

LAND ADJACENT 37 HILL LANE

DRAINAGE STATEMENT

FLOOD RISK

The site sits outside of flood zones 2 and 3 – extract from the Environment Agency mapping below (the yellow pin shows the site location):



SURFACE WATER

Infiltration testing and groundwater monitoring has been carried out and is attached (appendix i). Whilst groundwater levels were low, the soil infiltration rates indicate poor drainage conditions. It is likely therefore that a tanked porous paving drainage solution will be necessary, with a controlled discharge into the watercourse along Hill Lane if viable. It is assumed that any permit granted will be conditional on the submission and approval of a full surface water drainage design. A drainage engineer will be commissioned post-permission to work up the drainage scheme for approval.

There is a large expanse of buildings on the site that will be demolished. It is unclear where the roofs of the existing buildings are draining to currently. A CCTV survey will be carried out to establish whether they are running to soakaways or into the foul sewer. The roof area of the proposed buildings is less than existing and this together with the provision of a tanked soakaway should mean that the final solution will represent an improvement over the existing.

FOUL WATER

Record information from Southern Water is attached (appendix ii). This shows the mains sewer running in front of the houses along Hill Lane. A new connection into the sewer will be formed for the new houses, subject to the normal approvals.

Appendix i



23rd April 2018
Our Ref: 18.9837

37 Hill Lane
Barnham
West Sussex
PO22 0BL

FAO Jeremy Naphine

Soil Infiltration Testing and Groundwater Monitoring – 37 Hill Lane, Barnham

Dear Jeremy,

I write further to the completion of soil infiltration testing (in accordance with BRE 365) and subsequent groundwater level monitoring at the above referenced site. Trial pitting works and the installation of the standpipes were carried out between the 9th and 12th March 2018, with groundwater level monitoring carried out weekly from this date, for 5 weeks until the 13th April 2018. The following factual report describes the work undertaken and presents copies of the test data obtained.

Scope

The primary aim of the investigation was to provide an assessment of the underlying ground conditions to assess the current drainage conditions on site, as well as to establish a groundwater level, and any groundwater level fluctuations, with a view to future development of the site.

Site Works

Intrusive site works were completed over two days; Friday 9th and Monday 12th March 2018, supervised by an Engineering Geologist from CE. Photographs of the works can be viewed to the rear of this report.

Two trial pits (TP1 and TP2) were advanced by way of a mini-excavator to a maximum depth of 2.20mbgl. Following this, both pits were then rapidly filled with potable water from a trailer mounted bowser. Data loggers were then placed within the pits to monitor the fall in water level over time.

Two windowless sample boreholes (WS1 and WS2) were drilled to a maximum depth of 5.00mbgl, with the soil conditions logged by the Engineering Geologist on site. Standpipe piezometers (50mm diameter black plastic plain and slotted pipework) were then installed to 3.90-4.40mbgl to enable future groundwater level monitoring.

Ground Conditions

Below the surface covering of pea shingle, the soils were described as a black/ dark brown sandy Gravel of flint and occasional brick and tarmac. This was encountered to depths between 0.20mbgl in TP1, TP2 and WS2, however an extended thickness of 1.50mbgl in WS1. This material is considered to be Made Ground.



The initial natural soils are described as a soft to firm becoming firm brown slightly sandy silty Clay, with rare to occasional gravels of flint. This material was encountered to a maximum excavated depth of 2.10-2.30mbgl in TP1/TP2 and a 5.00mbgl in WS2. Within WS1, this material was proven to a maximum depth of 3.80mbgl. Below 3.80mbgl in WS1, soils were described as a soft pale brown gravelly Silt/Clay from 3.80mbgl to 4.30mbgl. This material is considered representative of River Terrace Deposits, or formerly 'Brickearth'.

The underlying Chalk was encountered in WS1 below 4.30mbgl. This was described as a structureless chalk, composed of a white slightly gravelly Silt and proven to a maximum drilled depth of 5.00mbgl. This material is considered representative of the Upper Chalk.

