

SuDS and Drainage Report

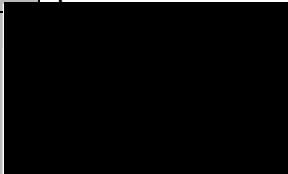
The Brook, Cuttinglye Road, Crawley Down, West Sussex RH10 4LR

Rev: I

Ref: **C4004**

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Document Control

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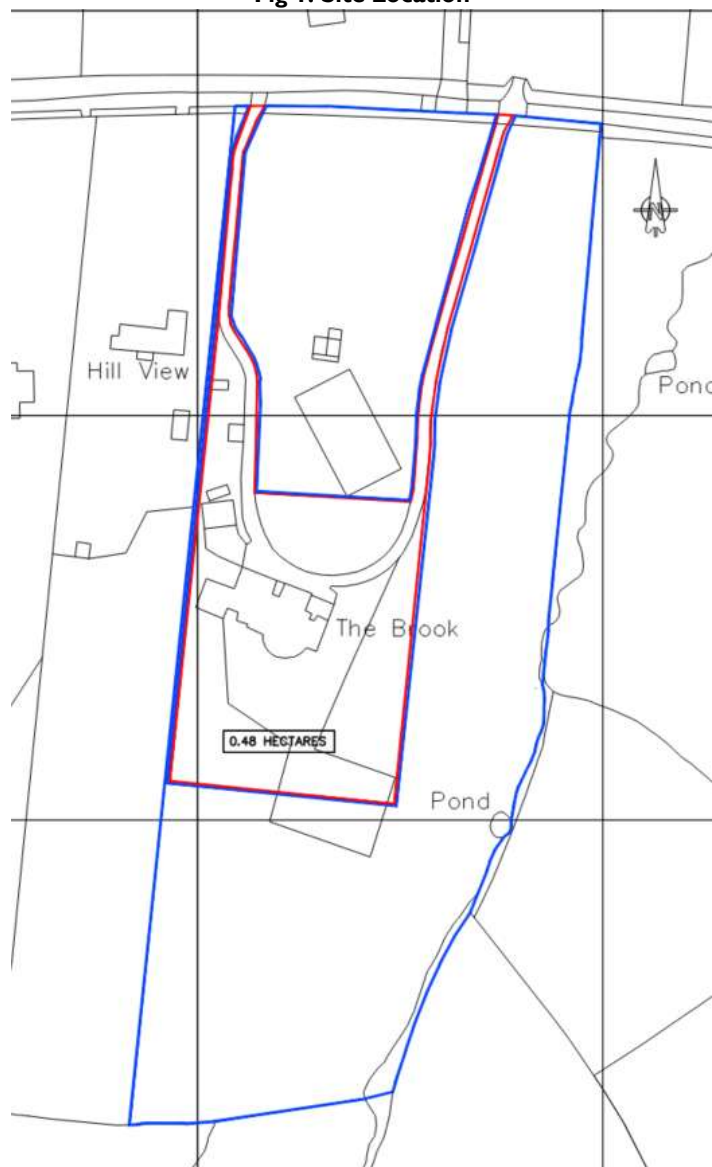
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1 Introduction

- 1.1.1 CGS Civils Ltd has been appointed to undertake a drainage strategy report for a proposed development at The Brook, Cuttinglye Road in Crawley Down.
- 1.1.2 The proposed development will consist of a replacement dwelling. The proposed development is located as OS Grid Reference TQ 35129 38657 and has the post code RH10 4LR.
- 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.

Fig 1. Site Location



2 Executive Summary:

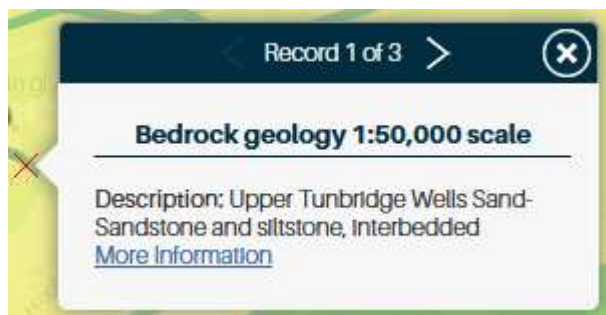
- 2.1.1 The proposed scheme will consist of the demolition of an existing dwelling followed by the construction of a replacement dwelling.
- 2.1.2 The underlying geology is noted to be comprised of a sandy clay. During an infiltration test, the water level failed to drain more than 210mm during the day-long test and therefore is considered a failure and confirms that infiltration is not viable as a means of surface water discharge.
- 2.1.3 The surface water runoff from the proposed dwelling is to be captured by a positive drainage network and discharged into an existing drainage network which is understood to discharge into an existing stream to the east of the site. The discharge rate is to be restricted to 1.0l/s and the network will make use of a detention basin in order to cater for the 1 in 100-year + 45% storm + 10% urban creep. The detention basin is to also allow for infiltration through the base, so infiltration is achieved where possible.
- 2.1.4 The Foul water is to be treated on site via a package treatment plant prior to utilising the existing discharge from the septic tank which is understood to discharge into the watercourse to the east. The inclusion of a swimming pool will result in the need for a holding tank which will retain backwash/overflow from the pool prior to connecting into the rest of the drainage network following the evaporation of chlorine.

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 Upper Tunbridge Wells Sand which is comprised Sandstone and Siltstone. 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 A site investigation was conducted by CGS Civils Ltd in March 2026. The works consisted of the excavation of a single trial pit at a shallow depth and an infiltration test to BRE365 was conducted within the pit.
- 3.2.2 During the excavation, the underlying geology was noted to be comprised of a sandy clay with no groundwater being encountered. The water level failed to drain more than 210mm during the day-long test and therefore is considered a failure and confirms that infiltration is not viable as a means of surface water discharge.

Fig 3. Soakaway test photos



4 Existing Drainage

- 4.1.1 A CCTV Drainage survey of the existing network was conducted on site, which confirmed that the existing surface water runoff discharges primarily to ground with a couple of rainwater gully's connecting into the foul water network.
- 4.1.2 The foul water from the existing dwelling and outbuildings discharge into a septic tank which then discharges towards the east. The outlet is understood to connect into the watercourse present towards to the east of the site.
- 4.1.3 A copy of the CCTV drainage survey can be found in Appendix E.

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 has been included within the design to allow for re-use within the property.
Discharge to Ground	Infiltration test failed although a degree of infiltration will take place within the proposed basin.
Discharge to Watercourse	Yes – discharge to existing drainage network which is understood to discharge east towards a stream. Discharge rate to be restricted to 1.0l/s with a detention basin being utilised as a storage feature whilst also allowing for as much infiltration as possible.
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
Infiltration Basin Design	Base Coefficient (m/hr): 0.01908
	Side Coefficient (m/hr): 0.00000
	Factor of Safety: 2
	Porosity: 100%
	Time to Half Empty (mins): 1440

5.3 Surface Water Drainage

- 5.3.1 Based upon the failure of the infiltration test on site, it is proposed that all surface water is to be discharged into an existing stream located to the east of the site via a connection into an existing drainage network.
- 5.3.2 The surface water runoff from the proposed dwelling is to be captured by a positive drainage network and discharged into an existing drainage network which is understood to discharge into an existing stream to the east of the site. The discharge rate is to be restricted to 1.0l/s and the network will make use of a detention basin in order to cater for the 1 in 100-year + 45% storm + 10% urban creep. The detention basin is to also allow for infiltration through the base, so infiltration is achieved where possible.
- 5.3.3 The hard paved areas are to be retained, and any new areas are to be constructed from a permeable surface to allow them to freely drain to ground via infiltration.
- 5.3.4 Hydraulic calculations have been carried out which can be found in **Appendix C**. A 10% urban creep has been applied to the calculations.

