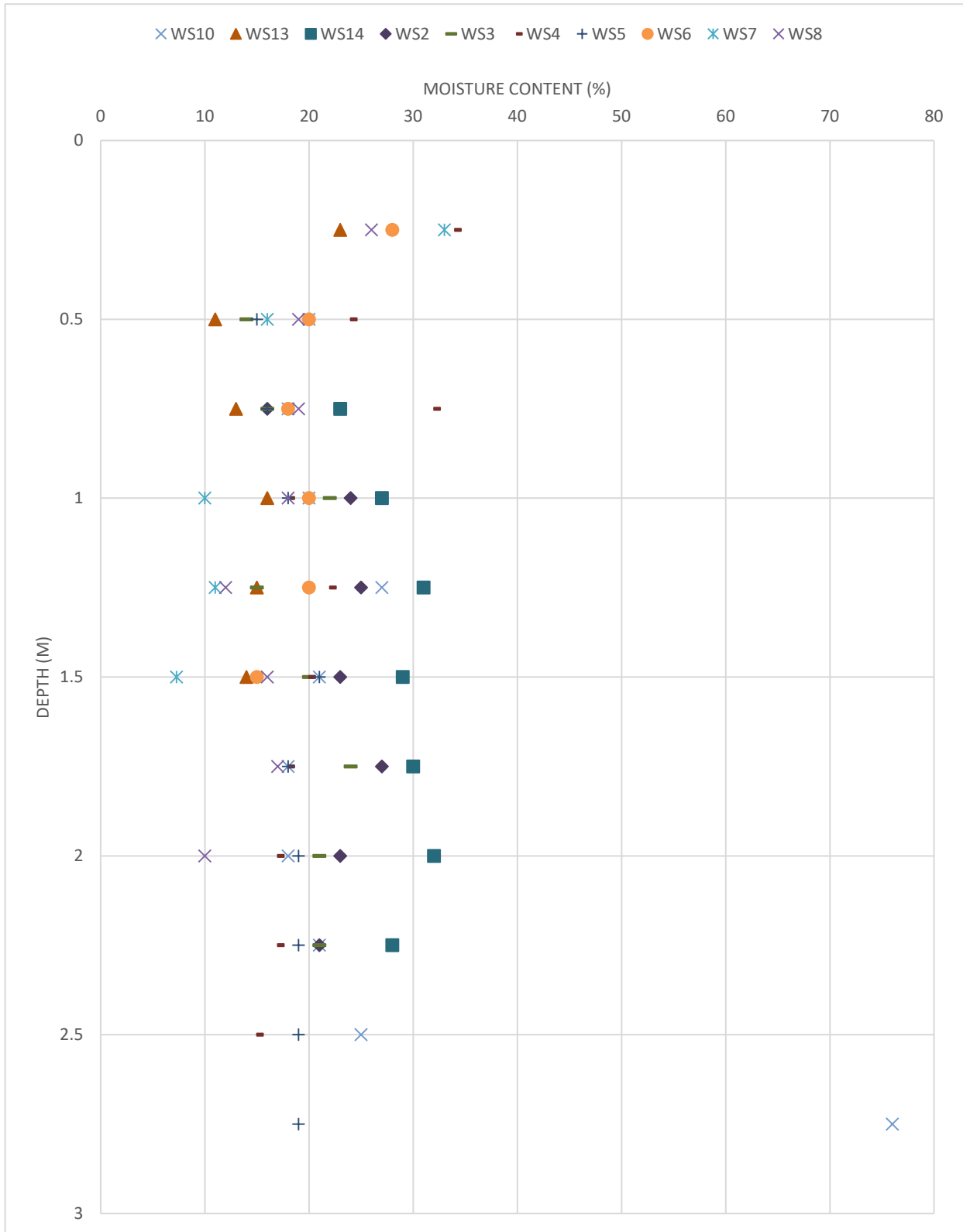
Moisture Content vs Depth

Project ID: **GE18741**

Project Title: **Boorley B6 Linden - Desiccation Assessment**

Client: **Linden Homes South**

Location: **Winchester Road, Southampton**





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+44 (0)1273 832972

HPEN Vs DEPTH

Project ID: **GE18741**

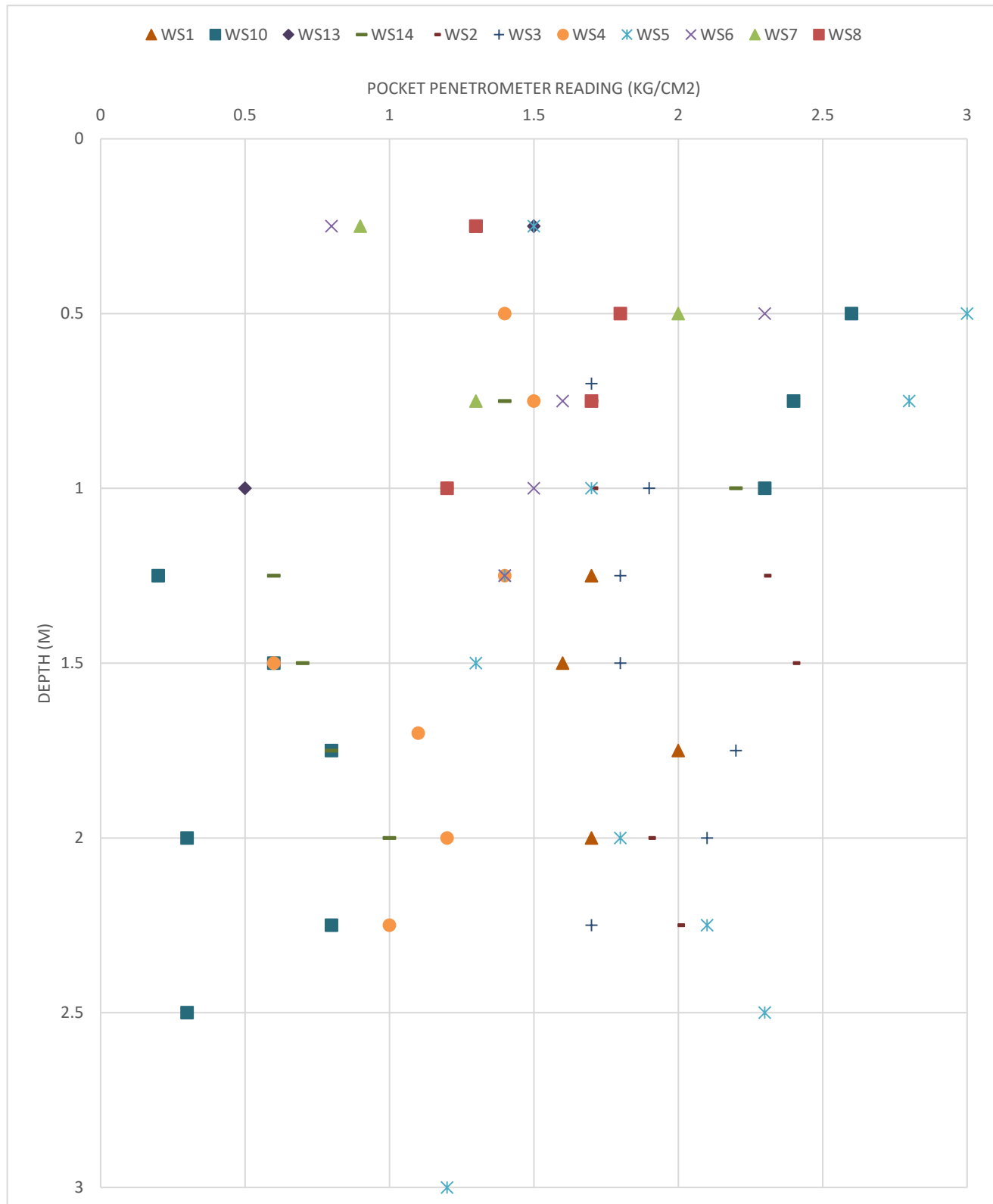
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Client: **Linden Homes South**

Location: **Winchester Road, Southampton**

Date Drilled:



Date Reported: **04/02/2020**

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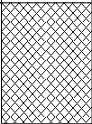
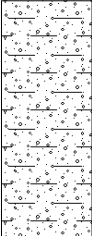
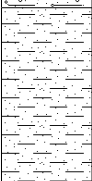
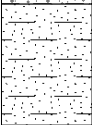


APPENDIX A

Exploratory Hole Logs



 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log				Borehole No. WS1 Sheet 1 of 1	
Project Name: Boorley B6 Linden - Desiccation Assessment		Project No. GE18741		Co-ords: 451323E - 114571N		Hole Type WLS	
Location: Winchester Road, Southampton				Level: 18.83		Scale 1:25	
Client: Linden Homes South				Dates: 06/01/2020		Logged By KOD	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.40	18.43		Brown slightly gravelly sandy CLAY with brick fragments, some organic material, rare rootlets and some black staining with a mild organic odour.	1
		0.50	D					Orangish brown slightly sandy clayey flint GRAVEL with reddish brown staining. Sand is fine to coarse. Gravel is fine to coarse sub angular.	
		0.75	D						
		1.00	D						
