

SuDS and Drainage Report

1 Highfields, Brighton Road, Warringlid RH17 5SY

Planning Ref: DM/25/1376

Rev: 1

Ref: **C3980**

CGS Civils Ltd
Richard Cobden House
Lion Street
Chichester
West Sussex
PO19 1LW
mail@cgscivils.co.uk
www.cgscivils.co.uk

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Date	Revision	Author	Approved
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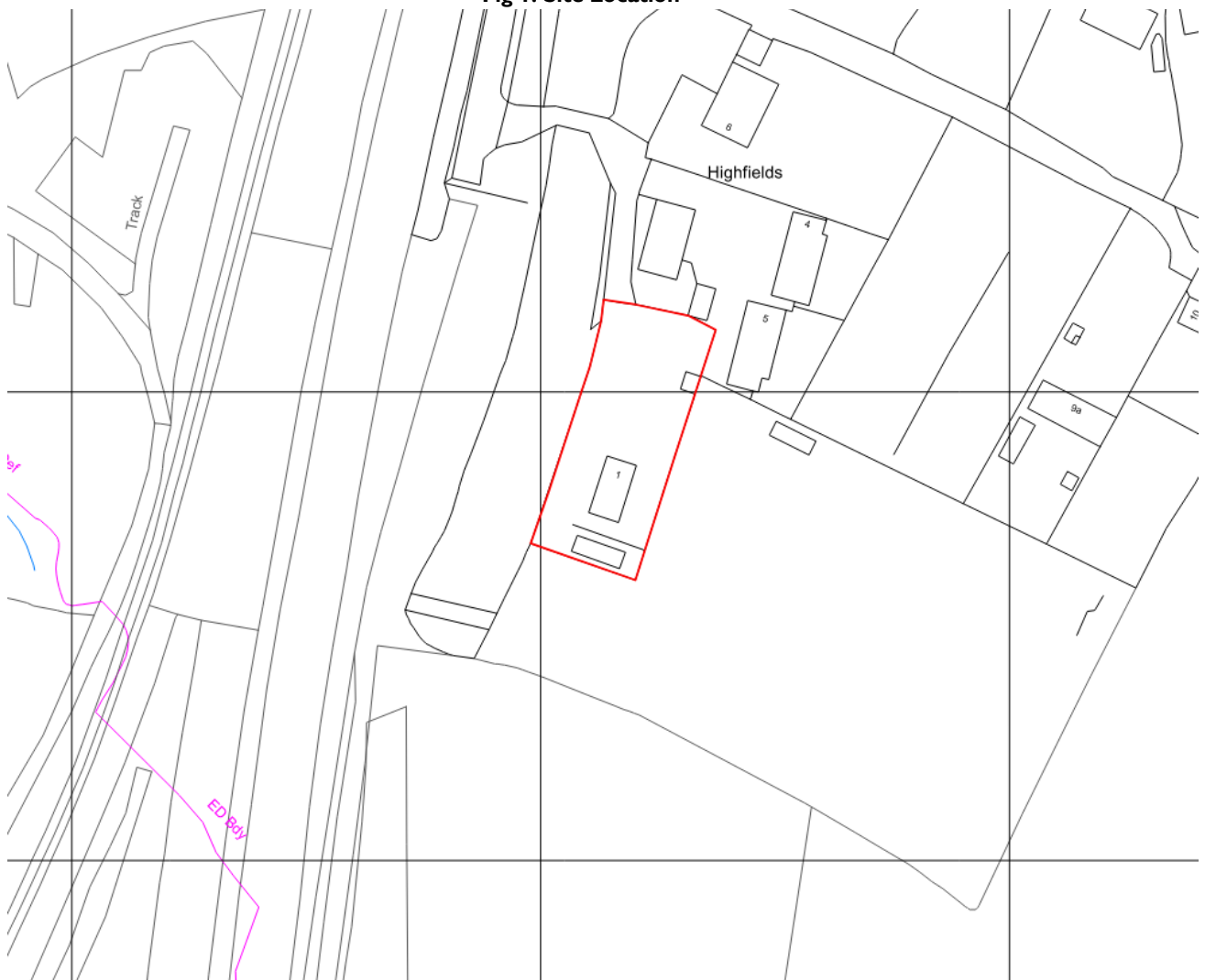
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1 Introduction

- 1.1.1 CGS Civils Ltd has been appointed to undertake a drainage strategy report for a proposed development at I Highfields in Warninglid.
- 1.1.2 The proposed development will consist of the erection of 2 No. detached dwellings with detached garages following the demolition of 2 No. residential structures. The proposed development is located as OS Grid Reference TQ 26619 25282 and has the post code RH17 5SY.
- 1.1.3 The purpose of this drainage scheme is to demonstrate how the proposed development can be satisfactorily drained without increasing flood risk onsite and where appropriate, providing betterment over the existing site to reduce flood risk in the region.
- 1.1.4 In addition to the above, it will also demonstrate compliance with Conditions 7. The condition is in place on Decision Notice from **8th July 2025**, with the planning reference: **DM/25/1376**. The condition requires the following to be included:
- The results of an assessment into the potential for disposing of surface water by means of Sustainable Drainage System (SuDS).
 - Details of foul water drainage and means of disposal.
 - Details of a management and maintenance plan for the drainage scheme
 - The appropriate design standard for the surface water drainage scheme must be the 1 in 100-year return period with a 45% allowance for climate change + 10% Urban Creep.

Fig 1. Site Location



2 Executive Summary:

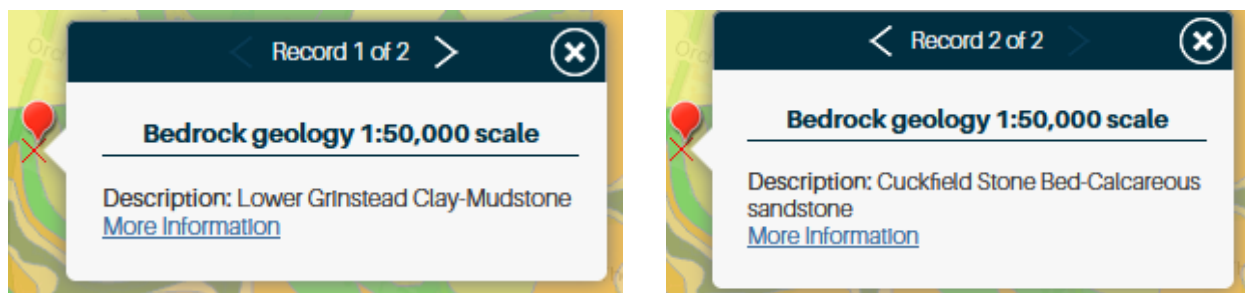
- 2.1.1 The proposed development will consist of the erection of 2 No. detached dwellings with detached garages following the demolition of 2 No. residential structures.
- 2.1.2 The underlying geology is noted to be gravelly, sandy clay. Infiltration testing recorded a fair rate of $4.6 \times 10^{-6} \text{m/s}$, which is deemed to be suitable for discharging surface water via infiltration.
- 2.1.3 It is therefore proposed that the surface water runoff from site is to be discharged to ground via infiltration. Each plot is to be served by a single ring soakaway which will make use of an attenuation tank in order to provide storage for the 1 in 100-year +45% storm +10% urban creep. Hard paved areas are to freely drain to ground via infiltration
- 2.1.4 The Foul water will discharge into the adjacent public foul sewer via a new connection into an existing manhole on site. Remedial works will be required prior to construction.

3 Site Geology

3.1 British Geological Survey information

- 3.1.1 The British Geological Survey confirms the bedrock geology to be made up of Lower Grinstead Clay and Cuckfield Stone Bed. At the time of writing the British Geological Survey website does not have any recorded information of the Superficial deposits on site.

Fig 2. British Geological Survey



3.2 Geological Assessment

- 3.2.1 Ground investigations were undertaken on site by Ashdown Site Investigation Ltd (Project ref: LT17277). During the investigation, 4 No. trial pits were excavated and the underlying geology was assessed. The ground was noted to be comprised of gravelly, sandy Clay. The gravel was noted to be a mixture of flint and sandstone.
- 3.2.2 In addition to ground investigations, an infiltration test to BRE365 was undertaken which recorded a worst-case infiltration rate of $4.26 \times 10^{-6} \text{ m/s}$ which is considered a fair rate and proves that infiltration is a viable means of surface water discharge. A copy of the infiltration test results can be found in **Appendix D**.

Fig 3. Infiltration Test Photographs



4 Existing Drainage

- 4.1.1 It is not currently known how the existing site discharges surface water runoff, however, it is believed that it discharges to ground via infiltration.
- 4.1.2 A CCTV drainage survey was conducted on site which traced the existing foul water drainage on site. The foul water discharges into an existing foul sewer main which runs adjacent to Brighton Road to the west of the site.

5 Proposed Drainage Strategy

5.1 SuDS Hierarchy

- 5.1.1 All options for the destination of run-off generated on site have been assessed in line with the SuDS hierarchy as set out in Building Regulations Part H document and DEFRA's Draft National Standards for SuDS.

