

Project: Freshford Community Farm

Subject: Drainage Statement

Reference: 20035-TUM-TN-XXX-0003

Date	Details	Rev	Author	Checked by
06/07/26	First issue	A	JJ	SW

1 Introduction

Tumu Consulting Ltd have been appointed by Freshford Community Farm Ltd to produce a drainage statement for a proposed development at Freshford Community Farm, Church Lane, Limpley Stoke, Bath, BA2 7GH.

2 Site Characteristics

2.1 Topography

A topographic survey (REF: 989/7097/1) was conducted in December 2025 by Clifton Surveys Ltd. The survey shows that the approximately 1.5 ha site has a single high point (96.35mAOD) on the western corner with the rest of the site falling away from this region. The lowest point on site is 86.66mAOD in the south-eastern corner and there is a second low point in the north-western corner (87.84mAOD). There are no ditches shown onsite. See Appendix A for the Topographic Survey.

2.2 Geology and Hydrogeology

According to the BGS website (British Geological Society) the site is underlain by a bedrock geology of the Chalfield Oolite Formation, a calc-oolidal grainstone. There is no BGS information on the superficial geology.

The LandIS Soilscales Viewer shows the site as being covered by: *Soilscape 3: Shallow lime-rich soils over chalk or limestone*. This is described as freely draining.

2.3 Hydrology

The site is approximately 350m from the River Frome (due south-east of site) and 425m from the River Avon (due north of site). There are no ordinary watercourses within the near vicinity of the site.

2.4 Existing Drainage

Wessex Water's Asset Records show no surface water nor foul water sewers within or passing the site. The nearest public sewer is foul water, being approximately 30m east of the eastern site boundary in third party land (house No.9), it flows eastwards from this point. The foul Wessex Water manhole at the head of the sewer is labelled as 5301.

From a desktop study of Church Lane, there are multiple gullies and manhole covers visible along the road. This suggests the presence of a highways drain travelling west to east beneath Church Lane.

3 Development Proposals

3.1 Description of Proposed Works

It is proposed to construct a community farm facility. This will include the erection of 3 No. polytunnels, a packing shed and a welfare/tool shed, complete with associated vehicular access, parking spaces and landscaping. Also proposed is a bin store, composting area and various planting beds across the rest (majority) of site. See Appendix B for the Engineering Layout.

3.2 Flood Risk Vulnerability Classification

In accordance with Annex 3 of the NPPF, the proposed development is classified as 'less vulnerable' as shown in Figure 3-1.

Less vulnerable

- Police, ambulance and fire stations which are not required to be operational during flooding.
- Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the 'more vulnerable' class; and assembly and leisure.
- Land and buildings used for agriculture and forestry.
- Waste treatment (except landfill* and hazardous waste facilities).
- Minerals working and processing (except for sand and gravel working).
- Water treatment works which do not need to remain operational during times of flood.
- Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place.
- Car parks.

Figure 3-1 Annex 3 of the NPPF Flood Risk Vulnerability Classification.

3.3 Design Life

The development will have a design life of 50 years. This is based on 'Design Working Life Category 4 – Building Structures and other Common Structures' from Table 2.1 in BS EN 1990.

4 Flood Risk Assessment

The flood risk associated with the site has been investigated and is summarized in Table 4.1 below.

Item	Response	Source
Fluvial Flood Risk	Low Risk – Site is wholly within FZ1	Flood Map for Planning – EA
Tidal Flood Risk	Low Risk	Flood Map for Planning – EA
Surface Water Flood Risk	Low Risk	Flood Map for Planning – EA
Ground Water Flood Risk	Low Risk	Wiltshire Council SFRA Level 1, Appendix G, Groundwater Emergence: Bradford on Avon.
Sewer Flood Risk	Low Risk	Wiltshire Council SFRA Level 1, Appendix I, Risk of Flooding from Sewers: Bradford on Avon
Reservoirs, Canals, and Other Artificial Sources	Low Risk	Wiltshire Council SFRA Level 1, Appendices H and M.
Historical Flooding	No recorded flooding events.	Wiltshire Council SFRA Level 1, Appendix J, Risk of Flooding from Sewers: Bradford on Avon

Table 4-1 Summary of Flood Risk on Site.

It is therefore concluded that the proposed development can be undertaken in a suitable manner without increasing the flood risk to the proposed development or to surrounding properties/utilities.

5 Surface Water Drainage Strategy

The surface water drainage strategy has been developed in accordance with the relevant design standards and guidance, including but not limited to; the National Standards for SuDS (NSS), CIRIA 753 The SuDS Manual, and the Approved Documents: Building Regulations 2010 Part H: Drainage and Waste Disposal.