A groundwater seepage was noted in WS1 3.60m during the investigation. WS2 was recorded as dry.

Detailed soil logs can be observed at the rear of this report.

Infiltration Testing (BRE 365)

Testing was conducted in both pits (TP1 and TP2) in locations as per the site plan attached and was carried out in general accordance with BRE 365 methods; following the mechanical excavation, squaring of the pit sides, the trial pit was filled rapidly with potable water and the subsequent fall in water level monitored over time. The aim of the test is to reach the 25% fill depth marker to determine an infiltration rate for the soil.

TP1 was filled with a 1.52m deep column of water and recorded a fall in water level of 1.43m over a monitoring period of 4347 minutes. SA2 was filled with a 1.45m deep column of water and recorded a fall in water level of 0.79m over a monitoring period of 4077 minutes.

Results

The 25% marker was reached in TP1 only, over the time period tested. On this basis, a soil infiltration rate for TP1 of 1.02×10^{-6} has been calculated. TP2 did not reach the 25% marker during the allotted time, due to slower infiltration, however an extrapolated soil infiltration rate of 3.5×10^{-7} has been calculated on the review of the data.

These results generally correlate to 'poor' drainage conditions (Ref: 'Soil Mechanics in Engineering Practice' Terzaghi *et al*; Table 14.1 Permeability and drainage characteristics of soils (after Casagrande and Fadum 1940)).

In ideal conditions, subsequent testing should be carried out to simulate saturated conditions, however due to time constraints this isn't always possible. As such, soil infiltration rates within saturated conditions will likely be slower and therefore this should be taken into consideration during any designs.

Please refer to infiltration test sheets appended to the rear of this report.

Groundwater Monitoring

Follow-on groundwater monitoring was conducted over a five week period following the infiltration testing, within the installed standpipes in WS1 and WS2



Results

Groundwater monitoring results are presented in the table overleaf.

Hole Ref	W51	W52
Depth of Install	3.80m	4.40
16/03/2018	3.60m	Dry
22/03/2018	3.70m	Dry
04/04/2018	No access*	4.38m
10/04/2018	3.80m	4.39m
18/04/2018	3.80m	Dry

*A pallet was put over the installation position.

I trust the above information is sufficient for your requirements in this matter, should you have any queries please do not hesitate to contact me.

