

Please reply to: Swindon Office

Your Ref: LU/253/17/DOC
Our Ref: SS/sc/5753adc

10th January 2018

Arun District Council
Engineering Services
Arun Civic Centre
Maltravers Road
Littlehampton
BN17 5LF

For the attention of Mr Paul Cann

Dear Mr Cann

Re: Land Adjacent to Shell Garage, Worthing Road, Littlehampton - Planning Ref
LU/20/17/PL
- Planning Condition 4 - Surface Water Drainage

I write in response to Arun District Council's decision notice on application reference LU/253/17/DOC, dated 3rd November 2017. I note the requirement to provide full justification for discounting infiltration drainage methods and seek to address this below.

Site Investigation (SI) Works & Existing Ground Conditions

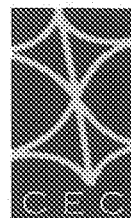
Intrusive Site Investigation was undertaken in May 2017. The works comprised a trial pit excavated to a depth of 3m and 4 No. boreholes to 4m depth. Beneath a shallow layer of topsoil/made ground, clay based River Terrace Deposits were encountered to a depth of 3-4m below ground level in 4 No. boreholes, and to 1.8m below ground in bore hole WS04 in the western part of the site, where chalk was encountered beneath the River Terrace Deposits to a depth of 4m below ground level. Refer to the attached bore hole logs and location plan.

BRE 365 soil infiltration testing undertaken within the River Terrace Deposits in bore hole WS01 demonstrated that the potential for infiltration in this material is negligible.

The SI report states that the chalk strata found in WS04 is highly weathered producing a fine-grained silt, and recommends that based on local experience, it is relatively impermeable and not suitable for soakaway drainage. The report discounts discharge of runoff into the deeper layers of chalk via a deep bore soakaway due to the potential for hydrocarbon contaminants from the adjacent petrol station and car wash entering the chalk, which has Principal Aquifer status. Based on interpolated water levels from historical borehole logs the report suggests that the water table is likely to lie at approximately 4.5m below ground level, which would prevent the effective operation of a deep bore soakaway. Refer to the attached excerpt from the SI report.

Location of Infiltration Testing

While it is acknowledged that the infiltration test was not performed in the location of the proposed SUDS system, please note that the underlying strata do not vary significantly across the site; the only materials present are the River Terrace Deposits and the underlying chalk, as the attached borehole logs confirm.



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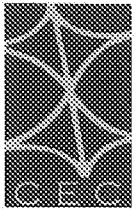
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10th January 2018

Mr Paul Cann
Arun District Council



As discussed above, the testing in WS01 established that the River Terrace Deposits, being predominantly clay based, are impermeable, and the SI report confirms that the chalk is not suitable for soakaway drainage. We therefore consider the location of the testing within what is a relatively small site area to be unimportant in this instance.

Groundwater Monitoring

Groundwater monitoring is usually carried out to determine if a suitable buffer can be provided between the base of a soakaway and the highest groundwater level. As ground conditions are clearly unsuitable for soakaways I would suggest that this information is not required. Floatation of the proposed attenuation tank is not a concern as the SI report estimates that the groundwater table is 4.5m below ground level, approximately 3m below the base of the tank.

In view of the findings of the Site Investigation we believe that in this case an attenuation based drainage strategy is required to ensure the site can be drained effectively and to protect the controlled waters of the Principal Aquifer beneath the site. Soakaways, permeable pavements and basins are therefore not proposed.

I trust that this letter and the attached information satisfies the requirement to justify the choice of drainage system and I look forward to hearing from you in relation to this matter.

Yours sincerely

A large black rectangular box redacting the signature of Stuart Starr.

Stuart Starr BSc (Hons)
Engineer

A black rectangular box redacting contact information, likely a phone number or email address.

