

Caffyns

Audi, Worthing

Proposed Drainage Strategy

The proposed development is the construction of a new car dealership on the site of a residential dwelling and former garden centre outbuildings. A copy of the proposed site layout, SRA Architects Drg. No. 3068-60B is appended.

Surface Water Drainage

In support of the planning application (A/162/15/PL), a flood risk assessment (FRA) was carried out by The Civil Engineering Partnership (CEP), dated October 2015. This assessment concluded that *"Surface water runoff from the development will be discharged to ground via a suitable infiltration system incorporating sufficient storage to accommodate a 1:100 year pluvial event including an allowance for the predicted effects of climate change"*.

Infiltration testing was carried out in February 2016 by Soils Ltd. An extract of their report is appended which states a minimum infiltration rate of 6.67×10^{-5} for the three tests within test hole SK2.

As conditioned, winter groundwater monitoring between January and May 2016 was undertaken by Soils Ltd. An extract of their report is appended, which states that the highest measured level was 3.3m below ground level.

CEP submitted these two figures to Arun District Council (ADC) and it was agreed that these were to be used as a basis for preparing an initial surface water disposal design.

However, as there was only limited access on the site due to the presence of existing buildings and the fact that some of the site was outside of the developer's ownership at that time, it was proposed that additional percolation tests were undertaken post demolition, in order to check the infiltration rates across the wider site area.

Notwithstanding the need for additional percolation testing, Eastwood & Partners prepared a Preliminary Drainage Layout which proposed the use of systems of soakaway chambers linked by trench soakaways. This preliminary layout was issued to ADC for discussion and approval was obtained as a basis for the detailed design, as stated in the appended correspondence.

Eastwood & Partners have subsequently carried out percolation tests in three locations within the footprint of the original large “greenhouse” building. The report on the testing is appended, which shows that a minimum infiltration rate of 1.3×10^{-6} was obtained.

Calculations are appended showing the length, size and depth of soakaways that are required based on this lower infiltration rate of 1.3×10^{-6} .

It is proposed that the surface water be drained to three separate soakaway systems, the contributing areas for each are shown on the appended Sheet SW1.

For Areas A & B (mainly public access areas) all run-off generated by rainfall events up to and including 1 in 100 year return period plus an allowance of 30% for climate change is to be stored below ground within the soakaway systems, as shown on appended calculation sheets SW2A – SW5A.

For Area C (mainly compound area) it is proposed that some storage be provide in shallow surface ponding around drainage channels. The intention is that all run-off generated by rainfall events up to and including a 1 in 100 year return period is stored below ground within the soakaway systems, and that the additional volume required by the 30% climate change allowance is provided above ground. See appended calculation sheets SW6A – SW9A. The strategy for this area has been discussed and agreed with the client/site operator.

A maintenance schedule for the surface water drainage system is appended.

Foul Drainage

There are no available public sewers in the area. Therefore, all “domestic” foul discharge from the proposed Showroom/Workshop and Valet buildings it to be piped by gravity to a new private cesstank within the site. The proposed car washing facilities are to utilise a “closed” full recycling system to minimise discharge volumes to the cesstank.

A copy of the proposed external drainage layout Drg. No. 40923/061E showing the strategies outlined above is appended, along with the Typical Manhole and Pipe Bedding Details Drg. No. 40923/062A.

3.2 Infiltration Tests (BRE Digest: 365)

Infiltration tests were performed at three locations (SK1, SK2 and SK3) during the investigation in an area of the site proposed for an infiltration basin in order to provide guidance on the suitability of the ground for the adoption of a surface water drainage system. The test strata comprised the River Terrace Deposits. Tests were conducted in accordance with the principles of BRE Digest 365 Soakaway design: 2003.

BRE 365 states that for an accurate infiltration rate to be obtained a soakage pit needs to be filled three times in quick succession. Each test is completed once 75% of the water present has drained away, in order to determine whether or not the underlying ground conditions may be suitable for surface water drainage. Three tests were carried out in trial pit SK2, whereas only a single test was conducted in trial holes SK1 and SK3 due to time constraints on site. Calculations were carried out according to the methods reported in BRE 365 Soakaway design: 2003.

The test comprised piping water via a 10,000L tanker into the open trial hole, the drop in water level over time was then recorded to give an indication of soakage potential.

Table 3.5 Infiltration Test Results

Trial Hole/Test	Test Stratum	Test Depth (m bgl)	Infiltration Rate (m/sec)
SK1-T1	RTD	3.02	Insufficient Infiltration
SK2-T1	RTD	2.97	8.878×10^{-5}
SK2-T2	RTD	2.90	6.656×10^{-5}
SK2-T3	RTD	2.80	7.967×10^{-5}
SK3-T1	RTD	3.04	Insufficient Infiltration

In addition to the infiltration tests, four constant head tests were performed in trial hole BH1. The infiltration rate was calculated by means of the time taken to infill the borehole with a known volume of water (30 litres) in order to keep the water level constant.

Table 3.6 Constant Head Tests

BH No.	Time to fill 30 litres (Seconds)				Average flowrate l/sec
	1	2	3	4	
1	70.95	48.08	52.23	68.45	0.514

In summary the average flow rate determined from the four constant head tests was **0.514l/sec**.

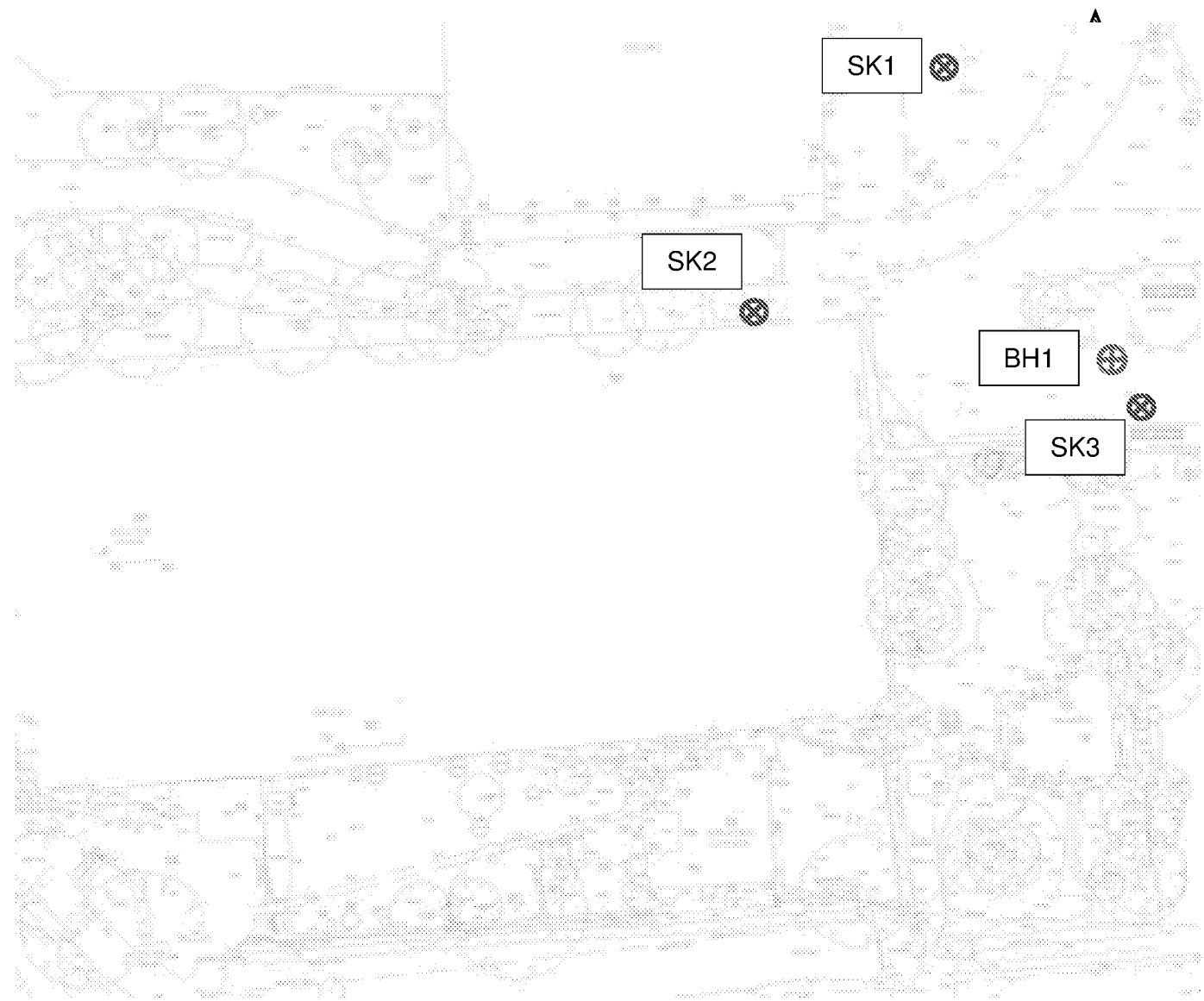


Figure number
3

Project
Land North of A259, Angmering,
West Sussex BNI 6 1ED

Client
The Civil Engineering Practice on
behalf of Caffyns Audi

Title
Trial Hole Location Map

Date
February 2016

Job Number
15366

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.

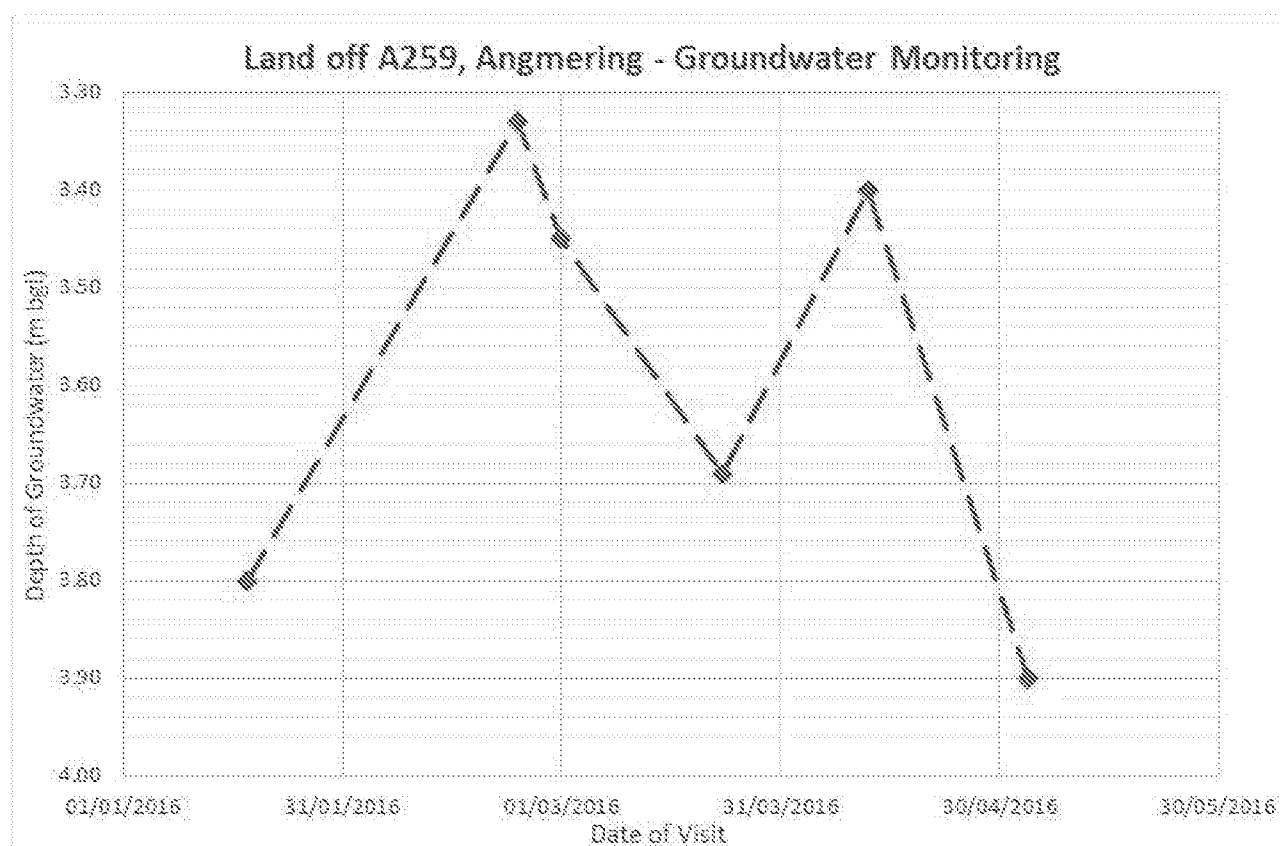
Groundwater monitoring was undertaken by Soils limited on four occasions over a period of three months. Monitoring was undertaken by means of manual dipping of the wells. Groundwater monitoring results have been presented in Table 1 and are displayed in Graph 1.