Shaun Gilbrook BSc FGS
Engineering Geologist
Constructive Evaluation Limited

Enclosed: Photographs
 Soil Logs
 Site Plan
 Infiltration (BRE 365) Test Sheets

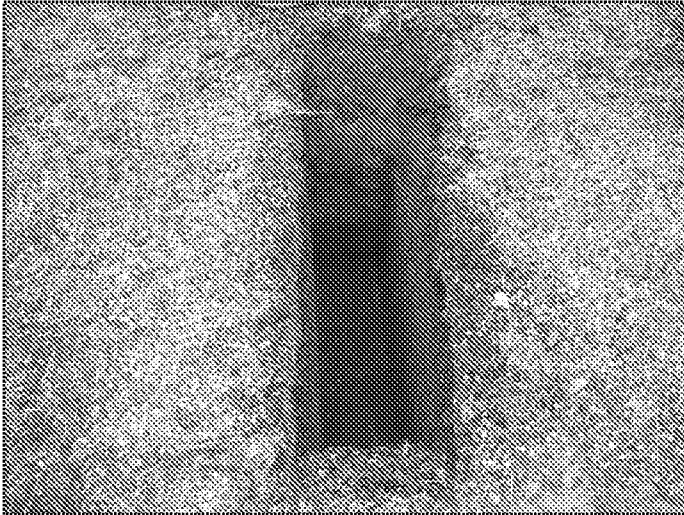


Investigation Photographs

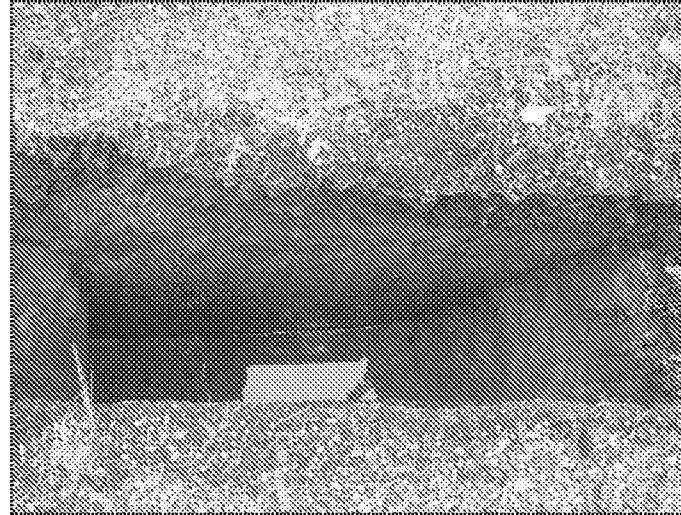
Project Ref: 18.9837

Site Name: 37 Hill Lane

1.

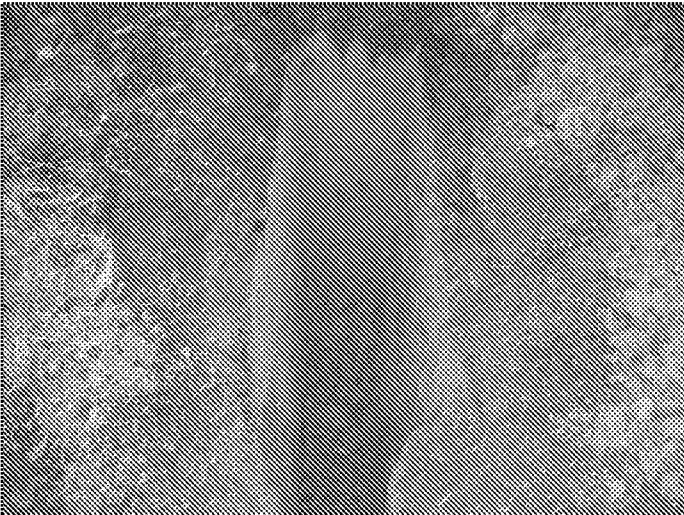


2.



- 1) TP1
- 2) TP1
- 3) TP2

3.





Borehole Log

Borehole No.

WS1

Sheet 1 of 1

Project Name: 37 Hill Lane, Barnham

Project No.
18.9837

Co-ords:

Hole Type
WLS

Location: Barnham, West Sussex

Level:

Scale
1:35

Client: Salt Earth Ltd

Dates: 09/03/2018

Logged By
SG

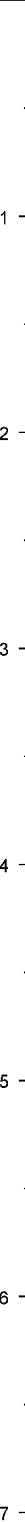
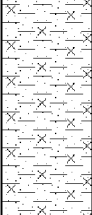
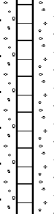
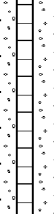
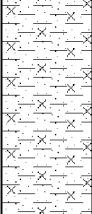
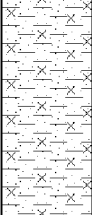
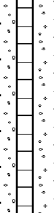
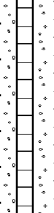
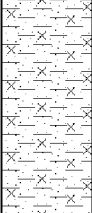
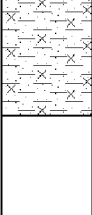
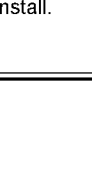
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.10			(MADE GROUND) Pea shingle. (MADE GROUND) Black/ dark brown sandy fine to coarse Gravel of flint, with occasional brick and tarmac. Sand is fine to coarse.	
		1.60	D		1.50			Firm becoming firm to stiff brown slightly sandy silty CLAY. Sand is fine. Rare to occasional fine sub-angular to sub-rounded gravels of flint. Frequent black mottling. (RIVER TERRACE DEPOSITS)	1
		2.00	D						2
		2.50 - 3.00	D						3
		4.00	D		3.80			Soft pale brown gravelly SILT/CLAY. Gravel is fine to medium sub-angular to sub-rounded chalk. (RIVER TERRACE DEPOSITS)	4
		4.50	D		4.30			Recovered as: Structures Chalk, composed of a white slightly gravelly SILT. Gravel is fine to coarse angular to sub-rounded weak, low density chalk. Frequent brown/ orange brown staining. (LEWES NODULAR/ SEAFORD/ NEWHAVEN/ CULVER/ PORTSDOWN CHALK FORMATIONS (UNDIFFERENTIATED))	5
					5.00			End of Borehole at 5.000m	6
									7

