

Caffyns Volvo Worthing
Proposed Drainage Strategy

The proposals involve the construction of a car dealership building with associated vehicle display, parking and circulation areas on an unoccupied area of scrubland, formerly part of the nearby Haskins Garden Centre. The proposed site layout is shown on the appended SRA Architects Drg. No. 3661-SRA-XX-XX-DR-A-09-011 Rev.P01.

Existing Site Arrangement

The existing site arrangement is shown on the appended Survey Solutions Drg. No. 36763BWLS-01 Rev.B. As can be seen, a large part of the site consists of gravel areas with a network of concrete walkways. The remainder of the site is predominantly grassed, with some trees and shrubbery.

Existing Foul Drainage

There is currently no foul discharge from the site and the former usage makes it is unlikely that there has ever been any positive foul drainage. The appended Southern Water record plan shows that there are no gravity foul or combined sewers in the area. A pumping main of unknown size is shown to be within Roundstone Lane to the west of the site.

Proposed Foul Drainage Strategy

It is proposed that the foul discharge from the development is collected within a traditional gravity drainage system and conveyed to a new private cesstank within the site. This is the same solution as is currently in operation on the adjacent Audi dealership. There is to be no vehicle washing undertaken within the current application development, with the existing water recycling vehicle wash system within the adjacent Audi dealership becoming for shared use.

Existing Surface Water Drainage

The appended Southern Water sewer record shows that there are no surface water sewers within the area. The former usage of the site makes it is unlikely that there has ever been any positive surface water drainage from the area.

Proposed Surface Water Strategy

In accordance with National Policy, consideration should initially be given to the discharge of surface water to ground via soakaways or other infiltration methods.

In order to determine if disposal by soakaways is a viable option, infiltration testing has been undertaken on the site, the results of which are appended. Three tests were undertaken in two holes and a single test in a third hole. The lowest BRE 365 Infiltration Rate obtained was 1.9×10^{-6} and the lowest Average Infiltration Rate was 0.24×10^{-6} . These figures are similar to the rate of 1.3×10^{-6} which was taken in the design for the adjacent Audi soakaway system. It is therefore proposed that the lowest rate of 0.24×10^{-6} is taken for the design of the soakaway system serving the proposed development.

Winter groundwater monitoring within three boreholes on the site has been undertaken, the results from which are appended. Two holes with depths of approximately 4m have had no groundwater present. The third hole had a highest water level of 3.15m below ground level. This is slightly higher than the water level which was recorded during the monitoring which was undertaken on the adjacent Audi site (report appended), but this is not unexpected due to the likely fluctuations in rainfall immediately before the depth readings were taken.

In order to reduce flood risk to others, the proposed soakaways are to be designed to prevent flooding from the site during all rainfall events up to and including the 1 in 100 year return period plus an allowance of 40% for climate change.

The appended calculation sheets SA1A & SA2A show the details of a soakaway system which satisfies the design criteria. These calculations use the same design principles as the adjacent Audi site soakaway design.

Proposed Site Drainage Layout

Appended is Eastwood & Partners Drg. No. 46357/061A showing the proposed foul and surface water drainage systems based upon the strategies outlined within this document. The appended Drg. No. 46357/063A shows typical details of the proposed surface water soakaway chambers and linking trenches.

Flood Routing

Should a rainfall event occur which exceeds the design criteria, then the additional storage volume available within the pipework of the drainage system which has not been taken into account within the design will be utilised. Should this also become full, shallow surface water ponding will initially occur around the lowest gully associated with the system. This gully is located at the south west corner of the new external parking area, where up to 100mm depth of ponding can be accommodated. Should the water level rise above this point, off-site flooding will occur onto the existing private access road to the south. From here, surface flow by gravity will take the water to the existing road gully on Roundstone Lane at the southern tangent point of the private access road.

Proposed Maintenance

The foul and surface water drainage systems will remain private and will be maintained by the Dealership Management in accordance with the appended External Drainage Maintenance Schedule.



Caffyns Volvo Worthing

Drawing title
Site Plan

Amendments
Building Control Review

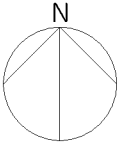
Drawing No.
3661-SRA-XX-XX-D-A-09-011

Revision
P01

Drawn by Author	Checked by Checker	Approved by Approver	A1 Scale 1 : 250	Date 28/01/2022 10:33:25	Reason For Issue INFORMATION
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TOPOGRAPHICAL & MEASURED BUILDING SURVEYS

ABBREVIATIONS & SYMBOLS

AB	Arch Height	ER	Earth Road	RSD	Roller Shutter Door
AB	Arch Brick	ET	EP Transformer	RSJ	Roller Steel Joist
AR	Assumed Road	FB	Flow Bed	SI	Sign Post
AV	Air Valve	FBD	Floor Board Direction	SP	Arch Spring Point Height
BB	Belted Beacon	PH	Fix Hydrant	SV	Stop Valve
BH	Born Hole	PL	Floor Level	SV	Cable Slew
BL	Bed Level	FP	Flag Pole	SW	Surface Water
BO	Bollard	FW	Foot Water	Tac	Tackle Paving
BPF	Brake Post	GG	Gully Grate	TC	Telecom Cover
BS	Bus Stop	GV	Gas Valve	TH	Top of Wall
BU	Bush	HH	Head Height	THL	Threshold Level
BW	Barbed Wire Fence	IC	Inspection Cover	TL	Top of Wall
BX	Box (Utilities)	IL	Invert Level	TP	Telegraph Pole
C/B	Close Board Fence	IR	Iron Railings	TS	Traffic Signal Cover
CH	Chill Height	KD	Kent Casket	TV	Cable TV Cover
CL	Cover Level	LP	Lamp Post	UB	Universal Beam
CL	Chain Link Fence	MH	Manhole	UC	Unknown Cover
CL	Close Board Fence	MP	Marker Post	UD	Under Drain
CL	Close Board Fence	NB	Name Board	UG	Unusable Ground
C/P	Chestnut Paling Fence	OHL	Overhead Line (approx)	UMG	Unusable Ground
CR	Cable Rider	PA	Panel Fence	USL	Under Side Beam
CW	Chicken Wire	PS	Post Box	UTS	Unable To Survey
DC	Drainage Channel	PM	Parking Meter	VP	Vent Pipe
DH	Door Head Height	PO	Post	WB	Waste Bin
DI	Disinfectant	PR	Post & Rail Fence	WH	Wing Hole
DP	Down Pipe	PAW	Post & Wire Fence	WL	Water Level
DR	Drain	P/W	Part Wall	WM	Water Meter
ED	Electric Box	RE	Routing Eye	WO	Wash Out
EC	Electric Supply Cover	RL	Ridge Level	RP	Reflector Post
EL	Eaves Level	RS	Road Sign	RS	Road Sign
EP	Electric Pole	RS	Road Sign	RS	Road Sign