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



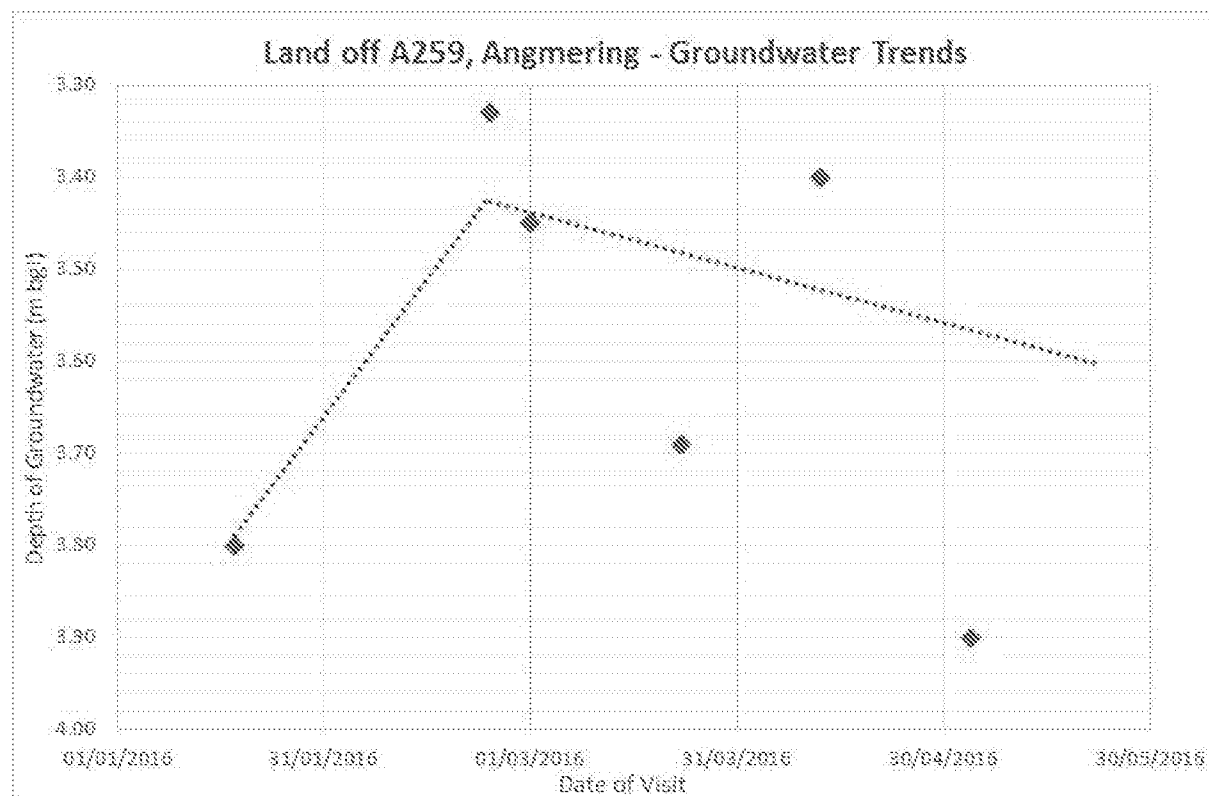
The groundwater reading for 18th January was recorded during the drilling of the borehole. The graph showed the increase in groundwater depth between January and April. It must be noticed that every single reading has its own importance for the definition of the highest groundwater depth. The readings, 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

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

From: Thomas Callaway [REDACTED]
Sent: 16 March 2017 13:51
To: 'Steve English'
Cc: Hugh Parker; david hawtin; Garry Davies
Subject: [pending]RE: 40923 - Audi Worthing - Initial Proposed Drainage Strategy

Steve

The principal for the surface water drainage design is fine. I have asked the planning officer to get back to you confirming what will be possible regarding the wording of the condition.

Regards

Tom Callaway

[REDACTED]

From: Steve English [REDACTED]
Sent: 14 March 2017 [REDACTED]
To: Thomas Callaway [REDACTED]
Cc: Hugh Parker; david hawtin; Garry Davies
Subject: 40923 - Audi Worthing - Initial Proposed Drainage Strategy

Tom,

[Planning Application Ref: A/162/15/PL](#)

Further to our telephone conversation yesterday regarding the proposed new Audi Dealership on the A259/Roundstone By-pass, Angmering, we have the following comments to make.

We have been appointed as Civil and Structural Engineers for the project and, as discussed, we wish to propose a drainage strategy for the development. Our proposed strategy differs from that produced by The Civil Engineering Practice in October 2016 (which had been developed following discussions with you). For your ease of reference (and as we have, at this stage, based our initial design information on design parameters within this document), please find attached a PDF copy of this document for your information.

Please also find attached a PDF copy of our initial sketch proposals detailing the fundamental principles behind our proposed drainage strategy for the site.

The surface water drainage proposals for this scheme follow the same principles that we adopted for our drainage design for the recently completed BMW Worthing dealership (just off the A259 approx. 1 mile from this location), which we liaised with you to obtain the required consents.

It is our proposal to collect the surface water run-off from the building and hard paved vehicle display/storage areas and discharge it to ground via a series of soakaway trenches designed to accommodate a 1 in 100 year rainfall event (plus 30% for climate change). The extent of soakaway trench, associated storage required (including within the manhole chambers/silt traps etc.) and any required above ground storage will be based upon the percolation test results obtained to date. As discussed, it is our proposal to utilise above ground storage (i.e. nominal surface ponding) for the additional 30% climate change only, for the rear compound area. Potential exceedance of this additional above ground storage would overtop the perimeter kerb and discharge to the adjacent strips of soft landscaping within the site boundary – this has been discussed and agreed with the end user/Client as acceptable. All other areas, including roof drainage, will be designed to accommodate the 1 in 100 year plus 30% below ground.

Based on the percolation test results available, the current underside of soakaway trench is expected to be at a depth of approximately 2.3 m, i.e. 1.0 m above the highest recorded ground water level.

It should be noted that the majority of the external hard standing area is for the storage or display of new/nearly new cars. There will be very little associated vehicle movements and these vehicles (in turn) will be kept clean (via the car wash down/valeting area) and free from potential surface water contaminants. As such, there is not likely to be any significant contaminants exposed to the surface water run-off that would need treatment. The gullies/drainage channels specified, will be trapped and have silt buckets that further assist in the removal of any suspended solids. There are not expected to be any significant source of metals to contaminate the surface water discharge from the site. Nor are there expected to be any significant hydrocarbon contaminants to be treated, as could be potentially expected in a public/supermarket car park for example.

As discussed briefly, permeable paving is not considered viable for this type of development in this location due to the presence of clay/underlying impermeable ground conditions close to the surface and the fact that maintenance of this type of surfacing would prove to be impracticable due to the logistics of removing and storing all the display vehicles etc. The proposed soakaway trench solution would facilitate the opportunity for future maintenance (or in the most severe case, a phased replacement/re-excavation of soakaway trenches).

The foul drainage provision from the development will be a traditional cesspit/tank to serve the toilets/canteen/building foul drainage. The car valet building will have a closed loop full recycling system by specialist manufacturer. In short, there will be no piped foul discharge from the site or foul discharge to ground for this development.

It is our understanding following our telephone discussion, that the above drainage strategy (as detailed on the attached sketch proposal) for this development is acceptable to you/Arun District Council. We will, of course, produce a full drainage design and associated design calculations/scheme justification in due course for approval. In the meantime however, we would be grateful if you would confirm that the above correctly reflects our conversation and that you are satisfied with our approach to the foul and surface water drainage requirements for this development.

It should be noted that, at this time, we require confirmation that this Drainage Strategy is acceptable, in order for the pre-commencement planning condition to be discharged so that demolition of the existing buildings on the site can be carried out. Once this has been achieved, we will be in a position to undertake additional percolation tests/site investigation work to further justify the final drainage design. At this time the existing former greenhouses (formerly part of the Haskins development, which are currently positively drained into the Haskins current soakaway system) cover the majority of the

area of the proposed rear storage compound (i.e. location of the proposed soakaways). As such and as discussed yesterday, we are unable to undertake these additional tests in this area until such a time that demolition is permitted.

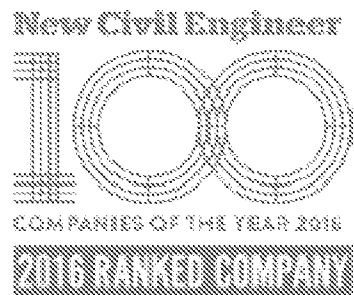
If you have any further queries, please do not hesitate to contact us.

Regards,

Steve English

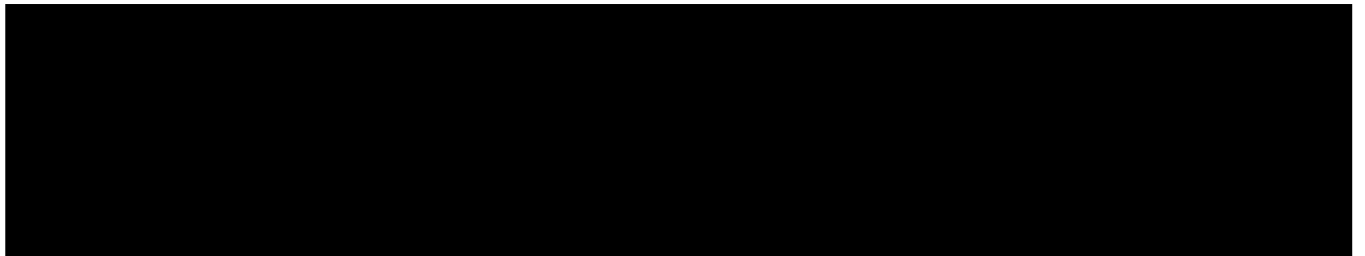
Director

Eastwood&Partners
CONSULTING ENGINEERS



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SJE/RAN/01/40923

23 August 2017

For the attention of David Hawtin

Dear David,

Audi Worthing – Report on Infiltration Tests

Introduction

Ashdown Site Investigation produced a 'Combined Geotechnical and Ground Contamination Risk Assessment' in June 2015, referenced LW26140. This report included the results of four infiltration tests which were undertaken outside the footprint of the former greenhouses. Infiltration rates of between 3.38×10^{-5} and 4.81×10^{-4} m/sec were calculated.

Additional infiltration testing was required in the area of the greenhouses following demolition.

Site Works

Eastwood & Partners visited site on 16 August 2017 and excavated three pits (SA1 to SA3) in the area of the former greenhouses in the north of the site. A sketch plan showing the location of the pits is enclosed. The pits reached depths of between 1.25 m and 2.4 m bgl. Each pit was filled with approximately 500 mm depth of water and monitored over a period of several hours.

Infiltration Results

The ground conditions encountered were consistent with those recorded by Ashdown Site Investigation previously. Topsoil was encountered at the surface in two pits with concrete present at the surface in one. The natural ground was encountered directly below the topsoil or concrete and comprised slightly sandy silt/clay, representative of the River Terrace Deposits known to cover the site.

A copy of the pit logs and infiltration rate calculations is enclosed and the results are summarised in the table below. In each case the average infiltration rate has been calculated. The water level in the

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Consultant: J M Wood BSc, CEng, MICE, FIStructE



pits did not drop below 25% effective depth, thus it was not possible to calculate the BR365 infiltration rate.

Pit	Depth (mm)	Average Infiltration Rate (m/sec)
SA1	2200	1.3×10^{-6}
SA2	2400	1.4×10^{-5}
SA3	1250	7.8×10^{-6}

The rates recorded are all slower than those recorded by Ashdown Site Investigation previously. This could be due to seasonal effects in the lead up to the testing, i.e. amount of rainfall, or slight localised variations in the soil composition.

Conclusions

Although the recent testing has demonstrated a lower infiltration rate, soakaway drainage is still considered viable for the site. A conservative infiltration rate should however be adopted during the design of the drainage system to allow for the variation recorded across the site.