Enc:

Enclosures

Unit 7, Danworth Farm
Hurstpierpoint
BN6 9GL

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Trial Pit Log

TrialPit No

TP01

Sheet 1 of 1

Project Name: Coffee Drive-Thru, Rustington

Project No.
GE16347

Co-ords: 503871.61 - 103315.17
Level:

Date
26/05/2017

Location: Littlehampton

Dimensions (m):

Scale
1:25

Client: Store Property Investments Ltd

Depth
3.10

05.0

Logged
V. Bennett

[illegible]



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BN6 9GL

Borehole Log

Borehole No.

WS01

Sheet 1 of 1

Project Name: Coffee Drive-Thru, Rustington

Project No.
GE16347

Co-ords: 503872E - 103308N

Hole Type
WLS

Location: Littlehampton

Level:

Scale
1:25

Client: Store Property Investments Ltd

Dates: 26/05/2017

Logged By
V. Bennett

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10	ES		0.15			Brown silt with many rootlets and occasional subangular gravel.	
		0.20	ES					TOPSOIL	
		0.50	D					Soft to firm orangish brown CLAY.	
		0.50	ES					RIVER TERRACE DEPOSITS	
		1.00	D						1
		1.50	D						
		2.00	D						2
		2.50	D						
		3.00	D		3.00			Firm to stiff orangish brown slightly sandy CLAY.	3
		3.50	D					RIVER TERRACE DEPOSITS	
		4.00	D		4.00			Roots (1mm) to 3m bgl.	
								End of Borehole at 4.00m	4
									5
Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks			
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to				





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BN6 9GL

Borehole Log

Borehole No.

WS02

Sheet 1 of 1

Project Name: Coffee Drive-Thru, Rustington

Project No.
GE16347

Co-ords: 503880E - 103320N

Hole Type
WLS

Location: Littlehampton

Level:

Scale
1:25

Client: Store Property Investments Ltd

Dates: 26/05/2017

Logged By
V. Bennett

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10	ES		0.16			Brown silt with many rootlets and occasional subangular gravel. TOPSOIL
		0.30	ES					Soft to firm orangish brown CLAY. RIVER TERRACE DEPOSITS
		0.50	D		1.50			Soft to firm orangish brown slightly sandy CLAY. Occasional subrounded flint coarse gravel. RIVER TERRACE DEPOSITS
		1.00	D					
		1.50	D					
		2.00	D		4.00			End of Borehole at 4.00m
		2.50	D					
		3.00	D					
4.00	D							

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





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Hurstpierpoint
BN6 9GL

Borehole Log

Borehole No.

WS03

Sheet 1 of 1

Project Name: Coffee Drive-Thru, Rustington

Project No.
GE16347

Co-ords: 503888E - 103315N

Hole Type
WLS

Location: Littlehampton

Level:

Scale
1:25

Client: Store Property Investments Ltd

Dates: 26/05/2017

Logged By
V. Bennett

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	ES		0.05		Brown silt with many rootlets and occasional subangular gravel. TOPSOIL Brown mottled orangish brown silt with pockets of clay. MADE GROUND	1 2 3 4 5
		0.50 0.50	D ES					
		1.00	D		0.90		Soft to firm orangish brown CLAY. RIVER TERRACE DEPOSITS	
		1.50	D					
		2.00	D					
		2.50	D					
		3.00	D					
		3.90 4.00	D				Firm to stiff orangish brown slightly sandy CLAY. RIVER TERRACE DEPOSITS End of Borehole at 4.00m	

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





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Hurstpierpoint
BN6 9GL

Borehole Log

Borehole No.

