

Micro Drainage Soakaway Calculations

For

**Poachers, Eastergate Lane,
Chichester, PO20 3JS**

**Date: June 2021
Project No: 59363**

Dixon Hurst Kemp		Page 1
Victoria Court 22 St Pancras West Sussex PO1...	Poachers, Easter... Surface Water Dr... Soakaway Design	
Date June 21 File SOAKAWAY DE...	Designed by JS Checked by	
Elstree Computin...	Source Control w.12.6	

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 140 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	16.203	0.433	0.6	6.6	O K
30 min Summer	16.335	0.565	0.7	8.6	O K
60 min Summer	16.450	0.680	0.9	10.3	O K
120 min Summer	16.519	0.749	1.0	11.4	O K
180 min Summer	16.541	0.771	1.0	11.7	O K
240 min Summer	16.545	0.775	1.0	11.8	O K
360 min Summer	16.534	0.764	1.0	11.6	O K
480 min Summer	16.513	0.743	1.0	11.3	O K
600 min Summer	16.488	0.718	0.9	10.9	O K
720 min Summer	16.463	0.693	0.9	10.5	O K
960 min Summer	16.415	0.645	0.8	9.8	O K
1440 min Summer	16.335	0.565	0.7	8.6	O K
2160 min Summer	16.248	0.478	0.6	7.3	O K
2880 min Summer	16.187	0.417	0.5	6.3	O K
4320 min Summer	16.104	0.334	0.4	5.1	O K
5760 min Summer	16.051	0.281	0.4	4.3	O K
7200 min Summer	16.013	0.243	0.3	3.7	O K
8640 min Summer	15.985	0.215	0.3	3.3	O K
10080 min Summer	15.964	0.194	0.2	2.9	O K
15 min Winter	16.256	0.486	0.6	7.4	O K
30 min Winter	16.404	0.634	0.8	9.6	O K
60 min Winter	16.534	0.764	1.0	11.6	O K
120 min Winter	16.632	0.862	1.0	12.8	O K
180 min Winter	16.870	1.100	1.0	13.1	O K
240 min Winter	16.808	1.038	1.0	13.1	O K
360 min Winter	16.601	0.831	1.0	12.6	O K
480 min Winter	16.556	0.786	1.0	11.9	O K
600 min Winter	16.517	0.747	1.0	11.3	O K

Storm Event	Rain (mm/hr)	Time-Peak (mins)
15 min Summer	124.633	25
30 min Summer	83.789	37
60 min Summer	53.779	64
120 min Summer	33.337	102
180 min Summer	24.832	134
240 min Summer	20.006	168
360 min Summer	14.706	236
480 min Summer	11.818	304
600 min Summer	9.966	370
720 min Summer	8.665	436
960 min Summer	6.943	566
1440 min Summer	5.071	818
2160 min Summer	3.696	1192
2880 min Summer	2.949	1560
4320 min Summer	2.142	2292
5760 min Summer	1.705	3008
7200 min Summer	1.427	3744
8640 min Summer	1.235	4480
10080 min Summer	1.093	5152
15 min Winter	124.633	25
30 min Winter	83.789	37
60 min Winter	53.779	64
120 min Winter	33.337	112
180 min Winter	24.832	144
240 min Winter	20.006	182
360 min Winter	14.706	254
480 min Winter	11.818	324
600 min Winter	9.966	394

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Victoria Court 22 St Pancras West Sussex PO1...	Poachers, Easter... Surface Water Dr... Soakaway Design	
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Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
720 min winter	16.479	0.709	0.9	10.8	O K
960 min winter	16.412	0.642	0.8	9.8	O K
1440 min winter	16.307	0.537	0.7	8.2	O K
2160 min winter	16.202	0.432	0.6	6.6	O K
2880 min winter	16.133	0.363	0.5	5.5	O K
4320 min winter	16.047	0.277	0.4	4.2	O K
5760 min winter	15.995	0.225	0.3	3.4	O K
7200 min winter	15.961	0.191	0.2	2.9	O K
8640 min winter	15.937	0.167	0.2	2.5	O K
10080 min winter	15.918	0.148	0.2	2.3	O K

Storm Event	Rain (mm/hr)	Time-Peak (mins)
720 min winter	8.665	462
960 min winter	6.943	596
1440 min winter	5.071	854
2160 min winter	3.696	1232
2880 min winter	2.949	1592
4320 min winter	2.142	2336
5760 min winter	1.705	3056
7200 min winter	1.427	3760
8640 min winter	1.235	4496
10080 min winter	1.093	5240

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time / Area Diagram

Total Area (ha) 0.030

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.010	4-8	0.010	8-12	0.010

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Model Details

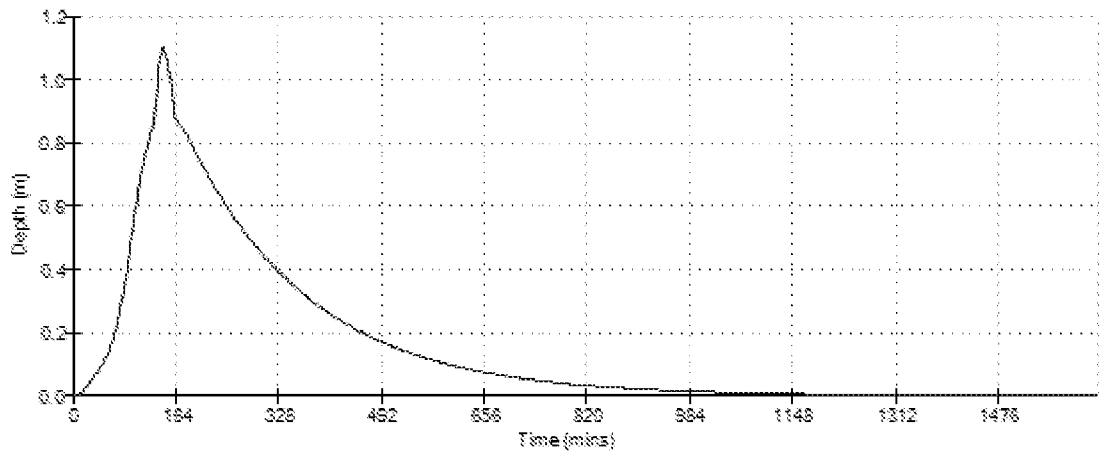
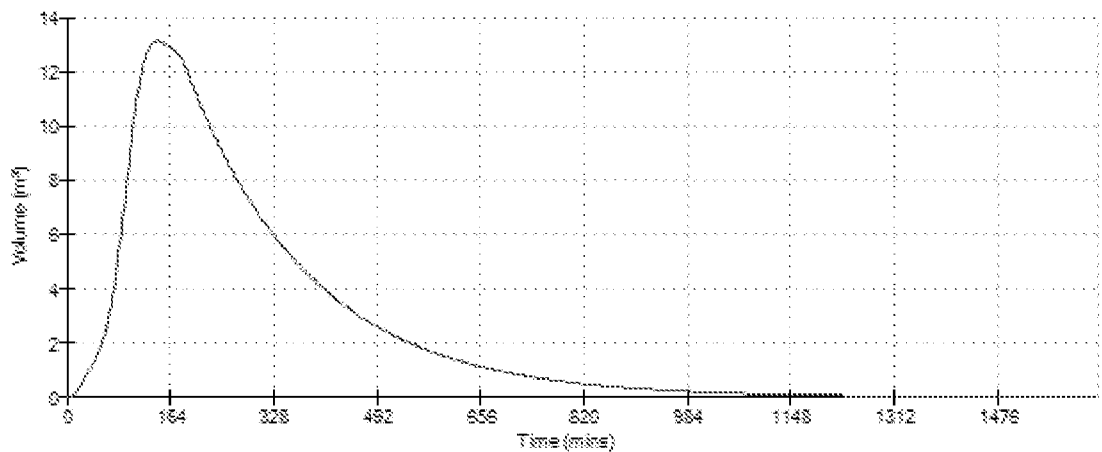
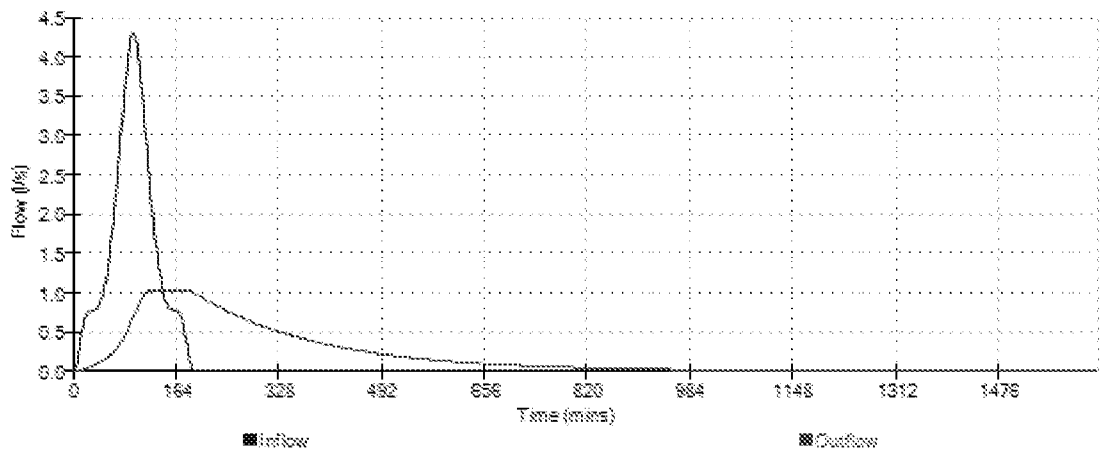
Storage is Online Cover Level (m) 17.100