Remarks

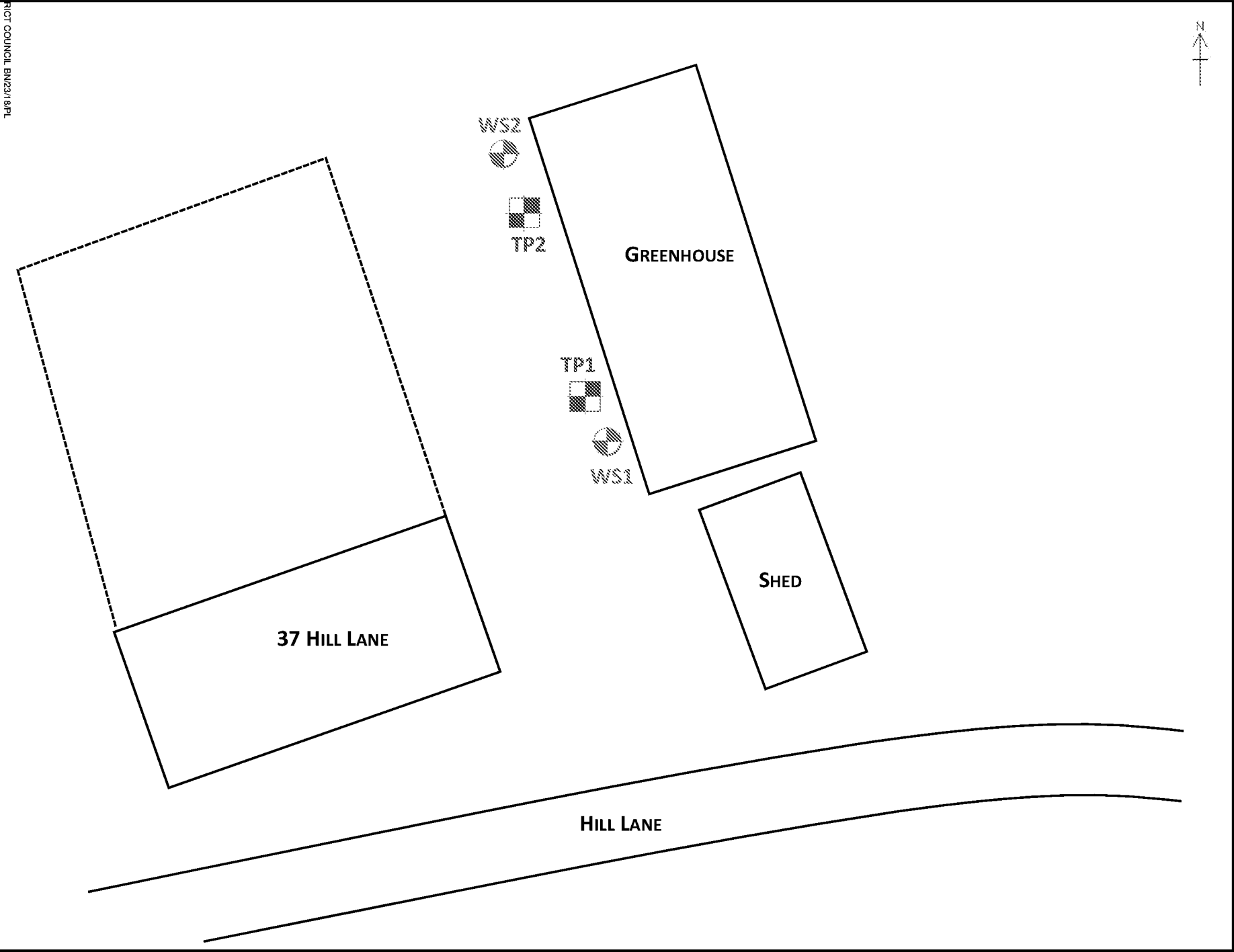
Hand excavated pit to 1.00mbgl. Windowless sample borehole completed in base of pit to 5.00mbgl. Standpipe installed to 3.80mbgl (0.80m plain, 3.00 slotted; 50mm HDPE). Groundwater reading at 3.61mbgl, 20 mins after install)



