



DRAINAGE STRATEGY

BROCK COTTAGE, BURFORD ROAD, BRIZE
NORTON OX18 3NR
ALBRIGHT DENE
SEPTEMBER 2023
5158-BROCK-ICS-XX-RP-C-07.002

DRAINAGE STRATEGY

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REPORT ISSUE

Revision	Date	Notes
P01	27/09/2023	First Issue

PREPARED BY

B. KNOWLDEN May 2022

REVIEWED BY

R. J. WHITE May 2022

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Directors:

R.J. White B.Sc (Hons) C.Env C.WEM I.Eng MCIWEM, A. J. Griffiths BEng (Hons) MCIHT
N. Jones, M. Blanco M.Eng GMICE
Registered Office: Jamesons House, Compton Way, Witney, OX28 3AB
Registered in England and Wales 07521130, VAT No: 111335958

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1 DRAINAGE STRATEGY

Item	Details	Reference /comment
Method of Foul Water Discharge	Foul water flows are to drain via gravity to the existing Thames Water sewer running beneath the driveway to the south of the site. A new junction connection will be made with the exact location and depth TBC.	The new connection will be subject to S106 connection consent from Thames Water.
Method of Surface Water Discharge	<p>The surface water drainage design proposed for the new dwellings is to follow the drainage hierarchy to ensure the site reflects the natural flows from the site as closely as possible:</p> <ol style="list-style-type: none"> 1. Rainwater reuse 2. Infiltration 3. Discharge to Surface Water or a Watercourse 4. Discharge to a Surface Water sewer or a Highway Drain 5. Discharge to a Foul Sewer <p>Surface water falling onto the roof and hardstanding areas are to be drained via infiltration, to a permeable gravel driveway. Baffles will be introduced to prevent the through flow of water. Beyond the internal bay, the drive will drain via infiltration at a 1:1 ratio.</p>	
Local Ground Conditions	<p>3 exploratory holes have been dug as part of soakage testing undertaken on site to BRE365 by JAYSTONES on 22/11/2022. It found the site to be underlain by:</p> <p>0.1-0.9m: Light brown slightly clayey gravelly and cobbles of limestone.</p> <p>0.2m: Firm brown very sandy gravelly clay with occasionally angular limestone cobbles. Gravel is fine to coarse angular limestone.</p> <p>0.2-0.55m: Light brown clayey sandy gravel and occasional angular limestone cobbles. Gravel is fine to coarse angular limestone.</p>	
Infiltration Rate	Soakage testing to BRE365 (Ref: 22.11.001, Dated 22/11/2022) has been undertaken on site by JAYSTONES and found the site-specific infiltration rates to be: 1.8×10^{-4} m/s, 4.8×10^{-6} m/s, 4.6×10^{-5} m/s, 2.1×10^{-4} m/s, 3.9×10^{-5} m/s, 1.5×10^{-4} m/s and 1.9×10^{-5} m/s.	The Infiltration Rate used for the design is 4.8×10^{-6} m/s
Surface Water Calculations	<p>The surface water drainage system has been designed for a 1 in 100-year event, plus an allowance of 40% for climate change.</p> <p>Impermeable areas have had an additional 10% added for urban creep in line with Ciria C753.</p> <p>Contributing Areas</p> <p>Roof Areas = 215.0 m²</p>	The total impermeable area for the site is 0.046ha