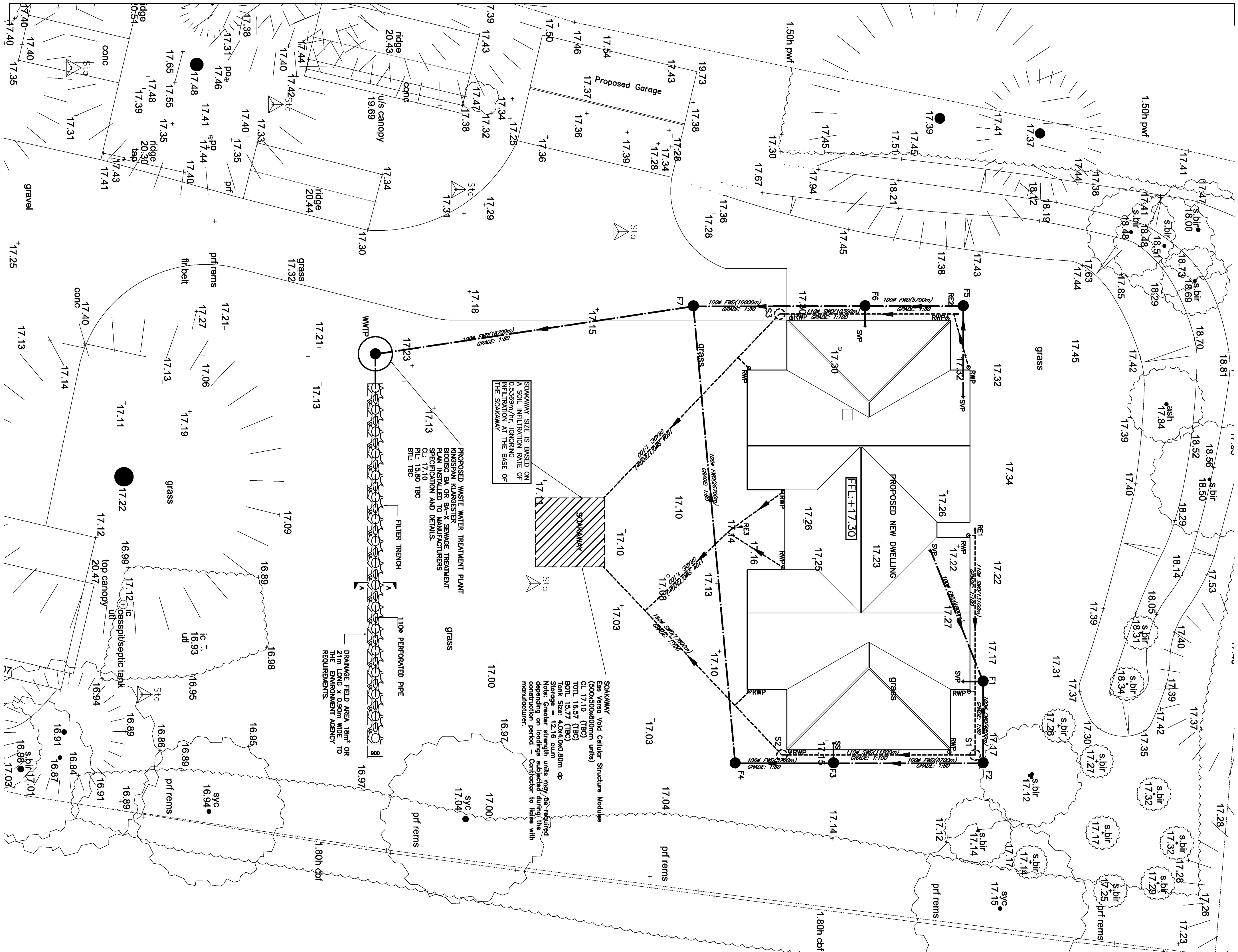
cellular Storage Structure

Invert Level (m) 15.770
Infiltration Coefficient Base (m/hr) 0.00000
Infiltration Coefficient Side (m/hr) 0.57816
Safety Factor 2.0
Porosity 0.95

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	16.0	16.0	0.900	0.0	28.8
0.800	16.0	28.8			

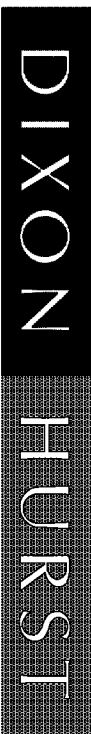
Event: 180 min winter





SURFACE WATER MANHOLE SCHEDULE						
M/H REF	APPROX. COVER LEVEL	INVERT LEVEL	DEPTH (M)	M/H TYPE	COVER TYPE	COMMENTS
RE1	17.20	16.75	0.45	RODDING EYE	—	
S1	17.20	16.61	0.59	3	B125	
S2	17.20	16.49	0.71	3A-500g SILT TRAP	B125	
RE2	17.20	16.75	0.45	RODDING EYE	—	
S3	17.15	16.64	0.51	3A-500g SILT TRAP	A15	
RE3	17.20	16.75	0.45	RODDING EYE	—	
FOUL WATER MANHOLE SCHEDULE						
M/H REF	APPROX. COVER LEVEL	INVERT LEVEL	DEPTH (M)	M/H TYPE	COVER TYPE	COMMENTS
F1	17.20	16.62	0.58	3	B125	
F2	17.20	16.57	0.63	3	B125	
F3	17.20	16.46	0.74	3	B125	
F4	17.20	16.38	0.82	3	B125	
F5	17.20	16.62	0.58	3	B125	
F6	17.20	16.54	0.66	3	B125	
F7	17.20	16.04	1.16	3	B125	

0	ORIGINAL ISSUE	08/06/21/US
REV	DESCRIPTION	DATE BY



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CONTRACT

**POACHERS
EASTGATE LANE
CHICHESTER, PO20 3SU**

DRAINAGE LAYOUT

DRAWING

DRAWING No.	DATE	REV	CHECKED
59363 / 10	31/12/5 @ A1	0	APPROVED
AUDUCO Ref: 59363-10-dwg	JUNE 21	BRAIN JUS	

This drawing is produced using AutoCAD. Only written dimensions are to be respected.