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 Hazard Level	Total Suspended Solids	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 layer 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
Residential Roof	Ground Water	Table 26.4	Bioretention feature	0.8	0.8	0.8
Individual driveways, residential car parks and low traffic roads	Ground water	Table 26.4	Permeable Paving	0.7	0.6	0.7

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 is to be treated on site by a package treatment plant prior to discharging into the existing foul water network on site downstream of the existing septic tank. The existing septic tank is to be removed and disposed off site.
- 5.5.2 The proposed dwelling will include the construction of an internal swimming pool. The chlorine that will be present within the backwash/overflow from the pool is harmful to the bacteria within the treatment plant and it is therefore proposed that the backwash/overflow from the pool is to be discharged into a holding tank prior to connection to the remainder of the foul water network.
- 5.5.3 The holding tank will be vented to allow chlorine to break down and dissipate into the atmosphere prior to discharging into the treatment plant.
- 5.5.4 The design of the holding tank is subject to correspondence with both the pool and treatment plant manufacturers.
- 5.5.5 Remedial works will be required on the existing foul network to clear the pipework of root ingress and to ensure the network discharges as intended.
- 5.5.6 The proposed foul water discharge does not require Environment Agency approval as it adheres to the general binding rules for small discharge to surface water. This is because the proposed discharge:
- Is less than 5m³ a day
 - Utilises a sufficient treatment system
 - Is not causing pollution
 - Is not within 500 meters of a protected site
 - Is not within 50m of any other exempt discharge

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 a replacement dwelling.
- 6.1.2 The surface water runoff from the proposed dwelling is to be captured by a positive drainage network and discharged into an existing drainage network which is understood to discharge into an existing stream to the east of the site. The discharge rate is to be restricted to 1.0l/s and the network will make use of a detention basin in order to cater for the 1 in 100-year + 45% storm + 10% urban creep. The detention basin is to also allow for infiltration through the base, so infiltration is achieved where possible.
- 6.1.3 The Foul water is to be treated on site via a package treatment plant prior to utilising the existing discharge from the septic tank which is understood to discharge into the watercourse to the east. The inclusion of a swimming pool will result in the need for a holding tank which will retain backwash/overflow from the pool prior to connecting into the rest of the drainage network to ensure chlorine has evaporated to protect the treatment plant.
- 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.

7 Appendices

7.1 Appendix A – Site Plan

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FOOTPRINT OF
EXISTING HOUSE

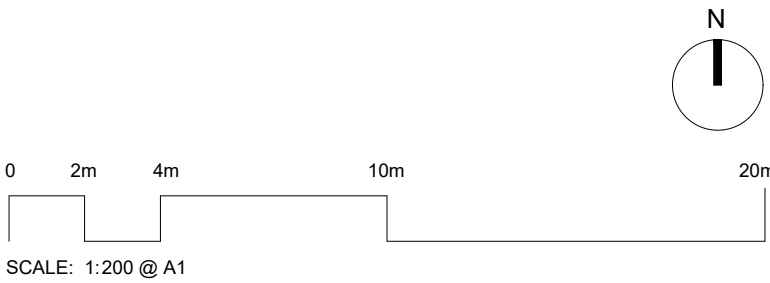


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I	SE	06/01/26	Paving removed
H	SE	14/11/25	Windows amended
G	SE	13/11/25	Annex mods
F	SE	04/11/25	Annex + Loft layout mods
E	CC	26/09/25	Trees updated
D	CC	20/08/25	Minor mods
C	CC	08/08/25	General Amendments, lift shaft
B	CC	01/08/25	General Amendments
A	CC / SE	03/07/25	General Amendments
rev.	drawn.	date.	amendment.



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drawing title
Proposed Site Plan

scale	1 : 200 @A1	drawn	SE
status	For Planning	job no.	541714
drawing no.		revision	

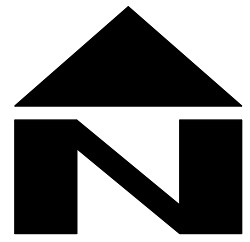
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Proposed Site Plan

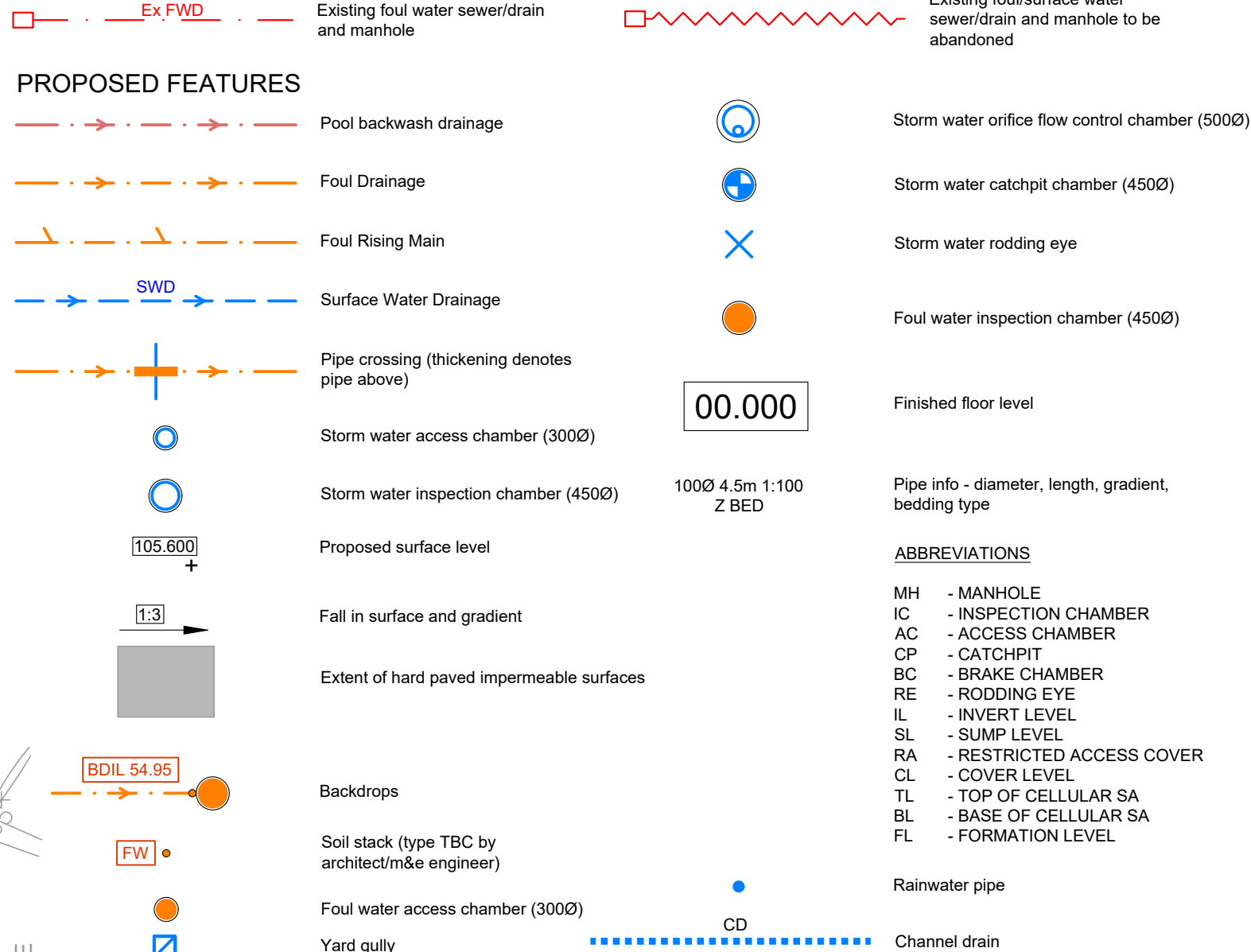
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7.2 **Appendix B – Drainage Layout**