DRAWING NOTES

- Topographical Surveys**
- Trees are drawn to scale showing the average canopy spread. Descriptions and heights should be used as a guide only.
- All building names, descriptions, number of storeys, construction type including roof line details are indicative only and taken externally from ground level.
- All below ground details including drainage, voids and services have been identified from above ground and therefore all details relating to these features including: sizes, depth, description etc will be approximate only. All critical dimensions and connections should be checked and verified prior to starting work.
- Detail, services and features may not have been surveyed if obstructed or not reasonably visible at the time of the survey.
- Surveyed physical features may not necessarily represent the legal boundary line.
- Measured Building Surveys**
- Measurements to internal walls are taken to the wall finishes at approx 1m above the floor level and the wall assumed to be vertical.
- Cill heights are measured as floor to the cill and head heights are measured from cill to the top of window.
- General**
- The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work. Any errors or discrepancies must be notified to Survey Solutions immediately.
- The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.
- The survey control listed is only to be used for topographical surveys at the stated scale. All control must be checked and verified prior to use.
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- Do not scale from this drawing.

SURVEY CONTROL CO-ORDINATES

STATIONS	EASTINGS	NORTHINGS	LEVEL	DESCRIPTION
ST01	507444.407	103354.918	10.525	PK Nail
ST02	507440.102	103354.032	10.422	PK Nail
ST03	507435.051	103374.570	10.408	PK Nail
ST04	507398.083	103364.881	10.105	Peg & Nail
ST05	507417.254	103308.521	10.031	Peg & Nail
ST06	507460.716	103308.432	9.727	Peg & Nail
ST07	507485.986	103338.771	10.482	Peg & Nail

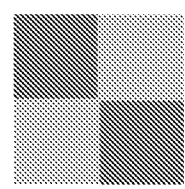
SURVEY GRID AND LEVEL DATUM

The coordinate system established for this survey is related to Ordnance Survey (OS) national grid at a single point using Smartnet, then orientated to grid north with a scale factor of 1.000.

The level datum established for this survey is related to Ordnance Survey (OS) using GPS Smartnet.

To avoid discrepancies any coordinated data used in conjunction with this survey must be derived directly from this control data.

REV	DESCRIPTION	DRAWN	APPR	DATE
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SURVEY SOLUTIONS

LAND SURVEYING
BUILDING SURVEYING
UNDERGROUND SURVEYING
SITE ENGINEERING
MONITORING

0845 040 5969
survey-solutions.co.uk

PSNCH BRENTWOOD COVENTRY GLASGOW NORMICH NOTTINGHAM YEOVL

PROJECT TITLE WORTHING SUDI, ROUNDSTONE ROAD ANGMERING, WEST SUSSEX, BN14 8AH			
DRAWING DETAIL TOPOGRAPHICAL SURVEY Sheet 1 of 1			
CLIENT CAFFYNS	SURVEY DATE 02/11/2021		CHECKED BY JG
APPROVED BY MB		DWG STATUS FINAL	
DRAWING NUMBER 36763B/WLS-01		REVISION A	ISSUE DATE 08/11/2021





(c) Crown copyright and database rights 2021 Ordnance Survey 100031673 Date: 17/11/21 Scale: 1:1000 Map Centre: 507440,103311 Data updated: 20/10/21 Our Ref: 704494 - 2 Wastewater Plan A3

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. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2021 Ordnance Survey 100031673. This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.