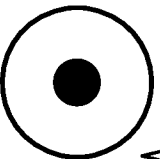
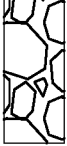
ALL DIMENSIONS AND LEVELS
TO BE CHECKED AND
CONFIRMED BY THE ARCHITECT
PRIOR TO CONSTRUCTION.

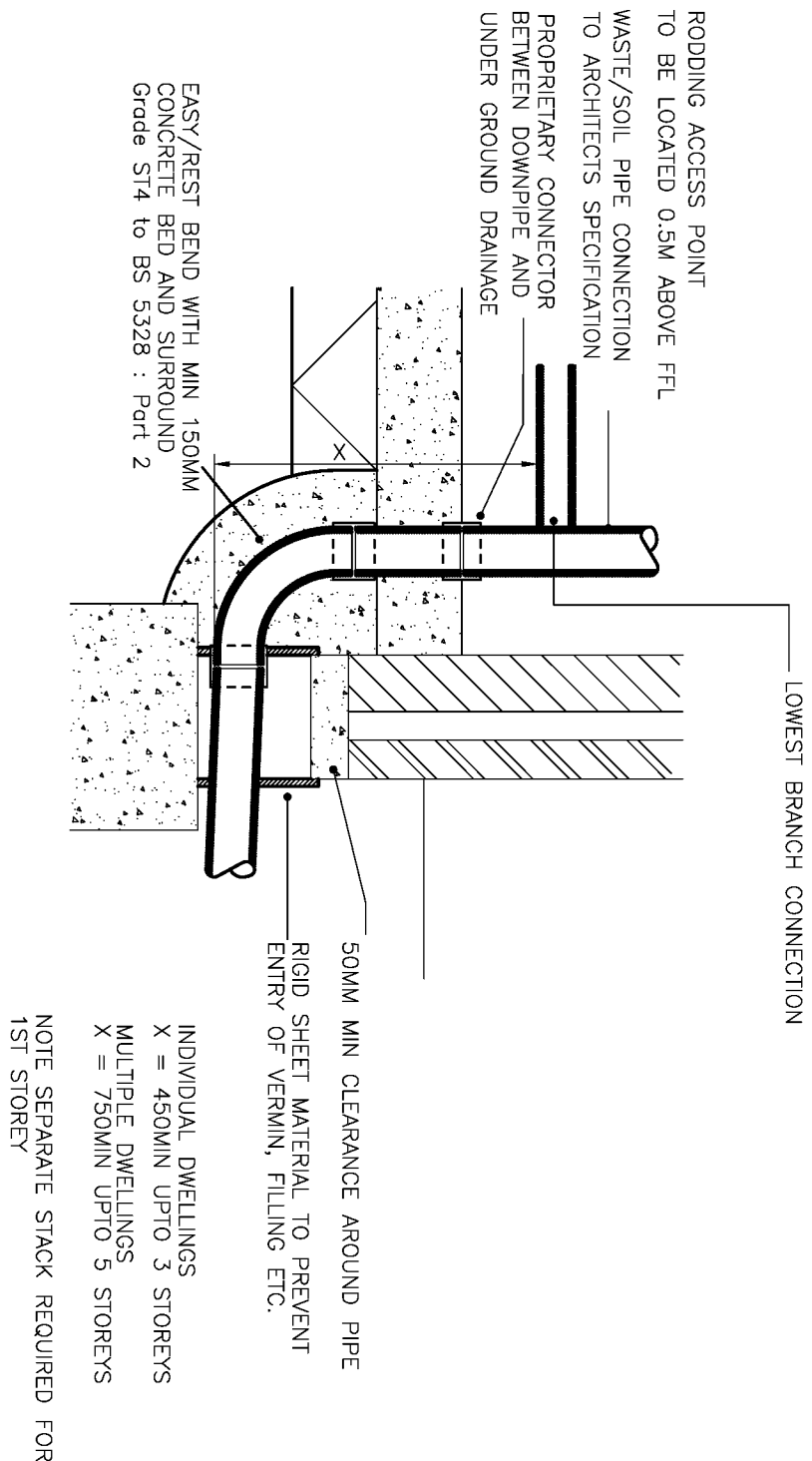
PRELIMINARY

1. THIS DRAWING IS BASED ON DRAWING NOS-20-038/DL BY PLOTON.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE FOLLOWING DRAWING:
59363/11 DRAINAGE DETAILS
3. CONTRACTOR IS TO TAKE NECESSARY PRECAUTIONS TO ENSURE THAT TRENCHES ARE KEPT CLEAR OF GROUNDWATER DURING CONSTRUCTION.
4. ALL DRAINAGE WORKS TO BE CARRIED OUT IN ACCORDANCE WITH "SEWERS FOR ADOPTION" 7TH EDITION.
5. ALL ADOPTED PIPEWORK TO BE 100% VITRIFIED CLAY UNLESS NOTED OTHERWISE.
6. ALL PIPEWORK THROUGH WALLS TO BE IN ACCORDANCE WITH THE BUILDING REGULATIONS.
7. ALL PIPEWORK UNDER ROADS WITH LESS THAN 900MM COVER TO HAVE 150MM CONCRETE SURROUND.
8. MINIMUM GRADIENT TO DRAINS TO BE 1:80 FOR 1100 OR 1100 FW AND 1:100 FOR 1100 SW.
9. POSITIONS OF MANHOLES SHOWN ON THIS DRAWING ARE INDICATIVE ONLY. ACTUAL LOCATIONS TO BE FINALIZED ON SITE.
10. PROVIDE CONCRETE LINTELS OVER OPENINGS WHERE PIPES PASS THROUGH WALLS. ALLOW FOR 150MM CLEARANCE ALL ROUND PIPE.
- NOTES
- All drawings are in millimetric unless noted otherwise.
- This drawing has been produced electronically and may have been photo reduced or enlarged when printed or copied. Dimensions on this drawing should not be scaled. Work only to figured dimensions. Any dimensional discrepancies between drawings are to be reported to the Engineer immediately.
- Levels are in metres unless noted otherwise to Ordnance Survey datum.
- The Contractor is responsible for the stability of the building whilst the works are in progress.