		1.25	D		1.20	17.63		Stiff orangish brown and grey mottled very sandy CLAY with orange staining.	
		1.25	PP	1.7kg/cm2					
		1.50	D						
		1.50	PP	1.6kg/cm2					
		1.75	D		1.80	17.03		Stiff orangish brown and grey mottled very sandy CLAY with 1-5mm sand lenses and orange staining.	
		1.75	PP	2.0kg/cm2					
		2.00	D		2.10	16.73		Orangish brown and greyish brown slightly clayey fine SAND with some orange staining.	
		2.00	PP	1.7kg/cm2					
	2.25	D		2.40	16.43		Firm orange and orangish brown slightly sandy gravelly CLAY with reddish orange staining. Sand is fine. Gravel is fine to medium sub angular sandstone.	2	
	2.50	D		2.60	16.23		Orangish brown and greyish brown slightly clayey fine SAND with some orange staining.		
	2.75	D							
		3.00	D		3.00	15.83	End of Borehole at 3.00m		3
									4
									5

Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to	
						Plot 362.





www.gesl.net

Borehole Log

Borehole No.

WS2

Sheet 1 of 1

Project Name:

Boorley B6 Linden - Desiccation Assessment

Project No.	GF18741
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Co-ords:

451334E - 114569N

Hole Type	WLS
1	0.0000
2	0.0000
3	0.0000
4	0.0000
5	0.0000
6	0.0000
7	0.0000
8	0.0000
9	0.0000
10	0.0000
11	0.0000
12	0.0000
13	0.0000
14	0.0000
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99	0.0000
100	0.0000

Location:

Winchester Road, Southampton

Level:

18.43

Scale
1:25

Client:

Linden Homes South

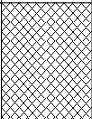
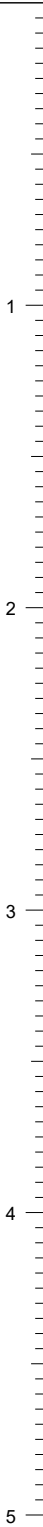
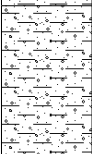
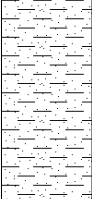
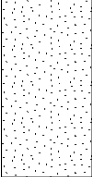
Dates:

06/01/2020

Logged By
KOD

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
								Dark brown slightly gravelly sandy CLAY with brick fragments, rotting organic material, some rootlets and some black staining.	
		0.50	D		0.30	18.13		Brown slightly sandy clayey flint GRAVEL with some rootlets. Sand is fine to coarse. Gravel is fine to coarse sub angular flint.	
		0.75	D		0.60	17.83		Stiff brown slightly sandy gravelly CLAY with some black flecking. Sand is fine. Gravel is fine to coarse sub angular flint.	
		0.75	PP	1.7kg/cm2	0.80	17.63		Stiff orangish brown and greyish brown mottled sandy CLAY with some dark brown organic staining. Sand is fine.	1
		1.00	D					Stiff orangish brown and grey mottled very sandy CLAY with orange staining and reddish orange staining and some 1-5mm sand lenses.	
		1.00	PP	1.7kg/cm2	1.10	17.33		<i>Some sub angular sandstone of medium gravel size</i>	
		1.25	D						
		1.25	PP	2.3kg/cm2					
		1.50	D						
		1.50	PP	2.4kg/cm2					
		1.75	D						
		2.00	D						
		2.00	PP	1.9kg/cm2	2.10	16.33		Damp greenish grey and orangish brown mottled slightly clayey fine SAND with some 1-3mm clay lenses.	2
		2.25	D						
		2.25	PP	2.0kg/cm2					
		2.50	D		2.50	15.93		----- End of Borehole at 2.50m	

 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log				Borehole No. WS3 Sheet 1 of 1	
Project Name: Boorley B6 Linden - Desiccation Assessment		Project No. GE18741		Co-ords: 451345E - 114569N		Hole Type WLS	
Location: Winchester Road, Southampton				Level: 18.15		Scale 1:25	
Client: Linden Homes South				Dates: 06/01/2020		Logged By KOD	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.40	17.75		Dark brown slightly gravelly slightly cobbly sandy CLAY with brick fragments, black staining roots 1-3mm and abundant rootlets. Gravel and cobbles are fine to coarse sub rounded flint.	
		0.50	D					Dark brown very gravelly sandy CLAY with some rootlets. Sand is fine. Gravel is fine to coarse sub angular flint.	
		0.70	PP	1.7kg/cm2	0.65	17.50			
		0.75	D		0.80	17.35		Stiff dark brown sandy CLAY with some dark brown to black staining. Sand is fine.	
		1.00	D					Stiff orangish brown and grey mottled slightly sandy very gravelly CLAY with reddish orange staining and rare rootlets.	
		1.00	PP	1.9kg/cm2					
		1.25	D		1.30	16.85			
		1.25	PP	1.8kg/cm2					
		1.50	D					Stiff orangish brown and grey mottled very sandy CLAY with abundant 1-5mm sand lenses and reddish orange staining.	
		1.50	PP	1.8kg/cm2					
		1.75	D						
		1.75	PP	2.2kg/cm2					
		2.00	D		2.10	16.05			
		2.00	PP	2.1kg/cm2	2.20	15.95		Wet greenish grey fine SAND.	
	2.25	D					Stiff orangish brown slightly gravelly very sandy CLAY with abundant reddish orange staining		
	2.25	PP	1.7kg/cm2						
	2.50	D		2.40	15.75		Damp greenish grey fine SAND with some orange staining.		
	2.75	D							
	3.00	D		3.00	15.15		End of Borehole at 3.00m		

Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks	
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to		
						Plot 364. Hole collapse to 2.2m bgl.	

 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log				Borehole No. WS4	
Project Name: Boorley B6 Linden - Desiccation Assessment		Project No. GE18741		Co-ords: 451356E - 114568N		Hole Type WLS	
Location: Winchester Road, Southampton				Level: 17.90		Scale 1:25	
Client: Linden Homes South				Dates: 07/01/2020		Logged By KOD	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.25	D		0.20	17.70		Dark brown slightly gravelly sandy CLAY with abundant rootlets and roots 1-2mm. Sand is fine. Gravel is fine sub rounded flint.	1
		0.25	PP	1.3kg/cm2				Firm orangish brown and dark brown mottled slightly sandy gravelly CLAY with dark brown organic staining, frequent rootlets and some rotting rootlets. Sand is fine to coarse. Gravel is fine to coarse sub angular flint.	
		0.50	D		0.80	17.10		Firm dark brown slightly gravelly sandy CLAY with some rootlets and some black flecking. Sand is fine. Gravel is fine to medium sub angular flint.	
		0.50	PP	1.4kg/cm2				Soft to firm orangish brown and grey mottled slightly gravelly very sandy CLAY with orange staining and some black flecking.	
		0.75	D		1.10	16.80		<i>Some rootlets and roots 1-2mm and some rotting roots.</i>	
		0.75	PP	1.5kg/cm2					
		1.00	D		2.30	15.60		Firm orangish brown and grey mottled slightly sandy very gravelly CLAY with some orange staining.	
		1.00	PP	1.2kg/cm2					
		1.25	D		2.75	15.15		Recovered as coarse sub angular flint GRAVEL with some orangish brown sandy CLAY.	
		1.25	PP	1.4kg/cm2				End of Borehole at 2.80m	
		1.50	D		2.80	15.10			
		1.50	PP	0.6kg/cm2					
	1.70	PP	1.1kg/cm2					3	
	1.75	D							
	2.00	D						2	
	2.00	PP	1.2kg/cm2						
	2.25	D						1	
	2.25	PP	1.0kg/cm2						
	2.50	D						0	
	2.70	D							

Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to	
		2.75	2.75			Plot 365. Refusal at 2.8m bgl on hard layer.