Table 1. SuDS Hierarchy

Discharge Destination	
Rainwater Harvesting	Yes, rainwater harvesting is proposed to allow rainwater reuse on site.
Discharge to Ground	Yes – Surface water runoff is to be discharged to ground via proposed ring soakaways.
Discharge to Watercourse	N/A due to above
Discharge to Surface Water Sewer	N/A due to above
Discharge to Other Sewer	N/A due to above

5.2 Proposed Hydraulic Calculation Specifications:

Table 2. SuDS Hierarchy

Hydraulic Calculations Settings:	
Rainfall Methodology	FEH-22
Volumetric Run-off Coefficient Cv	1
CV Winter and Summer	1
Additional Storage (m ³ / ha)	0.0
Maximum Rainfall (mm/hr)	75
Ring Soakaway Design x 2	Base Coefficient (m/hr): 0.01534
	Side Coefficient (m/hr): 0.01534
	Ring Diameter (m): 1.50
	Pit Width (m): 3.0
	Pit Length (m): 3.0
	Factor of Safety: 2
	Porosity: 30%
	Time to Half Empty (mins): 805 / 883
Permeable Paving Design	Base Coefficient (m/hr): 0.01534
	Side Coefficient (m/hr): 0.01534
	Factor of Safety: 2
	Porosity: 30%
	Time to Half Empty (mins): 128

5.3 Surface Water Drainage

- 5.3.1 Based upon the results of the infiltration test that was conducted on site, it is determined that the discharge of surface water runoff via infiltration is viable. The surface water runoff is to be captured into a positive drainage network prior to discharging to ground via the installation of a single ring soakaway per plot; the soakaways have been designed to the recorded infiltration rate of $4.6 \times 10^{-6} \text{m/s}$ and will make use of an attenuation tank upstream to act as additional storage in order to cater for the 1 in 100-year storm +45% + 10% urban creep. The proposed soakaways are to be located a minimum of 5m away from any structures in addition to 2.5m away from the site boundary.
- 5.3.2 Each plot will have a rainwater harvesting tank installed which will allow the reuse of rainwater within the external areas of the site. The plots are also to be fitted within bio-retention planters to provide interception, water quality and bio-diversity benefits.
- 5.3.3 The access road is to be constructed from a permeable surface which has also been designed to the recorded infiltration rate and will allow all runoff to freely drain to ground via infiltration.
- 5.3.4 Hydraulic calculations have been carried out which can be found at **Appendix C**. It should be noted that a 10% urban creep has been applied to the roof areas only. This is included within the hydraulic calculations as additional area which is highlighted within the impermeable areas plan in **Appendix B**.

5.4 Water Quality

- 5.4.1 A key requirement of any SuDS system is that it protects the receiving water body from the risk of pollution.
- 5.4.2 Frequent and short duration rainfall events are those that are most loaded with potential contaminants (silts, fines, heavy metals, and various organic and inorganic contaminants) Therefore the first 5-10mm of rainfall should be adequately treated with SuDS.
- 5.4.3 The new SuDS Manual (Ciria C753, November 2015) introduces slightly different approach compared to the previous version for the water quality management of surface water. The Manual describes risks posed by the surface water runoff to the receiving environment as a function of:
- The pollution hazard at a particular site (i.e., the pollution source)
 - The effectiveness of SuDS treatment components in reducing levels of pollutants to environmentally acceptable levels
 - The sensitivity of the receiving environment
- 5.4.4 The recommended approaches for water quality risk management are given in the SuDS Manual Table 26.1.

Table 26.1 from SuDS manual. Approaches to Water Quality Risk Management

Table 26.1 Approaches to Water Quality Risk Management			
Design method	Hazard Characterisation	Risk Reduction	
		For Surface Water	For Groundwater
Simple Index Approach	Simple pollution hazard indices based on land use (Table 26.2)	Simple SuDS hazard mitigation indices (Table 26.3)	Simple SuDS hazard mitigation indices (Table 26.4)
Risk Screening	Factors characterising traffic density and extent of infiltration likely to occur (Table 26.5)	N/A	Factors characterising unsaturated soil depth and type, and predominant flow type through the soils (Table 26.5)
Detailed Risk Assessment	Site specific information used to define likely pollutants and their significance	More detailed, component specific performance information used to demonstrate that the proposed SuDS components reduce the hazard to acceptable levels	
Process-based treatment modelling	Time series rainfall used with generic pollution characteristics to determine statistical distributions of likely concentrations and loadings in the runoff	Models that represent the treatment processes in the proposed SuDS components give estimates of reductions in even mean discharge concentrations and total annual load reductions delivered by the system	

5.4.5 As per Table 26.1 Simple Index approach will be used as a design method for this site.

5.4.6 Table 26.2 will provide hazard classification of different land uses. The land uses for the surface water drainage for this site are.

- Residential Roofs
- Individual Property driveways and residential car parks

5.4.7 To deliver adequate treatment, the selected SuDS components should have a total pollution mitigation index for each contaminant type that equals or exceeds the pollution hazard index for each contaminant type. Therefore, the following must be achieved for the surface running off the site.

Total SuDS mitigation index $\geq$ pollution hazard index

5.4.8 Pollution Hazard Indices are given for different land uses in Table 26.2 of the SuDS manual;

Table 26.2 from SuDS manual. Pollution Hazard Indices for Different Land Use Classifications

Table 26.2 Pollution hazard indices for different land use classifications				
Land Use	Pollution Hazard Level	Total Suspended solids (TSS)	Metals	Hydro-Carbons
Residential roofs	Very Low	0.2	0.2	0.05
Other roofs (Typically commercial/industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (e.g., cul-de-sacs, homezones and general access roads) and non-residential car parking with infrequent change (e.g., schools, offices) i.e., < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (e.g., hospitals, retail), all roads except low traffic roads and trunk roads/motorways	Medium	0.7	0.6	0.7
Sites with heavy pollution (e.g., haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways	High	0.8	0.8	0.9

5.4.9 From Table 26.2 the following information is tabulated in Table I

Table 3: Pollution hazard index and destination of runoff for the proposed site

Table 3: Pollution Hazard Index and Destination of runoff for the proposed Site							
Land Use	Destination of Runoff	Pollution Level	Hazard	Total Solids	Suspended	Metals	Hydrocarbons
Residential Roof	Ground Water	Very Low		0.2		0.2	0.05
Individual driveways, residential car parks and low traffic roads	Ground water	Low		0.5		0.4	0.4

5.4.10 The SuDS mitigation index will be obtained from Table 26.4 (for groundwater) of the SuDS manual.

Table 26.4 from SuDS manual. Indicative SuDS Mitigation Indices for discharges to ground waters.

5.4.11 SuDS mitigation index are tabulated in Table 5 as followed.

Table 26.4 Indicative SuDS mitigation indices for discharges to groundwater			
Characteristics of the material overlying the proposed infiltration surface, through which the runoff percolates	TSS	Metals	Hydrocarbons
A layer of dense vegetation underlain by a soil with good containment attenuation potential of at least 300mm in depth	0.6	0.5	0.6
A soil with good contaminant attenuation potential of at least 300mm in depth	0.4	0.3	0.3
Infiltration trench (where a suitable depth of filtration material is included that provides treatment, i.e., graded gravel with sufficient smaller particles but not single size coarse aggregate such as 20mm gravel) underlain by a soil with good contaminant attenuation potential of at least 300mm in depth.	0.4	0.4	0.4
Constructed permeable pavement (where a suitable filtration later is included that provides treatment, and including a geotextile at the base separating the foundation from the subgrade) underlain by a soil with good contaminant attenuation potential of at least 300mm in depth	0.7	0.6	0.7
Bioretention underlain by a soil with good contaminant attenuation potential of at least 300mm in depth	0.8	0.8	0.8
Proprietary treatment systems	These must demonstrate that they can address each of the contaminant types to acceptable levels for inflow concentrations relevant to the contributing drainage area		

Table 4: SuDS mitigation index

Table 4 Mitigation Indices						
Runoff Source	Destination of Runoff	Mitigation Index Source	Type of SuDS Component	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Individual driveways, residential car parks and low traffic roads	Ground water	Table 26.4 (for ground waters)	Permeable Pavement	0.7	0.6	0.7
Residential Roofs	Ground water	Table 26.4 (for ground waters)	Bioretention	0.8	0.8	0.8

5.4.12 The above analysis demonstrates that the SuDS devices within the design will mitigate any pollution present within the surface water system.

5.5 Foul water drainage

- 5.5.1 The foul water will discharge into the local foul water sewer via a new direct connection into an existing private chamber located on site.
- 5.5.2 A CCTV survey was carried out and confirmed that remedial works to the existing foul water drainage is required. It is noted that there is an incoming pipe from an adjacent site which is to be traced to confirm the route to ensure that it does not clash with the proposed drainage network.