KEY

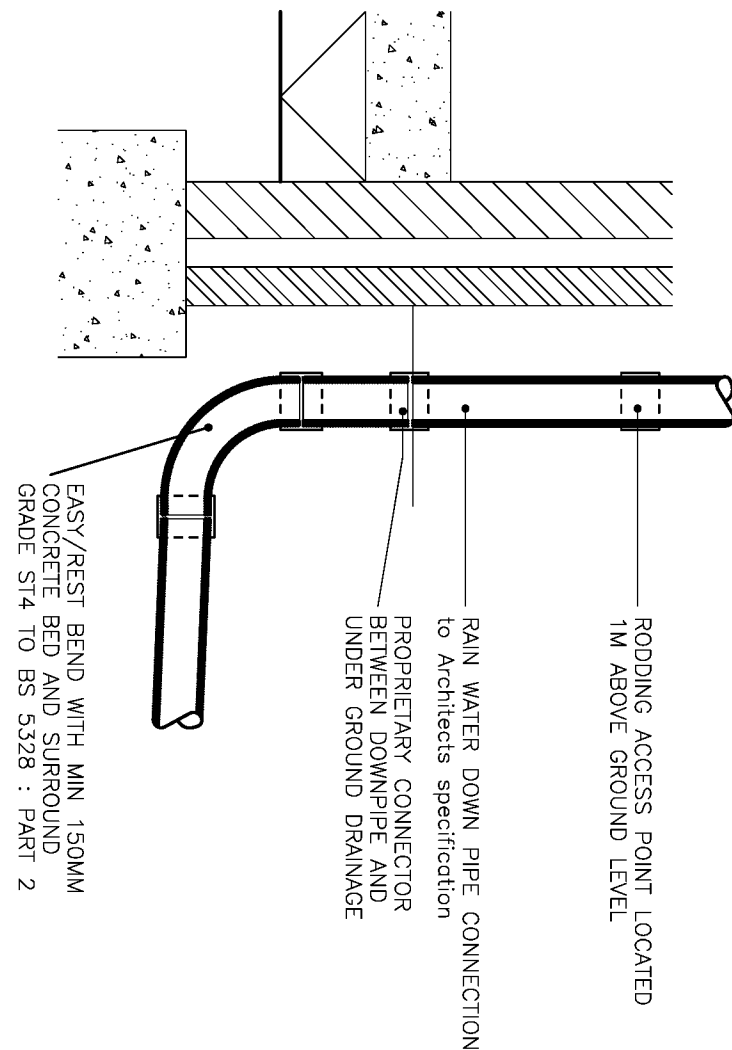
- * SVP Soil Vent Pipe with Rodding Access
- RWP Rain Water Pipe with Rodding Access
- SS Stub Stack with Air Admittance valve
- RE Rodding Eye
- Channel drain

	WWTTP Waste Water Treatment Plant
	permeable Block Paving Footpaths
	SW Sockaway
	S6 Surface Water Manhole
	F6 Foul Manhole
	FW -Existing Private Foul Water Sewer
	FW -Proposed Private Foul Water Sewer
	FW -Existing Public Foul Water Sewer
	FW -Proposed Foul Water Perforated Drain