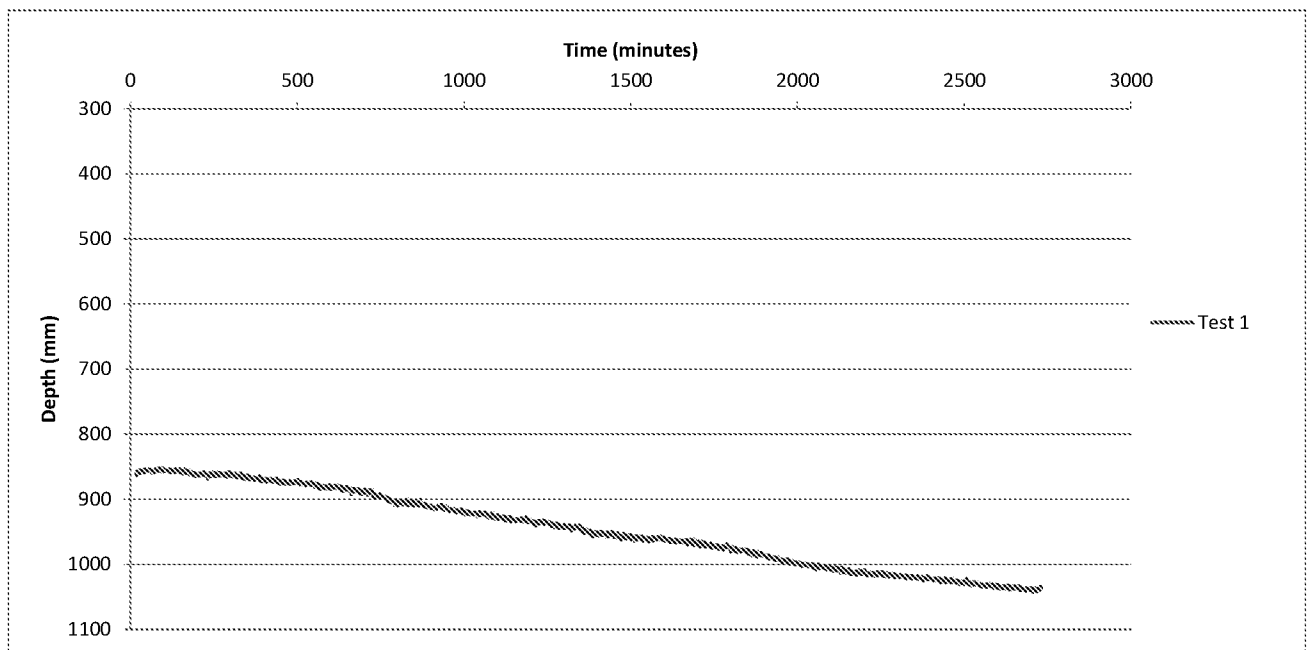
mail@eastwoodandpartners.com
46357



Infiltration Test Results and Calculation of Infiltration Rates

Site: Volvo Worthing
Client: Caffyns PLC (Eastbourne)
Test Reference: SA/TP01

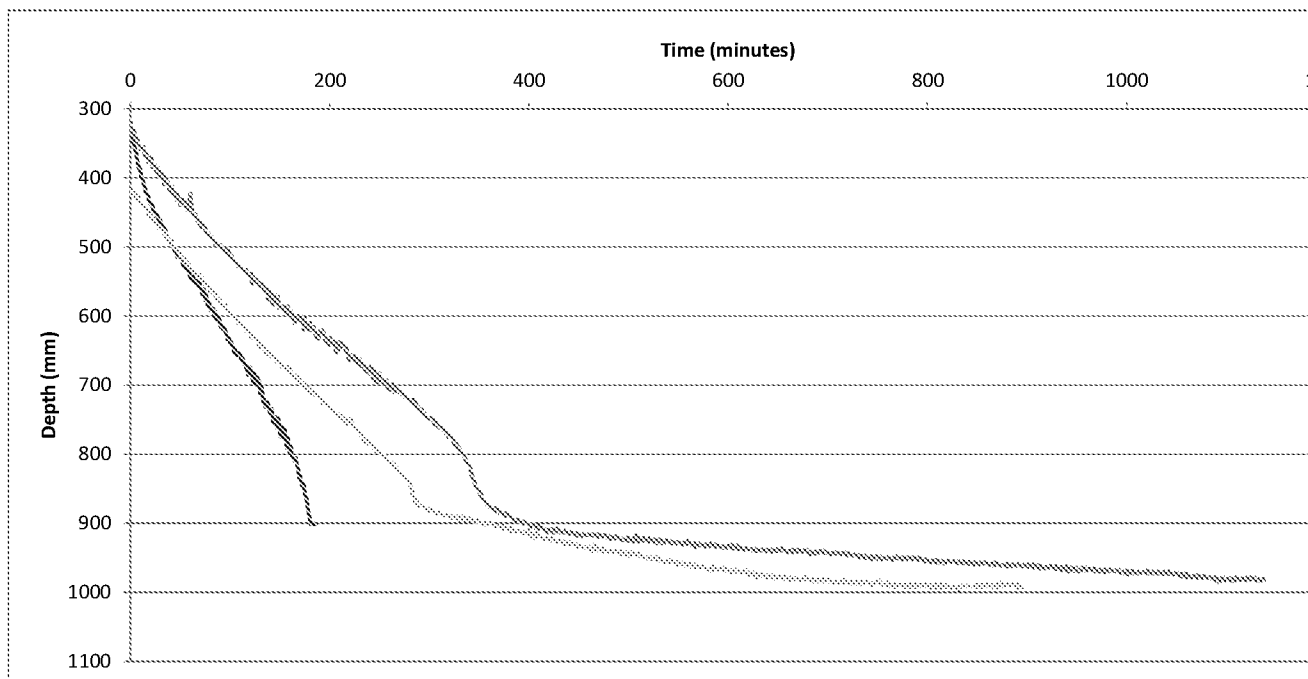
Test 1		Test 2		Test 3	
Pit Dimensions		Pit Dimensions		Pit Dimensions	
Trial pit length (mm)	1400	Trial pit length (mm)		Trial pit length (mm)	
Trial pit width (mm)	400	Trial pit width (mm)		Trial pit width (mm)	
Trial pit depth (mm)	1600	Trial pit depth (mm)		Trial pit depth (mm)	
Plan area (m ²)	0.56	Plan area (m ²)		Plan area (m ²)	
Depth to water at start of test (mm)	832	Depth to water at start of test (mm)		Depth to water at start of test (mm)	
End time (sec)	163800	End time (sec)		End time (sec)	
Final depth	1036	Final depth		Final depth	
75% Effective depth (mm)	1024	75% Effective depth (mm)		75% Effective depth (mm)	
25% Effective depth (mm)	1408	25% Effective depth (mm)		25% Effective depth (mm)	
Time at 75% effective depth - t _{p75} (sec)	142860	Time at 75% effective depth - t _{p75} (sec)		Time at 75% effective depth - t _{p75} (sec)	
Time at 25% effective depth - t _{p25} (sec)	N/A	Time at 25% effective depth - t _{p25} (sec)		Time at 25% effective depth - t _{p25} (sec)	
Effective Storage volume of water (m ³)	0.43008	Effective Storage volume of water (m ³)		Effective Storage volume of water (m ³)	
V _{p75-25} (m ³)	0.21504	V _{p75-25} (m ³)		V _{p75-25} (m ³)	
Internal surface area - a _{p50} (m ²)	1.9424	Internal surface area - a _{p50} (m ²)		Internal surface area - a _{p50} (m ²)	
t _{p75-25} (sec)	N/A	t _{p75-25} (sec)		t _{p75-25} (sec)	
BR365 Soil Infiltration Rate	N/A	BR365 Soil Infiltration Rate		BR365 Soil Infiltration Rate	
Average Soil Infiltration Rate	2.4E-07	Average Soil Infiltration Rate		Average Soil Infiltration Rate	
Testing completed by	EJD	Calculation completed by	EJD	Calculation checked by	RAN
Date	20-22/12/2021	Date	17/01/2022	Date	19/01/2022