Item	Details	Reference /comment
	Parking Area = 245.0 m ² Total Area = 460 m ²	
Ground Water	A site investigation has yet to be undertaken for the site. However, boreholes carried out in the vicinity of the site, found resting water at 9mbgl. Further in-situ testing would be required to confirm the seasonal depth of groundwater.	
Water Quality	Permeable gravel will be required for its water purification qualities in order to avoid the need for petrol interceptors.	
Exceedance Flows	<p>It is proposed that finished floor levels will be raised 150mm above the average ground level to mitigate against the risk of any surface water flooding.</p> <p>Exceedance flows will replicate the existing and flow at a surface level from the lowest point on the drive, then to the lower area of ground within the site, at the location of the original glass house to the west of the access road. This is an area of approximately 150m², producing a secondary swale storage volume in excess of 20 m² to ensure the consequence of failure would be minor surface ponding in land controlled by the site owner.</p> <p>The proposed surface water drainage measures will be designed to contain the peak storm event that can be expected for a 1 in 100-year situation. A 40% allowance has already been applied to the site to account for future climate change and a further 10% added to the impermeable areas to allow for urban creep.</p>	
Fluvial Flood Risk/ Environment Agency Flood Mapping	The Environment Agency flood map for the development site suggests that the site wholly falls within Flood zone 1, which is defined as land assessed as having a less than 1 in 1000 annual probability of river flooding in any one year.	
SuDS Maintenance	During construction, the SuDS systems will be maintained by the contractor. Upon sale of the last plot, the SuDS drainage system inclusive of access road, permeable paving and silt traps are to be maintained by the owner of the freehold or their appointed representative(s).	Refer to Appendix A for the suggested SuDS Maintenance schedule
Other		

Table 1 Drainage Strategy

Appendix A - Maintenance Schedule

Item	Required Maintenance	Frequency
Pipe and chambers	CCTV camera survey, flush, descale, repair as necessary	5 Years or upon poor performance
Pervious Pavements (Gravels)	Inspect gravel for siltation and weed growth	As required or upon poor performance
	Remove Weeds and rake	As required or upon poor performance
	For heavy siltation or petrochemical spills lift surface gravel, wash and replace	As required or upon poor performance
	Stabilise and mow contributing and adjacent areas.	As required.
	Initial inspection.	Monthly for 3 months after installation
	Inspect for evidence of poor operation and/or weed growth. If required, take remedial action.	3-monthly, 48 h after large storms.
	Inspect silt accumulation rates and establish appropriate brushing frequencies.	Annually.
	Monitor inspection chambers.	Annually.
Silt traps and catchpits	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly
	Debris removal from catchment surface (where may cause risks to performance)	Monthly
	Inspection of silt traps and catch pits to assess silt accumulation	Monthly (and after large storms)
	Removal of accumulated silt from silt trap and catch pit sumps	Annually, or as required
	Repair/rehabilitation of inlets, outlet, overflows and vents	As required
	Inspect/check all inlets, outlets, and overflows to ensure that they are in good condition and operating as designed	Annually and after large storms