Yours sincerely

S English
Director

Enc. Sketch Pit Location Plan
Logs and Infiltration Rate Calculations

PROJECT:	Audi Worthing	Job No. 40923	Date 16.08.17
SUBJECT:	Infiltration Test Results and Calculation of Infiltration Rates	Prepared RAN	Checked LED

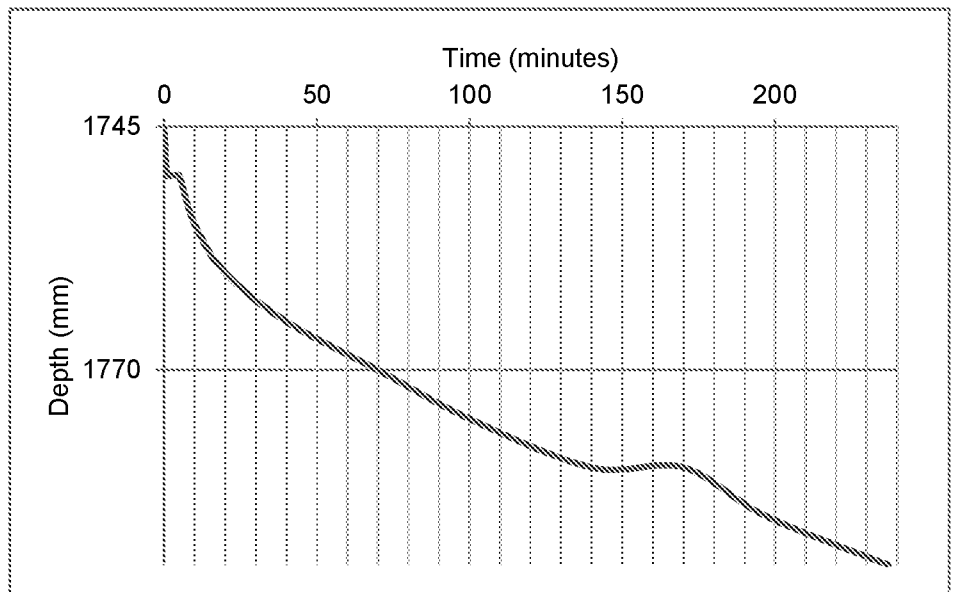
Test No. SA1

Test Pit Dimensions

Length = **1600** mm Plan area = **1.92** m²
Width = **1200** mm
Depth = **2200** mm (Total depth)

Approximate time to discharge water into the hole: **360** Seconds
Depth to water after completion of pumping: **1745** mm

Time (min)	Depth (mm)
0	1745
1	1750
2	1750
3	1750
4	1750
5	1750
10	1755
20	1760
40	1765
70	1770
100	1775
140	1780
170	1780
197	1785
237	1790



Test Pit Log

Depth (m)	Description
0.0-0.1	Concrete
0.1-0.55	Brown sandy, gravelly CLAY. Gravel is angular to sub-rounded, fine to coarse flint
0.55-2.2	Light brown slightly sandy SILT/CLAY.

PROJECT:	Audi Worthing	Job No. 40923	Date 16.08.17
SUBJECT:	Infiltration Test Results and Calculation of Infiltration Rates	Prepared RAN	Checked LED

Test No. SA1

Soil Infiltration Rate in Accordance with BR365

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

Where: V_{p75-25} is the effective storage volume of water in the trial pit between 75% and 25% effective depth;

a_{p50} is the internal surface area of the trial pit up to 50% effective depth and including the base area

t_{p75-25} is the time for the water level to fall from 75% to 25% effective depth

Initial parameters

Depth to water = **1750** mm Average water depth: **430** mm
Start time = **5** min

Change in water depth: **40** mm

Final parameters

Depth to water = **1790** mm Time interval: **232** min
End time = **237** min

Effective Storage Volume of Water in the Trial Pit = **0.8736** m³
75% Effective Depth = **1859** mm from ground level
25% Effective Depth = **2086** mm from ground level
Time at 75% Effective Depth = **N/A** minutes
Time at 25% Effective Depth = **N/A** minutes

V_{p75-25} = **0.44** m³
 a_{p50} = **3.19** m²
 t_{p75-25} = **0** sec
 f = **#DIV/0! m/sec**

Average Soakaway Rate = **5.5E-06** m³/sec
Average soakaway area = **4.33** m² (sides + base)

BR365 Soil Infiltration Rate = N/A m/sec
Average Infiltration Rate = 1.3E-06 m/sec

PROJECT:	Audi Worthing	Job No. 40923	Date 16.08.17
SUBJECT:	Infiltration Test Results and Calculation of Infiltration Rates	Prepared RAN	Checked LED

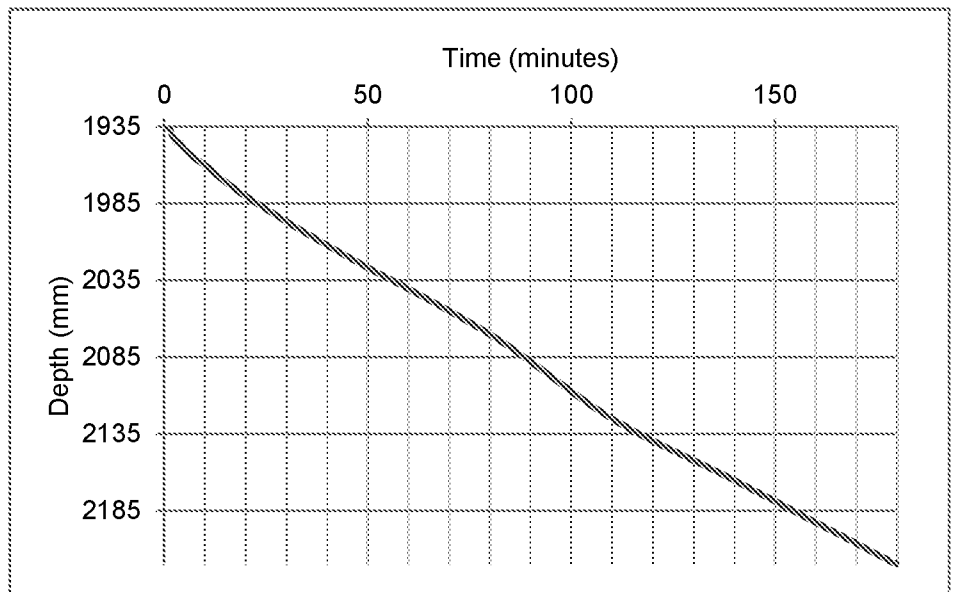
Test No. SA2

Test Pit Dimensions

Length = **1600** mm Plan area = **1.92** m²
Width = **1200** mm
Depth = **2400** mm (Total depth)

Approximate time to discharge water into the hole: **600** Seconds
Depth to water after completion of pumping: **1935** mm

Time (min)	Depth (mm)
0	1935
1	1935
2	1940
3	1945
4	1945
5	1950
10	1960
20	1980
42	2015
80	2070
110	2125
140	2165
180	2220



Test Pit Log

Depth (m)	Description
0.0-0.3	Dark brown very clayey silty SAND.
0.3-2.4	Light brown slightly sandy SILT/CLAY.

PROJECT:	Audi Worthing	Job No. 40923	Date 16.08.17
SUBJECT:	Infiltration Test Results and Calculation of Infiltration Rates	Prepared RAN	Checked LED

Test No. SA2

Soil Infiltration Rate in Accordance with BR365

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

Where: V_{p75-25} is the effective storage volume of water in the trial pit between 75% and 25% effective depth;

a_{p50} is the internal surface area of the trial pit up to 50% effective depth and including the base area

t_{p75-25} is the time for the water level to fall from 75% to 25% effective depth

Initial parameters

Depth to water = 1935 mm Average water depth: 322.5 mm
Start time = 0 min

Change in water depth: 285 mm

Final parameters

Depth to water = 2220 mm Time interval: 180 min
End time = 180 min

Effective Storage Volume of Water in the Trial Pit = 0.8928 m³
75% Effective Depth = 2051 mm from ground level
25% Effective Depth = 2284 mm from ground level
Time at 75% Effective Depth = 67 minutes
Time at 25% Effective Depth = N/A minutes

V_{p75-25} = 0.45 m³
 a_{p50} = 3.22 m²
 t_{p75-25} = -4020 sec
 f = -3.4E-05 m/sec

Average Soakaway Rate = 5.1E-05 m³/sec
Average soakaway area = 3.73 m² (sides + base)

BR365 Soil Infiltration Rate = N/A m/sec
Average Infiltration Rate = 1.4E-05 m/sec

PROJECT:	Audi Worthing	Job No. 40923	Date 16.08.17
SUBJECT:	Infiltration Test Results and Calculation of Infiltration Rates	Prepared RAN	Checked LED

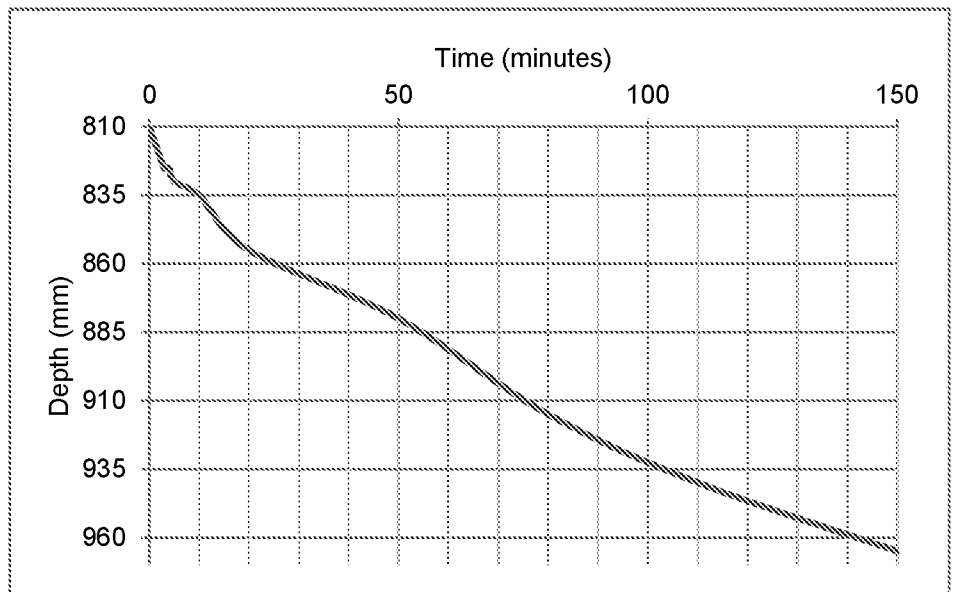
Test No. SA3

Test Pit Dimensions

Length = 1200 mm Plan area = 1.44 m²
Width = 1200 mm
Depth = 1250 mm (Total depth)

Approximate time to discharge water into the hole: 600 Seconds
Depth to water after completion of pumping: 810 mm

Time (min)	Depth (mm)
0	810
1	815
2	820
3	825
4	825
5	830
10	835
20	855
50	880
80	915
110	940
150	965



Test Pit Log

Depth (m)	Description
0.0-0.25	Dark brown very clayey silty SAND.
0.25-1.25	Light brown slightly sandy SILT/CLAY.