 constructiveevaluation site investigation • building pathology				Borehole Log			Borehole No. WS2 Sheet 1 of 1	
Project Name: 37 Hill Lane, Barnham				Project No. 18.9837		Co-ords:		Hole Type WLS
Location: Barnham, West Sussex				Level:		Scale 1:35		
Client: Salt Earth Ltd				Dates: 09/03/2018		Logged By SG		

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.05			(MADE GROUND) Pea shingle.	
					0.40			(MADE GROUND) Black/ dark brown sandy fine to coarse Gravel of flint, with occasional brick and tarmac. Sand is fine to coarse.	
								Firm becoming firm to stiff brown slightly sandy silty CLAY. Sand is fine. Rare to occasional fine sub-angular to sub-rounded gravels of flint. Becoming gravelly with depth. Frequent black mottling. (RIVER TERRACE DEPOSITS)	
								... 3.90-4.20mbgl Orange brown fine to medium SAND.	
									... 4.20-4.40mbgl Firm mottled grey green sandy CLAY.
									
					5.00			End of Borehole at 5.000m	
									
									
									
									

Remarks Hand excavated pit to 1.00mbgl. Windowless sample borehole completed in base of pit to 5.00mbgl. Standpipe installed to 4.40mbgl (0.90m plain, 3.00 slotted; 50mm HDPE). Borehole dry 20mins after install.		
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- Notes:
1. Do not scale from this drawing.
 2. All dimensions must be checked on site prior to commencement of work.
 3. Where applicable this drawing is to be read in conjunction with other consultants drawings.
 4. This drawing is the copyright of Constructive Evaluation Ltd.

Drawing Title:

Site Investigation Plan

Project Reference:

18.9837

Site Name:

37 Hill Lane, Barnham

Revision: 0
Drawn by: SG
Scale: Not to Scale

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construction & building pathology



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the professional's hidden partner