6 Summary and Conclusions

- 6.1.1 CGS Civils has been instructed to produce a Drainage statement under National Planning Policy Framework (NPPF) to support the Planning Application for the erection of 2 No. detached dwellings with detached garages following the demolition of 2 No. residential structures.
- 6.1.2 The Surface Water will discharge to ground via infiltration. Each plot is to be served by a single ring soakaway which will make use of an attenuation tank in order to provide storage for the 1 in 100-year +45% storm +10% urban creep. Hard paved areas are to freely drain to ground via infiltration
- 6.1.3 The Foul water will discharge into the adjacent public foul sewer via a new connection into an existing manhole on site. Remedial works will be required prior to construction.
- 6.1.4 The report has demonstrated that the proposed drainage measures ensure that suitable means of surface water and foul drainage can be achieved for the proposed development.
- 6.1.5 A maintenance schedule has been written up for the drainage network including the SuDS features and can be found within Appendix E.

7 Appendices

7.1 Appendix A – Site Plan

HIGHFIELDS



PROPOSED SITE PLAN
SCALE 1-500 @ A3

DO NOT SCALE

ALL DIMENSIONS AND LEVELS TO BE VERIFIED ON SITE BY CONTRACTOR PRIOR TO COMMENCEMENT OF WORKS

ANY DISCREPANCIES OR AMBIGUITIES TO BE REPORTED IMMEDIATELY TO THE ARCHITECT PRIOR TO CONSTRUCTION OR FABRICATION

DRAWINGS TO BE READ IN CONJUNCTION WITH RELEVANT ENGINEER'S DRAWINGS

ORIENTATION

NOTES

WORK IN PROGRESS

DANIEL HARRIS ARCHITECTS

The Old Stable House,
53-55 North Cross Road,
London SE22 9ET

www.dh-architects.com

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PROJECT

1 HIGHFIELDS

DATE

01/04/25

SCALE

1500 @ A3

ISSUE

PRELIMINARY

TITLE

PROPOSED SITE PLAN

PROJECT

312

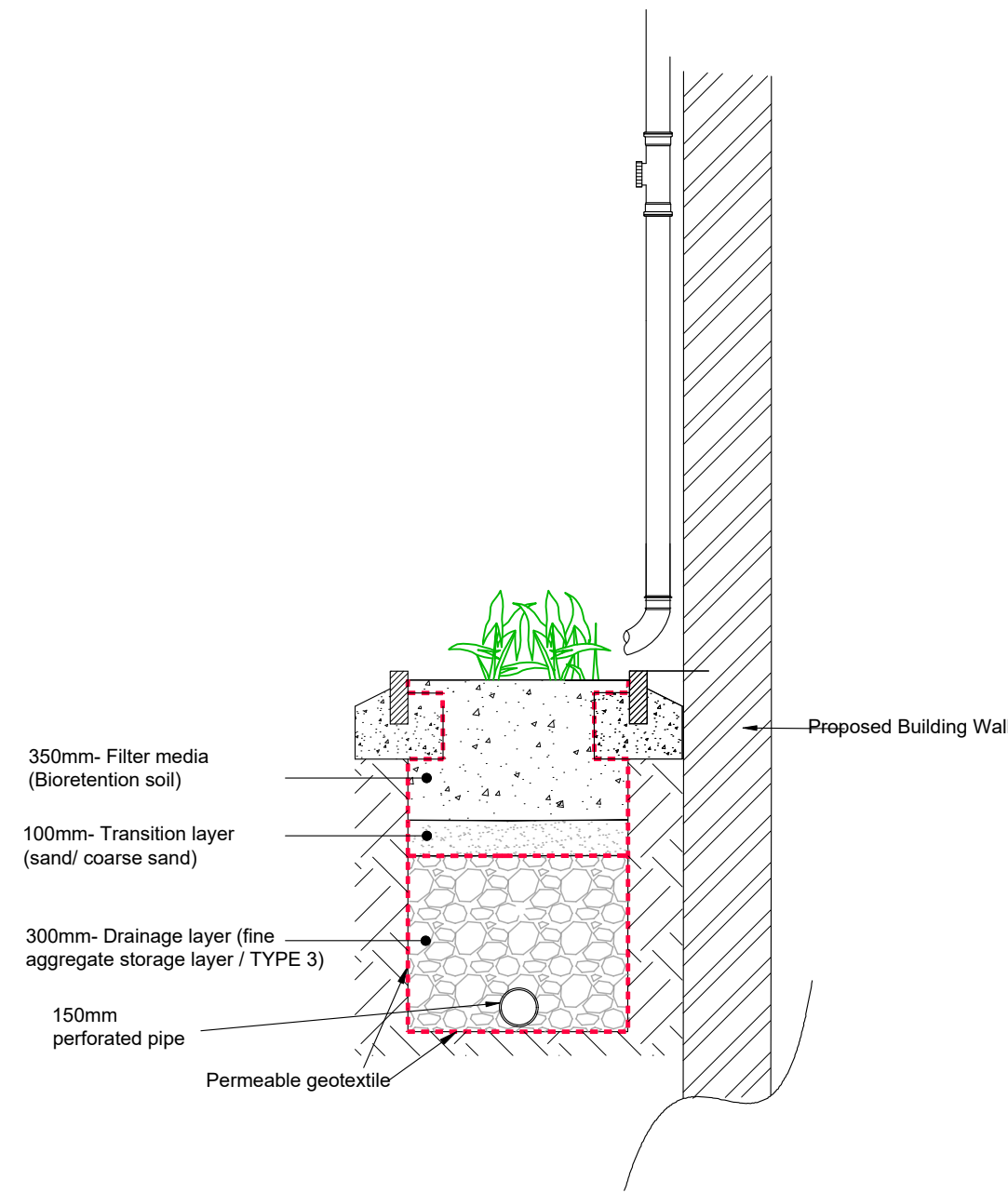
DRAWING

SP 02

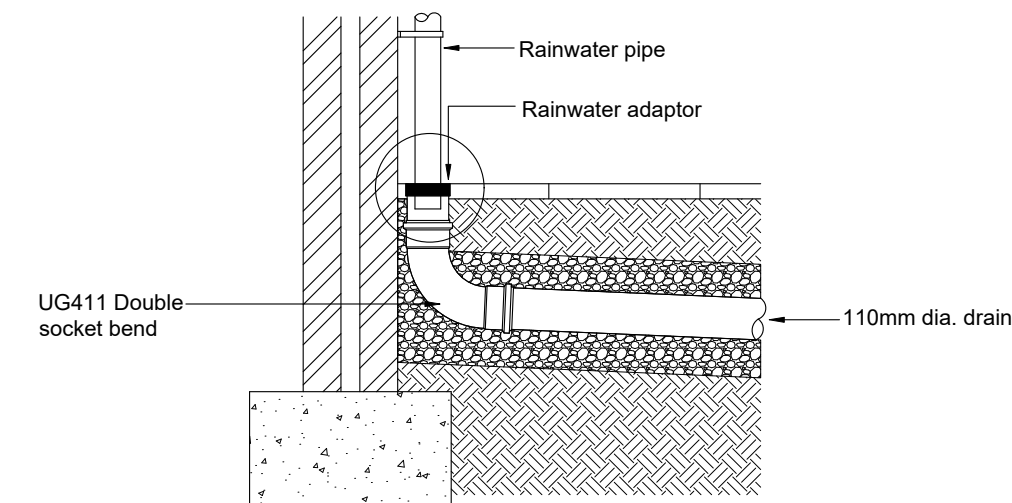
REVISION

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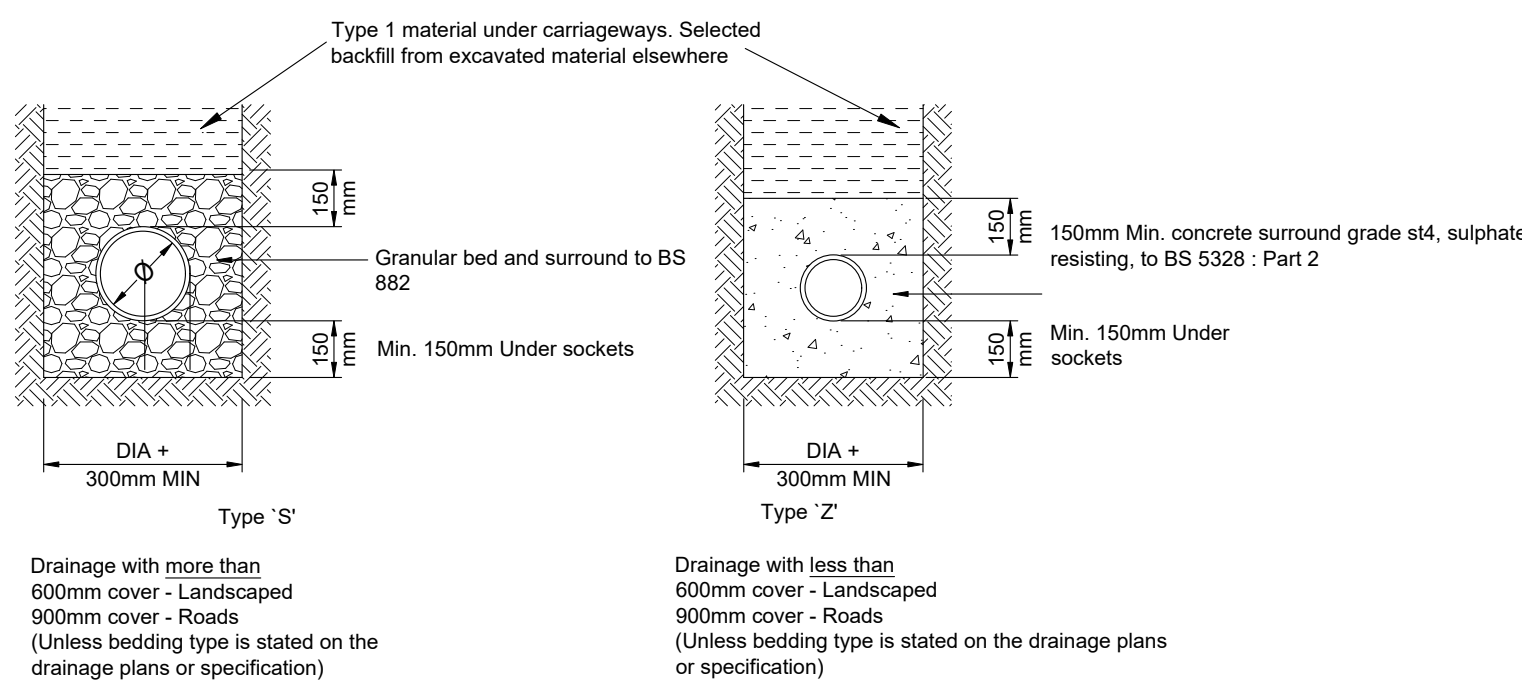
7.2 **Appendix B – Drainage Layout**