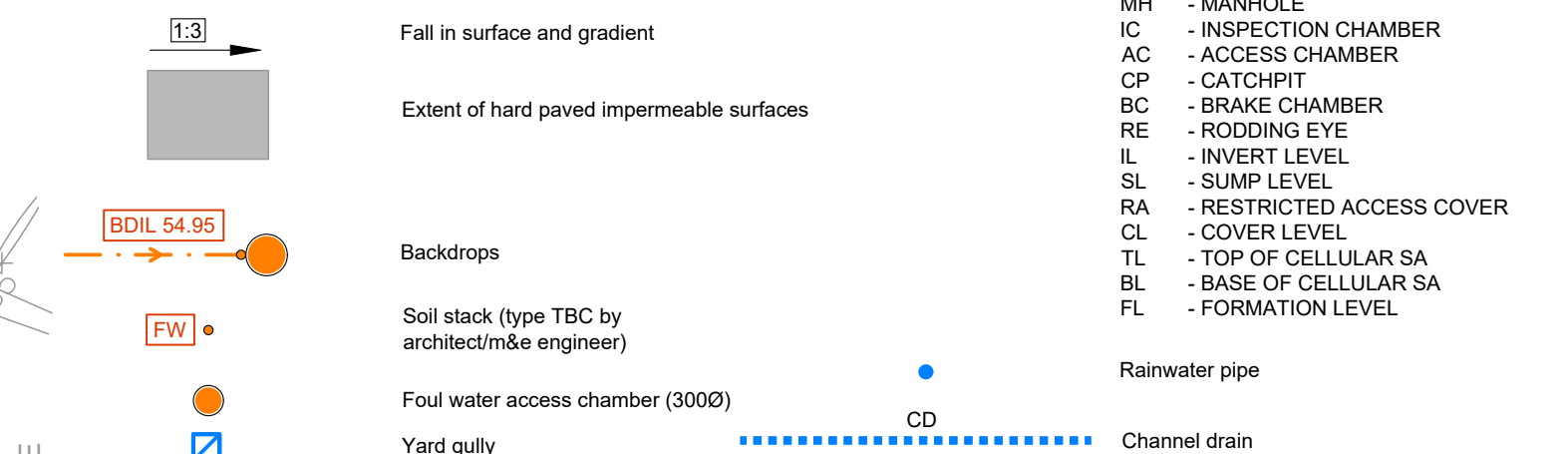


DRAINAGE LEGEND

EXISTING FEATURES



PROPOSED FEATURES



ABBREVIATIONS

MH - MANHOLE
IC - INSPECTION CHAMBER
AC - ACCESS CHAMBER
CP - CATCHPIT
BC - BRAKE CHAMBER
RE - RODDING EYE
IL - INVERT LEVEL
SL - SUMP LEVEL
RA - RESTRICTED ACCESS COVER
CL - COVER LEVEL
TL - TOP OF CELLULAR SA
BL - BASE OF CELLULAR SA
FL - FORMATION LEVEL

STANDARD DRAINAGE NOTES

- DO NOT SCALE FROM THIS DRAWING. REFER TO FIGURED DIMENSIONS ONLY. THE CONTRACTOR SHOULD CHECK ALL DIMENSIONS ON SITE.
- ALL DIMENSIONS IN MILLIMETRES AND ALL LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
- THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECT AND ENGINEERING DETAILS, DRAWINGS AND SPECIFICATIONS.
- ANY DISCREPANCIES SHOULD BE REPORTED TO THE ARCHITECT AND/OR ENGINEER IMMEDIATELY, SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO THE COMMENCEMENT OF WORK.
- BEFORE COMMENCING CONSTRUCTION THE CONTRACTOR MUST CHECK THE INVERT LEVELS OF EXISTING SEWERS TO WHICH CONNECTIONS ARE MADE. IN ADDITION THE CONTRACTOR MUST LOCATE AND DETERMINE INVERT LEVELS OF THE EXISTING SEWERS TO WHICH CONNECTIONS ARE PROPOSED. ANY DISCREPANCIES ARE TO BE NOTIFIED TO THE ENGINEER IMMEDIATELY, PRIOR TO CONSTRUCTION.
- ALL DRAINAGE WORKS SHOULD COMMENCE AT THE PROPOSED DOWNSTREAM CONNECTION POINT. THE WORKS CONTINUING UPSTREAM FOLLOWING CONFIRMATION OF THE TIE-IN INVERT LEVELS TO THE ENGINEER. CONNECTIONS TO MANHOLES OR LARGER SIZED PIPES ETC. SHOULD BE SOFFIT TO SOFFIT UNLESS OTHERWISE INSTRUCTED BY THE ENGINEER, IF THIS IS NOT POSSIBLE INFORM THE ENGINEER IMMEDIATELY.
- COVER LEVELS SHOWN ARE APPROXIMATE. COVERS AND FRAMES SHALL BE SET TO FINISHED GROUND LEVELS AND FALLS.
- ALL UN-REFERENCED PIPES ARE TO BE 100mm DIA.
- ALL PIPES TO BE ADOPTED, OR CONNECTING TO ADOPTED SEWERS, TO BE VITRIFIED CLAY TO BS EN 295 AND BS65 (SWIS ONLY), OR CONCRETE PIPES TO BE EN 1916 AND BS5911:PART 1.
- ROAD GULLY OUTLET PIPES ARE TO BE 150mm DIA. WITH CONCRETE SURROUND AND FLEXIBLE JOINTS. ALL GULLIES SHALL BE FITTED WITH GRADE D400 GRATINGS AND FRAMES TO BS EN124, UNLESS OTHERWISE STATED.
- ALL ADOPTABLE SEWERS SHALL BE CONSTRUCTED TO THE STANDARDS AND SPECIFICATION LAID DOWN IN 'SEWERS FOR ADOPTION' 6th EDITION, WITH A VIEW TO ADOPTION UPON COMPLETION OF WORKS.
- ALL PRIVATE DRAINAGE TO BE IN ACCORDANCE WITH THE BUILDING REGULATIONS APPROVED DOCUMENT PART-H, AND TO THE SATISFACTION OF THE BUILDING CONTROL INSPECTOR.
- THE CONTRACTOR IS TO KEEP A RECORD OF ANY VARIATIONS MADE ON SITE, INCLUDING THE RELOCATION OF SEWERS OR DRAINS, SO THAT AN AS CONSTRUCTED DRAWINGS CAN BE PREPARED UPON COMPLETION OF THE PROJECT.
- STUB CONNECTIONS TO ADOPTABLE MANHOLES SHALL BE MADE FROM VITRIFIED CLAY AND CONSIST OF TWO ROCKER PIPES LAID AT THE SAME GRADIENT AS THE UP OR DOWNSTREAM PIPE.
- IF ANY SUB SOIL DRAINAGE SYSTEMS ARE UNCOVERED DURING THE WORKS CONTACT THE ENGINEER FOR INSTRUCTIONS. SUB SOIL DRAINS ARE TO BE DIVERTED AROUND NEW WORKS AND CONNECTED INTO THE SURFACE WATER.
- NO PRIVATE AREAS ARE TO DRAIN ONTO ADOPTABLE AREAS AND VICE VERSA.
- ALL EXISTING MANHOLE COVER'S, GULLIES, ETC. ARE TO BE RAISED/LOWERED TO SUIT NEW LEVELS.
- IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONFIRM THE LOCATION AND DEPTH OF ALL EXISTING SERVICES AND UTILITIES THAT MAY BE PRESENT.
- UPON COMPLETION BUT PRIOR TO HANDOVER, CONTRACTOR TO CARRY OUT FULL CCTV SURVEY OF DRAINAGE SYSTEM WHICH IS TO BE REVIEWED BY ENGINEER TO ENSURE SATISFACTORY INSTALLATION.
- PROPRIETARY PRODUCTS TO BE INSTALLED IN FULL ACCORDANCE WITH MANUFACTURER'S GUIDANCE.
- MANHOLE AND CHAMBER COVER GRADES:
 - 'A15' IN ALL LANDSCAPED AREAS AND ON FOOTPATHS
 - 'B125' IN ALL DRIVEWAYS
 - 'C250' IN PRIVATE PARKING AREAS
 - 'D400' IN CARRIAGEWAY/ACCESS ROAD