Infiltration Test Results and Calculation of Infiltration Rates

Site: Volvo Worthing
Client: Caffyns PLC (Eastbourne)
Test Reference: SA/TP02

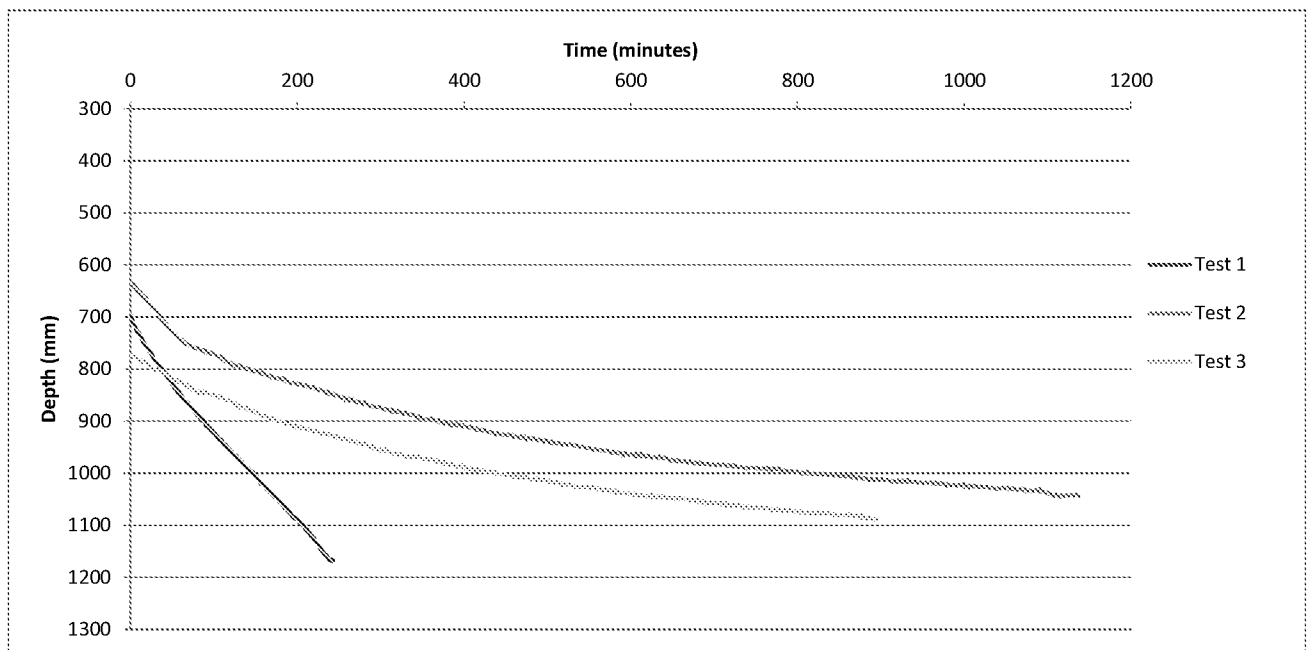
Test 1		Test 2		Test 3	
Pit Dimensions		Pit Dimensions		Pit Dimensions	
Trial pit length (mm)	1600	Trial pit length (mm)	1600	Trial pit length (mm)	1600
Trial pit width (mm)	400	Trial pit width (mm)	400	Trial pit width (mm)	400
Trial pit depth (mm)	1000	Trial pit depth (mm)	1000	Trial pit depth (mm)	1000
Plan area (m ²)	0.64	Plan area (m ²)	0.64	Plan area (m ²)	0.64
Depth to water at start of test (mm)	323	Depth to water at start of test (mm)	319	Depth to water at start of test (mm)	417
End time (sec)	11160	End time (sec)	68280	End time (sec)	53700
Final depth	901	Final depth	983	Final depth	992
75% Effective depth (mm)	492	75% Effective depth (mm)	489	75% Effective depth (mm)	563
25% Effective depth (mm)	831	25% Effective depth (mm)	830	25% Effective depth (mm)	854
Time at 75% effective depth - t_{p75} (sec)	2400	Time at 75% effective depth - t_{p75} (sec)	4980	Time at 75% effective depth - t_{p75} (sec)	4800
Time at 25% effective depth - t_{p25} (sec)	10140	Time at 25% effective depth - t_{p25} (sec)	20580	Time at 25% effective depth - t_{p25} (sec)	16980
Effective Storage volume of water (m ³)	0.43328	Effective Storage volume of water (m ³)	0.43584	Effective Storage volume of water (m ³)	0.37312
V_{p75-25} (m ³)	0.21664	V_{p75-25} (m ³)	0.21792	V_{p75-25} (m ³)	0.18656
Internal surface area - a_{p50} (m ²)	1.994	Internal surface area - a_{p50} (m ²)	2.002	Internal surface area - a_{p50} (m ²)	1.806
t_{p75-25} (sec)	7740	t_{p75-25} (sec)	15600	t_{p75-25} (sec)	12180
BR365 Soil Infiltration Rate	1.4E-05	BR365 Soil Infiltration Rate	7.0E-06	BR365 Soil Infiltration Rate	8.5E-06
Average Soil Infiltration Rate	1.5E-05	Average Soil Infiltration Rate	3.1E-06	Average Soil Infiltration Rate	3.8E-06
Testing completed by	EJD	Calculation completed by	EJD	Calculation checked by	RAN
Date	20-22/12/2021	Date	17/01/2022	Date	19/01/2022



Infiltration Test Results and Calculation of Infiltration Rates

Site: Volvo Worthing
Client: Caffyns PLC (Eastbourne)
Test Reference: SA/TP03

Test 1		Test 2		Test 3	
Pit Dimensions		Pit Dimensions		Pit Dimensions	
Trial pit length (mm)	1800	Trial pit length (mm)	1800	Trial pit length (mm)	1800
Trial pit width (mm)	400	Trial pit width (mm)	400	Trial pit width (mm)	400
Trial pit depth (mm)	1400	Trial pit depth (mm)	1169	Trial pit depth (mm)	1088
Plan area (m ²)	0.72	Plan area (m ²)	0.72	Plan area (m ²)	0.72
Depth to water at start of test (mm)	695	Depth to water at start of test (mm)	637	Depth to water at start of test (mm)	772
End time (sec)	14580	End time (sec)	68282	End time (sec)	53700
Final depth	1169	Final depth	1043	Final depth	1088
75% Effective depth (mm)	871	75% Effective depth (mm)	770	75% Effective depth (mm)	851
25% Effective depth (mm)	1224	25% Effective depth (mm)	1036	25% Effective depth (mm)	1009
Time at 75% effective depth - t_{p75} (sec)	4320	Time at 75% effective depth - t_{p75} (sec)	12000	Time at 75% effective depth - t_{p75} (sec)	14640
Time at 25% effective depth - t_{p25} (sec)	N/A	Time at 25% effective depth - t_{p25} (sec)	65880	Time at 25% effective depth - t_{p25} (sec)	27960
Effective Storage volume of water (m ³)	0.5076	Effective Storage volume of water (m ³)	0.38304	Effective Storage volume of water (m ³)	0.22752
V_{p75-25} (m ³)	0.2538	V_{p75-25} (m ³)	0.19152	V_{p75-25} (m ³)	0.11376
Internal surface area - a_{p50} (m ²)	2.271	Internal surface area - a_{p50} (m ²)	1.8904	Internal surface area - a_{p50} (m ²)	1.4152
t_{p75-25} (sec)	N/A	t_{p75-25} (sec)	53880	t_{p75-25} (sec)	13320
BR365 Soil Infiltration Rate	N/A	BR365 Soil Infiltration Rate	1.9E-06	BR365 Soil Infiltration Rate	6.0E-06
Average Soil Infiltration Rate	8.4E-06	Average Soil Infiltration Rate	2.0E-06	Average Soil Infiltration Rate	3.0E-06
Testing completed by	EJD	Calculation completed by	EJD	Calculation checked by	RAN
Date	20-22/12/2021	Date	17/01/2022	Date	19/01/2022