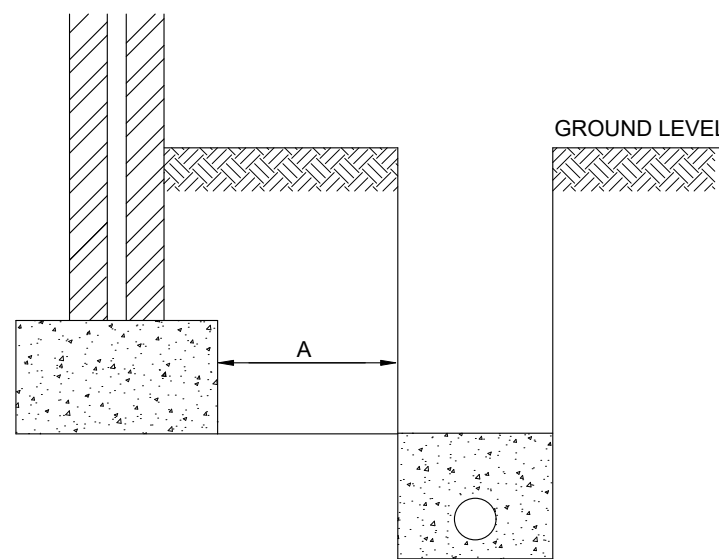
Proposed Below ground Bio-retention Unit Typical Detail



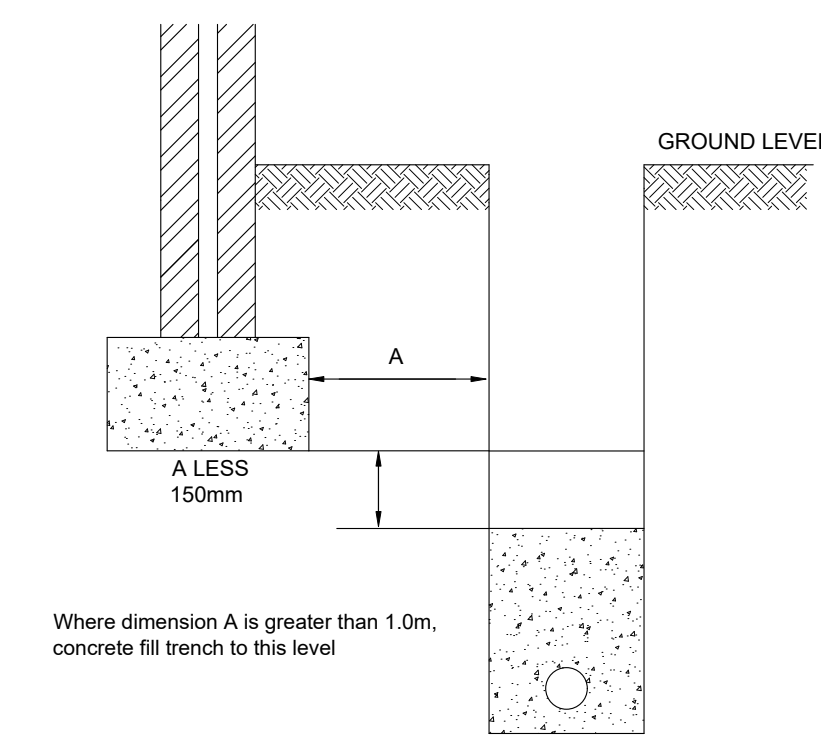
Rainwater pipe connection



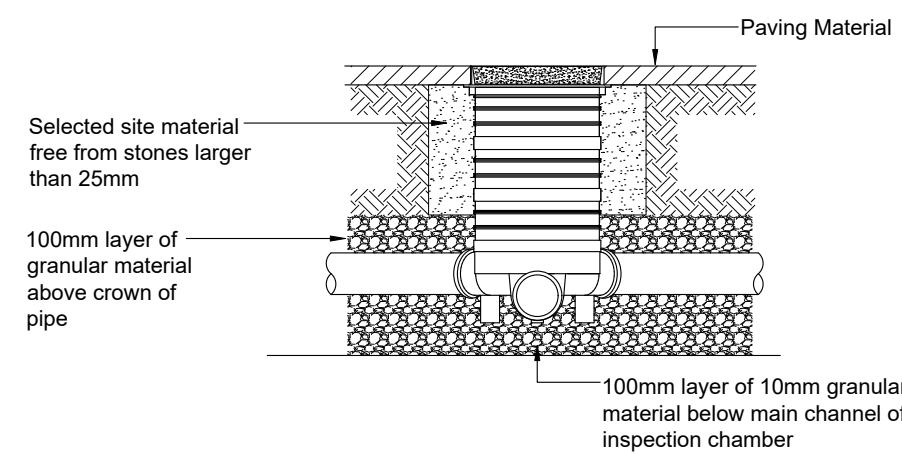
Pipe bedding details in private Areas



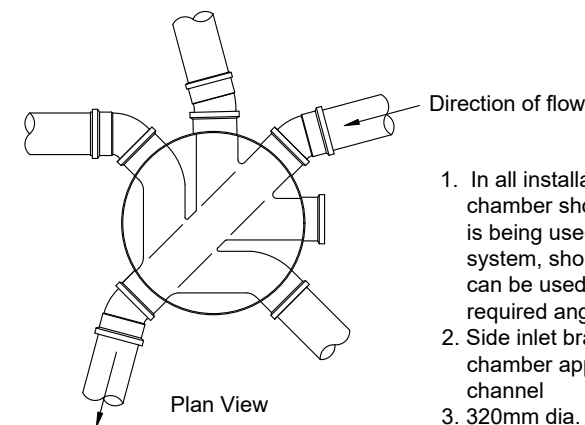
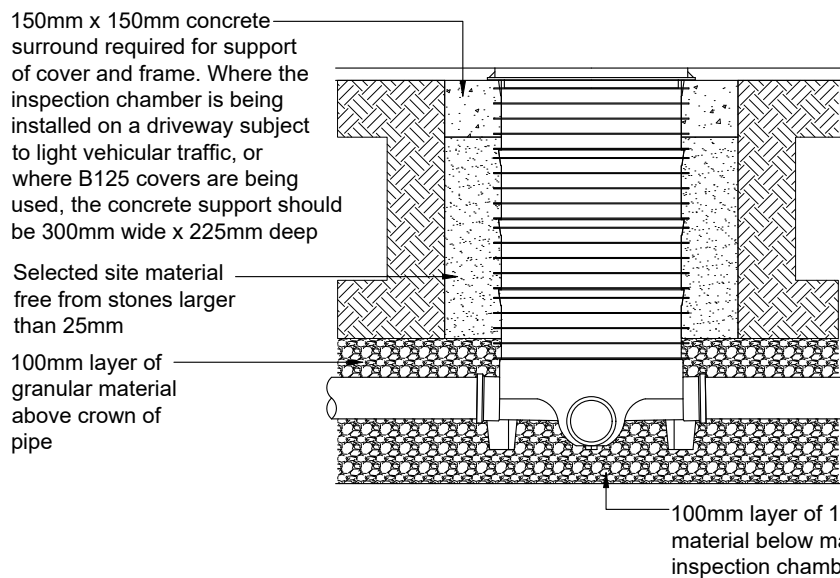
Pipes near buildings