PROJECT:	Audi Worthing	Job No. 40923	Date 16.08.17
SUBJECT:	Infiltration Test Results and Calculation of Infiltration Rates	Prepared RAN	Checked LED

Test No. SA3

Soil Infiltration Rate in Accordance with BR365

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

Where: V_{p75-25} is the effective storage volume of water in the trial pit between 75% and 25% effective depth;

a_{p50} is the internal surface area of the trial pit up to 50% effective depth and including the base area

t_{p75-25} is the time for the water level to fall from 75% to 25% effective depth

Initial parameters

Depth to water = 810 mm Average water depth: 362.5 mm
Start time = 0 min

Change in water depth: 155 mm

Final parameters

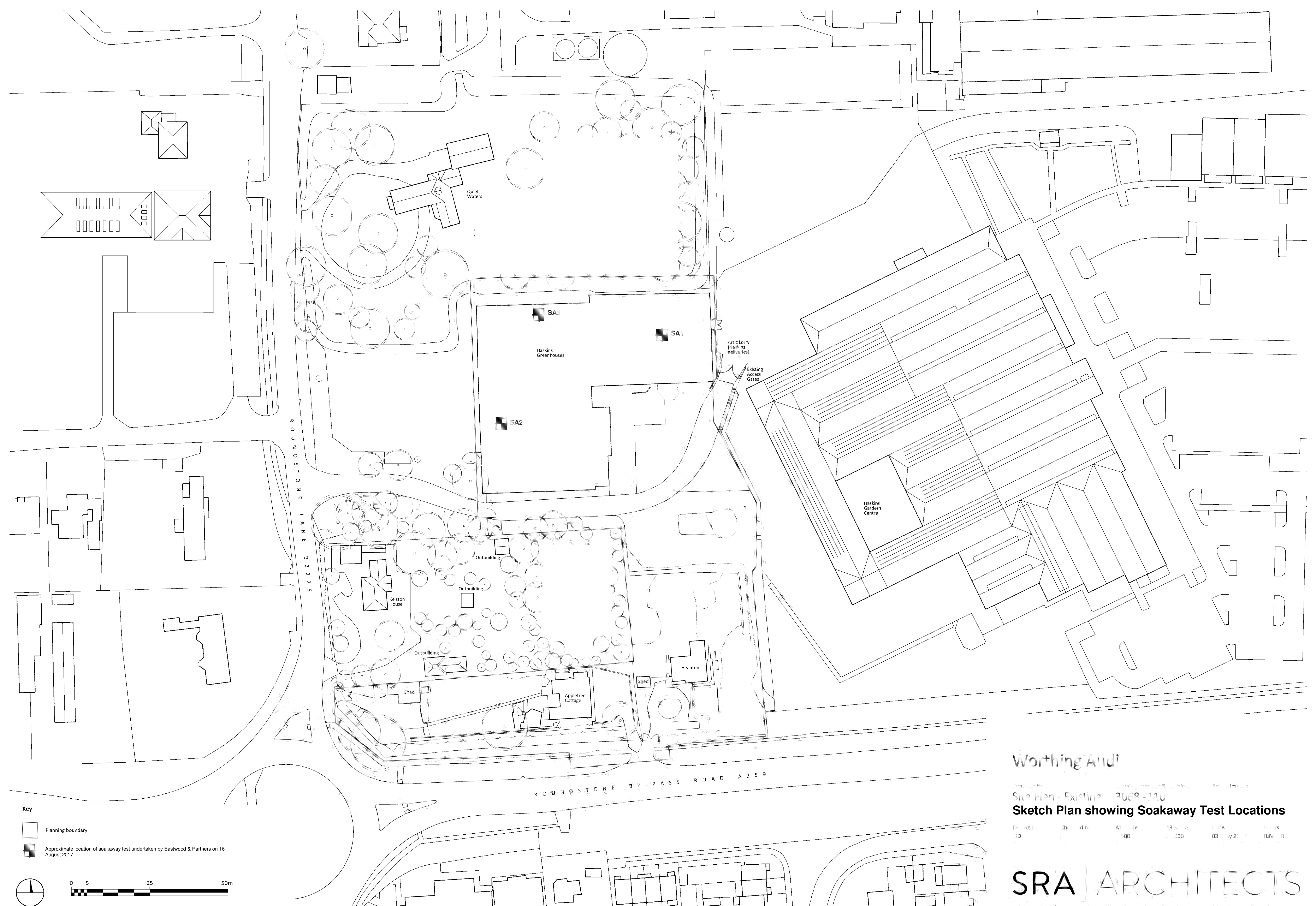
Depth to water = 965 mm Time interval: 150 min
End time = 150 min

Effective Storage Volume of Water in the Trial Pit = 0.6336 m³
75% Effective Depth = 920 mm from ground level
25% Effective Depth = 1140 mm from ground level
Time at 75% Effective Depth = 86 minutes
Time at 25% Effective Depth = N/A minutes

V_{p75-25} = 0.32 m³
 a_{p50} = 2.50 m²
 t_{p75-25} = -5160 sec
 f = -2.5E-05 m/sec

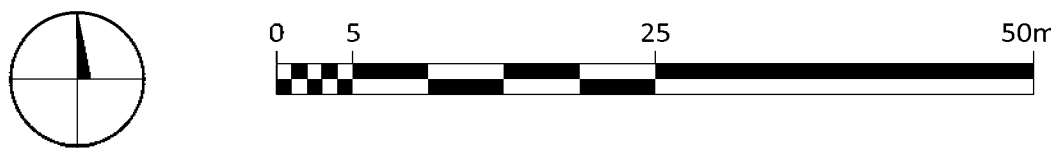
Average Soakaway Rate = 2.5E-05 m³/sec
Average soakaway area = 3.18 m² (sides + base)

BR365 Soil Infiltration Rate = N/A m/sec
Average Infiltration Rate = 7.8E-06 m/sec



Key

-  Planning boundary
-  Approximate location of soakaway test undertaken by Eastwood & Partners on 16 August 2017

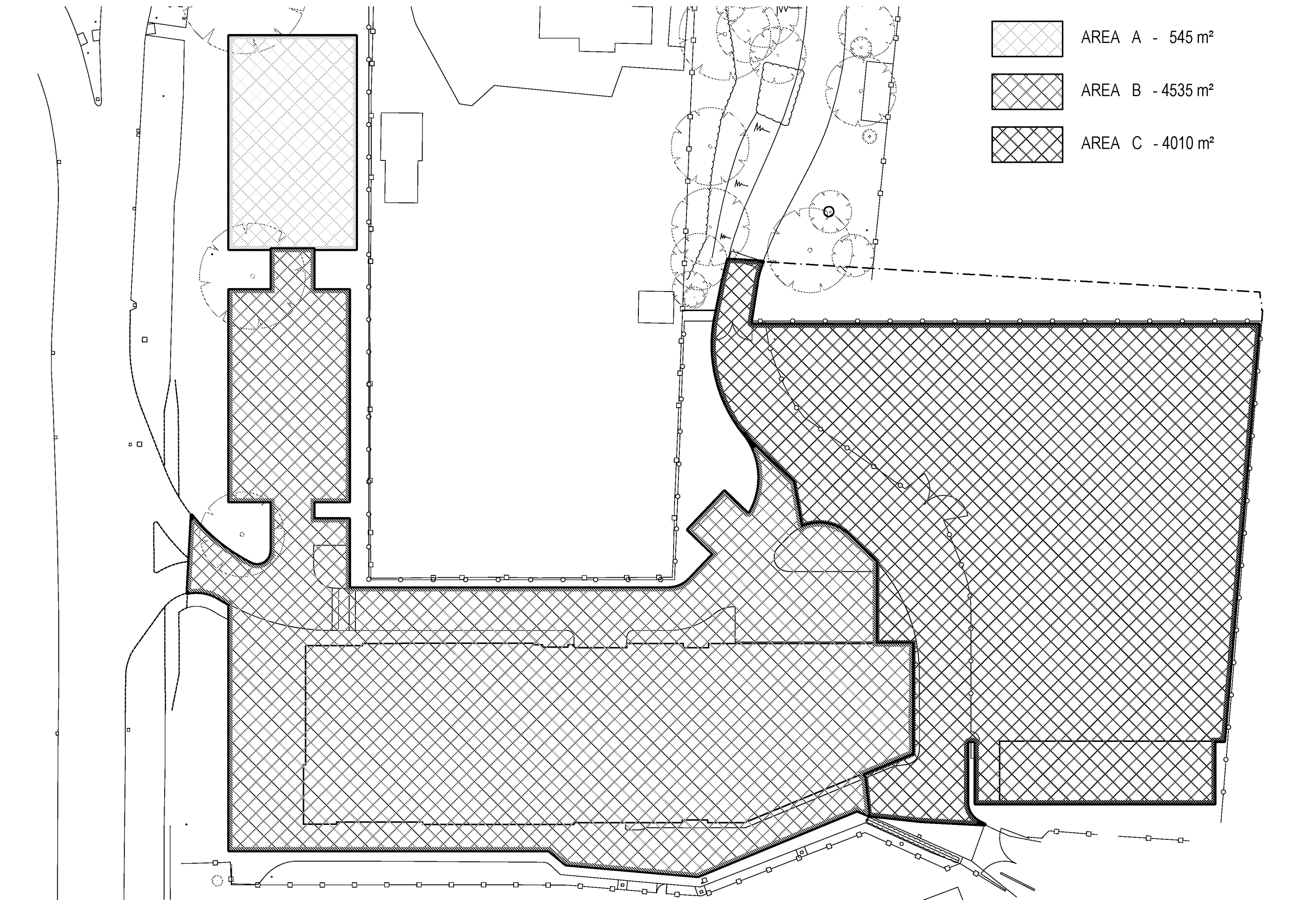


Worthing Audi

Drawing title	Drawing number & revision	Amendments
Site Plan - Existing	3068 -110	
Sketch Plan showing Soakaway Test Locations		
Drawn by	Checked by	A1 Scale
GO	gd	1:500
		A3 Scale
		1:1000
	Date	Status
	03 May 2017	TENDER

SRA | ARCHITECTS

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SW2A 40923 Audi, Worthing - Soakaway System A



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 = **545 m²**
Infiltration rate = **1.3 m/s x 10⁻⁶** or 0.0001 m/min
Climate change = **30%**

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>
5	0.36	7.20	1.21	8.70	4.7	1.87	13.45	17.48		9.5
10	0.51	10.20	1.22	12.44	6.8	1.91	19.48	25.33		13.8
15	0.62	12.40	1.22	15.13	8.2	1.91	23.68	30.79		16.8
30	0.79	15.80	1.23	19.43	10.6	1.95	30.81	40.05		21.8
60	1.00	20.00	1.24	24.80	13.5	2.00	40.00	52.00		28.3
120	1.22	24.40	1.24	30.26	16.5	2.00	48.80	63.44		34.6
240	1.50	29.94	1.24	37.13	20.2	2.02	60.48	78.62		42.8
360	1.69	33.80	1.23	41.69	22.7	2.00	67.60	87.88		47.9
600	1.95	38.94	1.23	47.77	26.0	1.98	77.10	100.23		54.6
1440	2.48	49.60	1.22	60.26	32.8	1.96	96.97	126.06		68.7

Outflow from Soakaway

Soakaway Properties - Trench

Length = **16.00 m**

Width = **2.00 m**

Working Depth = **2.10 m**

Void Ratio = **0.77**

Factor of Safety = **1.5**

Storage = 51.74 m³

Soakaway Area (a_{s50}) = 37.80 m²

Outflow = 0.002 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 **2**

Inner Storage = 5.09 m³

Outer Storage = 1.66 m³

Total Storage/Chamber = 6.75 m³

Total Storage = 13.50 m³

Soakaway Area (a_{s50}) = 8.17 m²

Outflow = 0.001 m³/min

SW3A 40923 Audi, Worthing - Soakaway System A



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 <i>m³</i>	Outflow <i>m³</i>	Storage <i>m³</i>	Inflow <i>m³</i>	Outflow <i>m³</i>	Storage <i>m³</i>
5	4.7	0.0	4.7	9.5	0.0	9.5
10	6.8	0.0	6.8	13.8	0.0	13.8
15	8.2	0.0	8.2	16.8	0.0	16.7
30	10.6	0.1	10.5	21.8	0.1	21.7
60	13.5	0.2	13.3	28.3	0.2	28.2
120	16.5	0.3	16.2	34.6	0.3	34.2
240	20.2	0.7	19.6	42.8	0.7	42.2
360	22.7	1.0	21.7	47.9	1.0	46.9
600	26.0	1.7	24.3	54.6	1.7	52.9
1440	32.8	4.1	28.8	68.7	4.1	64.6

Minimum 100 yr + CC storage required = 64.65 m³

Storage Provided = 65.24 m³

Soakaway volume is satisfactory

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

Half storage provided = 32.62 m³

Storage required after 24 hr = 28.79 m³

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 m³

Total storage = 65.24 m³

Minimum Storage Required = 64.65 m³

Soakaway volume is satisfactory

SW4A 40923 Audi, Worthing - Soakaway System B



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 = **4435** m²
Infiltration rate = **1.3** m/s x 10⁻⁶ or 0.0001 m/min
Climate change = **30%**