Trial Hole: TP1

Test 1

INSULISATION CALCULATED FROM 75%-75% WATER DEPTH RANGE

Infiltration Rate

from 75%-25%

1.02006E-06

Soakaway Test Results & Soil Infiltration Rate

Site: 37 Hill Lane, Barnham

Job No: 18.9837

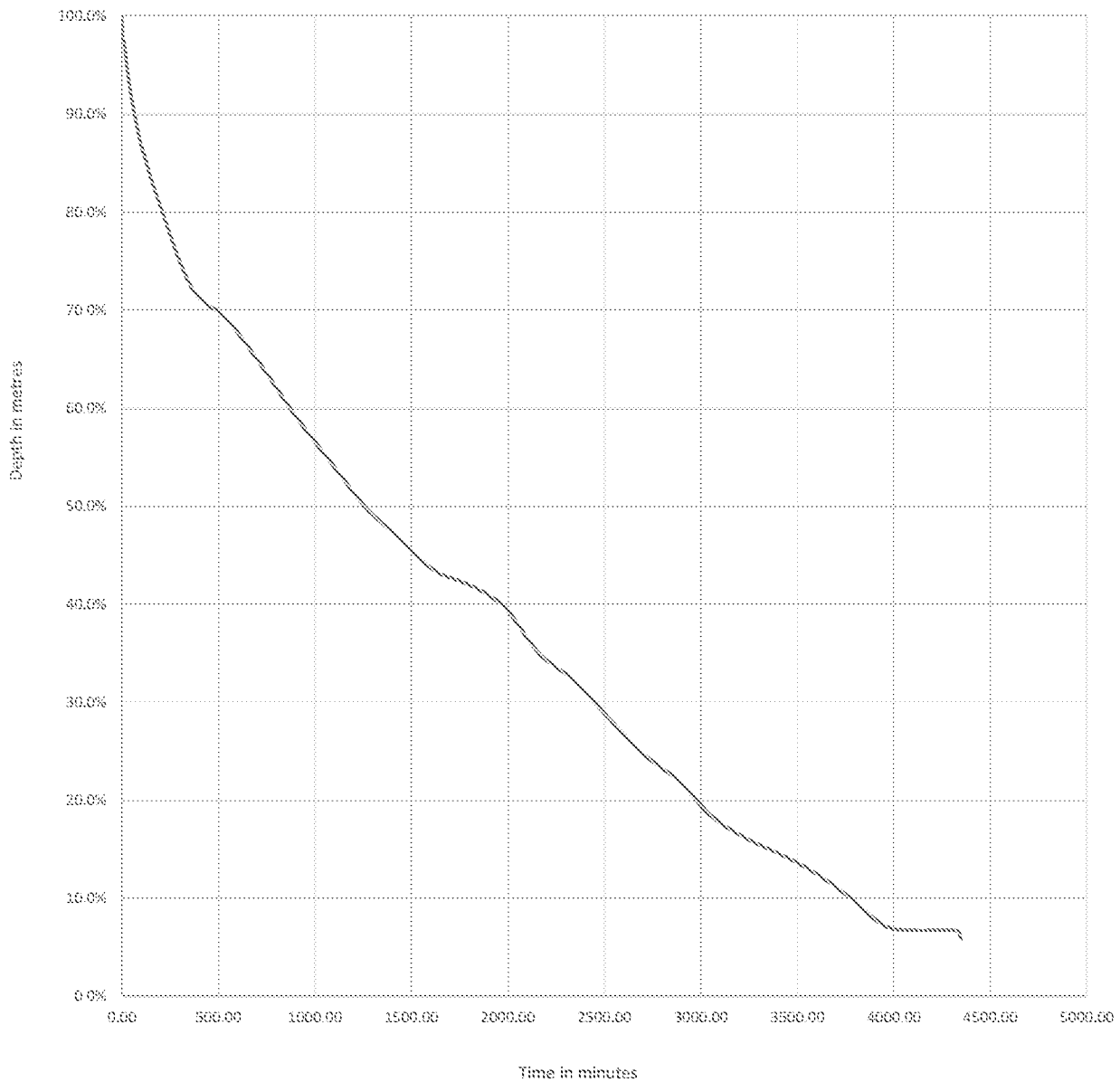


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site investigation & auditing services