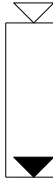
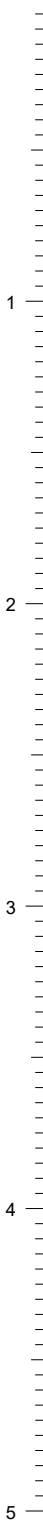
 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log				Borehole No. WS5 Sheet 1 of 1	
Project Name: Boorley B6 Linden - Desiccation Assessment		Project No. GE18741		Co-ords: 451376E - 114567N		Hole Type WLS	
Location: Winchester Road, Southampton				Level: 17.38		Scale 1:25	
Client: Linden Homes South				Dates: 07/01/2020		Logged By KOD	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.25	PP	1.5kg/cm2	0.30	17.08	 Firm orangish brown and greyish brown mottled slightly gravelly sandy CLAY with some orange staining and rare brick fragments. Sand is fine. Gravel is fine to medium sub angular flint.		
		0.50 0.50	D PP	3.0kg/cm2					 Stiff dry dark brown slightly gravelly very sandy CLAY with abundant rootlets and some black flecking. Sand is fine. Gravel is fine to medium sub angular flint.
		0.75 0.75	D PP	2.8kg/cm2			 Firm orangish brown and grey mottled slightly gravelly very sandy CLAY with reddish orange staining. Sand is fine. Gravel is fine to medium sub angular flint. <i>Rare rootlets</i>		
		1.00 1.00	D PP	1.7kg/cm2	1.10	16.28			 Stiff orangish brown and grey mottled sandy very gravelly CLAY with reddish orange staining. Sand is fine to coarse. Gravel is fine to coarse sub angular flint.
		1.25 1.25	D PP	1.4kg/cm2			 Stiff pale grey and orangish brown mottled slightly gravelly very sandy CLAY with orange staining. Sand is fine. Gravel is fine sub rounded flint.		
		1.50 1.50	D PP	1.3kg/cm2	1.60	15.78			 Firm pale grey and orangish brown mottled slightly sandy very gravelly CLAY with orange staining. Sand is fine. Gravel is fine to coarse sub angular flint.
		1.75	D				 Wet orangish brown and greyish brown mottled medium SAND. <i>Wet</i>		
		2.00 2.00	D PP	1.8kg/cm2	2.10	15.28			 End of Borehole at 3.00m
		2.25 2.25	D PP	2.1kg/cm2					
		2.50 2.50	D PP	2.3kg/cm2	2.60	14.78			
		2.75	D		2.80	14.58			
		3.00 3.00	D PP	1.2kg/cm2	3.00	14.38			

Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to	
		2.90	2.13			Plot 366. Collapsed to 2.8m bgl.



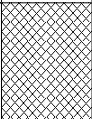
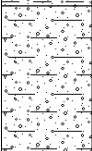
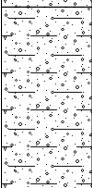
 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log				Borehole No. WS6 Sheet 1 of 1	
Project Name: Boorley B6 Linden - Desiccation Assessment		Project No. GE18741		Co-ords: 451397E - 114568N		Hole Type WLS	
Location: Winchester Road, Southampton				Level: 17.01		Scale 1:25	
Client: Linden Homes South				Dates: 07/01/2020		Logged By KOD	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.25	D	0.8kg/cm2	0.20	16.81		Dark brown slightly gravelly sandy CLAY with abundant rootlets and some brick fragments.	
	0.25	PP						Soft to stiff orangish brown and grey mottled slightly gravelly sandy CLAY with abundant orange staining, dark brown staining and frequent rootlets. Sand is fine. Gravel is fine to medium sub angular flint.	
	0.50	D	2.3kg/cm2	0.60	16.41		Stiff dark brown sandy CLAY with frequent rootlets, some rotting rootlets, black flecking and a mild organic odour. Sand is fine.		
	0.50	D							
	0.50	PP							
	0.75	D	1.6kg/cm2	0.90	16.11		Firm orangish brown slightly gravelly sandy CLAY with black flecking and some rootlets. Sand is fine. Gravel is fine to medium sub angular flint.		
	0.75	D							
	0.75	PP							
	1.00	D	1.5kg/cm2	1.20	15.81		Firm orangish brown and grey mottled sandy very gravelly CLAY with orange staining. Sand is fine to medium. Gravel is fine to medium sub angular flint.		
	1.00	D							
	1.00	PP							
	1.25	D	1.4kg/cm2						
	1.25	D							
	1.25	PP							
	1.50	D							
1.50	D								
1.75	D		1.80	15.21		Orangish brown slightly clayey sandy flint GRAVEL. Sand is fine to coarse. Gravel is fine to coarse sub angular flint.			
2.00	D		2.10	14.91		Wet orangish brown slightly gravelly fine to medium SAND. Gravel is fine sub angular flint.			
2.25	D								
2.50	D								
2.75	D		2.80	14.21		Wet grey and orangish brown gravelly fine to medium SAND. Gravel is fine to medium sub angular flint.			
3.00	D		3.00	14.01	End of Borehole at 3.00m				

Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to	
		2.10	2.61			Hole collapse to 2.75.



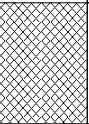
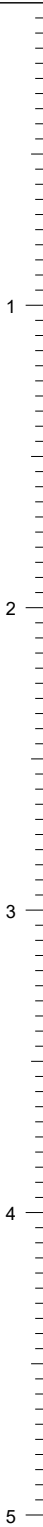
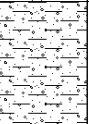
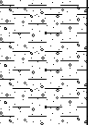
 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log				Borehole No. WS7 Sheet 1 of 1	
Project Name: Boorley B6 Linden - Desiccation Assessment		Project No. GE18741		Co-ords: 451414E - 114567N		Hole Type WLS	
Location: Winchester Road, Southampton				Level: 16.41		Scale 1:25	
Client: Linden Homes South				Dates: 07/01/2020		Logged By KOD	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.25 0.25	D PP	0.9kg/cm2	0.40	16.01		Soft brown, orangish brown and grey mottled slightly gravelly sandy CLAY with abundant dark brown organic staining and frequent rootlets. Sand is fine. Gravel is fine to medium sub angular flint.	1
		0.50 0.50	D PP	2.0kg/cm2	0.60	15.81		Stiff dark brown sandy CLAY with some black flecking and frequent rootlets. Sand is fine.	
		0.75 0.75	D PP	1.3kg/cm2	0.90	15.51		Firm orangish brown slightly gravelly very sandy CLAY with some rootlets. Sand is fine. Gravel is fine to medium sub angular flint.	
		1.00	D					Orangish brown very sandy very clayey GRAVEL. Sand is fine to coarse. Gravel is fine to coarse sub angular flint.	
		1.25	D		1.40	15.01		Orangish brown slightly clayey very sandy flint GRAVEL. Sand is fine to coarse. Gravel is fine to coarse sub angular.	
		1.50	D						
		1.75	D						
			2.00	D		2.00	14.41	End of Borehole at 2.00m	
									3
									4
									5

Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to	
						Refusal at 2.0m bgl on hard layer

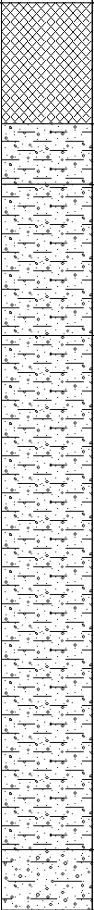


 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log				Borehole No. WS8 Sheet 1 of 1	
Project Name: Boorley B6 Linden - Desiccation Assessment		Project No. GE18741		Co-ords: 451427E - 114567N		Hole Type WLS	
Location: Winchester Road, Southampton				Level: 16.24		Scale 1:25	
Client: Linden Homes South				Dates: 07/01/2020		Logged By KOD	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.25 0.25	D PP	1.3kg/cm2	0.40	15.84		Firm brown and orangish brown mottled slightly gravelly slightly sandy CLAY with rare brick fragments, abundant rootlets, some bluish grey staining and some black stained rotting organic material. Sand is fine. Gravel is fine to medium sub rounded flint.	
		0.50 0.50	D PP	1.8kg/cm2				Stiff dark brown sandy CLAY with frequent rootlets. Sand is fine.	
		0.75 0.75	D PP	1.7kg/cm2		Firm to stiff orangish brown slightly gravelly sandy CLAY. Sand is fine. Gravel is fine sub rounded flint.			
		1.00 1.00	D PP	1.2kg/cm2					
		1.25	D			Firm orangish brown slightly sandy very gravelly CLAY with some black flecking and some orange staining. Sand is fine to coarse. Gravel is fine to coarse sub angular flint.			
		1.50	D						
		1.75	D						
		2.00	D			End of Borehole at 2.00m			

Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks	
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to		
		2.00	1.60			Refusal at 2.0m bgl on hard layer. Hole collapsed to 1.7 m bgl.	

 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log				Borehole No. WS10 Sheet 1 of 1			
Project Name:		Boorley B6 Linden - Desiccation Assessment		Project No. GE18741		Co-ords: 451372E - 114596N		Hole Type WLS	
Location:		Winchester Road, Southampton				Level: 17.59		Scale 1:25	
Client:		Linden Homes South				Dates: 07/01/2020		Logged By KOD	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description				
		Depth (m)	Type	Results								
	 	0.25 0.25	D PP	1.3kg/cm2	0.40	17.19		Firm greyish brown and dark brown mottled slightly gravelly sandy CLAY with reddish brown staining, black staining, frequent rootlets and some rotting rootlets.				
		0.50 0.50	D PP	2.6kg/cm2	0.60	16.99		Stiff dark brown slightly gravelly sandy CLAY with black stained rotting organic material, bluish grey staining and some rootlets.				
		0.75 0.75	D PP	2.4kg/cm2				Stiff orangish brown slightly gravelly sandy CLAY with black flecking and some rootlets. Sand is fine. Gravel is fine to medium sub angular flint.				
		1.00 1.00	D PP	2.3kg/cm2	1.10	16.49		Very soft to soft wet orangish brown and grey mottled slightly gravelly very sandy CLAY with black flecking and orange staining. Sand is medium. Gravel is fine to coarse sub angular flint.				
		1.25 1.25	D PP	0.2kg/cm2								
		1.50 1.50	D PP	0.6kg/cm2								
		1.75 1.75	D PP	0.8kg/cm2								
		2.00 2.00	D PP	0.3kg/cm2								
				2.25 2.25	D PP	0.8kg/cm2						
				2.50 2.50	D PP	0.3kg/cm2						
				2.75	D			2.80		14.79		
				3.00	D			3.00		14.59	Wet orangish brown clayey very sandy flint GRAVEL. Sand is fine to coarse. Gravel is fine to coarse.	
End of Borehole at 3.00m												

Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to	
		3.00	2.45			Collapse to 2.60.

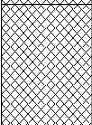
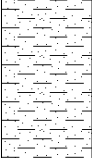
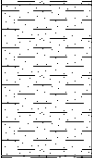


 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log				Borehole No. WS13 Sheet 1 of 1	
Project Name: Boorley B6 Linden - Desiccation Assessment		Project No. GE18741		Co-ords: 451341E - 114624N		Hole Type WLS	
Location: Winchester Road, Southampton				Level: 18.65		Scale 1:25	
Client: Linden Homes South				Dates: 07/01/2020		Logged By KOD	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.25	D	1.5kg/cm2	0.30	18.35		Greyish brown and orangish brown mottled slightly gravelly sandy CLAY with orange staining and some rootlets.	
		0.25	PP						
		0.50	D					Firm reddish brown sandy very clayey GRAVEL. Sand is fine to coarse. Gravel is fine to coarse sub angular flint.	
		0.75	D						
		1.00	D	0.5kg/cm2	0.80	17.85		Soft orangish brown sandy very gravelly CLAY with some orange staining and black flecking. Sand is fine. Gravel is fine to coarse sub angular flint.	
		1.00	PP						
		1.25	D					Orangish brown very clayey fine SAND with some 1-3mm clay lenses.	
		1.50	D					Yellowish brown fine SAND with some orange staining	
		1.75	D						
		2.00	D					Damp greenish grey and orangish brown mottled fine SAND with reddish orange staining.	
		2.25	D						
		2.50	D						
	2.75	D							
	3.00	D		3.00	15.65		End of Borehole at 3.00m		

Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks	
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to		
						Collapsed to 2.3m bgl.	