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>
5	0.36	7.20	1.21	8.70	38.6	1.87	13.45	17.48	77.5
10	0.51	10.20	1.22	12.44	55.2	1.91	19.48	25.33	112.3
15	0.62	12.40	1.22	15.13	67.1	1.91	23.68	30.79	136.6
30	0.79	15.80	1.23	19.43	86.2	1.95	30.81	40.05	177.6
60	1.00	20.00	1.24	24.80	110.0	2.00	40.00	52.00	230.6
120	1.22	24.40	1.24	30.26	134.2	2.00	48.80	63.44	281.4
240	1.50	29.94	1.24	37.13	164.7	2.02	60.48	78.62	348.7
360	1.69	33.80	1.23	41.69	184.9	2.00	67.60	87.88	389.7
600	1.95	38.94	1.23	47.77	211.8	1.98	77.10	100.23	444.5
1440	2.48	49.60	1.22	60.26	267.3	1.96	96.97	126.06	559.1

Outflow from Soakaway

Soakaway Properties - Trench

Length = **133.00** m
Width = **2.00** m
Working Depth = **2.10** m
Void Ratio = **0.77**
Factor of Safety = **1.5**

Storage = 430.12 m³
Soakaway Area (a_s50) = 283.50 m²

Outflow = 0.015 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 **12**

Inner Storage = 5.09 m³
Outer Storage = 1.66 m³
Total Storage/Chamber = 6.75 m³
Total Storage = 80.98 m³
Soakaway Area (a_s50) = 8.17 m²

Outflow = 0.005 m³/min

SW5A 40923 Audi, Worthing - Soakaway System B



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	38.6	0.1	38.5	77.5	0.1	77.4
10	55.2	0.2	55.0	112.3	0.2	112.1
15	67.1	0.3	66.8	136.6	0.3	136.3
30	86.2	0.6	85.6	177.6	0.6	177.0
60	110.0	1.2	108.8	230.6	1.2	229.4
120	134.2	2.4	131.8	281.4	2.4	279.0
240	164.7	4.8	159.9	348.7	4.8	343.9
360	184.9	7.1	177.7	389.7	7.1	382.6
600	211.8	11.9	199.9	444.5	11.9	432.6
1440	267.3	28.6	238.7	559.1	28.6	530.5

Minimum 100 yr + CC storage required = 530.50 m^3
Storage Provided = 511.10 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 = 255.55 m^3
Storage required after 24 hr = 238.70 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 = 511.10 m^3
Minimum Storage Required = 530.50 m^3

SOAKAWAY NOT SATISFACTORY

NOTE :-

THE ADDITIONAL 19.4 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 (22 LOCATIONS). THE VOLUME AVAILABLE AT EACH OF THESE LOCATIONS IS CALCULATED TO BE 0.88 CUBIC METRES (2.0 wide x 2.1 deep x 0.7 long x 0.3 void ratio) THEREFORE ADDITIONAL STORAGE AVAILABLE = 19.4 CUBIC METRES (22 x 0.88)

SW6A 40923 Audi, Worthing - Soakaway System C



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 = **4010** m²
Infiltration rate = **1.3** m/s x 10⁻⁶ or 0.0001 m/min
Climate change = **0%**

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>
5	0.36	7.20	1.21	8.70	34.9	1.87	13.45	13.45	53.9
10	0.51	10.20	1.22	12.44	49.9	1.91	19.48	19.48	78.1
15	0.62	12.40	1.22	15.13	60.7	1.91	23.68	23.68	95.0
30	0.79	15.80	1.23	19.43	77.9	1.95	30.81	30.81	123.5
60	1.00	20.00	1.24	24.80	99.4	2.00	40.00	40.00	160.4
120	1.22	24.40	1.24	30.26	121.3	2.00	48.80	48.80	195.7
240	1.50	29.94	1.24	37.13	148.9	2.02	60.48	60.48	242.5
360	1.69	33.80	1.23	41.69	167.2	2.00	67.60	67.60	271.1
600	1.95	38.94	1.23	47.77	191.5	1.98	77.10	77.10	309.2
1440	2.48	49.60	1.22	60.26	241.7	1.96	96.97	96.97	388.8

Outflow from Soakaway

Soakaway Properties - Trench

Length = **120.00** m
Width = **2.00** m
Working Depth = **2.10** m
Void Ratio = **0.77**
Factor of Safety = **1.5**

Storage = 388.08 m³
Soakaway Area (a_{s50}) = 256.20 m²

Outflow = 0.013 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 **9**

Inner Storage = 5.09 m³
Outer Storage = 1.66 m³
Total Storage/Chamber = 6.75 m³
Total Storage = 60.73 m³
Soakaway Area (a_{s50}) = 8.17 m²

Outflow = 0.004 m³/min

SW7A 40923 Audi, Worthing - Soakaway System C



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	34.9	0.1	34.8	53.9	0.1	53.8
10	49.9	0.2	49.7	78.1	0.2	78.0
15	60.7	0.3	60.4	95.0	0.3	94.7
30	77.9	0.5	77.4	123.5	0.5	123.0
60	99.4	1.0	98.4	160.4	1.0	159.4
120	121.3	2.1	119.3	195.7	2.1	193.6
240	148.9	4.1	144.8	242.5	4.1	238.4
360	167.2	6.2	161.0	271.1	6.2	264.9
600	191.5	10.3	181.3	309.2	10.3	298.9
1440	241.7	24.7	217.0	388.8	24.7	364.2

Minimum 100 yr + CC storage required = 364.15 m^3
Storage Provided = 448.81 m^3

Soakaway volume is satisfactory

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

Half storage provided = 224.41 m^3
Storage required after 24 hr = 216.97 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 = 448.81 m^3
Minimum Storage Required = 364.15 m^3

Soakaway volume is satisfactory

SW8A 40923 Audi, Worthing - Soakaway System C



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 = **4010** m²
Infiltration rate = **1.3** m/s x 10⁻⁶ or 0.0001 m/min
Climate change = **30%**

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>
5	0.36	7.20	1.21	8.70	34.9	1.87	13.45	17.48		70.1
10	0.51	10.20	1.22	12.44	49.9	1.91	19.48	25.33		101.6
15	0.62	12.40	1.22	15.13	60.7	1.91	23.68	30.79		123.5
30	0.79	15.80	1.23	19.43	77.9	1.95	30.81	40.05		160.6
60	1.00	20.00	1.24	24.80	99.4	2.00	40.00	52.00		208.5
120	1.22	24.40	1.24	30.26	121.3	2.00	48.80	63.44		254.4
240	1.50	29.94	1.24	37.13	148.9	2.02	60.48	78.62		315.3
360	1.69	33.80	1.23	41.69	167.2	2.00	67.60	87.88		352.4
600	1.95	38.94	1.23	47.77	191.5	1.98	77.10	100.23		401.9
1440	2.48	49.60	1.22	60.26	241.7	1.96	96.97	126.06		505.5

Outflow from Soakaway

Soakaway Properties - Trench

Length = **120.00** m
Width = **2.00** m
Working Depth = **2.10** m
Void Ratio = **0.77**
Factor of Safety = **1.5**

Storage = 388.08 m³
Soakaway Area (a_{s50}) = 256.20 m²

Outflow = 0.013 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 **9**

Inner Storage = 5.09 m³
Outer Storage = 1.66 m³
Total Storage/Chamber = 6.75 m³
Total Storage = 60.73 m³
Soakaway Area (a_{s50}) = 8.17 m²

Outflow = 0.004 m³/min

SW9A 40923 Audi, Worthing - Soakaway System C



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	34.9	0.1	34.8	70.1	0.1	70.0
10	49.9	0.2	49.7	101.6	0.2	101.4
15	60.7	0.3	60.4	123.5	0.3	123.2
30	77.9	0.5	77.4	160.6	0.5	160.1
60	99.4	1.0	98.4	208.5	1.0	207.5
120	121.3	2.1	119.3	254.4	2.1	252.3
240	148.9	4.1	144.8	315.3	4.1	311.2
360	167.2	6.2	161.0	352.4	6.2	346.2
600	191.5	10.3	181.3	401.9	10.3	391.6
1440	241.7	24.7	217.0	505.5	24.7	480.8

Minimum 100 yr + CC storage required = 480.81 m^3
Storage Provided = 448.81 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 = 224.41 m^3
Storage required after 24 hr = 216.97 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 = 448.81 m^3
Minimum Storage Required = 480.81 m^3

SOAKAWAY NOT SATISFACTORY

NOTE :-

THE ADDITIONAL 32 CUBIC METRES OF STORAGE WHICH IS REQUIRED TO MAKE THE SOAKAWAY DESIGN SATISFACTORY IS TO BE PROVIDED BY THE FOLLOWING :-

A - STORAGE WITHIN THE LENGTHS OF VOIDED STONE FILLED TRENCH BETWEEN THE ENDS OF THE GEOLIGHT UNITS AND THE MANHOLES (16 LOCATIONS). THE VOLUME AVAILABLE = 14 CUBIC METRES (16 x 0.88)

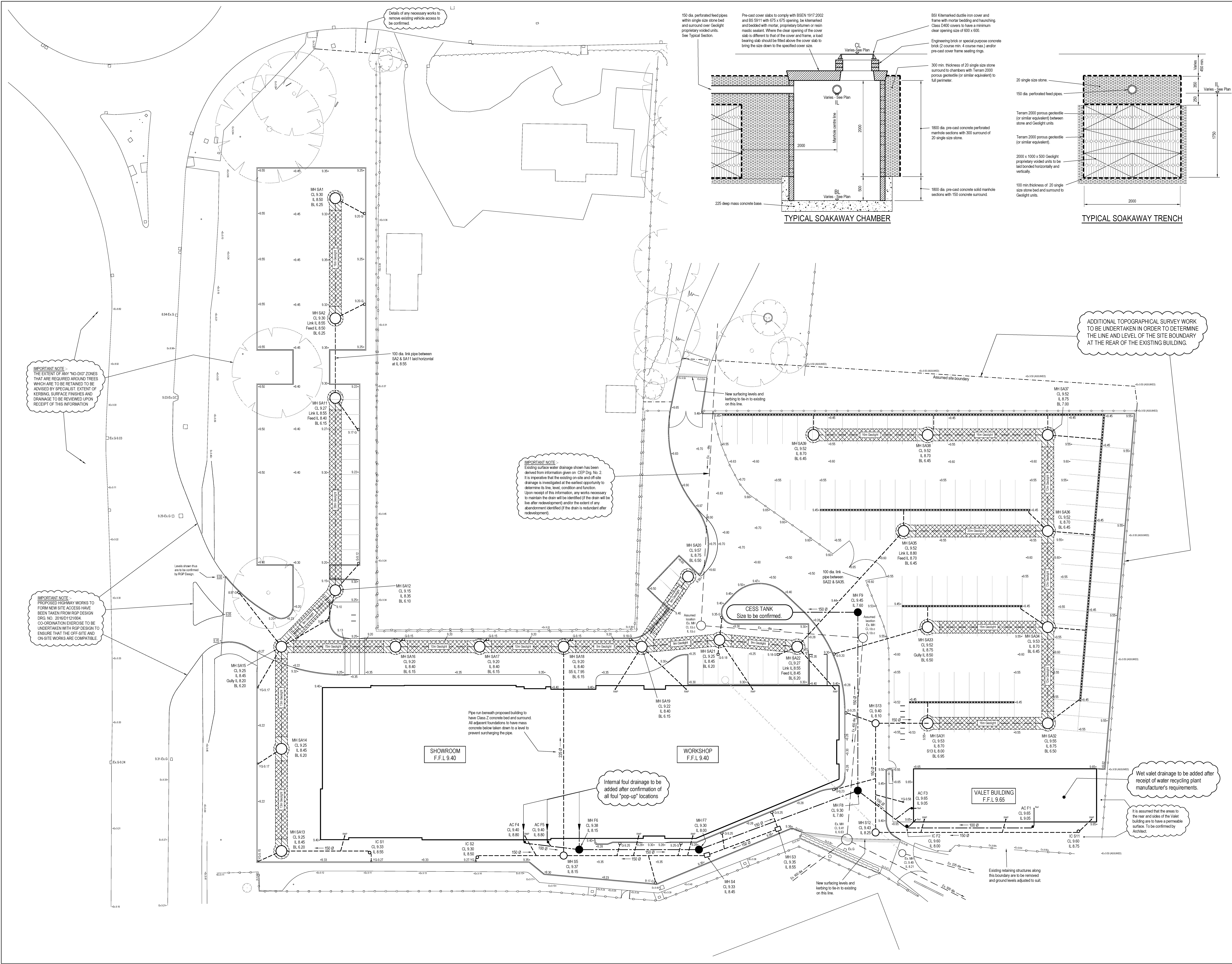
B - STORAGE WITHIN SHALLOW SURFACE WATER PONDING. THE VOLUME REQUIRED IS 18 CUBIC METRES (32 - 14).