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

P-	22.04.26	PRELIMINARY ISSUE	LH	CS	CS
REV	DATE	DESCRIPTION	BY	CHK	APP

cgs
civils
Consulting Civil Engineers

CLIENT	MR & MRS ROFF				
ARCHITECT	SCANDIA-HUS LTD				
JOB TITLE	THE BROOK CRAWLEY DOWN				
DRAWING TITLE	DRAINAGE DESIGN				
DRAWN	LH	ENGINEER	C SLADE	CHECKED	CS
DATE	APRIL 2026		SCALE @ A1 1:100		
JOB No.	C4004	STATUS	P	DRAWING No.	101
REV.					1

PRELIMINARY

Site Specific Notes

- The proposed scheme consists of the demolition of an existing dwelling followed by the construction of a replacement dwelling.
- The underlying geology is noted to be sandy clay. Onsite infiltration testing failed. The existing drainage network is noted to discharge into an existing septic tank which then discharges towards the east and is understood to connect into the watercourse.
- The surface water runoff will discharge to the existing drainage network at a restricted rate of 1.0l/s. The surface water network will make use of a detention basin which has been designed to cater for the 1 in 100-year +45% CCA + 10% urban creep.
- The foul water is to be treated on site via a package treatment plant prior to utilising the existing discharge from the septic tank which is understood to discharge into the watercourse to the east.
- The foul water runoff from the plant room and pool backwash is in abeyance and is to be confirmed following correspondence with an appointed pool manufacturer and CGS Civils Ltd.

Detention Basin
Top of banking: 105.600 - 105.110
Inlet pipes 1500 IL: 104.460
Basin base Level: 104.460
Depth 0.650m
A storage volume of 26.8 m³ is provided to accommodate the Designed to 1 in 100-year storm event, including a 45% allowance for climate change

Existing Drainage from outbuilding to be retained

F1
CL 106.760
IL 106.280
4500 IC
To replace existing manhole

S3
CL 106.710
IL 105.929 (1000)
IL 105.979 (1500)
4500 IC

FWIL 106.164
SWIL 105.804

F7
CL 106.710
IL 106.203
4500 IC

F8
CL 106.710
IL 106.260
3000 AC

FWIL 106.164
SWIL 105.804

FWIL 106.164
SWIL 105.804

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FWIL 106.164
SWIL 105.804

ACO Swale Inlet
IL 104.460

S6 Control Chamber
SEL Protected Orifice (Or similar approved)
Orifice = 22mmØ
MAX 1l/s
CL 105.160
IL 104.449
SL 104.149
5000 SEL Chamber
To be fitted with Foul Air Trap and Non-Return Valve