 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log				Borehole No. WS14 Sheet 1 of 1	
Project Name: Boorley B6 Linden - Desiccation Assessment		Project No. GE18741		Co-ords: 451326E - 114584N		Hole Type WLS	
Location: Winchester Road, Southampton				Level: 18.73		Scale 1:25	
Client: Linden Homes South				Dates: 07/01/2020		Logged By KOD	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.30	18.42		Firm orangish brown slightly gravelly sandy CLAY with brick fragments and some rootlets. Sand is fine. Gravel is fine to coarse sub angular flint.	1
					0.70	18.02		Grey and brown sandy gravelly CLAY with abundant brick fragments, breeze block fragments, some chalk and black staining. Sand is fine. Gravel is fine to coarse sub angular flint.	
	0.75	D			0.90	17.82		Firm orangish brown and greyish brown mottled sandy CLAY with bluish grey staining, dark brown staining and rare rootlets. Sand is fine.	
	0.75	PP	1.4kg/cm2					Soft to stiff orangish brown and bluish grey mottled sandy CLAY with reddish orange staining and some 1-2mm Sand lenses. Sand is fine.	
	1.00	D							
	1.00	PP	2.2kg/cm2						
	1.25	D							
	1.25	PP	0.6kg/cm2						
	1.50	D							
	1.50	PP	0.7kg/cm2		1.60	17.12		Soft bluish grey and orangish brown mottled very sandy CLAY with frequent 1-2mm sand lenses, reddish brown staining. Sand is fine to medium.	
1.75	D							2	
1.75	PP	0.8kg/cm2							
2.00	D								
		2.00	PP	1.0kg/cm2				Poor recovery of orangish brown, greenish grey and greyish brown mottled slightly clayey fine SAND with some reddish brown staining.	
		2.25	D		2.10	16.62			3
		2.75	D						
		3.00	D		3.00	15.72		End of Borehole at 3.00m	4
									5

Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to	
						Hole collapse to 2.3m bgl.





APPENDIX B

Geotechnical Laboratory Results





Summary of Natural Moisture Content, Liquid Limit and Plastic Limit Results

Job No. 27675	Project Name Boorley B6 - Dessication Assessment	Programme	
		Samples received	10/01/2020
		Schedule received	10/01/2020
Project No. GE18741	Client GESL	Project started	13/01/2020
		Testing Started	14/01/2020

Hole No.	Sample				Soil Description	NMC %	Passing 425µm %	LL %	PL %	PI %	Remarks
	Ref	Top m	Base m	Type							
WS1	4	1.25	-	D	Orangish brown and bluish grey mottled slightly sandy silty CLAY	24	99	61	18	43	
WS1	5	1.50	-	D	Brown mottled light greenish grey slightly sandy silty CLAY	29					
WS1	6	1.75	-	D	Brown mottled light greenish grey slightly sandy silty CLAY	25	100	70	20	50	
WS1	7	2.00	-	D	Orangish brown mottled greenish brown very sandy CLAY/clayey SAND	25	100	41	15	26	
WS1	8	2.25	-	D	Orangish brown mottled bluish grey sandy silty CLAY	23					
WS1	9	2.50	-	D	Orangish brown mottled bluish grey sandy silty CLAY	25					
WS1	10	2.75	-	D	Yellowish brown clayey SAND	21					
WS10	2	0.50	-	D	Dark greyish brown slightly gravelly sandy silty CLAY (gravel is fmc and sub-angular to sub-rounded)	20	92	45	16	29	
WS10	3	0.75	-	D	Orangish brown mottled greyish brown slightly gravelly sandy silty CLAY (gravel is fm and sub-angular)	18					
WS10	4	1.00	-	D	Orangish brown and greyish brown mottled slightly gravelly sandy silty CLAY (gravel is fm and sub-angular)	20	90	39	13	26	
WS10	5	1.25	-	D	Orangish brown mottled greyish brown sandy silty CLAY	27					
WS10	6	1.50	-	D	Orangish brown and greyish brown mottled slightly gravelly silty very sandy CLAY (gravel is fm and sub-angular)	21	97	34	12	22	

 2519	Test Methods: BS1377: Part 2: 1990: Natural Moisture Content : clause 3.2 Atterberg Limits: clause 4.3 and 5.0	Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU Tel: 01923 711 288 Email: James@k4soils.com	Checked and Approved Initials J.P Date: 24/01/2020
	Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)		MSF-5-R1(b)

					Summary of Natural Moisture Content, Liquid Limit and Plastic Limit Results						
Job No.		Project Name					Programme				
27675		Boorley B6 - Dessication Assessment					Samples received		10/01/2020		
Project No.		Client					Schedule received		10/01/2020		
GE18741		GESL					Project started		13/01/2020		
							Testing Started		14/01/2020		
Hole No.	Sample				Soil Description	NMC	Passing 425µm	LL	PL	PI	Remarks
	Ref	Top m	Base m	Type							
					%	%	%	%	%		
WS10	7	1.75	-	D	Orangish brown slightly mottled greenish grey sandy silty CLAY	18					
WS10	8	2.00	-	D	Greyish brown and orangish brown mottled sandy silty CLAY	18					
WS10	9	2.25	-	D	Bluish grey silty sandy CLAY	21	100	43	15	28	
WS10	10	2.50	-	D	Bluish grey silty sandy CLAY	25					
WS10	11	2.75	-	D	Light greenish grey sandy silty CLAY	76					
WS13	1	0.25	-	D	Greyish brown slightly gravelly slightly sandy silty CLAY (gravel is fm and sub-angular to angular)	23	95	59	20	39	
WS13	2	0.50	-	D	Brown clayey sandy GRAVEL (gravel is fmc and sub-angular to sub-rounded)	11	22	25	14	11	Sample washed to obtain test fraction
WS13	3	0.75	-	D	Brown clayey sandy GRAVEL (gravel is fmc and sub-angular to sub-rounded)	13					
WS13	4	1.00	-	D	Orangish brown slightly sandy gravelly silty CLAY (gravel is fmc and sub-angular to sub-rounded)	16	46	46	16	30	Sample washed to obtain test fraction
WS13	5	1.25	-	D	Orangish brown clayey SAND/very sandy CLAY	15					
WS13	6	1.50	-	D	Orangish brown clayey SAND	14					
WS14	1	0.75	-	D	Orangish brown and greenish grey mottled slightly sandy silty CLAY with rare fm sub-angular gravel	23	97	49	18	31	