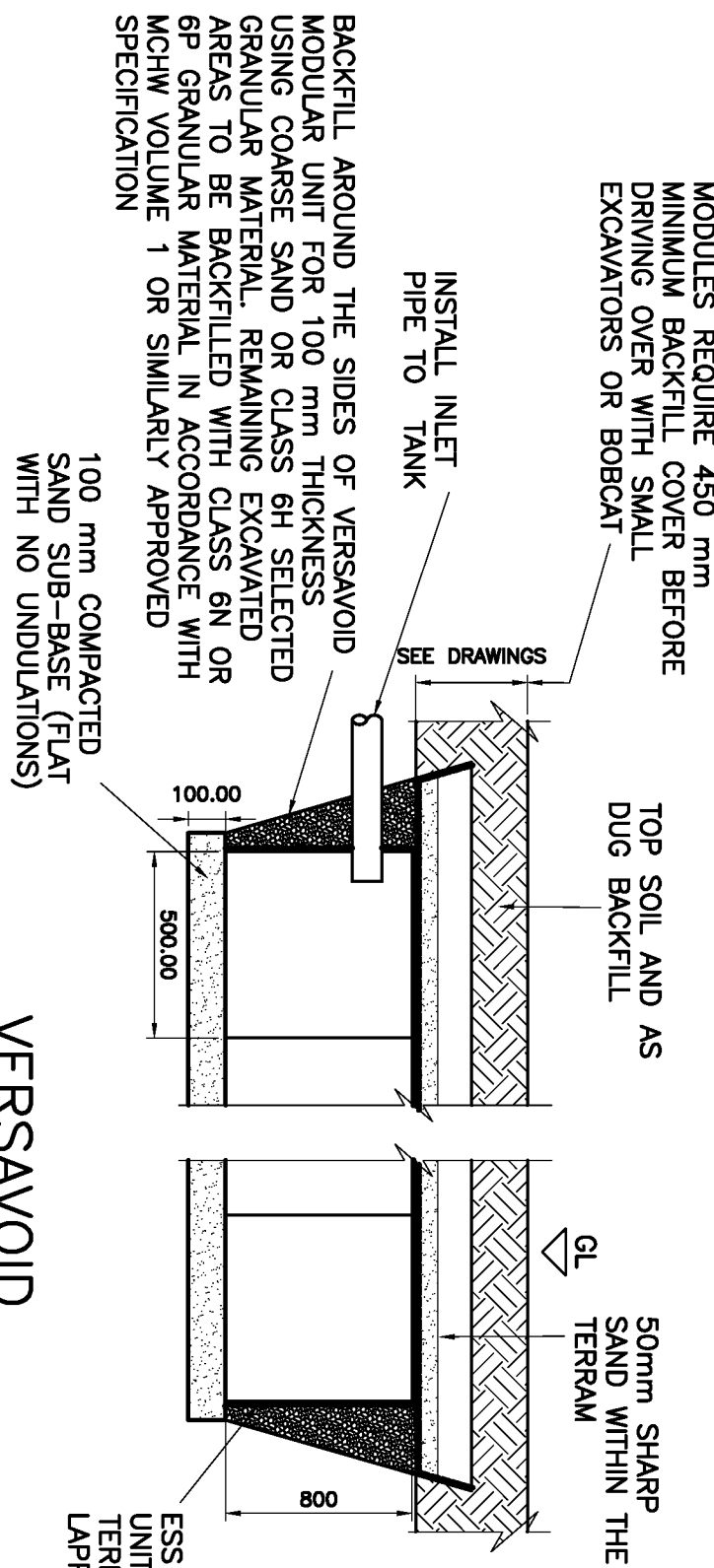
TYPICAL SOIL VENT PIPE DETAILS

SCALE 1:20



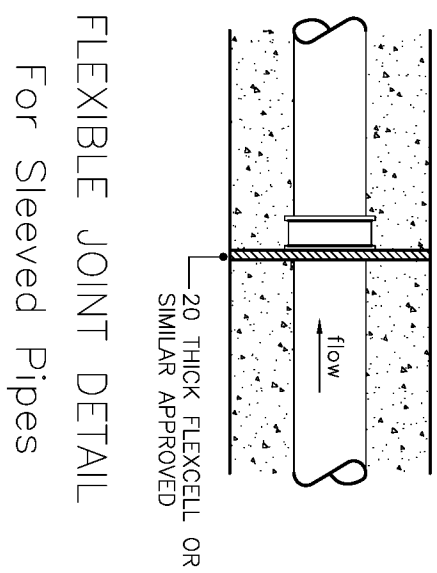
TYPICAL RAIN WATER DOWNPIPE DETAIL

SCALE 1:20



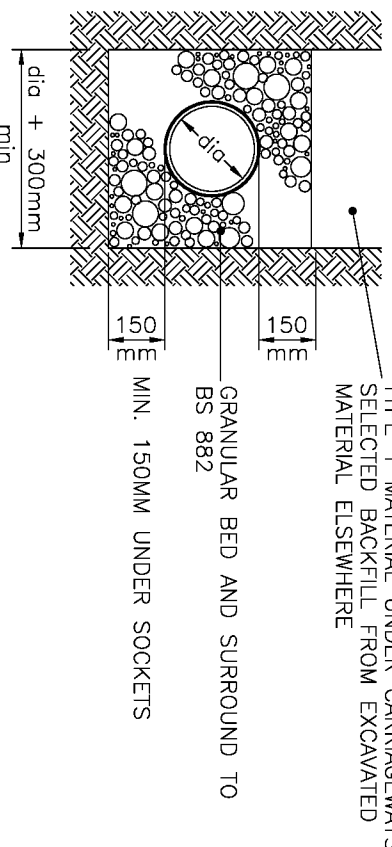
SOAKAWAY/INFILTRATION TANK
UNDER LANDSCAPED AREAS

SCALE 1:20



TYPICAL PIPE JOINTING DETAIL

SCALE 1:20

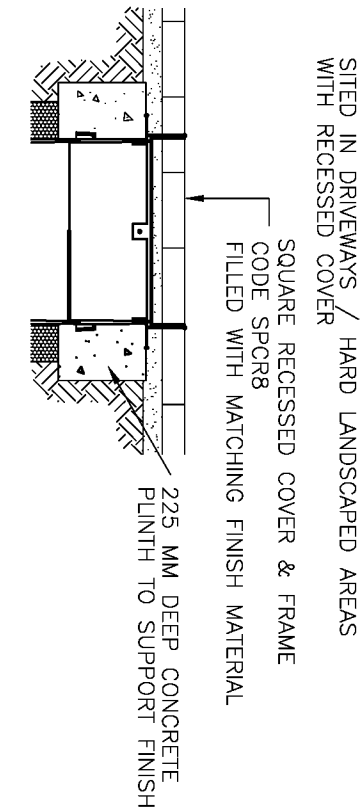
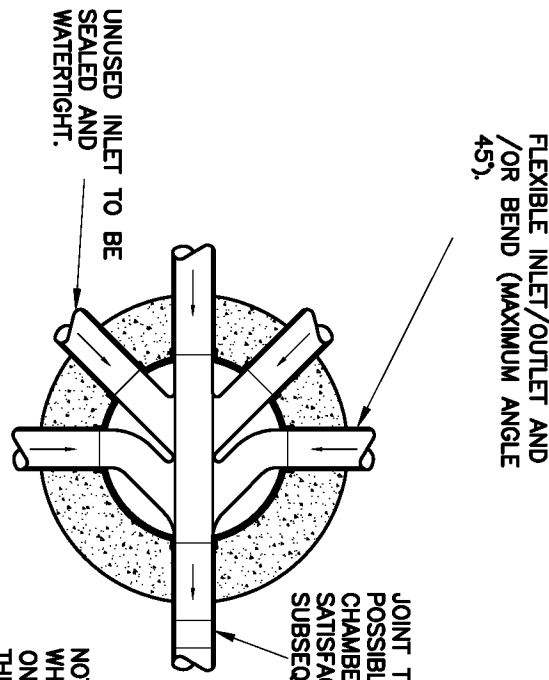


(BEDDING FACTOR – 2.2)

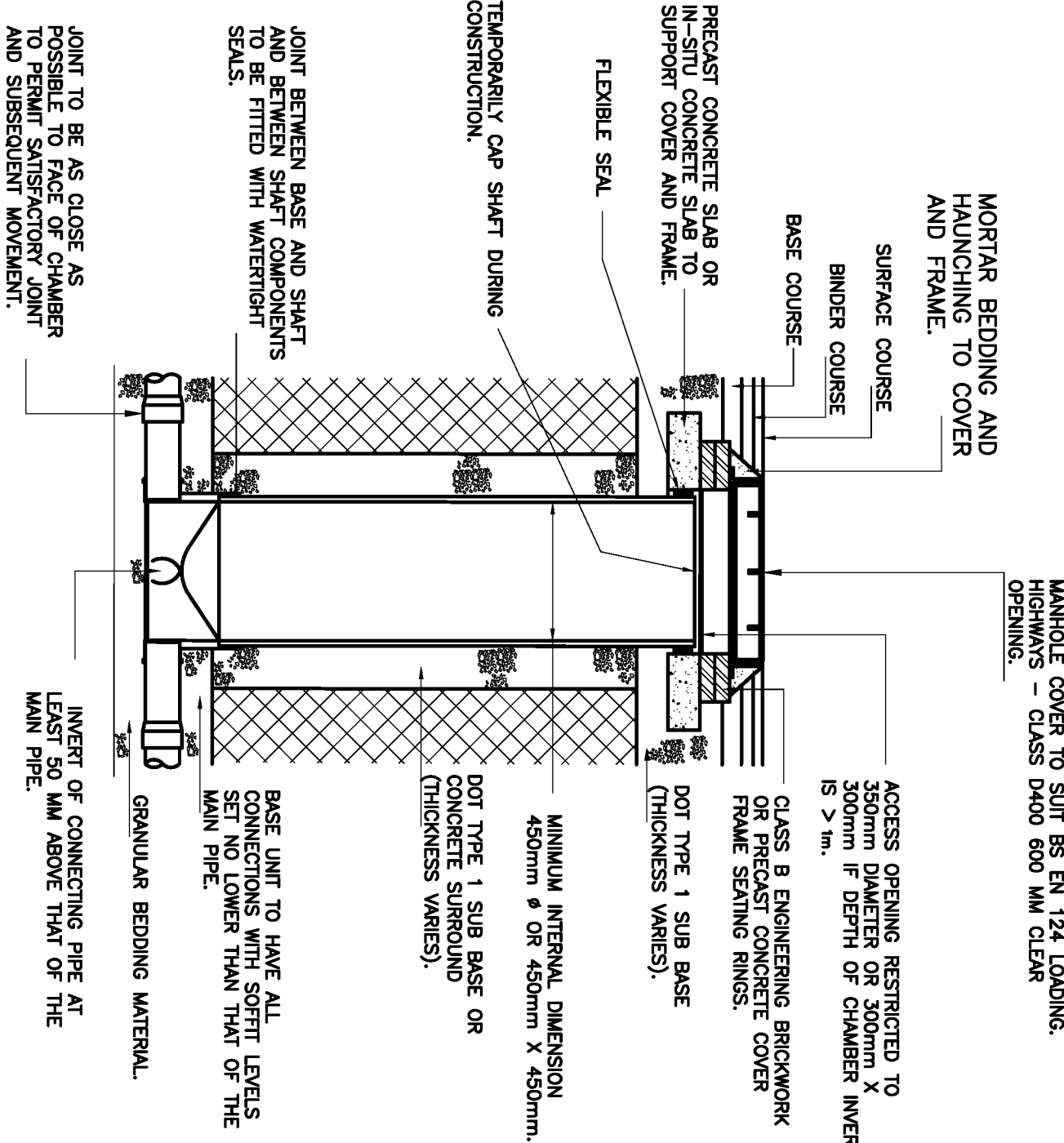
Drainage with more than 1.2m cover

PIPE BEDDING DETAIL

SCALE 1:20



PLAN

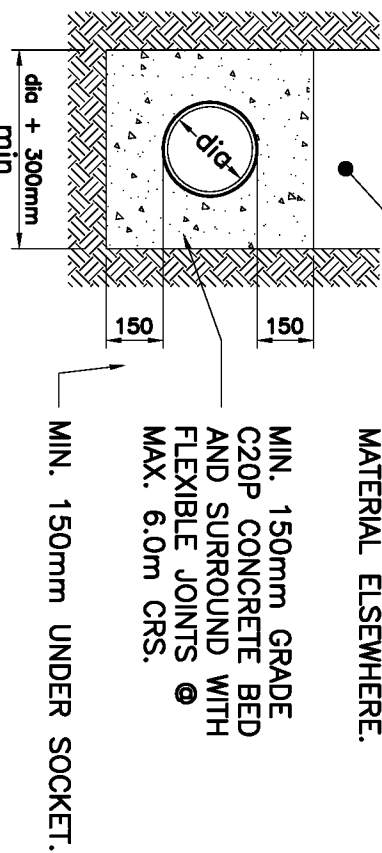


SECTION

TYPE 3 – 450P POLYPROPYLENE
INSPECTION CHAMBER (MAX. DEPTH 3.0M
TO PIPE SOFTIT).