S4
CL 106.440
IL 105.641 (1000)
IL 105.591 (1500)
SL 105.291
4500 CP

F6
CL 106.040
IL 105.400
4500 IC

F9
CL 106.600
IL 106.100
4500 IC

To replace existing manhole

FWIL 106.164
SWIL 105.804

FWIL 106.164
SWIL 105.804

FWIL 106.164
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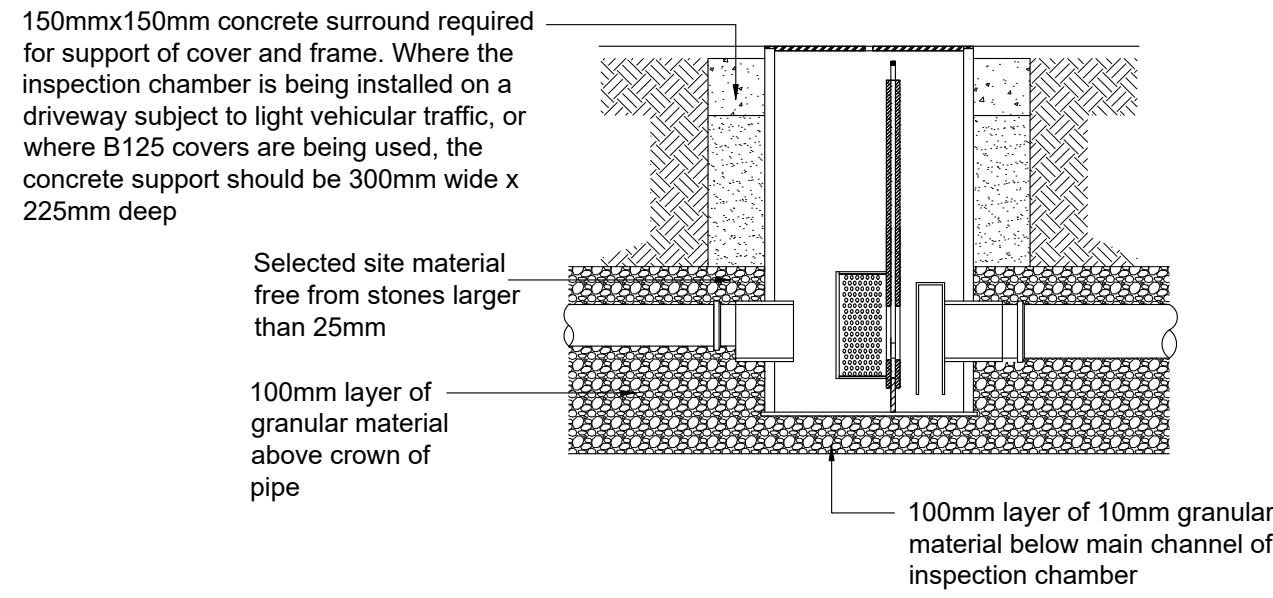
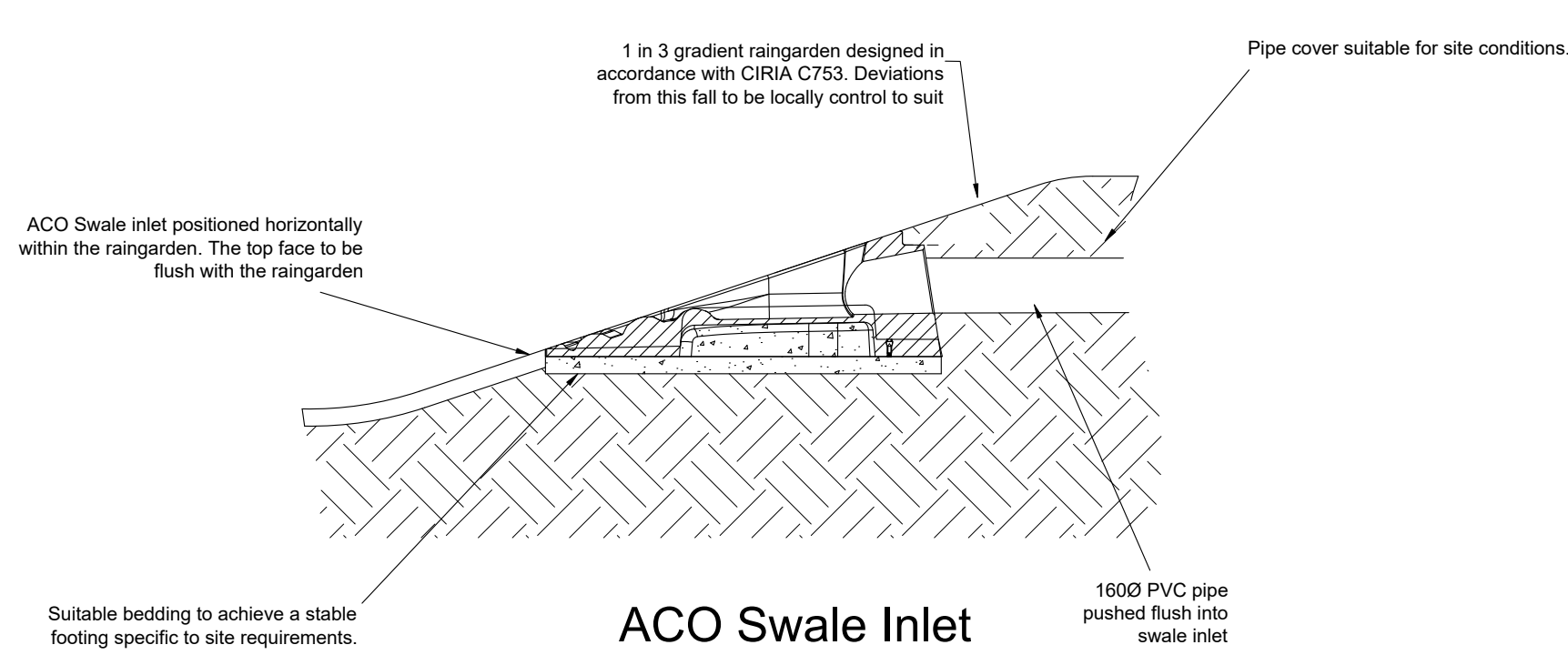
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SWIL 105.804