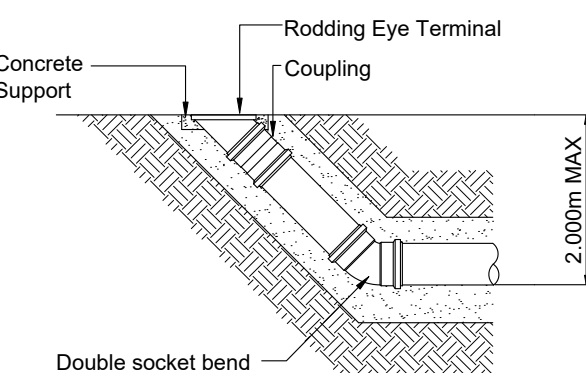
Pipes near buildings



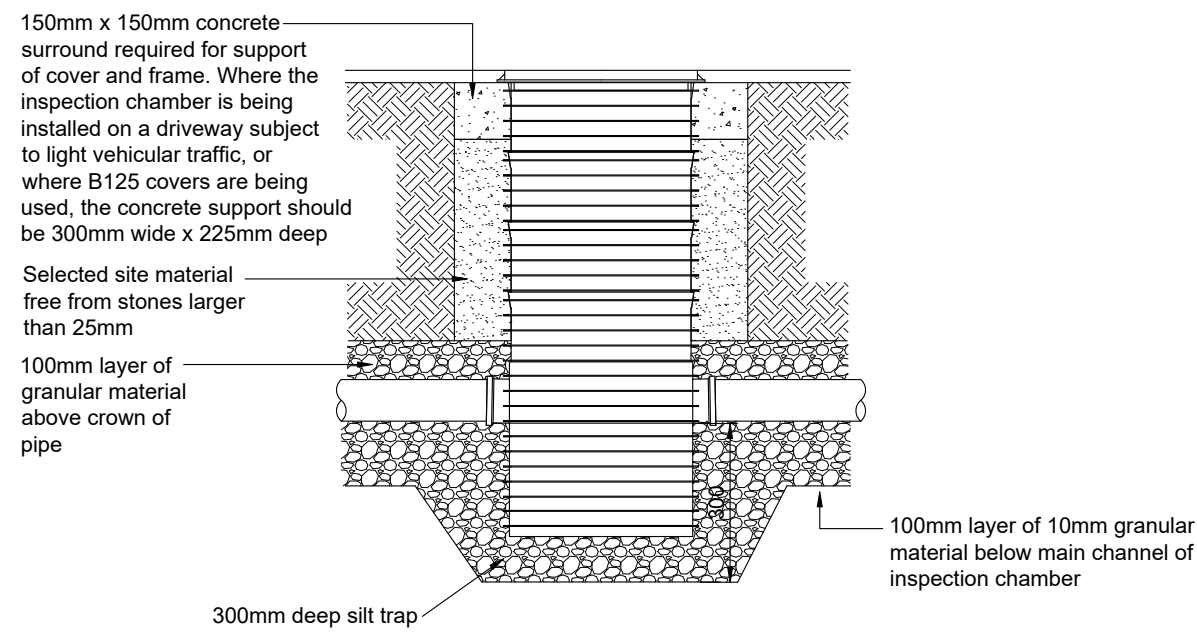
300mmØ SHALLOW INSPECTION CHAMBER DETAIL



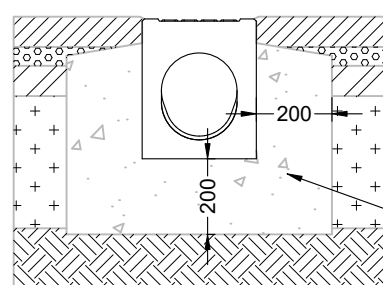
460mmØ INSPECTION CHAMBER DETAIL



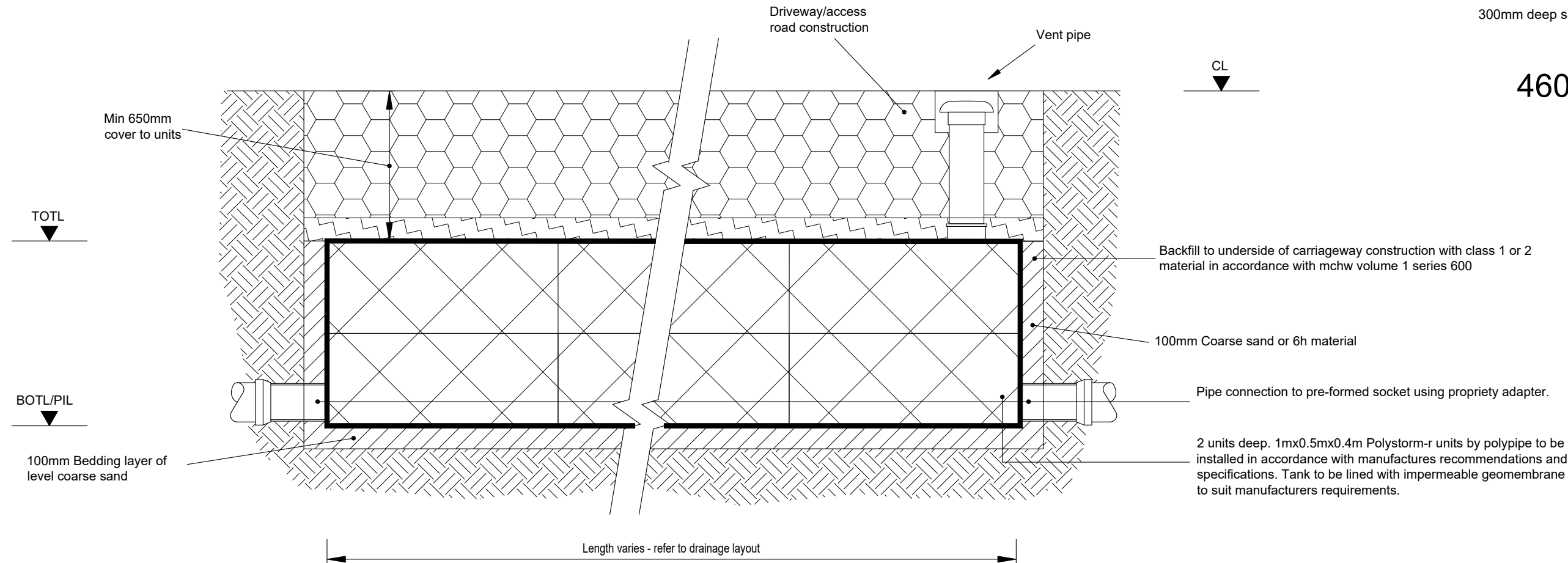
Rodding eye detail



460mmØ POLYPIPE BASIC SILT TRAP DETAIL

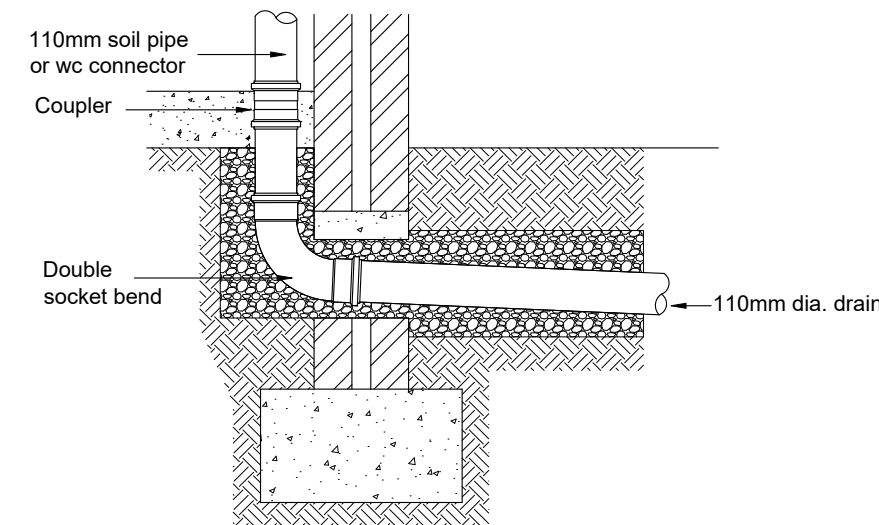


Aco Monodrain Construction Detail in Block Paving (To be read in conjunction with Aco installation specification)