CAFFYNS

AUDI, WORTHING

SURFACE WATER MAINTENANCE SCHEDULE

<u>CATEGORY</u>	<u>ACTION</u>	<u>FREQUENCY</u>
REGULAR	General removal of litter and debris.	Monthly (or more frequently if required)
	Cleaning of drainage channels, drainage channel sump units and gullies to remove debris and silt.	6 monthly, after autumn leaf fall (or more frequently if necessary)
	Cleaning of soakaway chambers to remove debris and silt.	Annually, after autumn leaf fall (or more frequently if necessary)
	Inspection of all access chambers, manholes and soakaway chambers to identify and make good any defects as necessary.	Annually
CORRECTIVE	Clear blockages in rainwater downpipes and branch connections.	As required
	Clear blockages in drainage channel/gully outlets.	As required
	Clear blockages in soakaway trench distribution pipework.	As required



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' drawing number 40923/062.
- All pipes shall be either :-
 - A - Verified 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
 - B - Class H concrete to BS 5911. **OR**
 - C - PVC to have BS1 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" (16th 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 landscaped 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 abandoned
- Surface water drainage
- Foul drainage
- Soakaway system consisting of 1800 dia. silt trap soakaway chambers and 2000 wide soakaway trenches - see Typical Details.
- ACO M1000 drainage channel with 150 Ø roddable sump outlets (or 100 Ø and outlets where indicated) and used Class C250 covers.
- G Road gully with 150 dia. roddable outlet.
- Y Yard gully with 100 dia. roddable outlet.
- T Trapped gully with 100 dia. roddable outlet.
- IC 450 min. dia. Polypropylene inspection chamber.
- AC 300 min. dia. Polypropylene access chamber (600 max. depth).

IMPORTANT NOTES :-
Foul drainage systems to be reviewed after confirmation of all proposed foul "pop-up" locations. Roof rainwater branches to main runs to be reviewed after confirmation of all rainwater down pipe locations.

E	Link pipes between soakaway systems added. Protection to pipe SS - SA18 below building added. Assumed RMP and branch connections indicated.	MW	SJE	25.08.17
D	Soakaways amended following on site percolation test.	MW	SJE	22.08.17
C	Tender issue.	MW	SJE	28.04.17
B	Foul drainage amended to suit fully recycling car wash.	MW	SJE	20.04.17
A	First Issue.			
REV	DESCRIPTION	SIG	CHK	DATE

CAFFYNS

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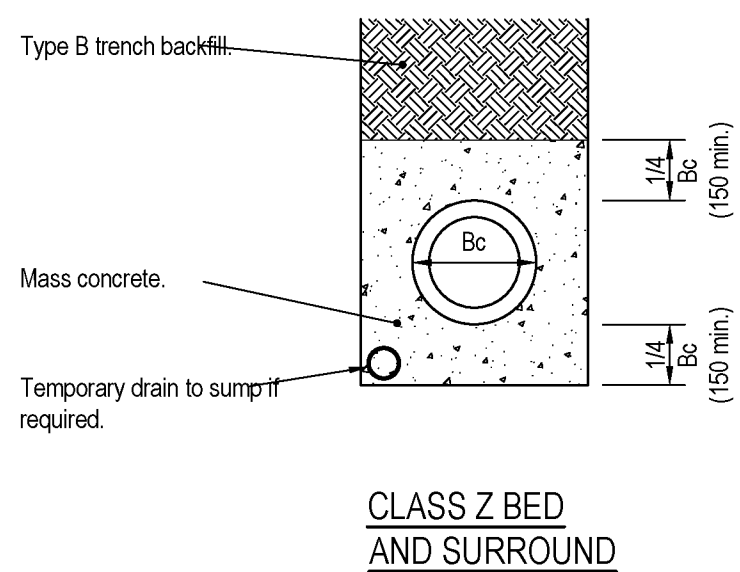
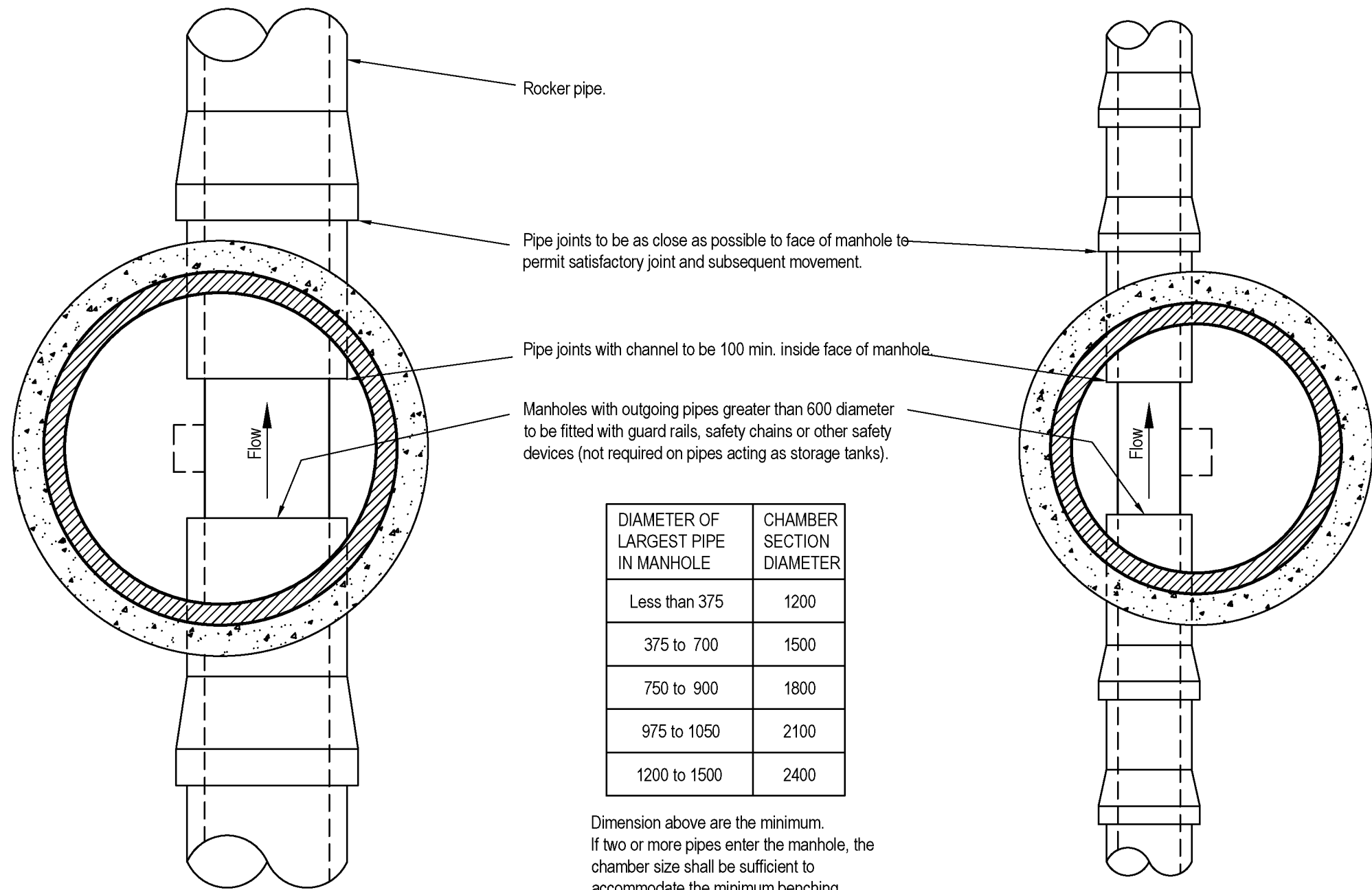
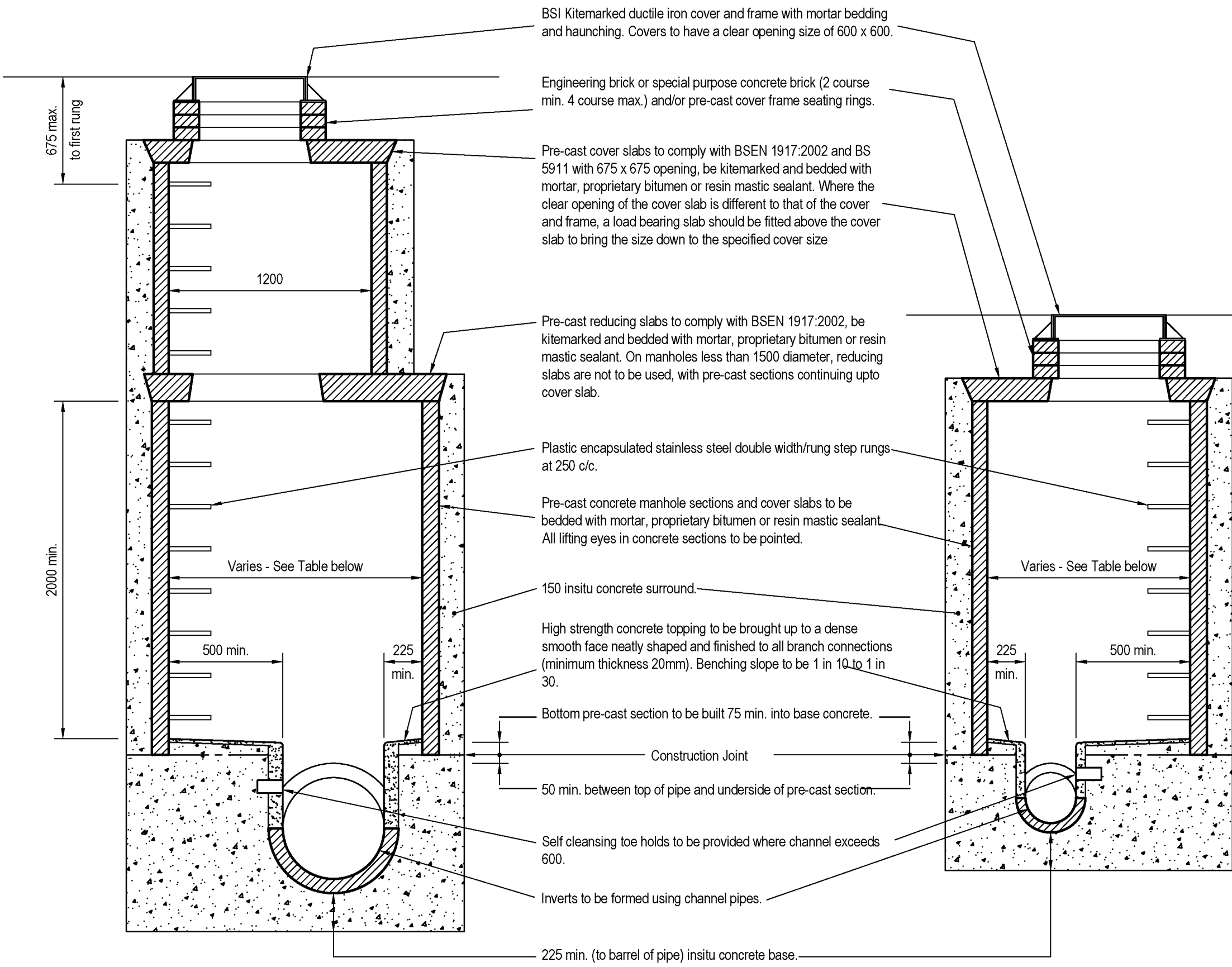
EXTERNAL DRAINAGE LAYOUT

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SCALE WHEN PLOTTED AT A2		DRAWING STATUS	
1:200 1:25		FOR APPROVAL	
DRAWN	CHECKED	DATE	DRAWING NUMBER
MW	SJE	11-04-17	40923/061
			REV
			E