EXFWMH7
CL 106.460
IL UNK
Taken from Eyes On Drainage CCTV Survey

Existing Drainage from outbuilding to be retained

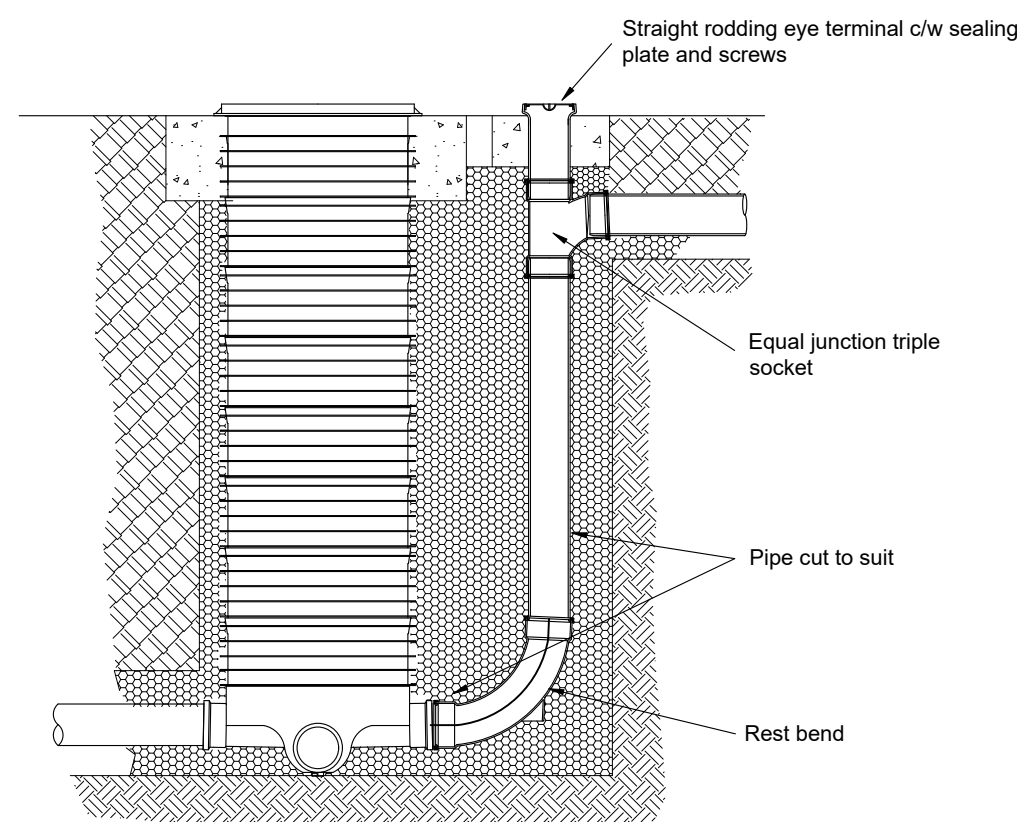
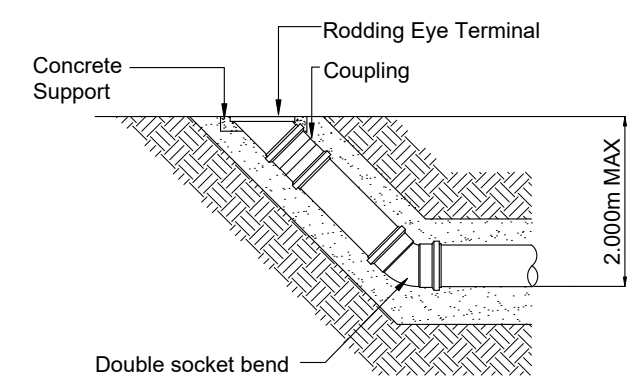
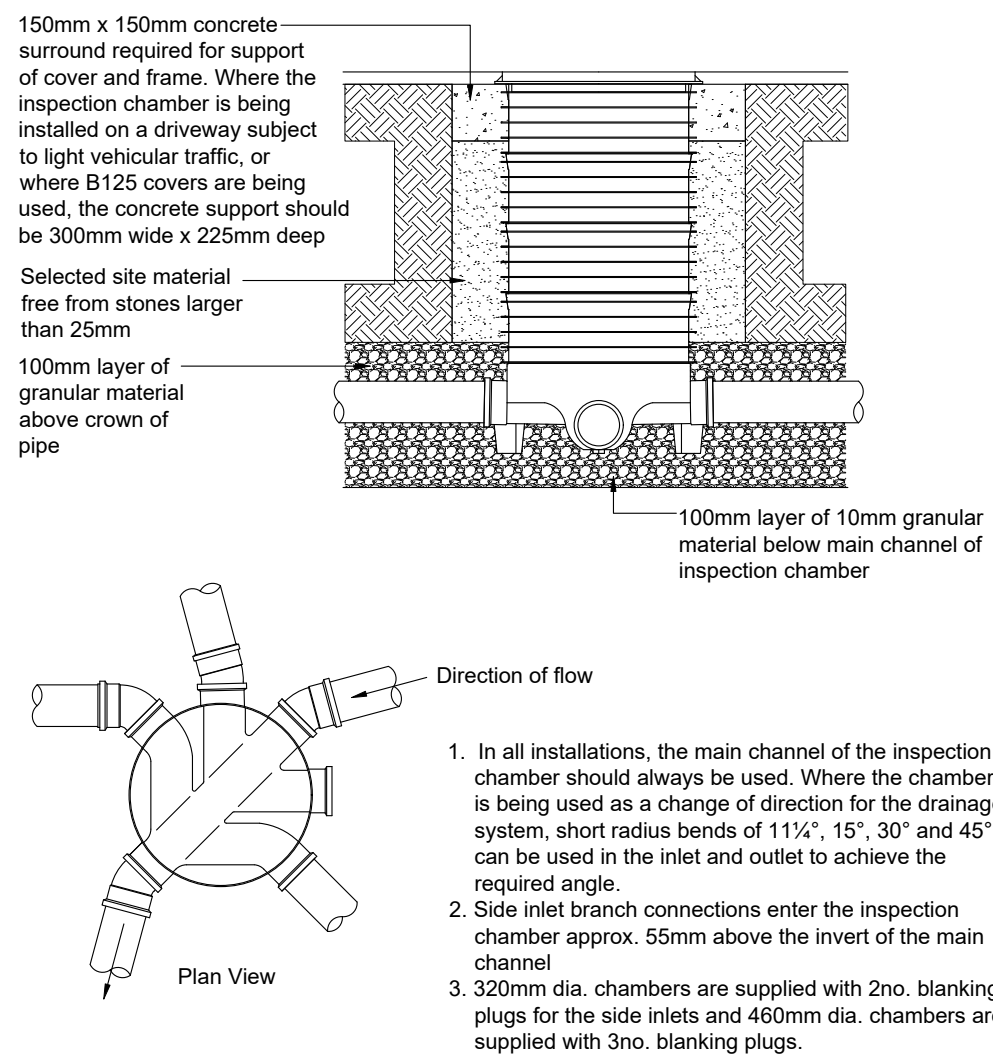