Winter Groundwater Monitoring Results

[illegible]

Well monitored and found to be dry

Could not locate

Well located but found to be damaged. Monitoring not possible.



Thomas Telford House
Sun Valley Business Park
Winnall Close
Winchester SO23 0LS

01962 673 330
soilslimited.co.uk

CEP on behalf of Caffyns Audi

F.A.O. Bava Sathan

Our Ref: 15366/LR/Rev1.02

9th May 2016

Dear Bava,

RE: Land North of A259, Angmering - Groundwater Monitoring

We are writing in regards to the groundwater monitoring which commenced on 1st March 2016. The following letter report must be read in conjunction with the Factual Ground Investigation Report ref. 15366/FGIR, dated February 2016, undertaken by Soils Limited.

Brief

Soils Limited and The Civil Engineering Practice agreed via email to carry out groundwater monitoring at the above mentioned site. The email was sent on 23rd February 2016 and comprised the agreement to carry out a series of four readings within the well previously installed in borehole BH1 at the time of the intrusive investigation. The four readings were undertaken monthly in February and April and bi-monthly in March within borehole BH1. A further fifth reading was taken by Soils Limited at the beginning of May in order to confirm the trend.

It was understood that the site was to be used for commercial development. The groundwater monitoring was intended to inform the design of the foundation scheme and the effects of groundwater within the months when groundwater was expected to be at its highest elevation (typically around March).

General

The site was located at land north of A259, Angmering, West Sussex BN16 1ED and had an approximate OS Land Ranger Grid Reference of TQ 075 032. At the time of reporting the site comprised two detached two-storey dwellings. Vegetation was represented in the gardens to the south, to the west and to the north of the property, with grass, hedges, mature and immature trees.

A site plan with the location of borehole BH1 and the related monitoring well is presented in Figure 1.

Groundwater Monitoring

At the time of the intrusive site investigation (January 2016) groundwater was only encountered within one trial hole (BH1) and was struck at a depth of 6.50m bgl, rising to 5.00m bgl after 20 minutes. A slight seepage was observed between 3.80m and 6.00m bgl.

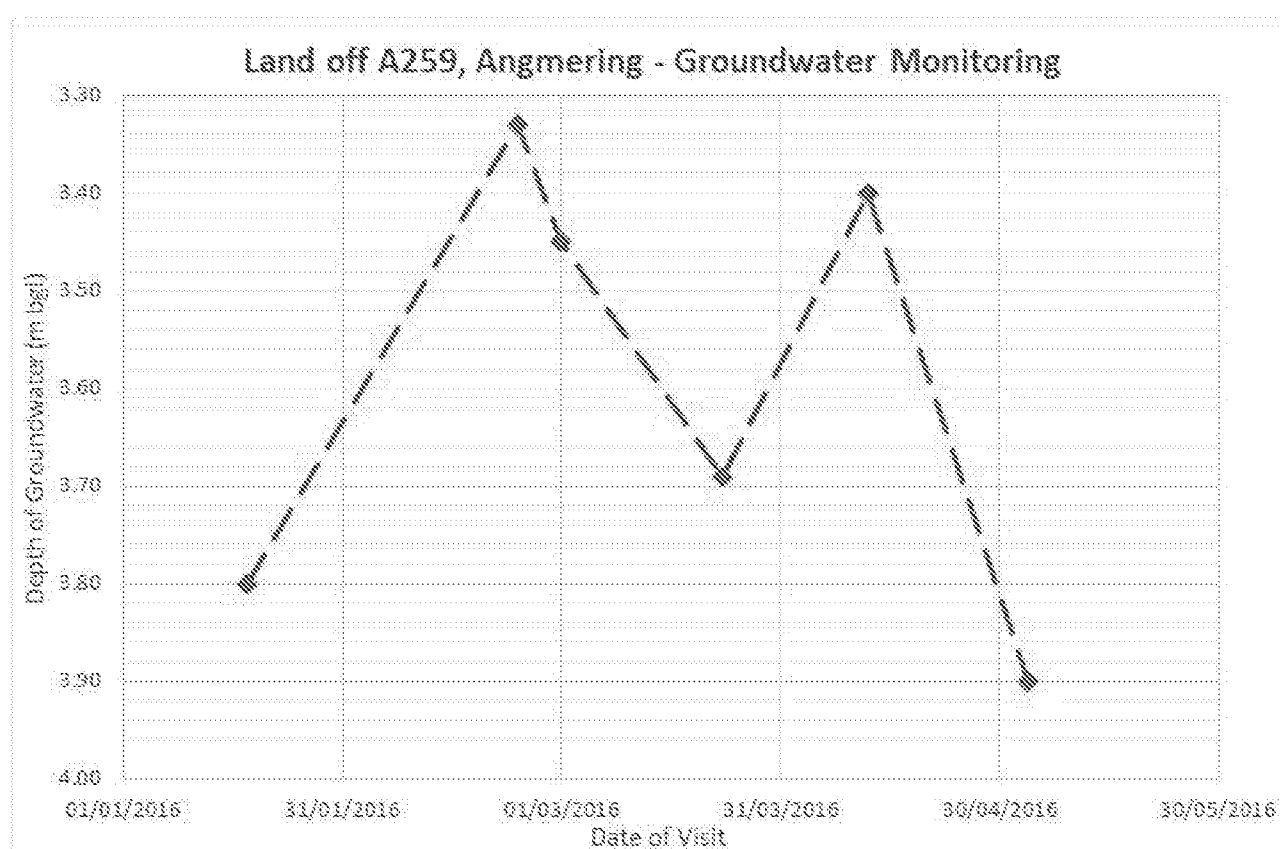
Groundwater monitoring was undertaken by Soils limited on four occasions over a period of three months. Monitoring was undertaken by means of manual dipping of the wells. Groundwater monitoring results have been presented in Table 1 and are displayed in Graph 1.