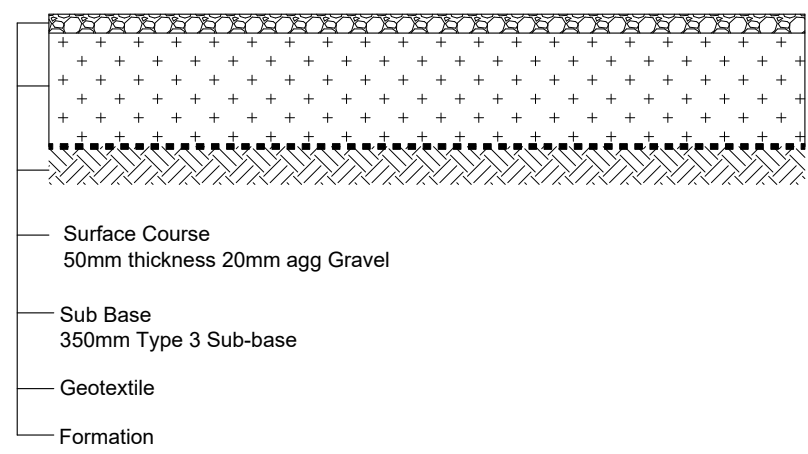


Attenuation tank using polystorm-r geomodular units trafficked areas

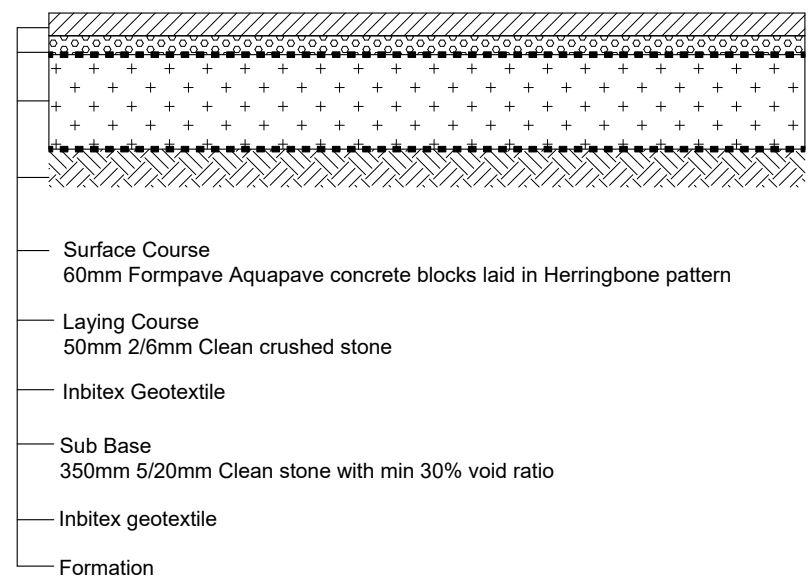
All storage tank drainage works shall be carried out in accordance with the specifications, method statements and recommendations of polypipe



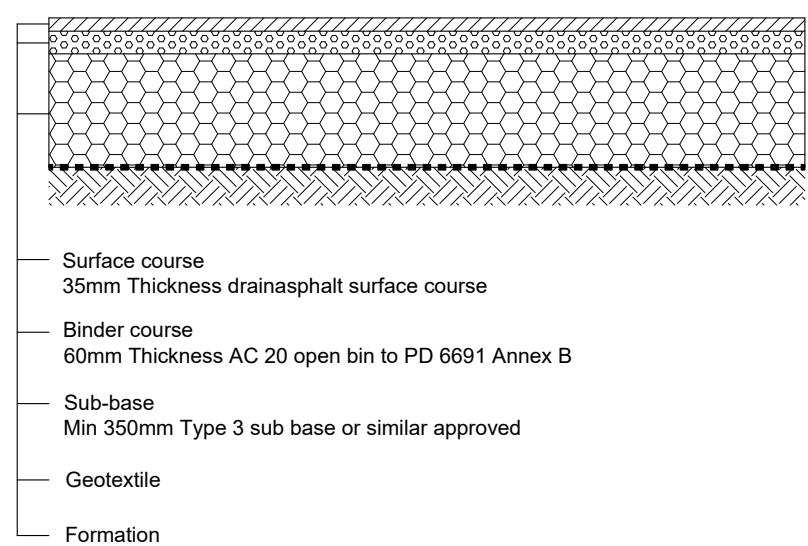
Soil pipe / wc connection



Infiltrating Gravel Car Parking area construction



Formpave permeable block paving private driveway construction



Permeable asphalt construction

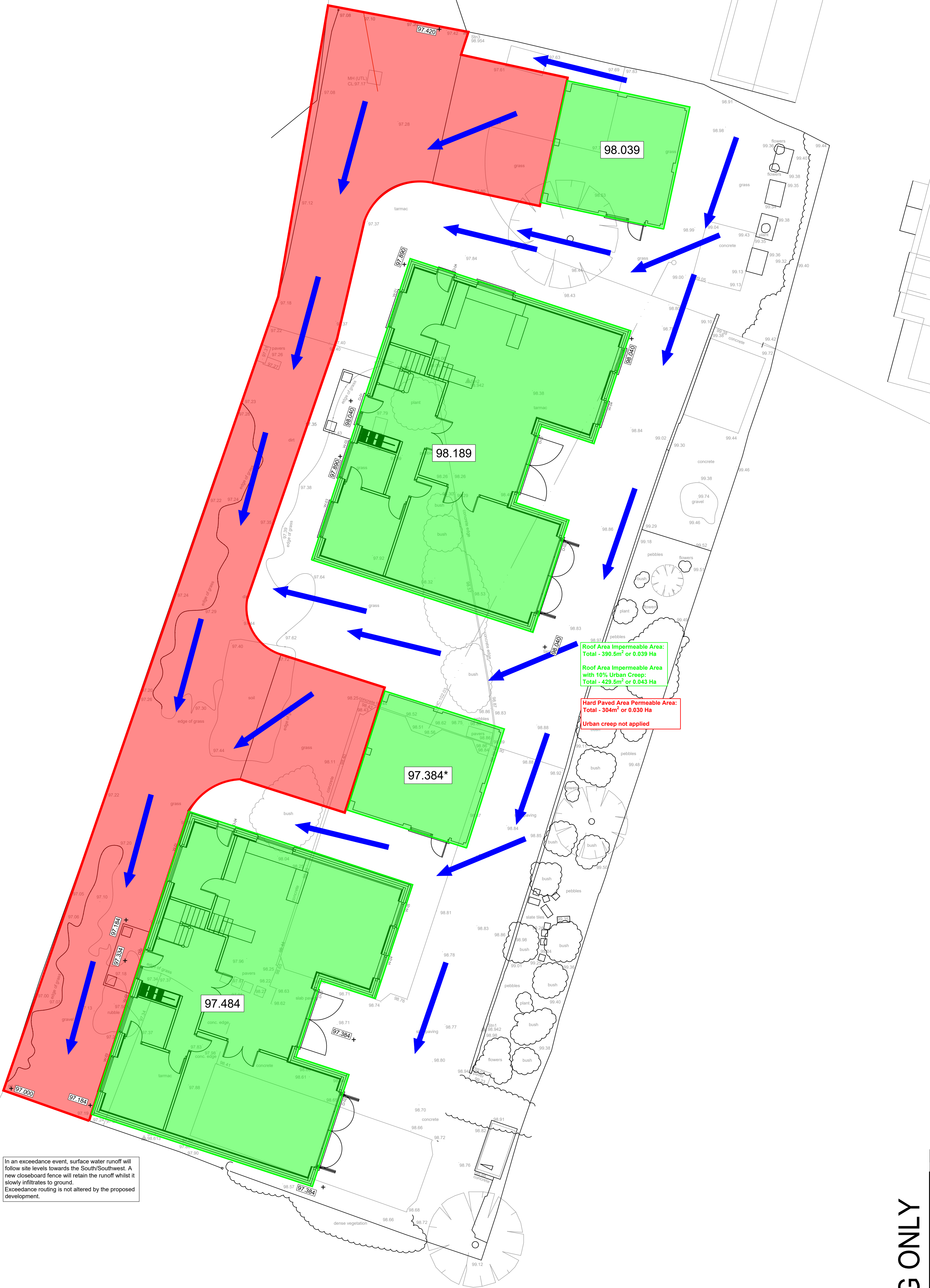
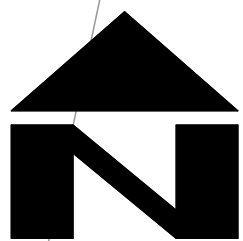
TYPE TBC BY CLIENT

Prefix to drawing numbers shall signify the following:-

PL = PLANNING	Shall not be used for contract or construction purposes
P = PRELIMINARY	Shall not be used for contract or construction purposes
T = TENDER	Shall not be used for construction purposes
C = CONSTRUCTION	These are the only drawings that shall be used for construction purposes
R = RECORD	Record of actual completed work

1	24.02.26	PRELIMINARY ISSUE	LH	CS	CS
REV	DATE	DESCRIPTION	BY	CHK	APP
CLIENT: VBMC DEVELOPMENT					
ARCHITECT: DANIEL HARRIS ARCHITECTS					
JOB TITLE: 1 HIGHFIELDS WARNINGLID					
DRAWING TITLE: CONSTRUCTION DETAILS					
DRAWN: LH	ENGINEER: C SLADE	CHECKED: CS	APPROVED: CS		
DATE: FEB 2026	SCALE @ A1: 1:20				
JOB No: C3980	STATUS: P	DRAWING No: 301	REV: 1		

FOR PLANNING ONLY



Roof Area Impermeable Area:
Total - 390.5m² or 0.039 Ha
Roof Area Impermeable Area
with 10% Urban Creep:
Total - 423.5m² or 0.043 Ha
Hard Paved Area Permeable Area:
Total - 304m² or 0.030 Ha
Urban creep not applied

Prefixed to drawing numbers shall signify the following:-			
PL = PLANNING	Shall not be used for contract or construction purposes		
P = PRELIMINARY	Shall not be used for contract or construction purposes		
T = TENDER	Shall not be used for construction purposes		
C = CONSTRUCTION	These are the only drawings that shall be used for construction purposes		
R = RECORD	Record of actual completed work		