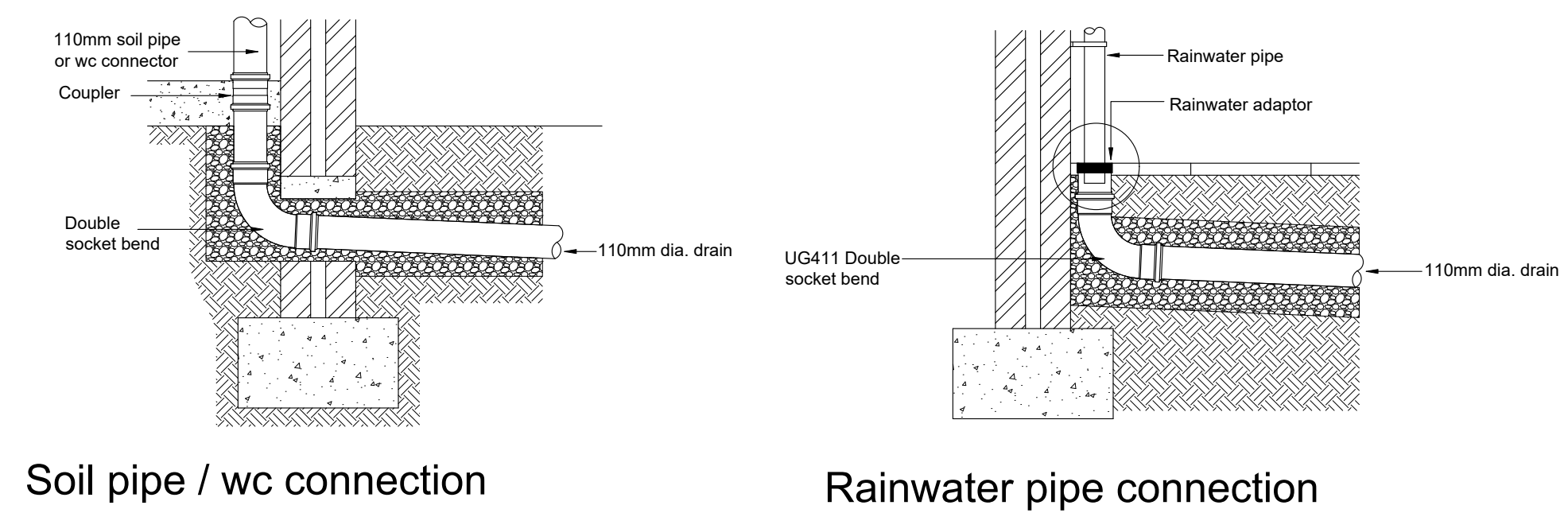
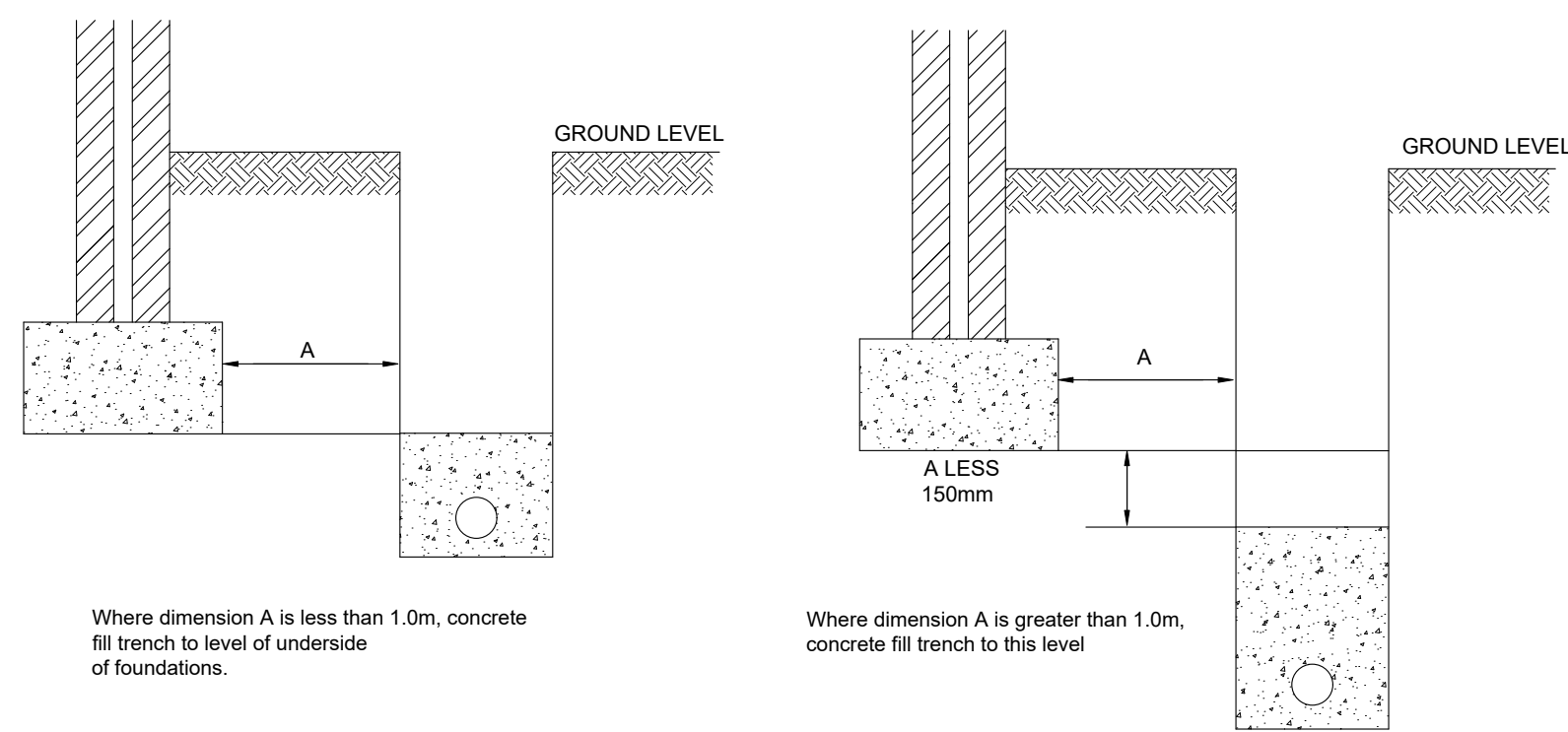
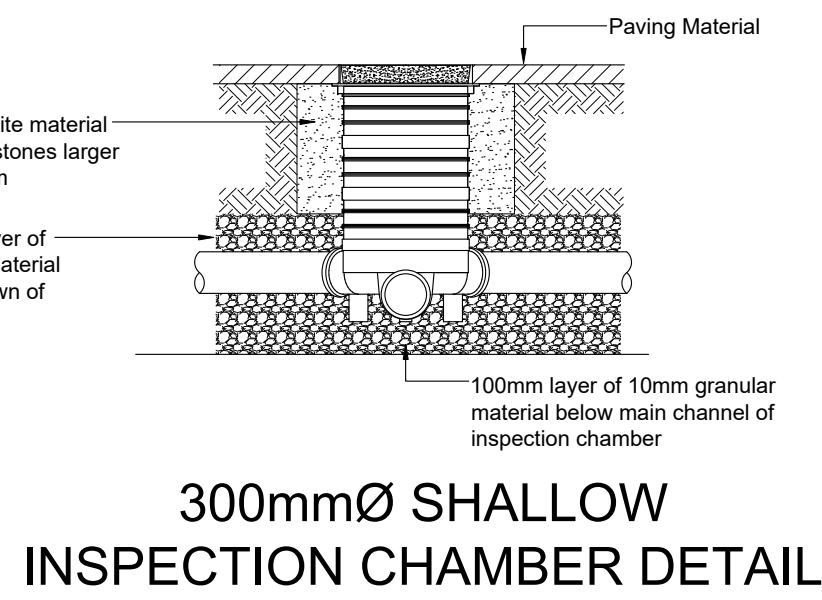
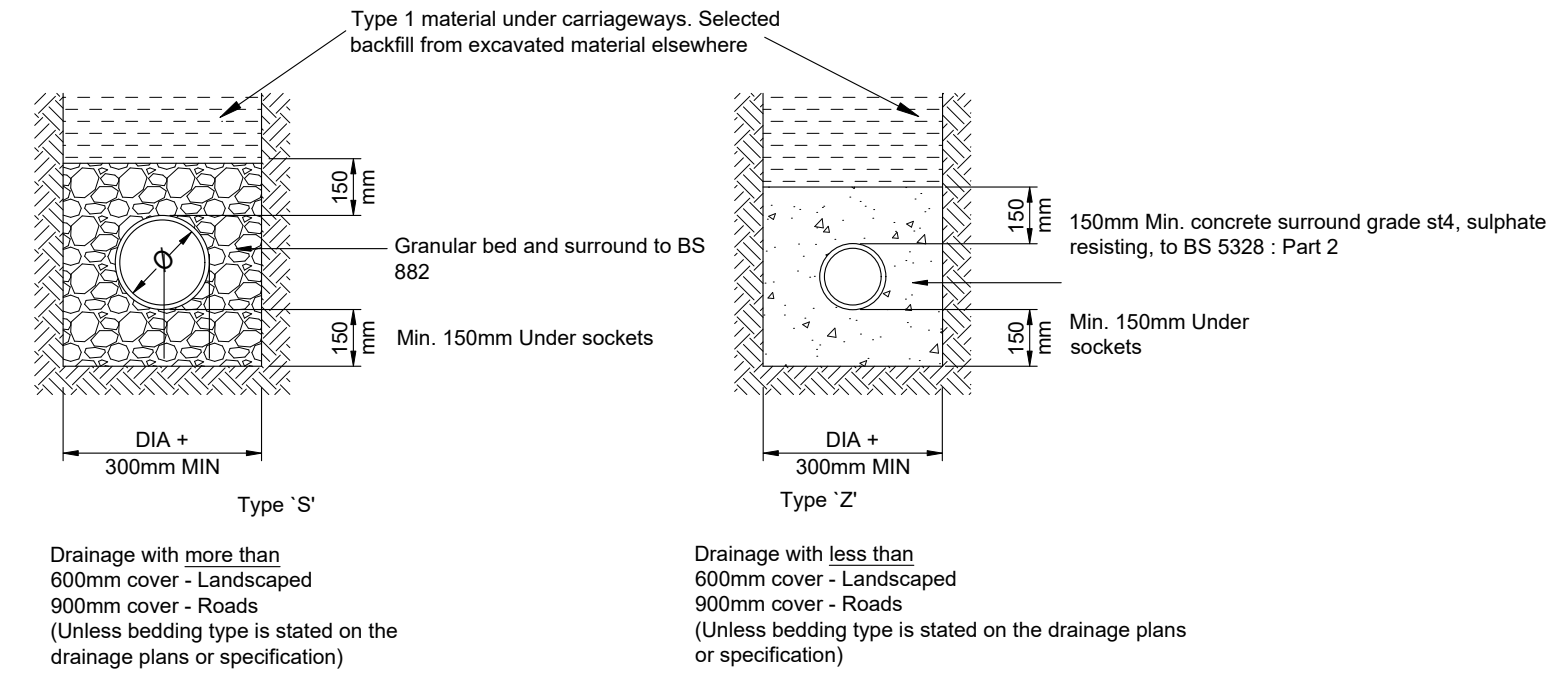
DESIGN SUBJECT TO THE CONFIRMATION OF:
EXTERNAL LEVELS DESIGN
GROUNDWATER DEPTH
ROOT PROTECTION AREAS