Table 1 Summary of Groundwater Monitoring

Borehole number	Depth to water (m bgl)					
	18/01/2016	24/02/2016	01/03/2016	23/03/2016	12/04/16	04/05/2016
BHI	3.80 ¹	3.33	3.45	3.69	3.40	3.90

Notes: ¹ = Reading taken during drilling of borehole; n/r = not recorded

Graph 1 Groundwater Monitoring Within Borehole BHI



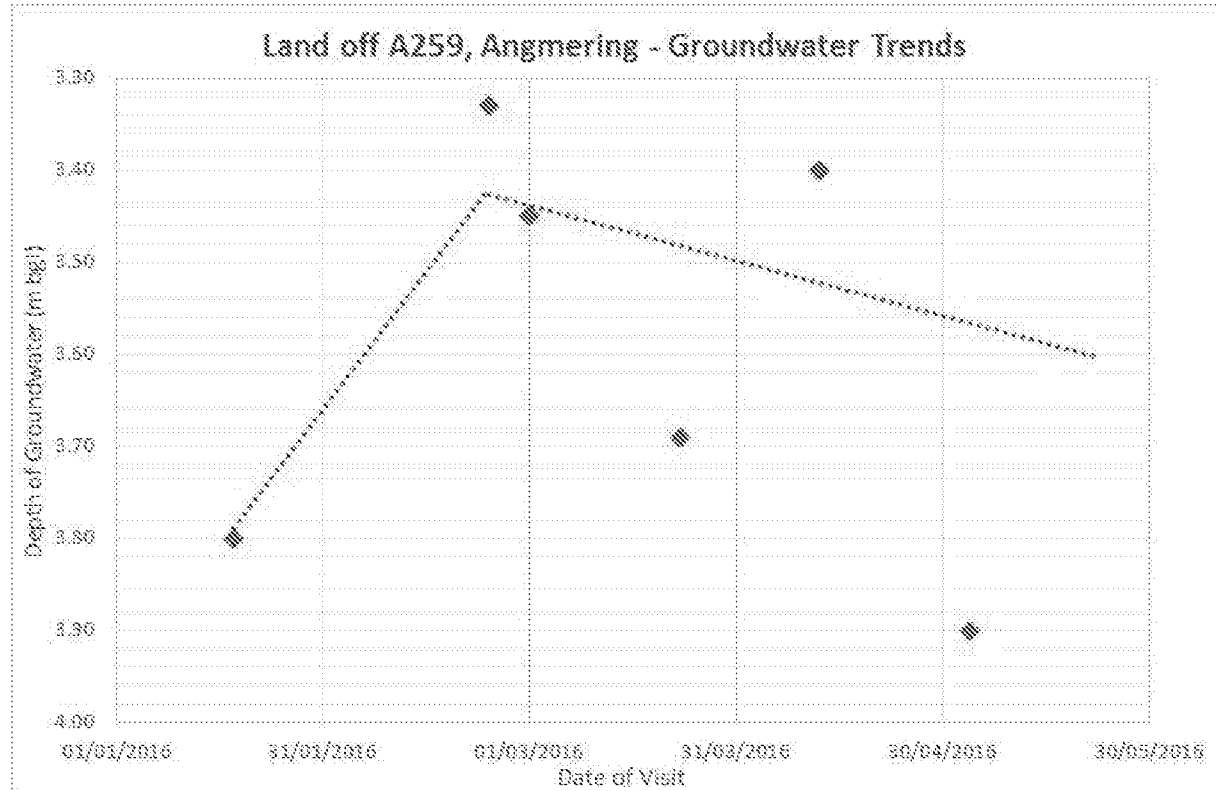
The groundwater reading for 18th January was recorded during the drilling of the borehole. The graph showed the increase in groundwater depth between January and April. It must be noticed that every single reading has its own importance for the definition of the highest groundwater depth. The readings, however, also showed the natural oscillatory behaviour of groundwater level, with influence from a number of factors including precipitation and site characteristics.

Conclusions

Graph 1 shows that, as anticipated, groundwater was rising from the annual minimum, which typically occurs around November, to the annual maximum, usually occurring around March.

The highest measured groundwater level was 3.33m bgl and was attained on 24th February 2016 and thereafter the readings varied between 3.45m and 3.40m bgl, with an intermediate reduction at 3.69m bgl. Notwithstanding the single readings, well-defined trends could be identified and showed how the average of groundwater depth was reducing after the peak conditions identified between February and March 2016. Those trends were reported in Graph 2.

Graph 2 Expected Groundwater Trends



The readings oscillated around the trendline and, as a consequence, it could not be excluded that in the following months the groundwater level, for example after intense periods of rainfall and also depending on the general site conditions, could occasionally rise again to values higher than the ones represented by the trendline or alternatively change or invert the trend. All of these must be considered as a part of the natural oscillations of groundwater.

Should you have any further questions please do not hesitate to contact the undersigned.

Yours Sincerely

[Redacted Signature]

Dr DV Tedesco MEng, PhD, Chlta.
Principal Geotechnical Engineer

[Redacted Contact Information]

SW1A 46357 Volvo, Worthing - Soakaway System



Calculation of Soakaway Size
Using the method given in BRE Digest 365:2016

Inflow to soakaway

Area of Britain: England & Wales Scotland & N Ireland

Rainfall ratio $r =$ **0.35** **0.00**

Impermeable Area = **2450 m²**

Infiltration rate = **0.24 m/s x 10⁻⁶** or 0.0000 m/min

Climate change = **40%**

Time		Rainfall		Rainfall		Inflow	Rainfall		Rainfall	Inflow
<i>min</i>	<i>Z1</i>	<i>M5-D mm</i>	<i>Z2</i>	<i>M10-D mm</i>	<i>m³</i>	<i>Z2</i>	<i>100-D mm</i>	<i>100yr + CC</i>	<i>m³</i>	<i>m³</i>
5	0.36	7.20	1.21	8.70	21.3	1.87	13.45	18.83	46.1	
10	0.51	10.20	1.22	12.44	30.5	1.91	19.48	27.27	66.8	
15	0.62	12.40	1.22	15.13	37.1	1.91	23.68	33.16	81.2	
30	0.79	15.80	1.23	19.43	47.6	1.95	30.81	43.13	105.7	
60	1.00	20.00	1.24	24.80	60.8	2.00	40.00	56.00	137.2	
120	1.22	24.40	1.24	30.26	74.1	2.00	48.80	68.32	167.4	
240	1.50	29.94	1.24	37.13	91.0	2.02	60.48	84.67	207.4	
360	1.69	33.80	1.23	41.69	102.1	2.00	67.60	94.64	231.9	
600	1.95	38.94	1.23	47.77	117.0	1.98	77.10	107.94	264.5	
1440	2.48	49.60	1.22	60.26	147.6	1.96	96.97	135.76	332.6	