TYPE A MANHOLE TYPICAL DETAILS

Depth to soffit 3m to 6m

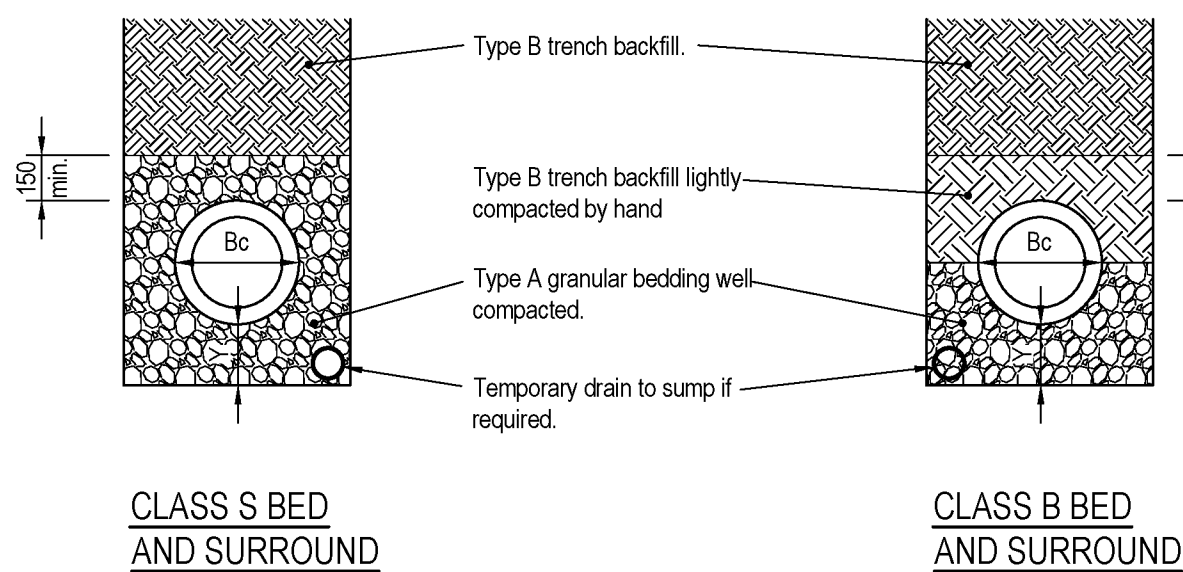


PIPE BED AND SURROUND DIMENSIONS

Bc = Outside Diameter of Pipe

IN UNIFORM SOILS
DIMENSION Y = 150 or 1/6Bc (whichever is the greater) under barrels and not less than 100 under sockets.

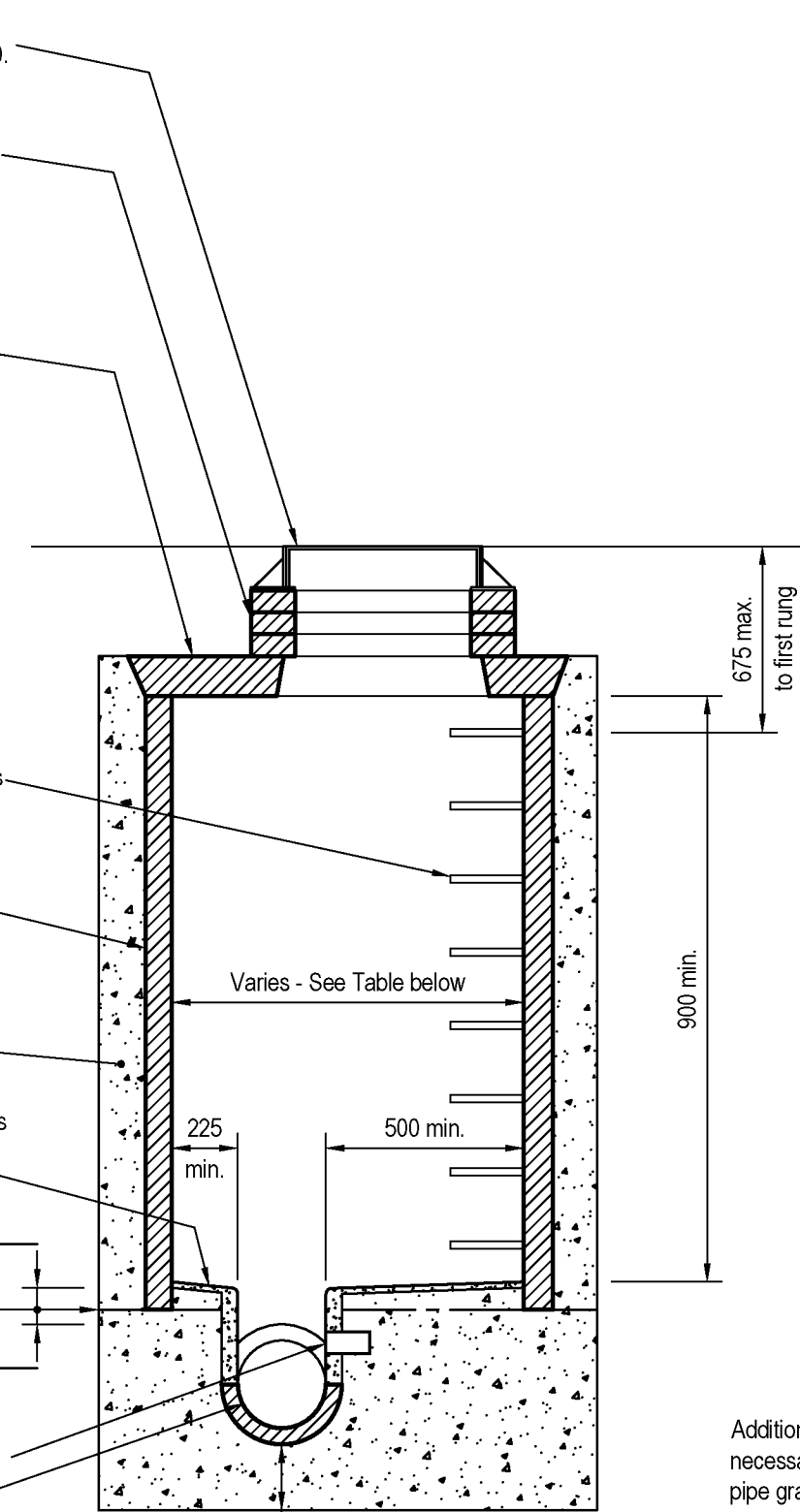
IN ROCK OR MATERIAL CONTAINING HARD SPOTS
DIMENSION Y = 200 or 1/4Bc (whichever is the greater) under barrels and not less than 200 under sockets.



TYPICAL PIPE BED AND SURROUND DETAILS

TYPE B MANHOLE TYPICAL DETAILS

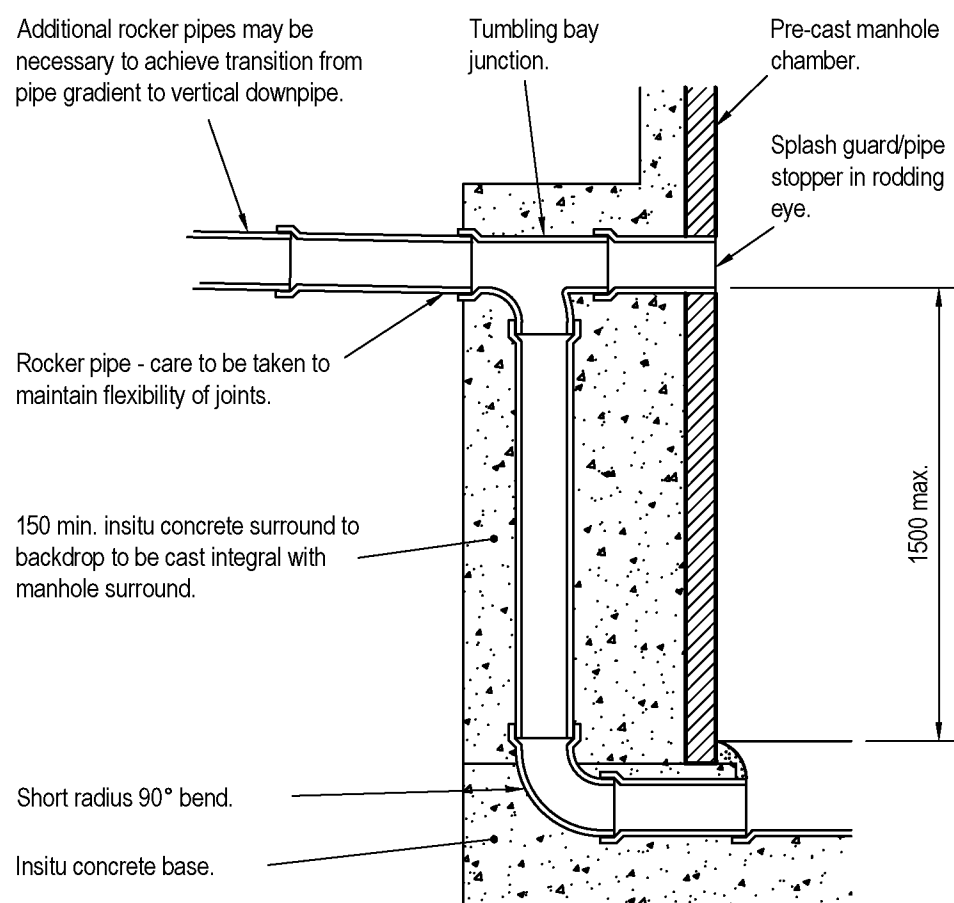
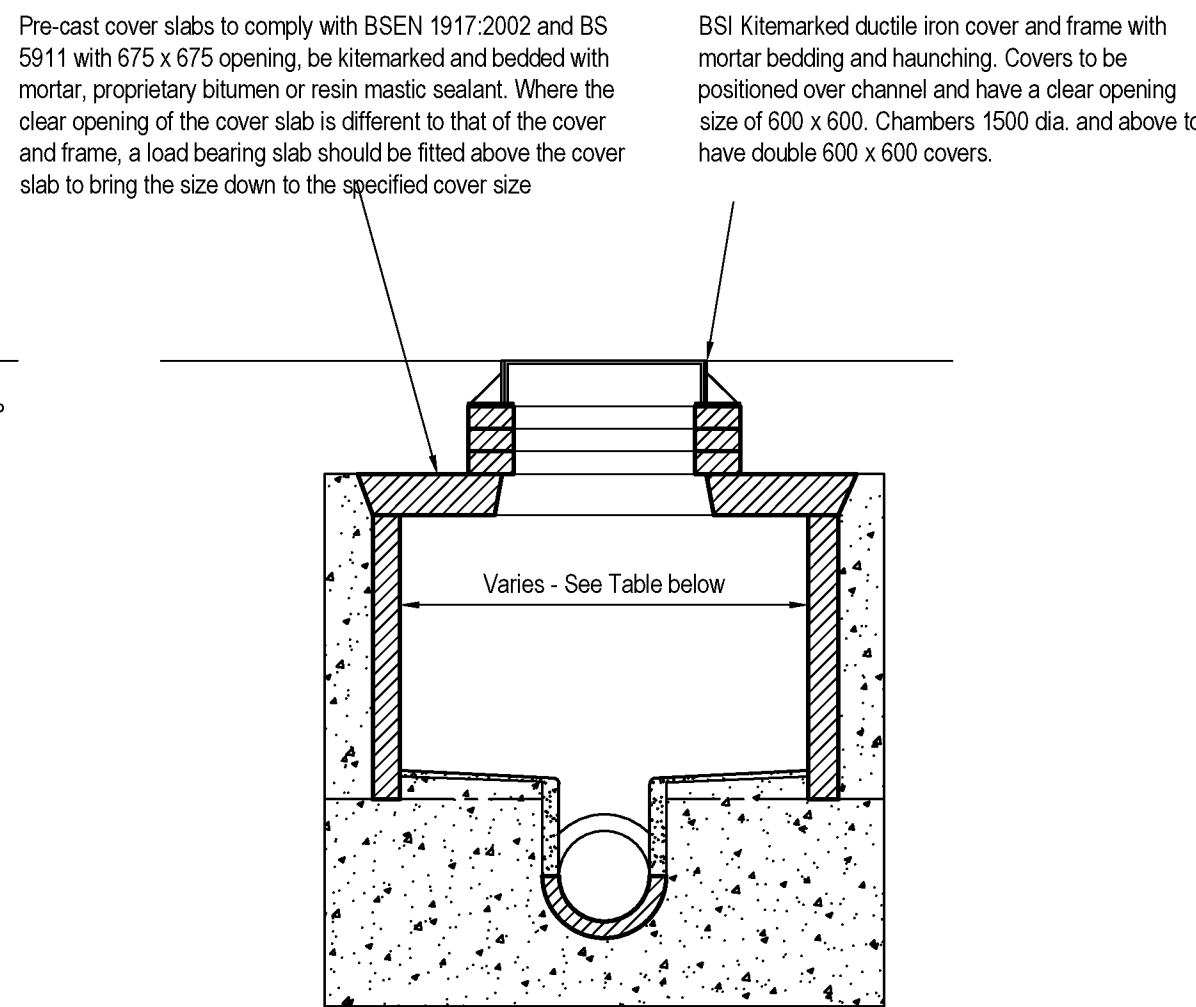
Depth to soffit 1.5m to 3m