	Test Methods: BS1377: Part 2: 1990: Natural Moisture Content : clause 3.2 Atterberg Limits: clause 4.3 and 5.0	Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU Tel: 01923 711 288 Email: James@k4soils.com	Checked and Approved Initials J.P Date: 24/01/2020
	Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)		
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					Summary of Natural Moisture Content, Liquid Limit and Plastic Limit Results						
Job No.		Project Name					Programme				
27675		Boorley B6 - Dessication Assessment					Samples received		10/01/2020		
Project No.		Client					Schedule received		10/01/2020		
GE18741		GESL					Project started		13/01/2020		
							Testing Started		14/01/2020		
Hole No.	Sample				Soil Description	NMC %	Passing 425µm %	LL %	PL %	PI %	Remarks
	Ref	Top m	Base m	Type							
WS14	2	1.00	-	D	Orangish brown, bluish grey and greenish grey mottled slightly gravelly slightly sandy silty CLAY (gravel is fm and sub-angular)	27					
WS14	3	1.25	-	D	Orangish brown, bluish grey and greenish grey slightly gravelly slightly sandy silty CLAY (gravel is fm and sub-angular)	31	99	56	18	38	
WS14	4	1.50	-	D	Orangish brown and greenish grey slightly sandy silty CLAY	29					
WS14	5	1.75	-	D	Orangish brown and greenish grey slightly sandy silty CLAY	30	100	63	18	45	
WS14	6	2.00	-	D	Orangish brown and greenish grey sandy CLAY	32					
WS14	7	2.25	-	D	Orangish brown and greenish grey sandy CLAY	28					
WS2	2	0.75	-	D	Brown gravelly sandy silty CLAY (gravel is fmc and sub-angular to angular)	16	65	36	15	21	
WS2	3	1.00	-	D	Orangish brown mottled greyish brown slightly sandy silty CLAY	24	100	47	17	30	
WS2	4	1.25	-	D	Orangish brown and greenish grey sandy CLAY with rare fine gravel	25					
WS2	5	1.50	-	D	Orangish brown mottled bluish grey slightly sandy silty CLAY	23	100	62	20	42	
WS2	6	1.75	-	D	Orangish brown and bluish grey mottled sandy CLAY	27					
WS2	7	2.00	-	D	Orangish brown mottled bluish grey slightly sandy silty CLAY	23	99	56	17	39	

	Test Methods: BS1377: Part 2: 1990: Natural Moisture Content : clause 3.2 Atterberg Limits: clause 4.3 and 5.0	Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU Tel: 01923 711 288 Email: James@k4soils.com	Checked and Approved Initials J.P Date: 24/01/2020
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Project No.		Client					Schedule received		10/01/2020		
GE18741		GESL					Project started		13/01/2020		
							Testing Started		14/01/2020		
Hole No.	Sample				Soil Description	NMC	Passing 425µm	LL	PL	PI	Remarks
	Ref	Top m	Base m	Type							
					%	%	%	%	%		
WS2	8	2.25	-	D	Orangish brown mottled greenish grey very sandy CLAY	21					
WS3	1	0.50	-	D	Dark grey brown clayey sandy GRAVEL (gravel is fmc and sub-angular to sub-rounded)	14					
WS3	2	0.75	-	D	Brown slightly gravelly sandy silty CLAY (gravel is fmc and sub-angular to angular)	16	74	31	14	17	
WS3	3	1.00	-	D	Orangish brown mottled greyish brown slightly sandy gravelly silty CLAY (gravel is fmc and sub-angular)	22					
WS3	4	1.25	-	D	Orangish brown slightly sandy gravelly silty CLAY (gravel is fmc and sub-angular to sub-rounded)	15					
WS3	5	1.50	-	D	Orangish brown silty very sandy CLAY	20	100	41	14	27	
WS3	6	1.75	-	D	Orangish brown, bluish grey and reddish brown mottled slightly sandy silty CLAY	24					
WS3	7	2.00	-	D	Orangish brown, bluish grey and reddish brown mottled slightly sandy silty CLAY	21					
WS3	8	2.25	-	D	Orangish brown slightly gravelly sandy silty CLAY (gravel is fmc and sub-angular)	21	85	43	12	31	
WS4	1	0.25	-	D	Brown mottled orangish brown slightly gravelly slightly silty CLAY with traces of rootlets (gravel is fmc and sub-angular to sub-rounded)	34					
WS4	2	0.50	-	D	Brown and orangish brown mottled slightly gravelly slightly sandy silty CLAY with traces of rootlets (gravel is fmc and sub-angular to sub-rounded)	24	86	63	18	45	
WS4	3	0.75	-	D	Brown mottled orangish brown slightly gravelly slightly silty CLAY with traces of rootlets (gravel is fmc and sub-angular to sub-rounded)	32					