Trial Hole: TP1

Test 1

Permeability Graph



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Trial Hole: TP2

Test 1

INSULISATION CALCULATED FROM 75%-75% WATER DEPTH RANGETime in mins

1260 75%

25%*

*estimated from graph. use with caution

Infiltration Rate

from 75%-25%

3.50952E-07

Soakaway Test Results & Soil Infiltration Rate

Site: 37 Hill Lane, Barnham

Job No: 18.9837

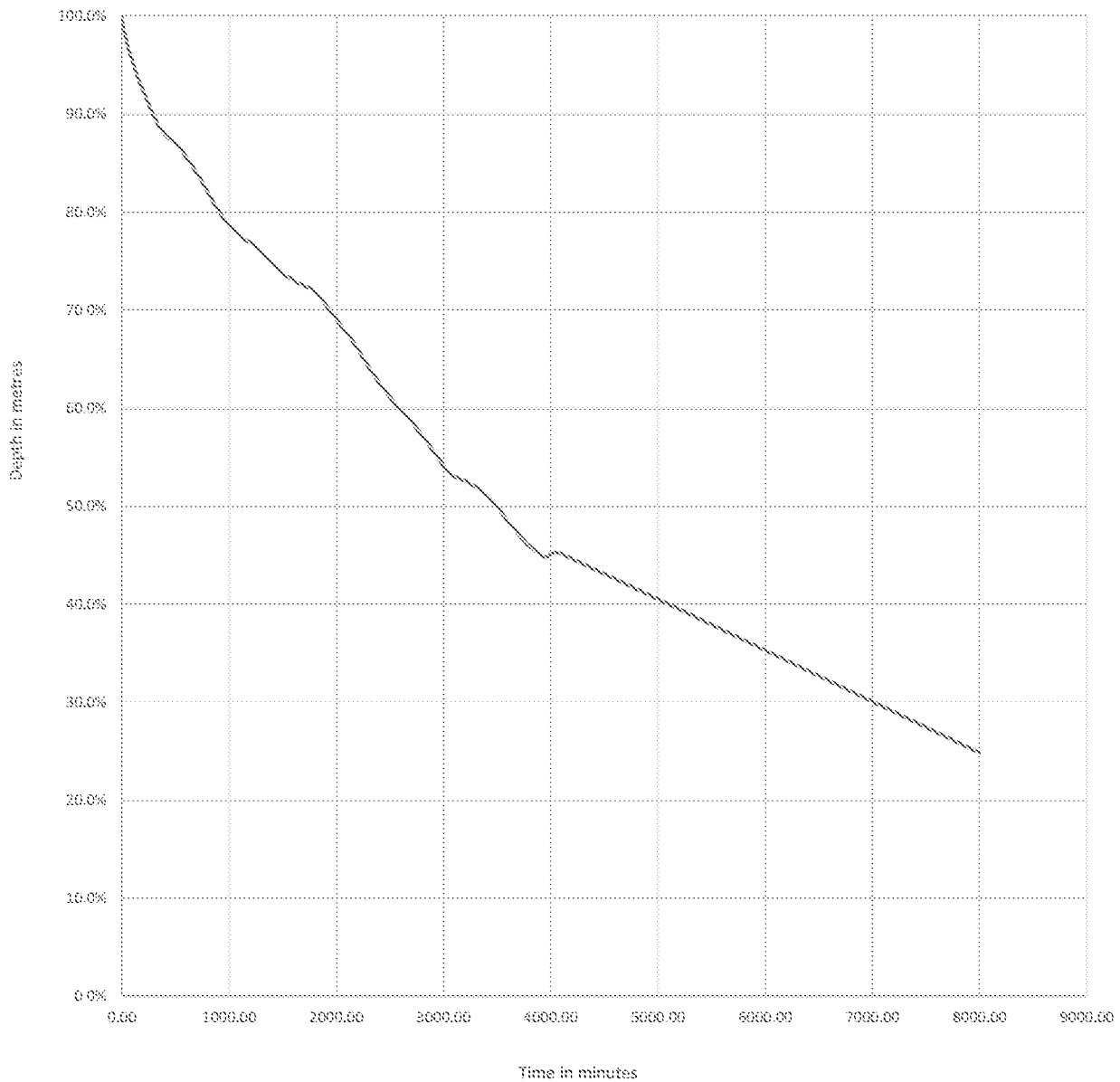


constructiveevaluation
site investigation & testing services

Trial Hole: TP2

Test 1

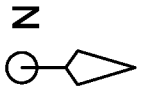
Permeability Graph



Appendix ii



O.S. REF. SU9603NW		Drawn by: yadavsa		The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. <i>WATERWORKS, 824C, 1999 are contributors of British Pathways Company WATERWORKS, 824C, 1999 are contributors of British Pathways Company</i>	
Scale: 1:1250					
Title: 288568_37 Hill Lane, Bognor Re	Date: 11/04/2018	Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved Licence No. WU 298530.			



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Southern Water

SEWER RECORDS PAGE 2 OF 2

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Drawn by: yadavsa	
Title: 288568_37 Hill Lane, Bognor Re	
Date: 11/04/2018	