Table 2 SuDS Maintenance

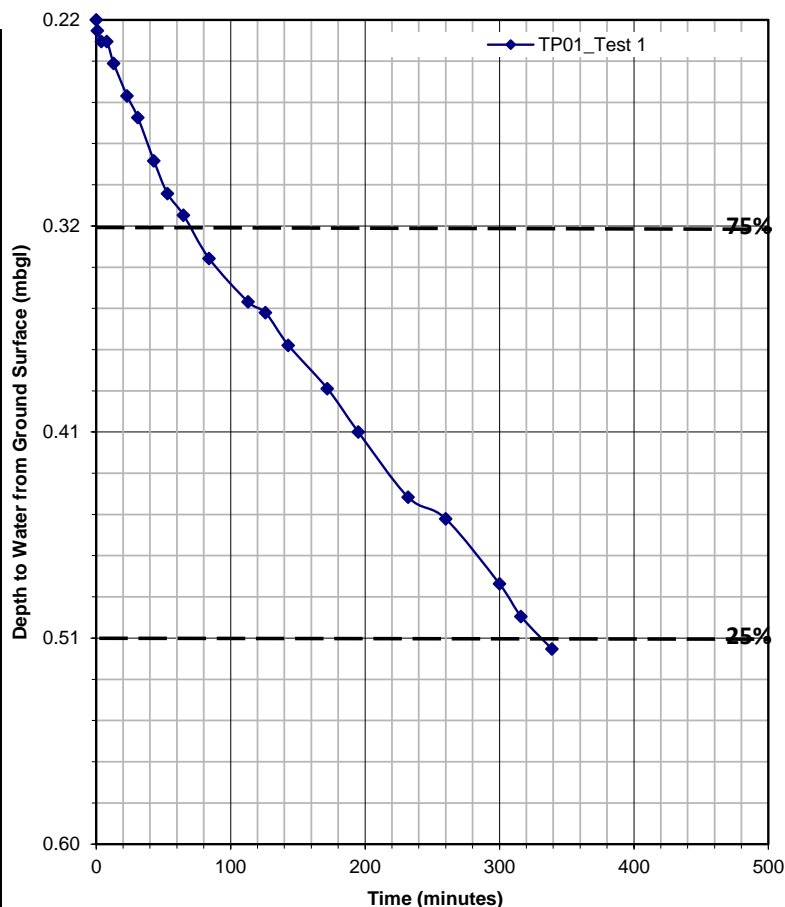
Appendix B - Infiltration Testing

Site:	Brock Cottage, Burford Road, Brize Norton, Carterton, Oxfordshire, OX18 3NN	Project No:	22.11.001
Test Location:	TP01_Test 1	Date Tested:	22/11/2022
Dimensions:	0.3mWx1.3mLx0.60m		
Groundwater:	unknown		

Soil Description - test response zone:

0.2: Firm brown very sandy gravelly CLAY with occasional angular limestone cobbles. Gravel is fine to coarse angular limestone

Time (mins)	Depth BGL
0	0.22
1	0.23
4	0.23
8	0.23
13	0.24
23	0.26
31	0.27
43	0.29
53	0.30
65	0.31
84	0.33
113	0.35
126	0.36
143	0.37
172	0.39
195	0.41
232	0.44
260	0.45
300	0.48
316	0.50
339	0.51



Calculated Soil Infiltration Rate, $f = 4.8 \times 10^{-6} \text{ m/s}$

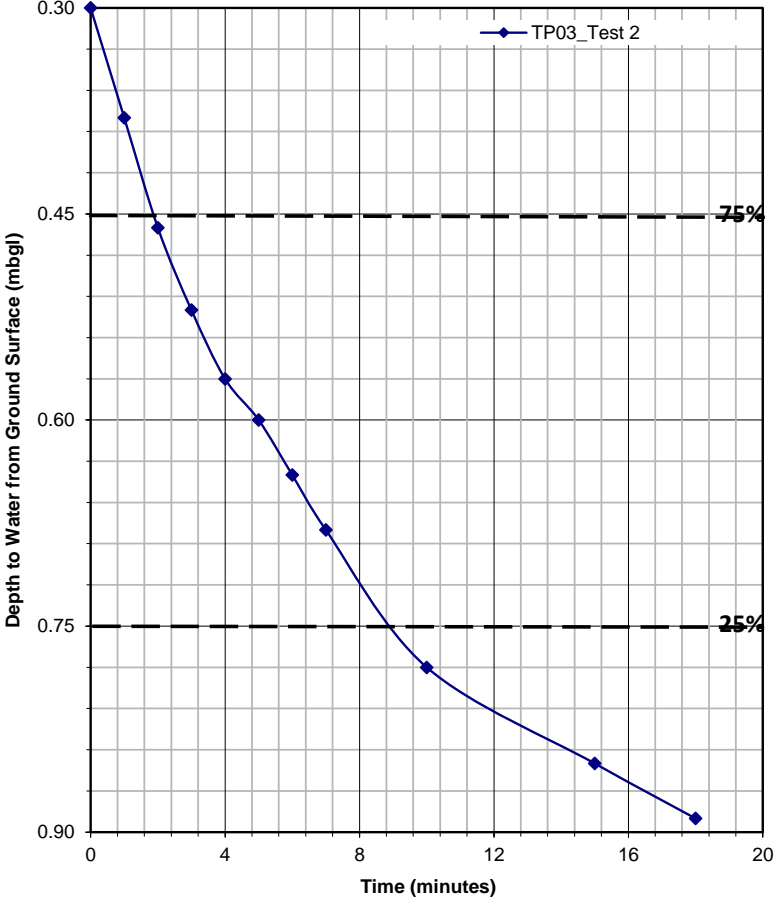
TRIAL PIT INFILTRATION TESTING to BRE Digest 365	Project Number: 22.11.001
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Site:	Brock Cottage, Burford Road, Brize Norton, Carterton, Oxfordshire, OX18 3NN	Project No:	22.11.001
Test Location:	TP03_Test 2	Date Tested:	22/11/2022
Dimensions:	0.3mWx1.4mLx0.90m		
Groundwater:	unknown		