Outflow from Soakaway

Soakaway Properties - Trench

Length = **62.00 m**

Width = **3.00 m**

Working Depth = **2.10 m**

Void Ratio = **0.77**

Factor of Safety = **1.5**

Storage = 300.76 m³

Soakaway Area (a_{s50}) = 136.50 m²

Outflow = 0.001 m³/min

Soakaway Properties - Chamber

Internal Dia = **1.80 m**

Outer Dia = **2.60 m**

Working Depth = **2.00 m**

Internal Void Ratio = **1.0**

Outer Void Ratio = **0.3**

Factor of Safety = **1.5**

Number of Chambers **4**

Inner Storage = 5.09 m³

Outer Storage = 1.66 m³

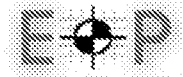
Total Storage/Chamber = 6.75 m³

Total Storage = 26.99 m³

Soakaway Area (a_{s50}) = 8.17 m²

Outflow = 0.000 m³/min

SW2A 46357 Volvo, Worthing - Soakaway System



Calculation of Soakaway Size
Using the method given in BRE Digest 365:2016

Storage Required

Time <i>min</i>	10 yr			100 yr + CC		
	Inflow m^3	Outflow m^3	Storage m^3	Inflow m^3	Outflow m^3	Storage m^3
5	21.3	0.0	21.3	46.1	0.0	46.1
10	30.5	0.0	30.5	66.8	0.0	66.8
15	37.1	0.0	37.0	81.2	0.0	81.2
30	47.6	0.0	47.6	105.7	0.0	105.6
60	60.8	0.1	60.7	137.2	0.1	137.1
120	74.1	0.2	73.9	167.4	0.2	167.2
240	91.0	0.4	90.6	207.4	0.4	207.1
360	102.1	0.6	101.6	231.9	0.6	231.3
600	117.0	1.0	116.1	264.5	1.0	263.5
1440	147.6	2.3	145.3	332.6	2.3	330.3

Minimum 100 yr + CC storage required = 330.26 m^3
Storage Provided = 327.75 m^3

Soakaway volume is not satisfactory - additional storage required - See Note below

Storage required after 24 hour 10 yr storm period should not be greater than half the storage provided

Half storage provided = 163.88 m^3
Storage required after 24 hr = 145.31 m^3

Soakaway rate is satisfactory

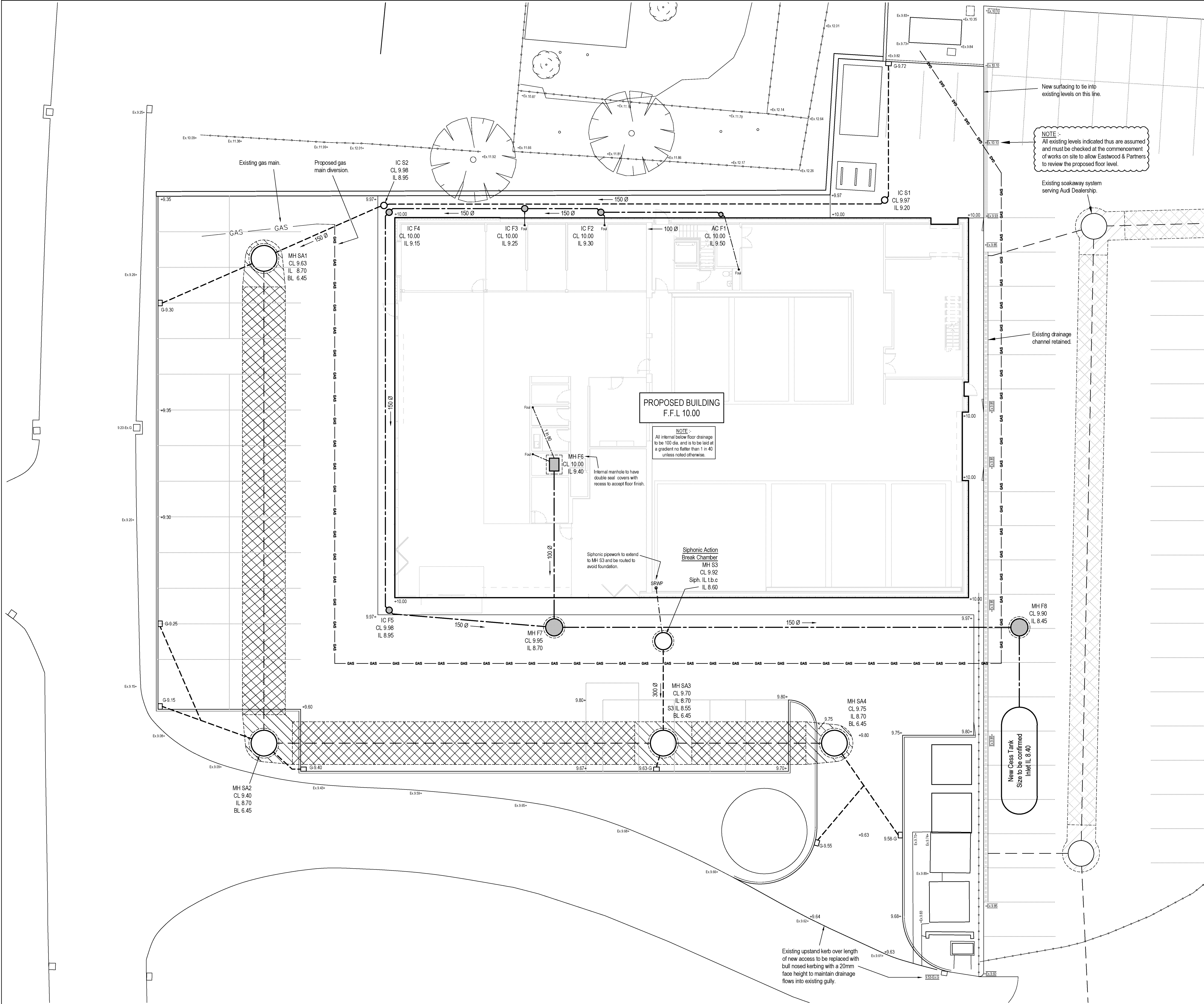
Additional storage where an impermeable layer overlies permeable ground:-