5.1 Discharge Hierarchy

Consideration has been given to the discharge hierarchy in order of priority to: Rainwater Harvesting, Soakaways/Infiltrating Drainage Systems, Watercourses, Public Surface Water Sewers, and finally Public Combined Sewers.

Rainwater harvesting is a significant consideration for this development. Due to its agricultural intent a plentiful water supply for irrigation purposes is required. Hence several large above ground water storage tanks (referred to as “water butts” on the site layout) will collect rainwater from multiple roof areas. When full the additional incoming surface water will discharge into the subsequent drainage network via controlled overflows.

BRE365 Soakaway Testing was conducted on site in June 2026. This confirmed the Soilscape description of the site’s soils and yielded viable infiltration rates, the lowest calculated being $7.6 \times 10^{-5} \text{m/s}$ (0.273 m/hr). See Appendix E for the testing results and calculations.

5.2 Proposed Drainage Arrangements

Due to site levels two sub-catchments are proposed, each draining to a separate soakaway.

For the majority of the site, all surface water generated on building and polytunnel roofs will be collected by guttering and rainwater pipes, with appropriate areas utilised to fill the rainwater harvesting storage tanks. The main external hardstanding areas will be finished as a permeable gravel surface over permeable sub-base construction, with the vehicular trafficked areas having a grid reinforcement system. Roof-generated surface water will be discharged into this permeable sub-base via distribution boxes. The permeable sub-base will be self-infiltrating but due to its steep gradient will primarily convey surface water to a cellular tank soakaway at the low-point at the eastern end of the parking area.

The main site access ramp will be formed in concrete and due to this having a significantly lower lowest level (at the edge of Church Lane) will drain via a dished channel to a gulley, then to a separate cellular tank soakaway in the site’s northeast corner.

See Appendix C for the Drainage Layout drawing and Appendix D for the Standard Drainage Details.

5.3 Climate Change Allowances

When developed (approximately 2026), the end of life can be estimated to be 2076. According to government guidance, a development with a design life concluding between 2061 and 2100 should use the central allowance for the 2070’s epoch when considering peak rainfall climate change allowances. For the Avon Bristol and North Somerset Streams Management Catchment Area, the climate change allowances to consider should be 25% in the 1 in 30 year rainfall event, and 25% in the 100 year rainfall event. This is shown in Figure 5-1.



Figure 5-1 Avon Bristol and North Somerset Streams Management Catchment Peak Rainfall Allowances.

5.4 Calculations

Causeway FLOW calculations using the FEH-22 rainfall data have been completed using the climate change parameters set in the above section and the soil infiltration rate discussed in Section 5.1. The calculations show that no flooding will occur during rainfall events up to and including the 1.0% AEP + 25% CC event and that the soakaways are sufficiently sized to accommodate the incoming flows. See Appendix E for the Causeway FLOW model.

5.5 Water Quality

The CIRIA 753 SuDS Manual has been consulted to ensure that the SuDS provided successfully mitigate the anticipated pollutants which may arise from the proposed land use. Out of all land uses on site, the access road and car park introduces the greatest pollution hazards onsite. Therefore, this is the land use that mitigation measures have been compared against.

Land Use	Pollution Hazard Level	TSS	Metals	Hydrocarbons
Non-Residential Car Parking with Infrequent Change	Low	0.5	0.4	0.4

Table 5-1 CIRIA 753 Table 26.2 Pollution Hazard Indices.

SuDS Component	TSS	Metals	Hydrocarbons
Permeable Paving	0.7	0.6	0.7

Table 5-2 CIRIA 753 Table 26.3 SuDS Mitigation Indices for SuDS.

All surface water generated on roofs, permeable paving, and the gravel areas will pass through the permeable paving. As shown in Tables 4-3 and 4-4, the mitigation indices of permeable paving exceed the pollution hazard indices generated by the land use of the site. Therefore, the SuDS proposed are suitable for water quality purposes.

5.6 Amenity

The primary amenity feature provided by this drainage strategy is the inclusion of water butts. They provide a sustainable source of water for crop irrigation, reducing reliance on mains water and energy requirements for utility companies.

5.7 Flood Exceedance Routing

In the event of a flood exceedance event the resulting overland flood routes will flow to the east of the access road and then overflow into the surrounding grassed area. If the volume of flooded water is sufficient then it will progress onto Church Lane where it will not pose a risk to adjacent properties.

5.8 Maintenance Arrangements

The operation and maintenance of the drainage is the responsibility of the site owner or any maintenance company that they choose to employ. All maintenance will be undertaken in accordance with the recommendations outlined in the SuDS Manual (CIRIA 753), see Tables 5-3, 5-4, and 5-5.