TYPE B1 MANHOLE TYPICAL DETAILS

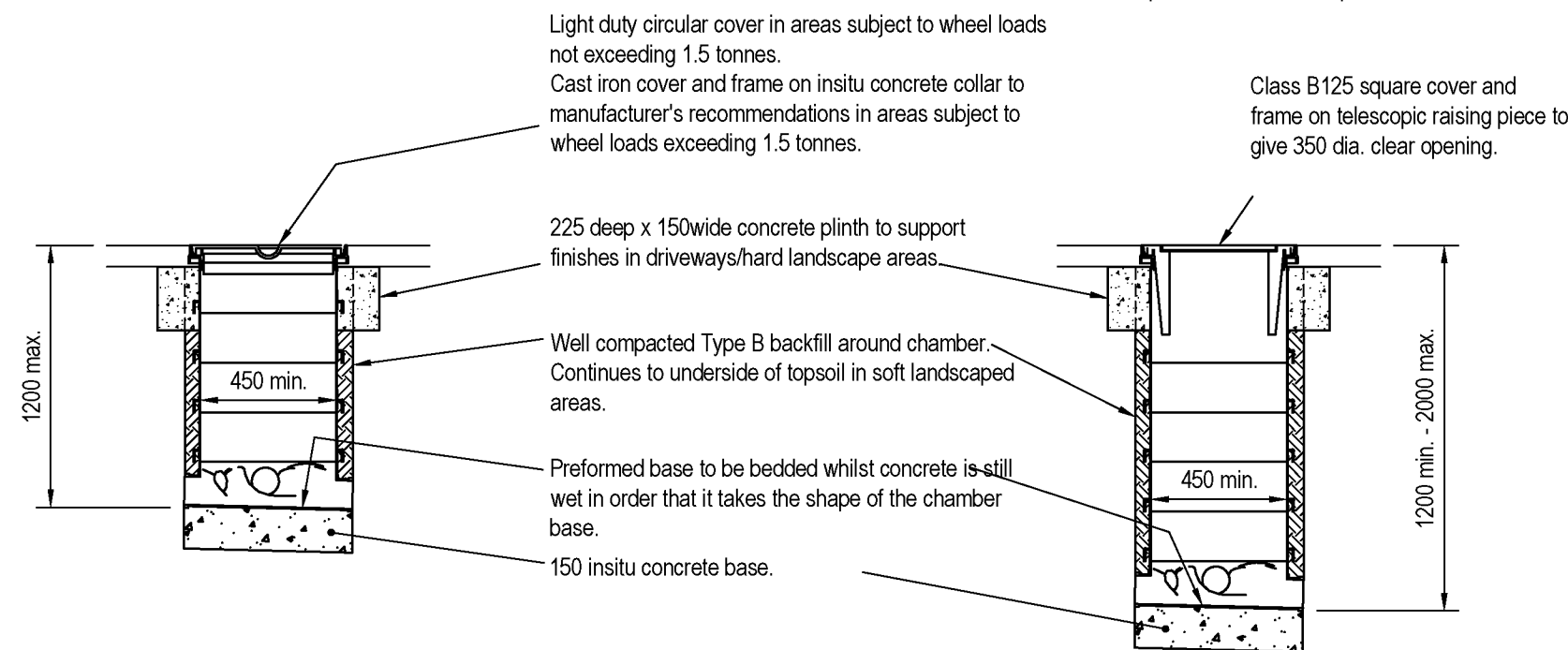
Depth to soffit 1m to 1.5m

CONSTRUCTION NOTES AS TYPE B MANHOLE
EXCEPT STEP RUNGS NOT REQUIRED



TYPICAL BACKDROP DETAIL

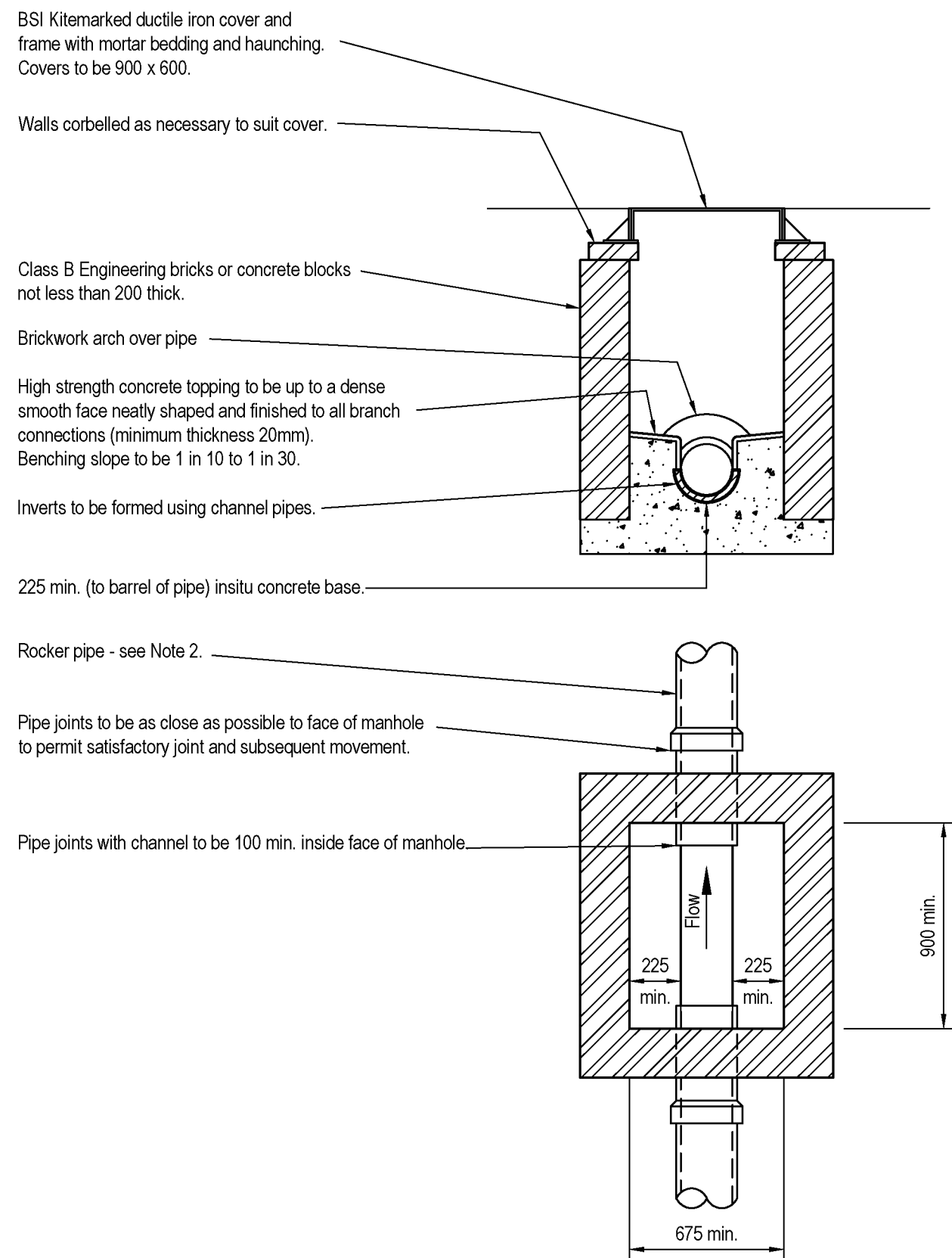
INSPECTION CHAMBER



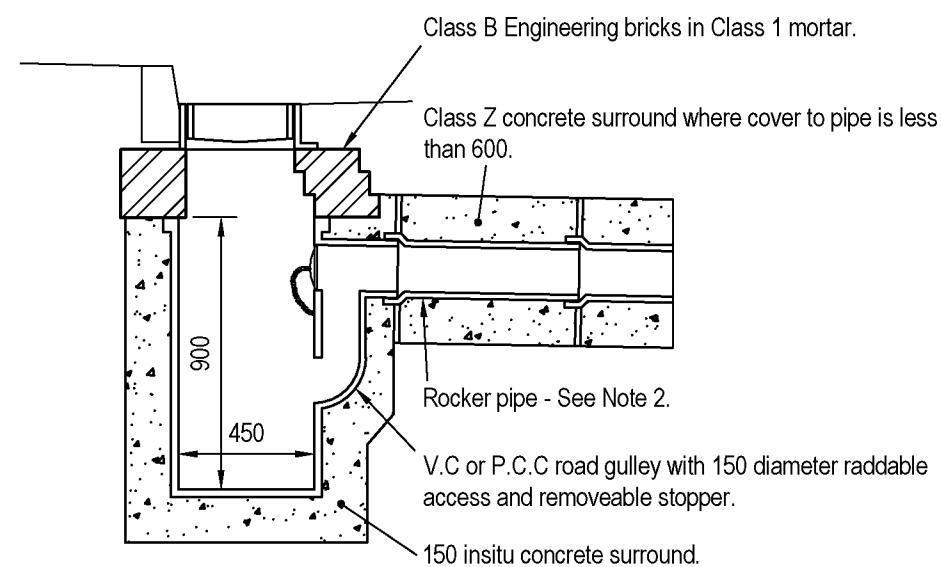
REDUCED ACCESS INSPECTION CHAMBER

TYPE D MANHOLE TYPICAL DETAILS

Depth to soffit less than 1m



TYPICAL GULLY DETAIL



TYPE A GRANULAR MATERIAL

All granular material to be single sized or graded in accordance with the following table :-

NOMINAL PIPE BORE	SIZE	
	SINGLE SIZE	GRADED
100-125	10	-
150-200	10 or 14	14 to 5
225-300	10, 14 or 20	14 to 5 or 20 to 5
375-500	14 or 20	14 to 5 or 20 to 5
Over 500	14, 20 or 40	14 to 5, 20 to 5 or 40 to 5

TYPE B MATERIAL

In Public Highways and other handstanding areas as may be noted on the scheme drawings, the material referred to as Type B is to be D.O.T Type 1 granular material to Clause 803 of the Specification For Highway Works, subject to the approval of the adopting Highway Authority.

Elsewhere, Type B selected material, whether imported or locally excavated, shall consist of uniform, readily compactable material, free from vegetable matter, building rubbish, frozen material and material susceptible to spontaneous combustion. Clay with a Liquid Limit greater than 80 and/or a Plastic Limit greater than 55 is to be excluded. Clay lumps and stones retained on 75 and 37 sieves respectively and all material with an excessively high moisture content to be excluded.

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

NOTES

- All pipes are to be laid soffit to soffit at manholes unless noted otherwise.
- Manhole covers shall have a clear opening of 600 x 600 and shall be class D400 to BS EN124 with 150 deep frames in highways. Covers to have closed keyways and are to be bedded on steel shims with 1:3 mortar haunching. Covers to be stamped BS EN124, carry BSI Certification Trade Mark (The Kitemark) and the manufacturer's name.
- 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 in accordance with table below :-

Pipe Diameter	Length
150 - 600	600
600 - 750	1000
Over 750	1250
- Where the depth of cover to pipes is less than 600 the pipes shall have a Class Z concrete bed and surround with sulphate resisting cement.
- All trenches in roads and paved areas shall be backfilled with Type 1 DOT granular sub-base material.
- All insitu concrete to be designated mix FND2 to BS 8500-1 unless agreed otherwise.
- The invert levels at the proposed points of connection to existing public sewers shall be checked before any new drains are constructed. Any variation to the levels shown on the drawing shall be notified to Eastwood & Partners.

A	First Issue.			
REV	DESCRIPTION	SIG	CHK	DATE

CAFFYNS

AUDI
WORTHING

TYPICAL MANHOLE AND PIPE
BEDDING DETAILS FOR PRIVATE
DRAINAGE

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EOP

SCALE WHEN PLOTTED AT 1:25		DRAWING STATUS TENDER	
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DRAWN MW	CHECKED SJE	DATE 28-04-17	DRAWING NUMBER 40923/062	REV A
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