Soil Description - test response zone:

0.1-0.9m: Light brown slightly clayey gravelly and COBBLES of limestone

Time (mins)	Depth BGL
0	0.30
1	0.38
2	0.46
3	0.52
4	0.57
5	0.60
6	0.64
7	0.68
10	0.78
15	0.85
18	0.89



Calculated Soil Infiltration Rate, $f = 2.1 \times 10^{-4}$ m/s

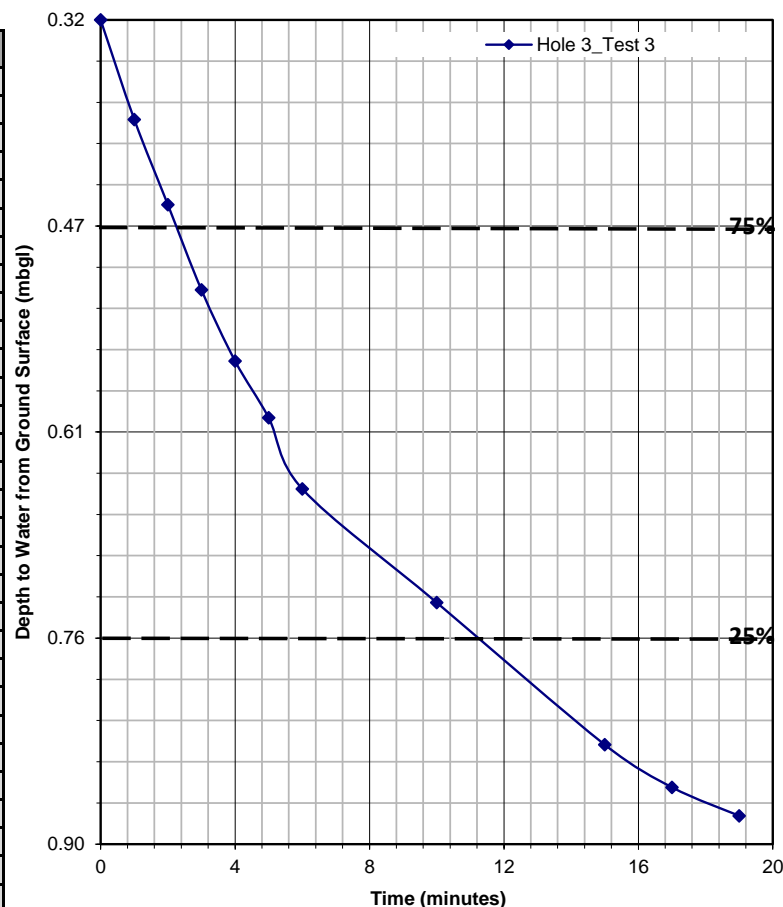
TRIAL PIT INFILTRATION TESTING to BRE Digest 365	Project Number: 22.11.001
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Site:	Brock Cottage, Burford Road, Brize Norton, Carterton, Oxfordshire, OX18 3NN	Project No:	22.11.001
Test Location:	Hole 3_Test 3	Date Tested:	22/11/2022
Dimensions:	0.3mWx1.4mLx0.90m		
Groundwater:	unknown		

Soil Description - test response zone:

0.1-0.9m: Light brown slightly clayey gravelly and COBBLES of limestone

Time (mins)	Depth BGL
0	0.32
1	0.39
2	0.45
3	0.51
4	0.56
5	0.60
6	0.65
10	0.73
15	0.83
17	0.86
19	0.88