Maintenance Schedule	Required Action	Typical Frequency
Regular Inspections	Inspect for sediment and debris in pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	Annually
	Cleaning of gutters and any filters on downpipes	Annually (or as required based on inspection)
	Trimming any roots that may be causing blockages	Annually (or as required)
Occasional Maintenance	Remove sediment and debris from pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	As required, based on inspections
Remedial Actions	Reconstruct soakaway and/or replace or clean void fill, if performance deteriorates or failure occurs	As required
	Replacement of clogged geotextile (will require reconstruction of soakaway)	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in the first year and then annually
	Check soakaways to ensure emptying is occurring	Annually

Table 5-3 Operation and Maintenance Requirements for Soakaways.

Maintenance Schedule	Required Action	Typical Frequency
Regular Inspections	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 manufacturers 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	Removal of weeds	As required – once per year on less frequently used pavements.
Remedial Action	Remedial work to any depressions, rutting, and cracks 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 rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Table 5-4 Operation and Maintenance Requirements for Permeable Pavements.

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect surface structures, removing obstructions and silt as necessary. Check there is no physical damage.	Monthly
	Remove cover and inspect, ensuring water is flowing freely and that the exit route for water is unobstructed. Remove any debris and silt Undertake inspection after leaf fall in autumn.	Annually
	Jet the pipes leading from overflow structures and check water is going through the overflow	Annually
Remedial Actions	Repair physical damage	As required

Table 5-5 Operation and Maintenance Requirements for Inlets, Outlets, Controls, and Inspection Chambers.

6 Foul Water Drainage Strategy

The client has advised that production of foul water will be minimal and dealt with by a bespoke self-composting toilet facility

7 Conclusions

Tumu Consulting Ltd have been appointed by Freshford Community Farm Ltd to produce a Drainage Statement for a proposed development at Freshford Community Farm, Church Lane, Limpley Stoke, Bath, BA2 7GH.

- The site is at a low risk of flooding from all sources.
- Surface water generated on roofs and the main hardstanding areas on the site will be collected via guttering and rainwater pipes before being discharged into a permeable paving subbase via distribution boxes. The surface water will then be conveyed to a soakaway at the low point where it will infiltrate.
- Surface water generated on the vehicle access point to the site will be intercepted by a dished channel and conveyed to a second soakaway.
- Some rainwater pipes will first fill water butts for irrigation purposes before overflowing into the below-ground drainage network.
- Causeway FLOW modelling has been conducted, and no flooding has been found to occur in any rainfall event up to and including the 1.0% AEP rainfall event with a 25% climate change allowance.
- Foul water on site will be dealt with by a bespoke self-composting toilet facility.

It is concluded that the proposed drainage strategy is sufficient to drain the proposed development without increasing the flood risk to the proposed development or surrounding properties/systems.