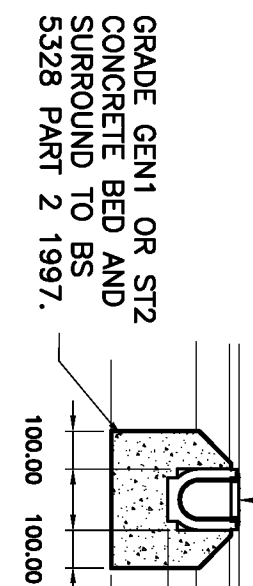
SCALE 1:20

NOTE: PLASTIC CHAMBERS AND RING
SHALL COMPLY WITH BS EN 13598-1
AND BS EN 13598-2 OR HAVE
EQUIVALENT INDEPENDENT APPROVAL.

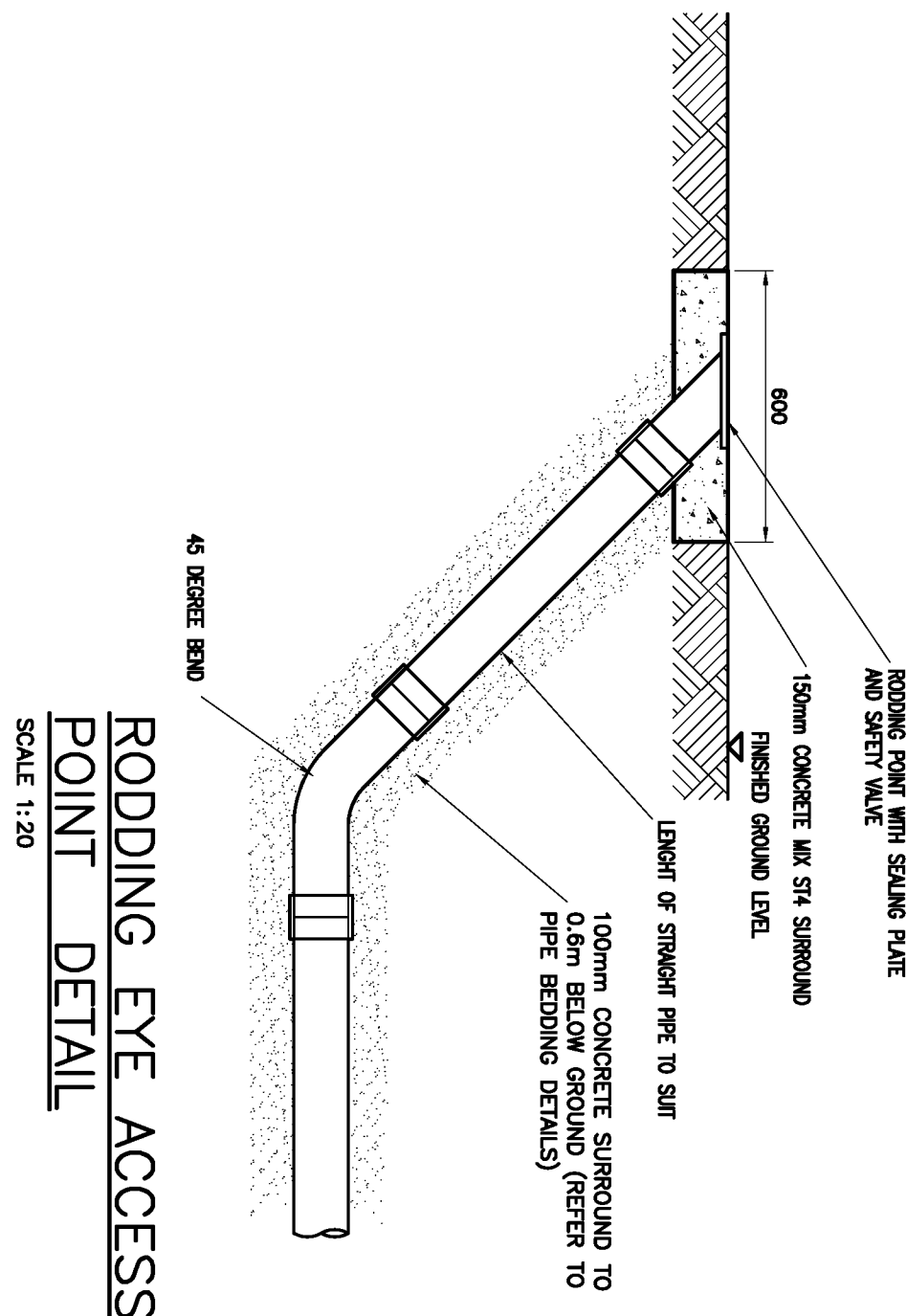


CONCRETE PIPE BEDDING

HAURATON RECFIX 100
CHANNEL DRAIN WITH
GRADING AS SPECIFIED
BY ARCHITECT.