Calculated Soil Infiltration Rate, $f = 1.5 \times 10^{-4}$ m/s

TRIAL PIT INFILTRATION TESTING to BRE Digest 365	Project Number: 22.11.001
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Appendix C - Local Borehole



British Geological Survey

BGS ID: 314673 : BGS Reference: SP20NE67
British National Grid (27700) : 428700,208800

Eastern L.S. Thames DRA.
FOXBURY FRM BRIZE NORTON 236 SP 20/151 SP20NE/67

Owner D. J. Dawes Farms LTD		Licence No.		Nat. Grid Ref. SP 287 088	
Occupier		IGS Ref. No.		Status to be lic	
Ground Level 100		m OD		ft. OD	
Level of Well Top 99.5		m OD		ft. OD	
Rest Water Level 9		m bwt		ft. bwt	
Date July '93		91		m OD	
Date		ft. OD		Aquifer Grt Oolite	
Construction		2/2/00/100		Summary of Geological Section	
Depth bwt		Dis.		Thickness	
				Depth	
		Lining (below well top)			
		From To Dis. Type			
32 m		150mm 0.5 m 6.5 m 150mm steel		Top soil 0.5 m 0.5 m	
				Cockleash 2.0 m 2.5 m	
				Forest Marble 1.5 m 4.0 m	
				Grt Oolite 28.0 m 32 m	
				SITE MAPPED AS FOREST MARBLE RM 11.95	
Abstraction Rates		Type of Pump Electric Submersible			
330 gph		Chem./Bact. Anal. YES NO			
gpd		Well Driller Guthrie Allsebrook			

If insufficient space has been allowed, continue in 'Notes' overleaf.

Appendix D - Drainage Layout

DESIGNERS CDM NOTE - RESIDUAL RISKS IDENTIFIED

The design Engineer(s) have analysed this design as the scheme has been developed, in order to identify if there are any significant residual risk hazards (i.e. unusual, unexpected, abnormal or difficult).

Residual risks **HAVE** been identified and are therefore shown on this drawing. These risks have not been possible to remove by design.

This statement assumes that a competent Contractor with the appropriate qualified staff will be employed for the works, and that they will be familiar with site wide construction risks and hazards that they can reasonably be expected to encounter as part of their work.

- CDM RESIDUAL RISK ITEM**
Existing services likely within working area.
Danger to site personnel and general public
- CDM RESIDUAL RISK ITEM**
Contact with waste water when making drainage connections.
Risk of infection from Weils disease etc.
- CDM RESIDUAL RISK ITEM**
Overhead cables within working area.
Danger to site personnel and general public
- CDM RESIDUAL RISK ITEM**
Works adjacent to public Highway.
Danger to site personnel and general public

DESIGNER NOTE
SuDS features sized for a 1 in 100 year event + 40% Climate Change + 10% UC

DESIGNER NOTE
Soakage testing on site to BRE365 found the worst case soakage rate from 3 trial holes used for design = 4.8 x 10⁻⁶ m/s

BURIED UTILITIES RISK NOTE

- Buried utilities are present on and in the vicinity of the site.
- The Contractor must satisfy themselves that they have seen utility returns for the area and that appropriate Risk Assessment Method Statement (RAMS) are in place and implemented to ensure that buried and/or overhead services are located prior to any works taking place.
- Any RAMS shall address safe procedures for protection and working in the proximity of services.

Construction Note
It is essential that new drainage associated with the development is laid from the outfall(s) into the site. This is essential to avoid unforeseen obstructions where encountered (such as services). If the drainage is laid from the site out to the outfall it can result in significant abortive works to relay and overcome such obstructions.

Location of Public Sewers have been taken from record drawings which should be fully substantiated by the contractor prior to commencing works on site.