Appendix A – Topo Survey

160400.00 N

160300.00 N

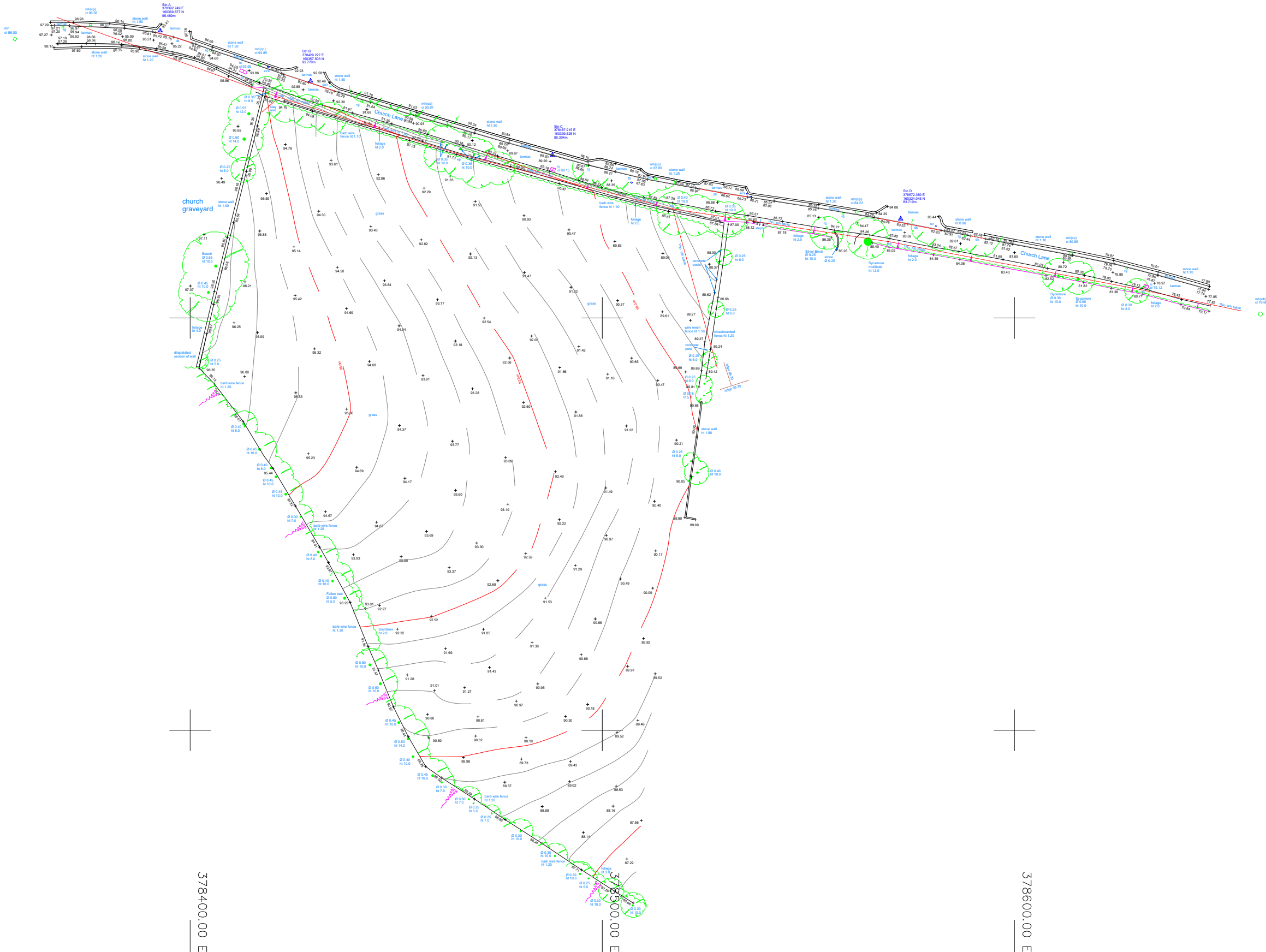
160200.00 N

378400.00 E

378500.00 E

378600.00 E

378700.00 E



STANDARD REFERENCES

ABBREVIATIONS	
bl	bollard
bb	bellish beacon
bs	bus stop
bt	telecoms
cbtv	cable TV cover
cl	cover level
conc	concrete
cws	combined sewer
dk	drop kerb
eic	electricity ic
ESS	Elec. Sub-Station
ep	electricity pole
fb	flower bed
fh	fire hydrant
fl	floor level
fp	footpath
fl.p	flagpole
fws	foul water sewer
g	gully
gsv	gas valve
ic	inspection cover
il	invert level
irf	iron railing fence
jb	junction box
ko	kerb outlet
lp	lamp post
mk	marker post
mh	manhole
nb	notice board
np	nameplate (road)
pb	post box
pd	pit depth
ret.	retaining wall
re	rodding eye
rg	road gully
rs	road sign
rwp	rainwater pipe
sp	signpost
sv	stop valve
svp	soil vent pipe
sww	storm water sewer
tcb	telephone callbox
tp	telegraph pole
tl	traffic light
utr	unable to raise
vp	vent pipe
wtap	woodtap fence
wm	water tap
wp	wood post
wt	water tap

- Notes
- This survey has been computed and drawn about the Ordnance Survey National Grid.
 - All levels are in metres and relate to the Ordnance Survey active GPS stations.
 - This survey was measured for a scale of 1:500, any subsequent enlargements should be verified on site.

Revisions



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Topographical and Measured Building Surveyors
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e-mail: info@cliftonsurveys.com
web: www.cliftonsurveys.com

The copyright in the plans remain vested in Clifton Surveys Ltd who will grant an irrevocable licence for use by the client upon receipt of full payment. No liability for accuracy shall extend beyond the specified scale of graphical mappings. All services and critical dimensions should be field verified.