WS04

Sheet 1 of 1

Project Name: Coffee Drive-Thru, Rustington

Project No.
GE16347

Co-ords: 503888E - 103326N

Hole Type
WLS

Location: Littlehampton

Level:

Scale
1:25

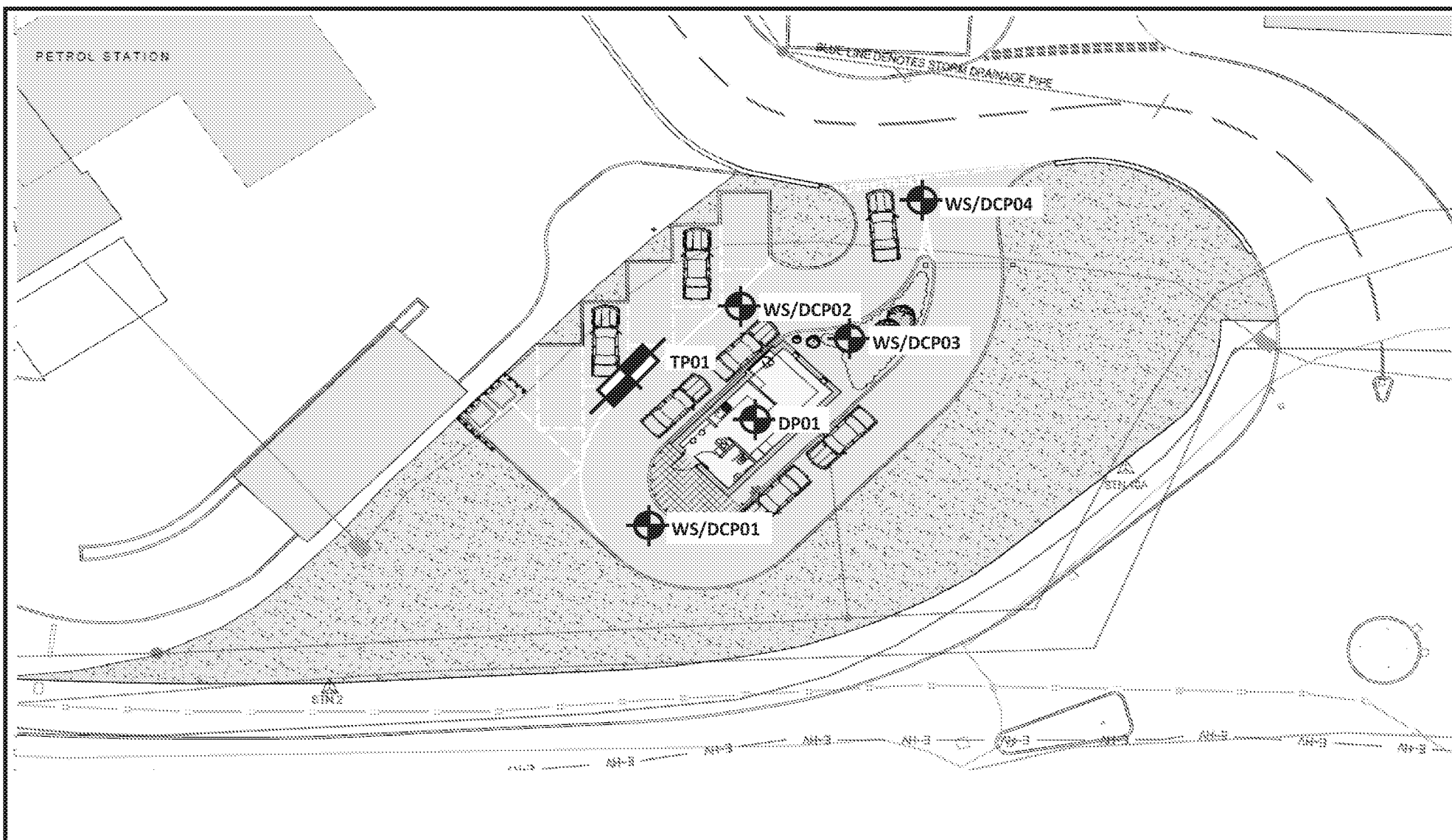
Client: Store Property Investments Ltd

Dates: 26/05/2017

Logged By
V. Bennett

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES		0.35			Brown gravelly silt. Gravel is subangular flint and concrete. TOPSOIL	
		0.40	ES					Soft to firm orangish brown CLAY. RIVER TERRACE DEPOSITS	
		0.50	D						
		1.00	D					Reddish brown medium SAND. RIVER TERRACE DEPOSITS	1
		1.50	D		1.60				
		2.00	D		1.80			Recovered as structureless CHALK composed of pale brown gravelly sandy SILT with occasional cobbles and clay layers. Gravel and cobbles are very weak and weak, low and medium density, off-white. WHITE CHALK SUBGROUP	2
		2.50	D						
		3.00	D					Pale brown CLAY.	3
		3.50	D						
		4.00	D		4.00			Pale brown CLAY.	4
								End of Borehole at 4.00m	5
Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks			
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to				





Project:	Coffee Drive-Thru, Littlehampton, BN17 6LE			Title	Exploratory Hole Location Plan Over Proposed Layout	
Client:	Store Property Investments			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:	GE16347	Revision:	0			
Drawn:	EN	Date:	May 2017			
Figure:	2	Scale:	Not To Scale			



that may be present.

10.5 Sulphates

The results of the sulphate content analysis indicate that buried concrete should be designed in accordance with DS-1 as defined within the BRE Special Digest 1, 2005. The pH analysis indicates that the ACEC Class corresponds to AC-1. It is recommended that the advice of this publication be taken for the design and specification of all sub-surface concrete.

10.6 Soakage Testing

Soakage testing in general accordance with BRE Digest 365 was undertaken within one trial pit. The result is summarised in Table 10.2.

Location	Test	Soil infiltration rate (m/s)
TP01	1	Negligible

Table 10.2: Summary of soakage test results

This test was undertaken in the clayey River Terrace Deposits. Chalk was only encountered at one location (WS04) and appears to be a highly irregular contact with the overlying River Terrace Deposits. Therefore, with the exception of the location of WS04 where the Chalk was proven the Chalk was at depths greater than 4m at all the other exploratory hole locations. The Chalk encountered