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27675		Boorley B6 - Dessication Assessment					Samples received		10/01/2020		
Project No.		Client					Schedule received		10/01/2020		
GE18741		GESL					Project started		13/01/2020		
							Testing Started		14/01/2020		
Hole No.	Sample				Soil Description	NMC %	Passing 425µm %	LL %	PL %	PI %	Remarks
	Ref	Top m	Base m	Type							
WS4	4	1.00	-	D	Greyish brown slightly gravelly sandy silty CLAY (gravel is fmc and sub-angular)	18					
WS4	5	1.25	-	D	Greyish brown and orangish brown mottled slightly gravelly slightly sandy silty CLAY (gravel is fm and sub-angular)	22	97	48	17	31	
WS4	6	1.50	-	D	Orangish brown and greenish grey mottled slightly sandy gravelly silty CLAY (gravel is fm and sub-angular)	20					
WS4	7	1.75	-	D	Orangish brown mottled bluish grey slightly gravelly slightly sandy silty CLAY (gravel is fm and sub-angular)	18					
WS4	8	2.00	-	D	Light brown and orangish brown mottled sandy silty CLAY	17	94	31	16	15	
WS4	9	2.25	-	D	Yellowish brown mottled orangish brown slightly gravelly sandy silty CLAY (gravel is fm and sub-angular)	17					
WS4	10	2.50	-	D	Brown slightly sandy clayey GRAVEL (gravel is fmc and sub-angular to sub-rounded)	15					
WS5	1	0.50	-	D	Greyish brown slightly gravelly very sandy CLAY (gravel is fm and sub-angular)	15					
WS5	2	0.75	-	D	Greyish brown slightly gravelly silty very sandy CLAY (gravel is fm and sub-angular)	16	99	36	17	19	
WS5	3	1.00	-	D	Greyish brown gravelly sandy silty CLAY (gravel is fmc and sub-angular)	18					
WS5	4	1.25	-	D	Orangish brown and greenish grey slightly gravelly slightly sandy silty CLAY (gravel is fmc and sub-angular to sub-rounded)	20	92	52	17	35	
WS5	5	1.50	-	D	Orangish brown and greenish grey slightly gravelly slightly sandy silty CLAY (gravel is fmc and sub-angular to sub-rounded)	21					

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GE18741		GESL					Project started		13/01/2020		
							Testing Started		14/01/2020		
Hole No.	Sample				Soil Description	NMC	Passing 425µm	LL	PL	PI	Remarks
	Ref	Top m	Base m	Type							
					%	%	%	%	%		
WS5	6	1.75	-	D	Orangish brown mottled bluish grey slightly sandy gravelly silty CLAY (gravel is fmc and sub-angular to sub-rounded)	18					
WS5	7	2.00	-	D	Orangish brown slightly mottled bluish grey slightly gravelly slightly sandy silty CLAY (gravel is fmc and sub-angular to sub-rounded)	19					
WS5	8	2.25	-	D	Greenish grey slightly gravelly slightly sandy silty CLAY with rare fm chalk fragments (gravel is fmc and sub-rounded to sub-angular)	19	84	57	15	42	
WS5	9	2.50	-	D	Greenish grey slightly gravelly slightly sandy silty CLAY with rare fm chalk fragments (gravel is fmc and sub-rounded to sub-angular)	19					
WS5	10	2.75	-	D	Greenish grey slightly sandy clayey GRAVEL (gravel is fmc and sub-angular to sub-rounded)	19					
WS6	1	0.25	-	D	Yellowish brown mottled bluish grey slightly sandy gravelly silty CLAY (gravel is fmc and sub-angular to sub-rounded)	28					
WS6	2	0.50	-	D	Orangish brown and greyish brown slightly gravelly slightly sandy silty CLAY (gravel is fm and sub-angular to angular)	20	90	57	18	39	
WS6	3	0.75	-	D	Greyish brown slightly gravelly sandy silty CLAY (gravel is fmc and sub-angular)	18					
WS6	4	1.00	-	D	Brown slightly gravelly slightly sandy silty CLAY (gravel is fmc and sub-angular to sub-rounded)	20	93	38	15	23	
WS6	5	1.25	-	D	Brown slightly gravelly slightly sandy silty CLAY (gravel is fmc and sub-angular to sub-rounded)	20					
WS6	6	1.50	-	D	Brown slightly sandy gravelly silty CLAY (gravel is fmc and sub-angular to sub-rounded)	15	42	35	13	22	Sample washed to obtain test fraction
WS7	1	0.25	-	D	Greyish brown mottled yellowish brown slightly gravelly slightly sandy silty CLAY (gravel is fm and sub-angular)	33					

	Test Methods: BS1377: Part 2: 1990: Natural Moisture Content : clause 3.2 Atterberg Limits: clause 4.3 and 5.0	Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU Tel: 01923 711 288 Email: James@k4soils.com	Checked and Approved Initials J.P Date: 24/01/2020
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Project No.		Client					Schedule received		10/01/2020		
GE18741		GESL					Project started		13/01/2020		
							Testing Started		14/01/2020		
Hole No.	Sample				Soil Description	NMC	Passing 425µm	LL	PL	PI	Remarks
	Ref	Top m	Base m	Type							
						%	%	%	%	%	
WS7	2	0.50	-	D	Brown slightly gravelly sandy silty CLAY (gravel is fm and sub-angular)	16	89	40	17	23	
WS7	4	1.00	-	D	Orangish brown clayey sandy GRAVEL (gravel is fmc and sub-angular to angular)	10	33	36	13	23	Sample washed to obtain test fraction
WS7	5	1.25	-	D	Orangish brown clayey sandy GRAVEL (gravel is fmc and sub-angular to angular)	11					
WS7	6	1.50	-	D	Orangish brown clayey sandy GRAVEL (gravel is fmc and sub-angular to angular)	7.3					
WS8	1	0.25	-	D	Brown slightly sandy gravelly silty CLAY (gravel is fmc and sub-angular to sub-rounded)	26					
WS8	2	0.50	-	D	Brown slightly gravelly sandy silty CLAY (gravel is fm and sub-angular)	19	92	33	17	16	
WS8	3	0.75	-	D	Brown slightly gravelly slightly sandy silty CLAY (gravel is fm and sub-angular to sub-rounded)	19	80	46	17	29	
WS8	4	1.00	-	D	Brown slightly gravelly slightly sandy silty CLAY (gravel is fm and sub-angular to sub-rounded)	18					
WS8	5	1.25	-	D	Light brown slightly sandy clayey GRAVEL (gravel is fmc and sub-angular to sub-rounded)	12					
WS8	6	1.50	-	D	Light brown slightly sandy clayey GRAVEL (gravel is fmc and sub-angular to sub-rounded)	16					
WS8	7	1.75	-	D	Light brown slightly sandy clayey GRAVEL (gravel is fmc and sub-angular to sub-rounded)	17	56	35	14	21	Sample washed to obtain test fraction
WS8	8	2.00	-	D	Light brown slightly sandy clayey GRAVEL (gravel is fmc and sub-angular to sub-rounded)	10					

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