1	24.02.26	PRELIMINARY ISSUE	LH	CS	CS
REV	DATE	DESCRIPTION	BY	CHK	APP
CLIENT VBMC DEVELOPMENT					
ARCHITECT DANIEL HARRIS ARCHITECTS					
JOB TITLE 1 HIGHFIELDS WARNINGLID					
DRAWING TITLE IMPERMEABLE AREA & OVERLAND FLOW ROUTE PLAN					
DRAWN LH	ENGINEER C SLADE	CHECKED CS	APPROVED CS		
DATE FEB 2026		SCALE @ A1 1:100			
JOB No. C3980	STATUS P	DRAWING No. 401		REV. 1	

FOR PLANNING ONLY

7.3 **Appendix C – Surface Water Calculations**

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	0.350
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	75.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
S4	0.022	5.00	97.334	450	526606.306	125282.665	0.746	96.588
AT1			97.334	100	526604.752	125282.775	1.300	96.034
SA1			97.334	1500	526607.949	125287.245	1.315	96.019
S9	0.022	5.00	97.890	450	526615.665	125308.942	0.765	97.125
AT2			97.539	100	526613.745	125309.772	1.200	96.339
SA2			97.539	1500	526616.308	125314.397	1.213	96.326
PP1	0.015	5.00	97.539	100	526616.471	125319.405	0.410	97.129
PP2	0.015		97.000	100	526599.623	125267.363	0.410	96.590

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S4	AT1	1.558	0.600	96.588	96.500	0.088	17.7	100	5.01	54.9
1.001	AT1	SA1	5.496	0.600	96.034	96.019	0.015	366.4	150	5.19	54.2
2.000	S9	AT2	2.092	0.600	97.125	96.849	0.276	7.6	100	5.01	54.9
2.001	AT2	SA2	5.288	0.600	96.339	96.326	0.013	406.7	150	5.19	54.2
3.000	PP1	PP2	54.701	0.600	97.129	96.590	0.539	101.5	150	5.91	51.2

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.844	14.5	4.4	0.646	0.734	0.022	0.0	38	1.620
1.001	0.519	9.2	4.3	1.150	1.165	0.022	0.0	72	0.511
2.000	2.825	22.2	4.4	0.665	0.590	0.022	0.0	30	2.198
2.001	0.492	8.7	4.3	1.050	1.063	0.022	0.0	75	0.491
3.000	0.997	17.6	2.8	0.260	0.260	0.015	0.0	40	0.728

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	1.558	17.7	100	Circular	97.334	96.588	0.646	97.334	96.500	0.734
1.001	5.496	366.4	150	Circular	97.334	96.034	1.150	97.334	96.019	1.165
2.000	2.092	7.6	100	Circular	97.890	97.125	0.665	97.539	96.849	0.590
2.001	5.288	406.7	150	Circular	97.539	96.339	1.050	97.539	96.326	1.063
3.000	54.701	101.5	150	Circular	97.539	97.129	0.260	97.000	96.590	0.260

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S4	450	Manhole	Adoptable	AT1	100	Manhole	Adoptable
1.001	AT1	100	Manhole	Adoptable	SA1	1500	Manhole	Adoptable
2.000	S9	450	Manhole	Adoptable	AT2	100	Manhole	Adoptable
2.001	AT2	100	Manhole	Adoptable	SA2	1500	Manhole	Adoptable
3.000	PP1	100	Manhole	Adoptable	PP2	100	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S4	526606.306	125282.665	97.334	0.746	450				
						0	1.000	96.588	100
AT1	526604.752	125282.775	97.334	1.300	100		1	1.000	96.500
						0	1.001	96.034	150
SA1	526607.949	125287.245	97.334	1.315	1500		1	1.001	96.019
S9	526615.665	125308.942	97.890	0.765	450				
						0	2.000	97.125	100
AT2	526613.745	125309.772	97.539	1.200	100		1	2.000	96.849
						0	2.001	96.339	150
SA2	526616.308	125314.397	97.539	1.213	1500		1	2.001	96.326
PP1	526616.471	125319.405	97.539	0.410	100		0	3.000	97.129
									150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
PP2	526599.623	125267.363	97.000	0.410	100		1	3.000	96.590	150

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
10	0	0	0
30	45	0	0
100	45	0	0

Node SA1 Lined Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.01534	Invert Level (m)	95.334	Pit Length (m)	3.000
Side Inf Coefficient (m/hr)	0.01534	Time to half empty (mins)	805	Depth (m)	0.685
Safety Factor	2.0	Ring Diameter (m)	1.500	Inf Depth (m)	
Porosity	0.30	Pit Width (m)	3.000	Number Required	1

Node AT1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	96.034
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	30.0	30.0	0.800	30.0	45.5	0.801	0.0	45.5

Node SA2 Lined Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.01534	Invert Level (m)	95.539	Pit Length (m)	3.000
Side Inf Coefficient (m/hr)	0.01534	Time to half empty (mins)	883	Depth (m)	0.787
Safety Factor	2.0	Ring Diameter (m)	1.500	Inf Depth (m)	
Porosity	0.30	Pit Width (m)	3.000	Number Required	1

Node AT2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	96.339
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	30.0	30.0	0.800	30.0	45.5	0.801	0.0	45.5

Node PP2 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.01534	Invert Level (m)	96.590	Slope (1:X)	101.0
Side Inf Coefficient (m/hr)	0.01534	Time to half empty (mins)	128	Depth (m)	0.300
Safety Factor	2.0	Width (m)	30.500	Inf Depth (m)	
Porosity	0.30	Length (m)	10.000		

Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S4	10	96.621	0.033	2.6	0.0053	0.0000	OK
960 minute winter	AT1	870	96.125	0.091	0.3	2.5905	0.0000	OK
960 minute winter	SA1	870	96.125	0.106	0.3	2.8868	0.0000	OK
15 minute summer	S9	10	97.150	0.025	2.6	0.0040	0.0000	OK
960 minute winter	AT2	870	96.416	0.077	0.3	2.1960	0.0000	OK
960 minute winter	SA2	870	96.416	0.090	0.3	3.2604	0.0000	OK
15 minute summer	PP1	10	97.161	0.032	1.8	0.0003	0.0000	OK
240 minute summer	PP2	156	96.662	0.072	1.4	2.3680	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	S4	1.000	AT1	2.6	1.256	0.179	0.0032
960 minute winter	AT1	1.001	SA1	0.3	0.268	0.033	0.0672
960 minute winter	SA1	Infiltration		0.0			
15 minute summer	S9	2.000	AT2	2.6	1.765	0.117	0.0031
960 minute winter	AT2	2.001	SA2	0.3	0.263	0.034	0.0533
960 minute winter	SA2	Infiltration		0.0			
15 minute summer	PP1	3.000	PP2	1.8	0.623	0.099	0.1859
240 minute summer	PP2	Infiltration		0.5			

Results for 10 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S4	10	96.656	0.068	7.8	0.0108	0.0000	OK
1440 minute summer	AT1	1470	96.346	0.312	0.6	8.9068	0.0000	SURCHARGED
1440 minute summer	SA1	1470	96.346	0.327	0.3	3.2783	0.0000	OK
15 minute summer	S9	10	97.174	0.049	7.8	0.0078	0.0000	OK
1440 minute summer	AT2	1470	96.635	0.296	0.6	8.4498	0.0000	SURCHARGED
1440 minute summer	SA2	1470	96.635	0.309	0.3	3.6480	0.0000	OK
15 minute summer	PP1	10	97.185	0.056	5.3	0.0004	0.0000	OK
240 minute summer	PP2	164	96.710	0.120	3.2	6.4184	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	S4	1.000	AT1	7.8	1.585	0.536	0.0076
1440 minute summer	AT1	1.001	SA1	0.3	0.253	0.027	0.0968
1440 minute summer	SA1	Infiltration		0.0			
15 minute summer	S9	2.000	AT2	7.8	2.275	0.350	0.0072
1440 minute summer	AT2	2.001	SA2	0.3	0.261	0.034	0.0931
1440 minute summer	SA2	Infiltration		0.0			
15 minute summer	PP1	3.000	PP2	5.2	0.843	0.298	0.4066
240 minute summer	PP2	Infiltration		0.7			

Results for 30 year +45% CC Critical Storm Duration. Lowest mass balance: 99.96%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute summer	S4	11	96.777	0.189	14.7	0.0300	0.0000	SURCHARGED
1440 minute summer	AT1	1470	96.641	0.607	1.0	17.2942	0.0000	SURCHARGED
1440 minute summer	SA1	1470	96.641	0.622	0.3	3.7981	0.0000	OK
15 minute summer	S9	10	97.204	0.079	14.7	0.0126	0.0000	OK
1440 minute summer	AT2	1470	96.931	0.592	1.0	16.8738	0.0000	SURCHARGED
1440 minute summer	SA2	1470	96.931	0.605	0.3	4.1701	0.0000	OK
15 minute summer	PP1	10	97.210	0.081	10.1	0.0007	0.0000	OK
180 minute summer	PP2	168	96.794	0.204	6.8	14.1235	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)
15 minute summer	S4	1.000	AT1	14.3	1.826	0.986	0.0122
1440 minute summer	AT1	1.001	SA1	0.3	0.254	0.028	0.0968
1440 minute summer	SA1	Infiltration		0.0			
15 minute summer	S9	2.000	AT2	14.6	2.525	0.660	0.0120
1440 minute summer	AT2	2.001	SA2	0.3	0.261	0.034	0.0931
1440 minute summer	SA2	Infiltration		0.0			
15 minute summer	PP1	3.000	PP2	10.0	1.003	0.569	0.6187
180 minute summer	PP2	Infiltration		0.7			