DESIGN SUBJECT TO THE APPROVAL OF:
BUILDING CONTROL

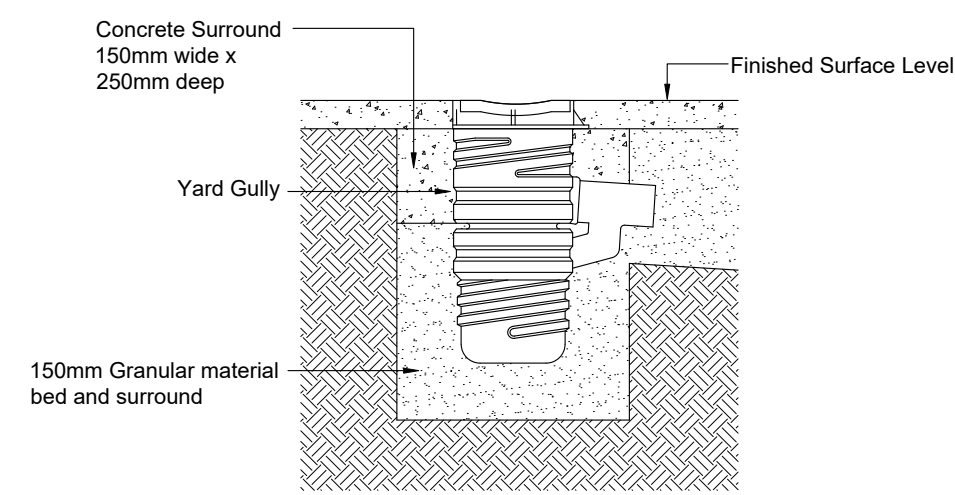
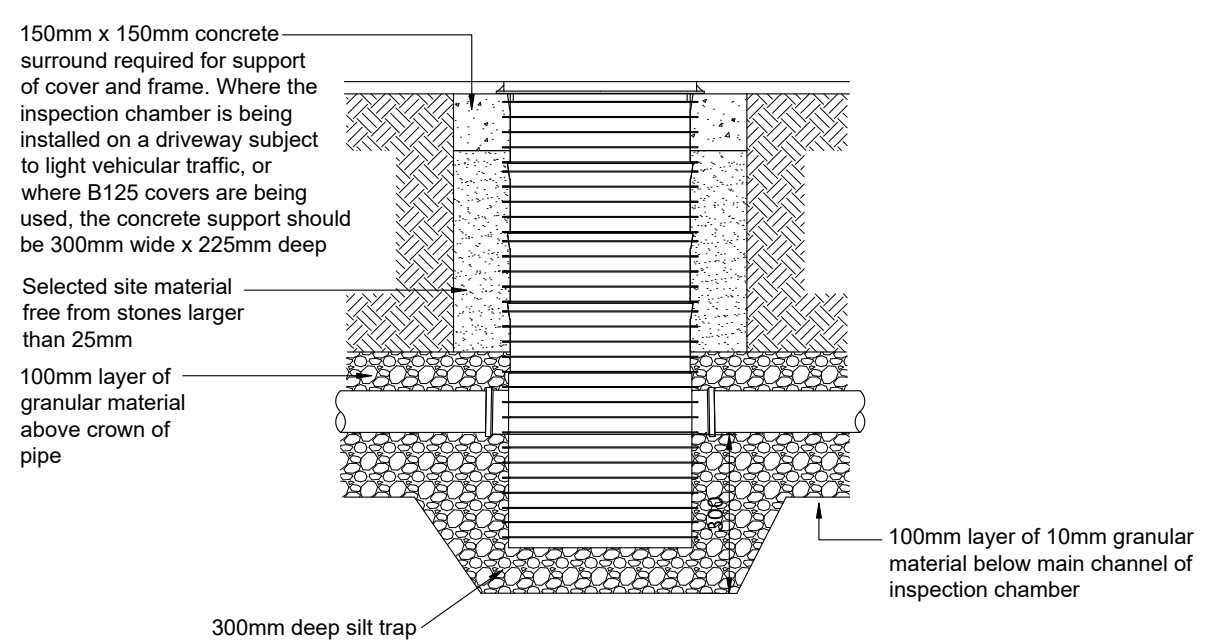


CONRAFLOW 500 WITH FOUL AIR TRAP

SEL Environmental LTD
Phone: 01254 589987
Email: sales@selenvironmental.com



REV		DATE	DESCRIPTION	BY	CHK	APP
P-		22.04.26	PRELIMINARY ISSUE	LH	CS	CS
PL			PLANNING			
P			PRELIMINARY			
T			TENDER			
C			CONSTRUCTION			
R			RECORD			



YARD GULLY DETAIL

PRELIMINARY

P-	22.04.26	PRELIMINARY ISSUE		LH	CS	CS
REV	DATE	DESCRIPTION			BY	CHK APP
 Consulting Civil Engineers						
CLIENT MR & MRS ROFF						
ARCHITECT SCANDIA-HUS LTD						
JOB TITLE THE BROOK CRAWLEY DOWN						
DRAWING TITLE CONSTRUCTION DETAILS						
DRAWN	ENGINEER		CHECKED	APPROVED		
LH	C SLADE		CS	CS		
DATE	APRIL 2026		SCALE @ A1	1:20		
JOB No.		STATUS	DRAWING No.		REV.	
C4004		P	301		1	

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	0.035	5.00	106.310	450	71.785	93.462	0.600	105.710
RG1			105.110	100	80.586	104.632	0.650	104.460
S6			105.160	450	87.787	99.641	0.754	104.406

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	RG1	14.221	0.600	105.710	104.460	1.250	11.4	150	5.08	54.7
1.001	RG1	S6	8.762	0.600	104.460	104.406	0.054	162.3	150	5.26	54.0

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	3.003	53.1	6.9	0.450	0.500	0.035	0.0	37	2.088
1.001	0.786	13.9	6.8	0.500	0.604	0.035	0.0	74	0.782

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	14.221	11.4	150	Circular	106.310	105.710	0.450	105.110	104.460	0.500
1.001	8.762	162.3	150	Circular	105.110	104.460	0.500	105.160	104.406	0.604

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S4	450	Manhole	Adoptable	RG1	100	Manhole	Adoptable
1.001	RG1	100	Manhole	Adoptable	S6	450	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S4	71.785	93.462	106.310	0.600	450				
						0	1.000	105.710	150
RG1	80.586	104.632	105.110	0.650	100				
						1	1.000	104.460	150
						0	1.001	104.460	150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S6	87.787	99.641	105.160	0.754	450	1 	1.001	104.406	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 %)
100	45	10	0

Node S6 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.754	Discharge Coefficient	0.650
Replaces Downstream Link	x	Design Flow (l/s)	1.0		
Invert Level (m)	104.406	Diameter (m)	0.022		

Node RG1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.01908	Safety Factor	2.0	Invert Level (m)	104.460
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	37.0	37.0	0.650	91.0	93.9

Results for 100 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 99.11%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S4	10	105.797	0.087	34.0	0.0139	0.0000	OK
240 minute winter	RG1	232	104.920	0.460	6.2	25.7760	0.0000	FLOOD RISK

240 minute winter	S6	232	104.919	0.513	0.8	0.0816	0.0000	OK
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Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S4	1.000	RG1	34.0	2.797	0.640	0.2009	
240 minute winter	RG1	1.001	S6	0.8	0.218	0.056	0.1543	
240 minute winter	RG1	Infiltration		0.1				
240 minute winter	S6	Orifice		0.8				17.9