All manholes covers located within carriageways shall have no slip covers to prevent motorcycles/cycles losing control

Manhole schedules - Invert level shown related to the deepest pipe within the chamber

NOTES

- All dimensions and levels are in metres unless otherwise noted
- This drawing is to be read in conjunction with the relevant Architect's/Engineer's drawings, specifications and CDM documentation
- This drawing has been produced electronically and may have been photo reduced or enlarged when copied. Work to figured dimensions only (DO NOT SCALE - EXCEPT FOR PLANNING PURPOSES). All dimensions to be checked on site. Any errors or omissions to be reported to the engineer immediately.
- This drawing contains coloured lines / information that may not be clear if reproduced in black and white.
- Digital copies of this plan can only be considered accurate if supplied directly by Infrastruct CS Ltd.

Drainage Key

Sewers

- Foul water drain (private/non adoptable)
- Surface water drain (private/non adoptable)
- Existing foul water sewer (Adopted)

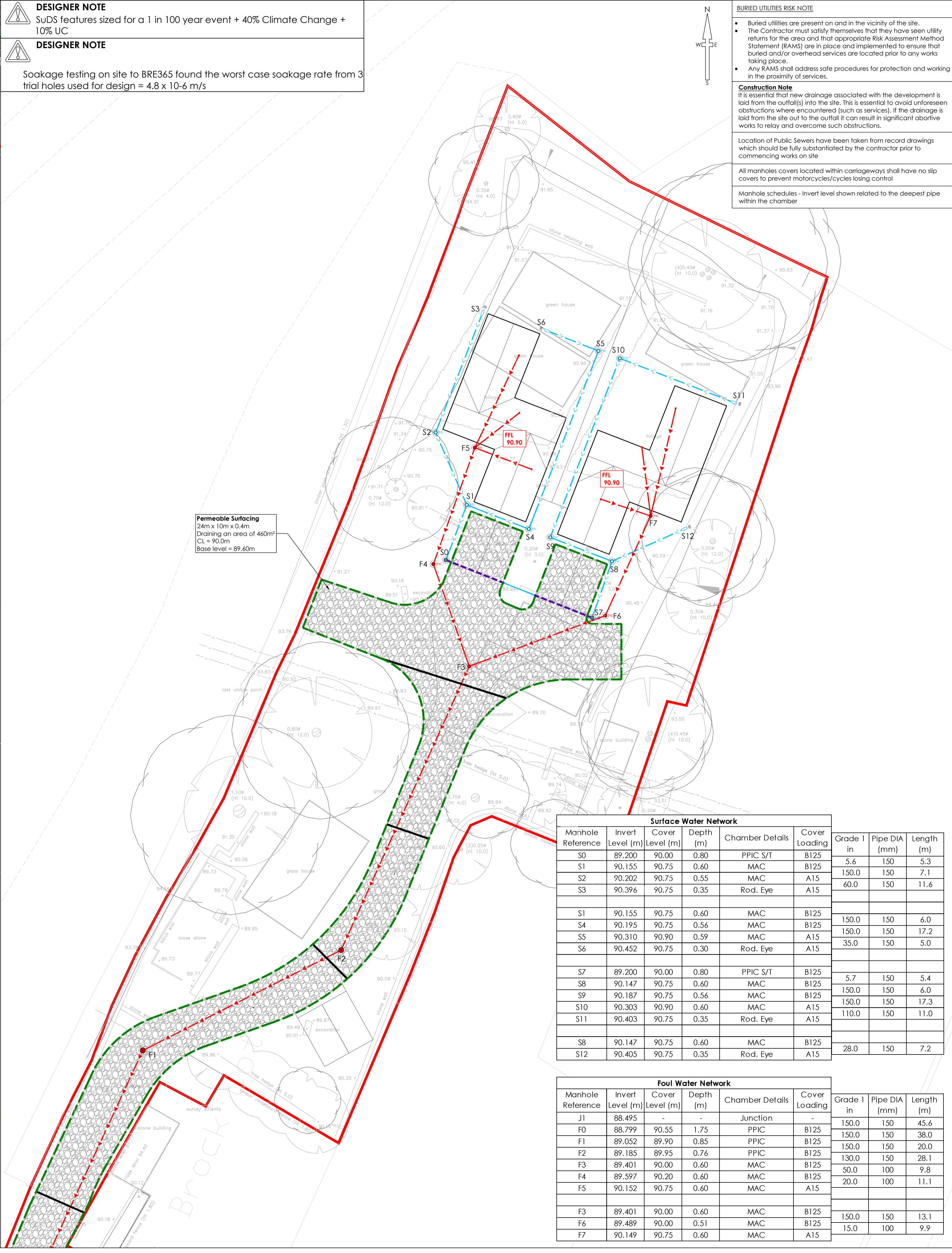
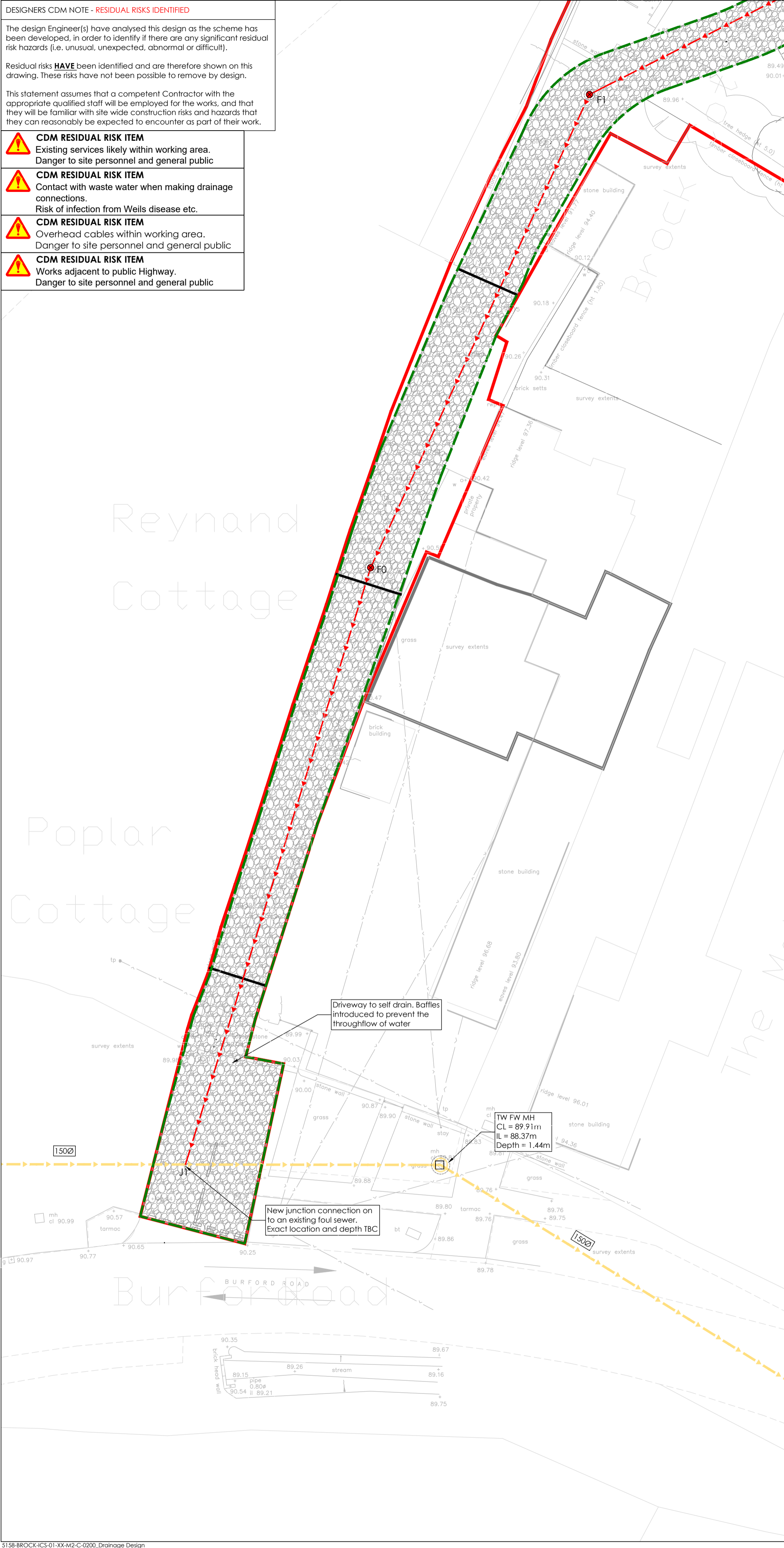
Chamber Key