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.33%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	S4	1440	97.158	0.570	0.9	0.0906	0.0000	FLOOD RISK
1440 minute winter	AT1	1440	97.158	1.124	0.9	22.8232	0.0000	FLOOD RISK
1440 minute winter	SA1	1440	97.158	1.139	0.2	4.7123	0.0000	OK
1440 minute winter	S9	1440	97.387	0.262	0.9	0.0416	0.0000	SURCHARGED
1440 minute winter	AT2	1440	97.387	1.048	0.9	22.8226	0.0000	FLOOD RISK
1440 minute winter	SA2	1440	97.387	1.061	0.3	4.9753	0.0000	OK
15 minute summer	PP1	10	97.224	0.095	12.7	0.0008	0.0000	OK
240 minute winter	PP2	232	96.844	0.254	4.8	18.6941	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
1440 minute winter	S4	1.000	AT1	0.9	0.965	0.062	0.0122
1440 minute winter	AT1	1.001	SA1	0.2	0.236	0.022	0.0968
1440 minute winter	SA1	Infiltration		0.0			
1440 minute winter	S9	2.000	AT2	0.9	1.332	0.041	0.0164
1440 minute winter	AT2	2.001	SA2	0.3	0.248	0.029	0.0931
1440 minute winter	SA2	Infiltration		0.0			
15 minute summer	PP1	3.000	PP2	12.6	1.066	0.715	0.7171
240 minute winter	PP2	Infiltration		0.7			

7.4 **Appendix D – Infiltration Test Results**

Job: 1 Highfields, Warninglid - Test 1

Infiltration Calculator

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

V_{p75-25} = Effective storage volume between 75% and 25% effective depth

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

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

f = Infiltration rate

Trial pit width	=	0.3
Trial pit depth	=	2
Trial pit length	=	1

a_{p50} = 2.9 m/squared

t_{p75-25} = 22000 seconds

V_{p75-25} = 0.3 m/cubed

F = 4.7E-06

Job: 1 Highfields, Warninglid - Test 2

Infiltration Calculator

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

V_{p75-25} = Effective storage volume between 75% and 25% effective depth

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

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

f = Infiltration rate

Trial pit width	=	0.3
Trial pit depth	=	2
Trial pit length	=	1

a_{p50} = 2.9 m/squared

t_{p75-25} = 23500 seconds

V_{p75-25} = 0.3 m/cubed

F = 4.4E-06

Job: 1 Highfields, Warninglid - Test 3

Infiltration Calculator

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

V_{p75-25} = Effective storage volume between 75% and 25% effective depth

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

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

f = Infiltration rate

Trial pit width	=	0.3
Trial pit depth	=	2
Trial pit length	=	1

a_{p50} = 2.9 m/squared

t_{p75-25} = 24300 seconds

V_{p75-25} = 0.3 m/cubed

F = 4.26E-06

7.5 **Appendix E – Maintenance Schedule**

SuDS Maintenance Schedule

1 Highfields, Brighton Rod, Warninglid RH17 5SY

Planning Ref: DM/25/1376

Rev – 1

Reference C3980

Date 26th February 2026

Maintenance

1.1 Introduction

- 1.1.1 During construction, the Contractor will be responsible for maintaining the drainage and SuDS (Sustainable Drainage Systems). Upon handover, the occupiers will take on the responsibility of these duties as laid out in this report.
- 1.1.2 The maintenance schedule for the proposed development will be split down into two separate categories; SuDS features and regular private drainage.

1.2 SuDS at 1 Highfields, Warninglid

- 1.2.1 As listed above, in section 5.1.2, the SuDS features used on site will be **Soakaway/Attenuation Tank, permeable paving, rainwater harvesting and bioretention planters**
- 1.2.2 The SuDS features have been designed for easy maintenance and comprise:
- Regular Day-to-Day care – litter collection, regular gardening to control vegetation growth and checking inlets where water enters the SuDS features
 - Occasional tasks – checking the SuDS features and removing any silt that builds up in the SuDS feature
 - Remedial work – repairing damage where necessary

1.3 SuDS Drainage Maintenance Specification

1.3.1 Rainwater Harvesting Tank

In order to maintain the functioning of the rainwater harvesting tanks, the following maintenance requirements should be adhered to:

Operation and maintenance requirements for rainwater harvesting tanks		
Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Ensure that all inlets and outlets are clear of debris and blockage	Weekly
	Remove debris inlets and outlets	Weekly
	Inspect first flush diverter to ensure it is working correctly and not clogged	Weekly – Clean if necessary
	Clean Filter screens	Monthly – Replace if damaged
	Inspect the tank for sediment build-up and any signs of algae	Monthly
	Inspect roof and gutters and clear of all debris	Every 3 months
	Inspect pump for any signs of wear or damage and test to ensure it is functioning correctly	Every 3 months
	Check bottom of the tank for sediment build-up and clear if necessary	Every 6 months
	Ensure all downpipes are clear and functioning correctly and clear if necessary	Every 6 months
	Test water	Every 6 months
	Thorough tank cleaning – drain tank, scrub interior and rinse	Annually or as required
	Service the pump and filtration system and replace any worn parts	Annually
	Inspect overflow to ensure it is working correctly and clear any obstructions	Annually
Monitoring	Monitor Water levels	Annually
	Inspect for pests e.g mosquitoes and take measures to prevent	As required

1.3.2 Soakaway/Attenuation Tank

In order to maintain the functioning of the soakaway, the following maintenance requirements should be adhered to:

Operation and maintenance requirements for soakaway		
Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae, or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from per-treatment structures and/or internal forebays	Annually, or as required
Remedial Actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents, and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

1.3.3 Permeable Paving

In order to maintain the functioning of the permeable paving, the following maintenance requirements should be adhered to:

Table 21.3 Operation and maintenance requirements for permeable paving		
Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required take remedial action	Three-monthly, 48h after large storms in first six months
	Inspect silt accumulation rate and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

1.3.4 Bio retention systems

In order to maintain the functioning of the bio retention systems, the following maintenance requirements should be adhered to:

Table 18.3 Operation and maintenance requirements for bio retention systems		
Maintenance Schedule	Required Action	Typical Frequency
Regular Inspections	Inspection infiltration surfaces for silting and ponding, record de-watering time of the facility and assess standing water levels in underdrain (if appropriate) to determine if maintenance is necessary	Quarterly
	Check operation of underdrains by inspection of flows after rain	Annually
	Assess plants for disease infection, poor growth, invasive species etc and replace as necessary	Quarterly
	Inspect inlets and outlets for blockages	Quarterly
Regular maintenance	Remove litter and surface debris and weeds	Quarterly (or more frequently for tidiness or aesthetic reasons)
	Replace any plants, to maintain planting density	As required
	Remove sediment, litter and debris build-up from around inlets or from forebays	Quarterly to biannually
Occasional maintenance	Infill any holes or scour in the filter medium, improve erosion protection if required	As required
	Repair minor accumulations of silt by raking away surface mulch, scarifying surface of medium and replacing mulch	As required
Remedial actions	Remove and replace filter medium and vegetation above	As required but likely to be > 20 years

1.4 General Drainage Maintenance Specification

1.4.1 Inlet Structures and Inspection Chambers

- Inlet structures such as rainwater downpipes, road gullies and channel drains should be free from obstruction at all times to allow free flow through the SuDS
- Inspection Chambers and Rodding Eyes are used on bends or where pipes come together. They allow access and cleaning to the system if necessary.

Inlet Structures and Inspection Chambers	
Regular Maintenance	Frequency
Inlet Structures Inspect rainwater downpipes, channel drains and road gullies, removing obstructions and silt as necessary. Check that there is no physical damage. Strim vegetation 1m min surround to structures and keep area free from silt and debris	Monthly
Inspection Chambers and below ground control chambers. Remove cover and inspect, ensuring that the water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt. Undertake inspection after leaf fall in Autumn	Annually
Occasional Maintenance Check topsoil levels are 20mm above edges of chambers to avoid mower damage.	As necessary
Remedial Work Repair physical damage if necessary	As required

1.4.2 Below ground drainage pipes

- Below ground drainage pipes convey water to the SuDS system. They should always be free from obstruction to allow free flow.

Below Ground Drainage Pipes	
Regular Maintenance	Frequency
Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months then annually
Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
Remove sediment from pre-treatment inlet structures and inspection chambers.	Annually or as required
Maintain vegetation to designed limits within the vicinity of below ground drainage pipes and tanks.	Monthly or as required
Remedial Work	
Repair physical damage if necessary	As required
Monitoring	
Inspect all inlets, outlets and vents to ensure that they are in good conditions and operating as designed.	Annually
Survey inside of pipe runs for sediment build up and remove if necessary.	Every 5 years or as required