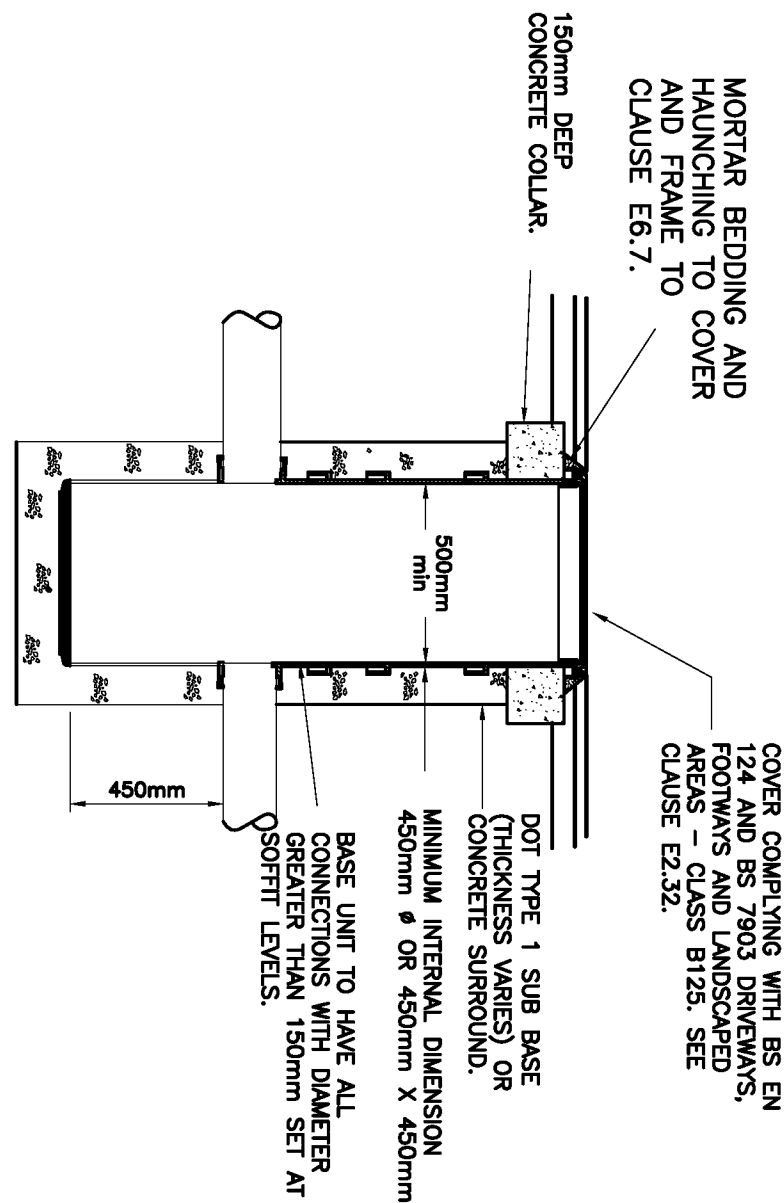


RECFIX CHANNEL DRAIN
(250xkn)
SCALE 1:20



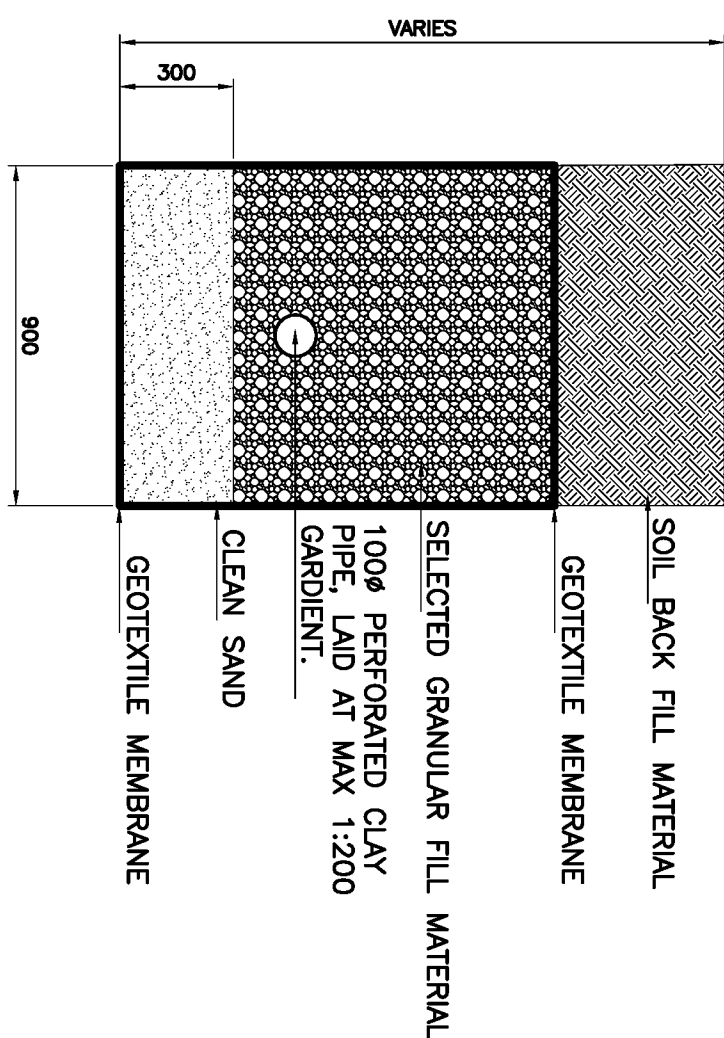
RODDING EYE ACCESS
POINT DETAIL

SCALE 1:20



TYPE 3A–500P
POLYPROPYLENE SILT TRAP
INSPECTION CHAMBER.

SCALE 1:20



TYPICAL SECTION A–A
THROUGH DRAINAGE FIELD

SCALE 1:20

In addition to these notes, reference shall be made to the specification of
works and the relevant Architect's and Specialist's drawings and specifications.
The Contractor is responsible for verifying all site dimensions before
commencing work.
All dimensions are in millimetres unless noted otherwise.
This drawing has been produced electronically and may have been photo
reduced or enlarged when printed or copied. Dimensions on this drawing shall
not be scaled. Work only to be carried out by the engineer immediately.
Errors or omissions are to be reported to the engineer immediately.
Levels are in metres unless noted otherwise to Ordnance Survey datum.
The Contractor is responsible for the stability of the building whilst the works
are in progress.

NOTES

1. THIS DRAWING IS BASED ON DRAWING NOS.20–028/DL1
BY POTTON (KINGSPAN LIMITED).
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH
THE FOLLOWING DRAWING:
59363/10 DRAINAGE LAYOUT

3. CONTRACTOR IS TO TAKE NECESSARY PRECAUTIONS TO
ENSURE THAT TRENCHES ARE KEPT CLEAR OF GROUND
WATER DURING CONSTRUCTION.
4. ALL DRAINAGE WORKS TO BE CARRIED OUT IN
ACCORDANCE WITH "SEWERS FOR ADOPTION" 7TH
EDITION.
5. ALL ADOPTED PIPEWORK, TO BE 100Ø VITRIFIED CLAY
UNLESS NOTED OTHERWISE.
6. ALL PIPEWORK THROUGH WALLS TO BE IN
ACCORDANCE WITH THE BUILDING REGULATIONS.
7. ALL PIPEWORK UNDER ROADS WITH LESS THAN 900MM
COVER TO HAVE 150MM CONCRETE SURROUND.
8. MINIMUM GRADIENT TO DRAINS TO BE 1:80 FOR
110Ø OR 110Ø FW AND 1:100 FOR 110Ø SW.
9. POSITIONS OF MANHOLES SHOWN ON THIS DRAWING
ARE INDICATIVE ONLY. ACTUAL LOCATIONS TO BE
FINALIZED ON SITE.
10. PROVIDE CONCRETE LINTELS OVER OPENINGS WHERE
PIPES PASS THROUGH WALLS. ALLOW FOR 150MM
CLEARANCE ALL ROUND PIPE.

PRELIMINARY

ALL DIMENSIONS AND LEVELS
TO BE CHECKED AND
CONFIRMED BY THE ARCHITECT
PRIOR TO CONSTRUCTION.

REV	DESCRIPTION	DATE	BY
0	ORIGINAL ISSUE	08/06/21JS	

DIXON HURST

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CONTRACT

POACHERS
EASTERGATE LANE
CHICHESTER, PO20 3SJ

DRAINAGE DETAILS

DRAWING No.	REV	CHECKED
59363 / 11	0	
SCALE @ A1	DATE	DRAWN
1:20	JUNE 21	JS
AutoCAD Ref: 59363-10.dwg		

This drawing is produced using AutoCAD. Only written dimensions are to be respected.

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Surface Water Drainage Proposal Checklist

This 'Surface Water Drainage Proposals Checklist' has been designed to clearly define Arun District Council's and Chichester District Council's expectations and requirements for any surface water drainage proposals, submitted for appraisal by the council's Engineers, during the planning process.

Please be aware that it is in your interest to provide all of the requested information, as this will allow the council's Engineers to quickly and efficiently review your proposals. The omission of any requested information may lead to delays in the planning process.