beneath the River Terrace Deposits in WS04 was described as pale brown gravelly sandy SILT with occasional cobbles and clay layers. Based on experience of weathered Chalk locally, and given the fine grained silty nature of the weathered chalk it is highly unlikely to give suitable soil infiltration rates for shallow soakaways. A deep bored soakaway into the Chalk is not recommended due to the proximity of potential contaminant sources (petrol filling station and car wash within 28m) together with the environmental sensitivity of the Chalk (Principal Aquifer). The construction of a deep borehole soakaway would effectively create a significant potential pathway for contaminants. In addition a search of historic boreholes identified shallow groundwater in the area. This data was compared to topographic levels on site where ground water levels, when extrapolated are likely to be encountered at c.4.5m bgl. In combination with the depth the Chalk is likely to be encountered at, storage capacity for surface water drainage is likely to be low.

11.0 Environmental Risk Assessment

The desk study identified that the site had been not been previously developed. However, given the proximity to a petrol filling station, and cemetery soil samples were submitted for analysis of a suite of commonly occurring contaminants including metals, metalloids, inorganic compounds, speciated TPH, PAH and asbestos.

11.1 Soil Contamination vs. End Users

The presence of a possible contaminant does not necessarily imply that a site or area is contaminated or that there is any unacceptable risk to human health. A Preliminary Quantitative Risk Assessment has been undertaken in accordance with CLR11, in order to evaluate any unacceptable risks posed to human health with respect to the proposed redevelopment. It should be noted that this assessment is protective of the chronic long-term effects of contaminants, which is also likely to be protective of any possible immediate acute effects.

A quantitative risk assessment has been undertaken by comparing the results of the laboratory chemical testing of shallow soils against Site Specific Assessment Criteria (SSAC) generated using the Contaminated Land Exposure Assessment (CLEA) model v1.06 published by the Environment Agency, or against the Category 4 Screening Levels (C4SLs) published by DEFRA. Although the C4SLs were released for Part 2A use, the associated policy companion