FW/SW

- Mini access chamber (mac) - 300mmØ
- PPIC - 475mmØ*
- Manhole
Depth: 1.25m to 1.5m*
Depth: 1.5m to 3.0m*

* General note
(Refer to standard details & longitudinal sections for chamber sizes. Size may need to increase dependant on number of incoming pipes/size of incoming pipes)

- Surface water rodding eye
- Soil vent pipe/soil stack
- Silt trap (ST) with removable silt bucket!
- Manhole reference number
- RWP cellular discharge/collection unit (DU) (Permavoid or similar)
- Baffle to prevent rapid through flow of water through permeable paving
- Impermeable barrier to stop lateral movement of water
- Finished Floor Level (FFL)
- Self Draining gravel Driveway



Surface Water Network

Manhole Reference	Invert Level (m)	Cover Level (m)	Depth (m)	Chamber Details	Cover Loading	Grade	Pipe DIA (mm)	Length (m)
S0	89.200	90.00	0.80	PPIC S/T	B125	5.6	150	5.3
S1	90.155	90.75	0.60	MAC	B125	150.0	150	7.1
S2	90.202	90.75	0.55	MAC	A15	60.0	150	11.6
S3	90.396	90.75	0.35	Rod. Eye	A15			
S4	90.155	90.75	0.60	MAC	B125	150.0	150	6.0
S5	90.310	90.90	0.59	MAC	A15	150.0	150	17.2
S6	90.452	90.75	0.30	Rod. Eye	A15	35.0	150	5.0
S7	89.200	90.00	0.80	PPIC S/T	B125	5.7	150	5.4
S8	90.147	90.75	0.60	MAC	B125	150.0	150	6.0
S9	90.187	90.75	0.56	MAC	B125	150.0	150	17.3
S10	90.303	90.90	0.60	MAC	A15	110.0	150	11.0
S11	90.403	90.75	0.35	Rod. Eye	A15			
S8	90.147	90.75	0.60	MAC	B125	28.0	150	7.2
S12	90.405	90.75	0.35	Rod. Eye	A15			

Foul Water Network

Manhole Reference	Invert Level (m)	Cover Level (m)	Depth (m)	Chamber Details	Cover Loading	Grade	Pipe DIA (mm)	Length (m)
J1	88.495	-	-	Junction	-	150.0	150	45.6
F0	88.799	90.55	1.75	PPIC	B125	150.0	150	38.0
F1	89.052	89.90	0.85	PPIC	B125	150.0	150	20.0
F2	89.185	89.95	0.76	PPIC	B125	130.0	150	28.1
F3	89.401	90.00	0.60	MAC	B125	50.0	100	9.8
F4	89.597	90.20	0.60	MAC	B125	20.0	100	11.1
F5	90.152	90.75	0.60	MAC	A15			
F3	89.401	90.00	0.60	MAC	B125	150.0	150	13.1
F6	89.489	90.00	0.51	MAC	B125	15.0	100	9.9
F7	90.149	90.75	0.60	MAC	A15			

POI	FM	RJW	Initial Issue	26/09/23
REV	DRAWN	CHECK	REVISION COMMENTS	ISSUE DATE
DRAWING TITLE				SHEET NO.
Drainage Design				1/1
PROJECT				
Land to Rear of Brock Cottage Burford Road, Brize Norton Oxon, OX18 3NR				
CLIENT				
Albright Dene				
SCALE @ A1				
1:200				
PROJECT NUMBER				
5158				
STATUS				
S2 INFORMATION				
PROJECT ORIGIN				
BROCK ICS 01 XX DR C 0200 P01				
ENGINEER				
RJW				
DRAFT				
NJ				
APPROVED				
AJG				
NO. REVISION				