This document will be of help to any applicant, or drainage consultant, preparing to submit a 'Discharge of Conditions Application' relating to surface water drainage conditions. Alternatively, it can also be used earlier in the planning process, if the applicant wishes to avoid pre-commencement conditions relating to surface water drainage. The Town and Country Planning Regulations now require pre-commencement conditions to have the prior agreement of the applicant regarding their wording and use. Therefore, if you wish to avoid pre-commencement conditions, in relation to surface water drainage, you will need to submit proposals that provide the information requested in this checklist and also align with the requirements of the following documents:

West Sussex Policy for the Management of Surface Water (WSSC)

'Supplementary Requirements for Surface Water Drainage Proposals'. (Arun DC)

'Supplementary Requirements for Surface Water Drainage Proposals'. (Chichester DC)

By submitting all of the information requested by this checklist you will enable the council's Engineers to determine whether your proposals follow the hierarchy for sustainable drainage and will adequately drain the site.

Please be aware that it will be difficult for the council's Engineers to undertake a timely assessment of your application if you fail to provide any of the information requested.



Surface Water Drainage Proposal Checklist

Ground Investigation Results			
Results Required	Results Provided?		
Winter groundwater monitoring results (Please refer to guidance note 1 below)	Yes	☒	No
Period of winter groundwater monitoring ^{Note 1}	From	9/3/2021	
	To	10/3/2021	
Maximum recorded groundwater level	None visible MADD to 2m depth. MBGL		
Winter infiltration test results ^{Note 2}	Yes	☒	No
Date of winter infiltration testing	10/03/2021		
Details of the location and depth of the infiltration testing ^{Note 3}	Yes	☒	No
Minimum infiltration rate ^{Note 4}	0.5368614 m/s		

Guidance Notes

1. A full winters groundwater monitoring should be undertaken, (October to March inclusive) to enable the peak annual groundwater levels to be established. The extent of winter monitoring for developments of less than 5 properties should be discussed with the council's Engineers.
2. Infiltration testing should be undertaken during the wet winter months (typically January) and in line with BRE365, or a similar approved method. Tests should be repeated 3x, to replicate saturated ground conditions. Please note that infiltration testing is to be carried out at a time and depth agreed with the Councils engineers.
3. Infiltration testing should be undertaken at the location and depth of any proposed infiltration structures. This must be above the maximum recorded groundwater level in that vicinity.
4. The minimum infiltration rate obtained at the location and depth of the proposed infiltration structures should be used to inform the design of the structures.

Proposed Method of Surface Water Disposal			
Infiltration	Yes	☒	No
On-site, via soak-away structures	Yes	☒	No
If on-site infiltration is not to be used, has justification for this been provided? ^{Note 5}	Yes	☐	No
Attenuation (on-site) with a restricted discharge to a watercourse on, or adjacent to, the site	Yes	☐	No ☒
Attenuation (on-site) with a restricted discharge to a surface water sewer on, or adjacent to, the site	Yes	☐	No ☒
Attenuation (on-site) with a restricted discharge to a foul water sewer on, or adjacent to, the site	Yes	☐	No ☒

Guidance Notes

5. If on-site infiltration is not being used to drain the site you will need to provide evidence that demonstrates on-site infiltration is unviable.

Version 3.0 (20.11.2019)

Drainage Design: Supporting Calculations				
Calculations Required		Calculations Provided?		
Infiltration Structures	Half-drain time for 10 year event (plus climate change allowance)	Yes	☒	No
		2.33 Hours		
	Half-drain time for 100 year event (plus climate change allowance)	Yes	☒	No
		2.33 Hours		
	Calculations demonstrating that the 1 in 100 year event, plus climate change allowance can be accommodated on-site. Note 7	Yes	☒	No
Attenuation and Subsequent Restricted Discharge	Lowest base level of infiltration structure	15.77 mAOD mBGL		
	Has the design sought to provide treatment of potential contaminants? E.g. hydrocarbons.	Yes	☒	No
	Pre-development run-off rate calculations	Yes	☐	No
	Proposed discharge rate Note 6	l/s		
	Calculations demonstrating that the 1 in 100 year event, plus climate change allowance can be accommodated on-site. Note 7	Yes	☐	No
	Has the design sought to provide treatment of potential contaminants? E.g. hydrocarbons.	Yes	☐	No
	If your proposed scheme incorporates any impermeable lined attenuation features we require calculations to demonstrate that appropriate resistance to floatation (due to groundwater levels) is catered for in the design	Yes	☐	No
	If you propose discharging into or altering an ordinary watercourse; have you sought Ordinary Watercourse/Land Drainage Consent? Note 8	Yes	☐	No
	If discharging to a watercourse, piped system or the sea, has the proposed drainage network been modelled against predicted top water levels for the 1 in 100 year storm event plus climate change allowance, within the existing system? Note 9	Yes	☐	No

Guidance Notes

- Any proposed discharge rate must be less than, or equal to, the pre-development rate. Greenfield sites must use the mean flow rate (Qbar) and be based upon the area occupied by the development, ignoring significant open spaces. Please note that the minimum acceptable discharge rate is 2l/s when using formal flow control devices, unless otherwise agreed. Additionally, if you are developing a brownfield site, we expect you to provide fully detailed plans of the existing surface water drainage arrangements on site, including impermeable areas, gullies, outfalls, pipes & diameters, manholes, etc. We generally seek 50% betterment in terms of run off from brownfield sites.
- The appropriate factor of safety from the table below must be applied to your calculations to ensure your design is fully in accordance with CIRIA R156/ CIRIA C753.

Factor of Safety Table						
Size of Area to be Drained	Consequences of failure					
	No damage or inconvenience		Minor inconvenience, e.g. surface water on car park		Damage to buildings or structures or roads.	
	Cv=1.0	Cv=0.75	Cv=1.0	Cv=0.75	Cv=1.0	Cv=0.75
<100 m ²	1.5	2	2	3	10	13
100m ² to 1000m ²	1.5	2	3	4	10	13
>1000m ²	1.5	2	5	6.5	10	13

8. Ordinary Watercourse/Land Drainage Consent will need to be sought, ideally in parallel with planning permission, if you propose discharging into, culverting or altering a watercourse.
9. Modelling is required to ensure that problems, such as surcharged outfalls, are addressed.

Plans/Drawings/Diagrams				
Required	Provided?			
Plan detailing the location of groundwater monitoring and infiltration testing	Yes		No	
Detailed drainage layout plan Note 10	Yes	✓	No	
Construction detail plans Note 11	Yes	✓	No	
Exceedance flow route plans Note 12	Yes		No	✓
Impermeable area plan	Yes		No	✓
If ground levels are being raised $\geq 300\text{mm}$ above existing levels and is unavoidable, have fully detailed plans been provided, together with drainage proposals, to address any potential drainage related issues.	Yes		No	

Guidance Notes

10. Drainage layout plans should include:
 - All surface water drainage pipes labelled with; diameters, pipe materials, falls and invert levels.
 - All infiltrating and attenuating structures (including permeable paving) labelled with; dimensions, invert and cover levels.
 - All manholes labelled with; cover levels, invert levels, cover types detailed.
 - All silt traps clearly labelled with sump depths.
 - Control structures with outflow rates and invert levels.
 - Proposed/existing levels of any areas subject to ground raising, together with suitable measures/detailed drawings for the associated management of surface water runoff. Please note that ground raising should be avoided unless there are exceptional circumstances.
11. Site specific construction detail plans should be supplied if your proposed drainage scheme includes any of the following elements: pipe bed and surround; infiltrating structures; attenuating structures; manholes; catch-pits/silt traps; control devices; permeable paving; headwalls.



12. Unless specifically requested by the council's drainage engineers 'Exceedance Flow Route Plans' are only required for developments of more than 5 residential properties or more than 0.5ha of commercial development .