Working depth above permeable layer = 0.00 m
Additional storage = 0.00 m^3
Total storage = 327.75 m^3
Minimum Storage Required = 330.26 m^3

SOAKAWAY NOT SATISFACTORY

NOTE :-

THE ADDITIONAL 2.5 CUBIC METRES OF STORAGE WHICH IS REQUIRED TO MAKE THE SOAKAWAY DESIGN SATISFACTORY IS TO BE PROVIDED WITHIN THE LENGTHS OF VOIDED STONE FILLED TRENCH BETWEEN THE ENDS OF THE GEOLIGHT UNITS AND THE MANHOLES (7 LOCATIONS). THE VOLUME AVAILABLE AT EACH OF THESE LOCATIONS IS CALCULATED TO BE 1.23 CUBIC METRES (3.0 wide x 2.1 deep x 0.65 long x 0.3 void ratio) THEREFORE ADDITIONAL STORAGE AVAILABLE = 8.6 CUBIC METRES (7 x 1.23)



INFORMATION WITHIN THIS DRAWING IS NOT NECESSARILY PRODUCED TO SCALE.
ALWAYS USE FIGURED DIMENSIONS AND CO-ORDINATES - IF IN DOUBT, ASK.

NOTES

- This drawing to be read in conjunction with Eastwood & Partners's drawing numbers 46357/062 & 063.
- All pipes shall be either :-
 - A - Vitrified clay to BS EN 295 with a minimum crushing strength as follows :-
 - 150 dia. - 40 kN/m
 - 225 dia. - 45 kN/m
 - 300 dia. - 72 kN/m

OR
 - B - Class H concrete to BS 5911. OR
 - C - PVC to have BSI kitemark status (certified to WS 4-35-01) Wavin or similar approved. Maximum pipe length to be 3m.
- All pipes are to be laid soffit to soffit at manholes unless noted otherwise.
- Pipes entering manholes and road gullies shall have a flexible joint within 600 of the inside of the manhole or gully joining with a short Rocker pipe.
- All pipes to be 100 dia. unless noted otherwise.
- All works and materials to be in accordance with "Sewers for Adoption" (6th edition), bedded with a Class S granular bed and surround as a minimum requirement. Pipes within highways with cover less than 1200 to have a Class Z concrete bed and surround. Pipes within paved areas with cover less than 600 to have a Class Z concrete bed and surround. Pipes within landscaped areas with cover less than 300 to have a Class Z concrete bed and surround.
- All trenches in roads and paved areas shall be backfilled with Type 1 DOT granular sub-base material.
- All cover levels are indicative only. Covers to be set to suit camber/gradient of existing and proposed surfacings.
- The invert levels at the proposed points of connection to existing drains shall be checked before any new drains are constructed. Any variation to the levels shown on the drawing shall be notified to Eastwood & Partners.

- Ex. surface water drainage
- Surface water drainage (PCC ring manhole)
- Foul drainage (PCC ring manhole)
- Foul drainage (brickwork manhole)
- Soakaway system consisting of 1800 dia. silt trap soakaway chambers and 3000 wide soakaway trenches - see Drg. No. 46357/063.
- G Road gully with 150 dia. roddable outlet.
- IC 450 min. dia. Polypropylene inspection chamber.
- AC 300 min. dia. Polypropylene access chamber (600 max. depth).

IMPORTANT NOTE :-
FOUL DRAINAGE LAYOUT HAS BEEN PREPARED USING ASSUMED DRAIN "POP-UP" POSITIONS AND IS TO BE REVIEWED AFTER CONFIRMATION OF THE ARCHITECT'S REQUIRED LOCATIONS.

A	First Issue.			
REV	DESCRIPTION	SIG	CHK	DATE

CAFFYNS

VOLVO

WORTHING

EXTERNAL DRAINAGE LAYOUT

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EOP

SCALE WHEN PLOTTED AT A1		DRAWING STATUS	
1:125		PRELIMINARY	
DRAWN	CHECKED	DATE	DRAWING NUMBER
MW	SJE	14-02-22	46357/061
			REV
			A



NOTES

1. This drawing to be read in conjunction with Eastwood & Partner's drawing numbers 46357/061 & 062.

REV	DESCRIPTION	SIG	CHK	DATE
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CAFFYNS

VOLVO
WORTHING

TYPICAL SOAKAWAY DETAILS

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EOP

SCALE WHEN PLOTTED AT A:

1:25

DRAWING STATUS

PRELIMINARY

DRAWN	CHECKED	DATE	DRAWING NUMBER	REV
MW	SJE	14-02-22	46357/063	A

CAFFYNS VOLVO WORTHING

EXTERNAL DRAINAGE MAINTENANCE SCHEDULE

<u>CATEGORY</u>	<u>ACTION</u>	<u>FREQUENCY</u>
REGULAR	General removal of litter and debris from external paving and landscaping areas.	Monthly (or more frequently if required)
	Cleaning of gullies, drainage channels and drainage channel sump units to remove debris and silt.	6 monthly, after autumn leaf fall (or more frequently if necessary)
	Cleaning of manholes and silt trap soakaway manholes to remove debris and silt.	Annually, after autumn leaf fall (or more frequently if necessary)
	Inspection of all gullies, drainage channels, chambers, silt trap soakaway to identify and make good any defects as necessary, including CCTV survey and jetting/cleaning of pipework if necessary.	Annually and after major rainfall events.
	Inspection of all proprietary geo-cellular unit soakaways to identify and make good any defects as necessary, including CCTV survey and jetting/cleaning of pipework if necessary	Annually and after major rainfall events.
CORRECTIVE	Clear blockages in gully outlets, drainage channel outlets and branch connections.	As required
	Clear blockages in manholes, silt trap soakaway chambers and soakaways.	As required