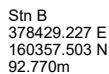
Surveyed	L Wakeford	Date	December 2025
Drawn	L Wakeford	Checked	January 2025

Drawing Title	Topographical Survey Church Road Freshford Bath
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Client	Freshford Community Farm Freshford
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Drawing No.	Scale A1 @
989/7097/1	1:500

Appendix B – Engineering Layout



Stn B
378429.227 E
160357.503 N
92.770m

Stn C
378487.915 E
160339.525 N
89.304m

ACCESS RAMP ARRANGEMENT
AS MILES WHITE DRAWING REF:
25127-SK02

All Poly Tunnels -
less than 1.0m
longitudinal fall.
0.1m cross fall

2m access path —
along southern side
of Poly Tunnels

Gabion basket retaining walls (drawn 0.5m wide, max 1m retained height. Final design by specialist supplier)

KEY:

+ 68.50 EXISTING LEVEL (RETAINED)

+ (68.50) EXISTING LEVEL (REMOVED)

+ 68.15 PROPOSED LEVEL

1:32 PROPOSED FALL

BANK (MAY 1 IN 3)

HP2 (125mm KEPP)

RICHER, CONCRETE CHAIR

© 2006 The Authors
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ET (FLOST EDGING KERB)



GABION RETAINING WALL
(WITH HEIGHT AT LOCATION)

 CONCRETE ENTRANCE RAMP

1. *Journal of the American Medical Association*, 1997; 277: 1039-1043.

GRAVEL GRID SYSTEM
TO ACCESS LAKE

 GRAVEL GRID SYSTEM TO PARKING BAYS LOOSE GRAVEL SURFACING
(PEDESTRIAN ONLY)

NOTE: FINALISED CONSTRUCTION BUILD-UPS AND
OVERALL DEPTHS SUBJECT TO CONSTRUCTION
STAGE DESIGN AND ON-SITE CBR TESTING

General Notes:

1. All Works are to be constructed in accordance with the Local Council and the Highways Agency's Specification for Highway Works (SHW) March 1998 as amended published by the Highways Agency.
2. All elevations shown on the survey which is in Ordinance datum. Dimensions not to be scaled.
3. Use of this drawing does not absolve the client from his responsibilities under the Health and Safety, The Construction Design and Management Regulations 2015. The Principal Designer has been used to coordinate the design and construction of the above works in conjunction with any construction works. For site specific CDM 2015 Designers Residual Risks, see drawing series 1140 and should be read in conjunction with Designer's Risk Register.
4. The Contractor is to check and verify all buildings and site dimensions and levels, including existing sewer invert levels, before works start on site.
5. Positions of existing services/statutory undertakers apparatus adjacent to or crossing proposed excavations are to be checked by the contractor prior to starting work.
6. All overhead, and retaining wall heights shown are the anticipated maximum finished height required.
7. All step shown are to have a min of 150mm rising and 280mm going dimensions up to a maximum of 12 steps per flight.
8. Where external ground levels are higher than the DPC tanking will be required even if shown on the drawing.
9. This drawing is to be read in conjunction with and checked against all other drawings, engineering details, specifications and any structural, geotechnical or other specialist reports. The Contractor is to ensure that all the above is taken into account and is reported to Turm Consulting before construction begins.

F	PLANNING APPLICATION	06/07/26	SW	BF
E	UPDATED TO FINALISED LAYOUT	29/06/26	SW	BF
D	UPDATED TO REVISED LAYOUT	29/05/26	SW	BF
C	THIRD ISSUE - FOR CLIENT REVIEW	29/04/26	SW	BF
B	SECOND ISSUE - WORK IN PROGRESS	27/04/26	SW	BF
A	FIRST ISSUE - WORK IN PROGRESS	24/04/26	SW	BF
REV.	DESCRIPTION	Date	BY	CHK

DESIGN BY:



CLIENT:

FRESHFORD COMMUNITY FARM LTD

DRAWING STATUS:

PLANNING APPLICATION

SCALE @ A1:

0 1:500 25 metres

PROJECT

PEAR TREE COMMUNITY FARM

TITLE-

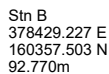
ENGINEERING LAYOUT

Project Ref: Originator: Stage: Phase: Number:
20035-TUM-DD-XXX-1100

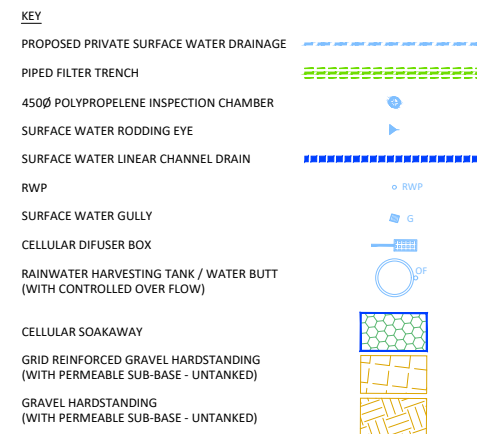
REV:

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Appendix C – Drainage Strategy



Stn B
378429.227 E
160357.503 N
92.770m



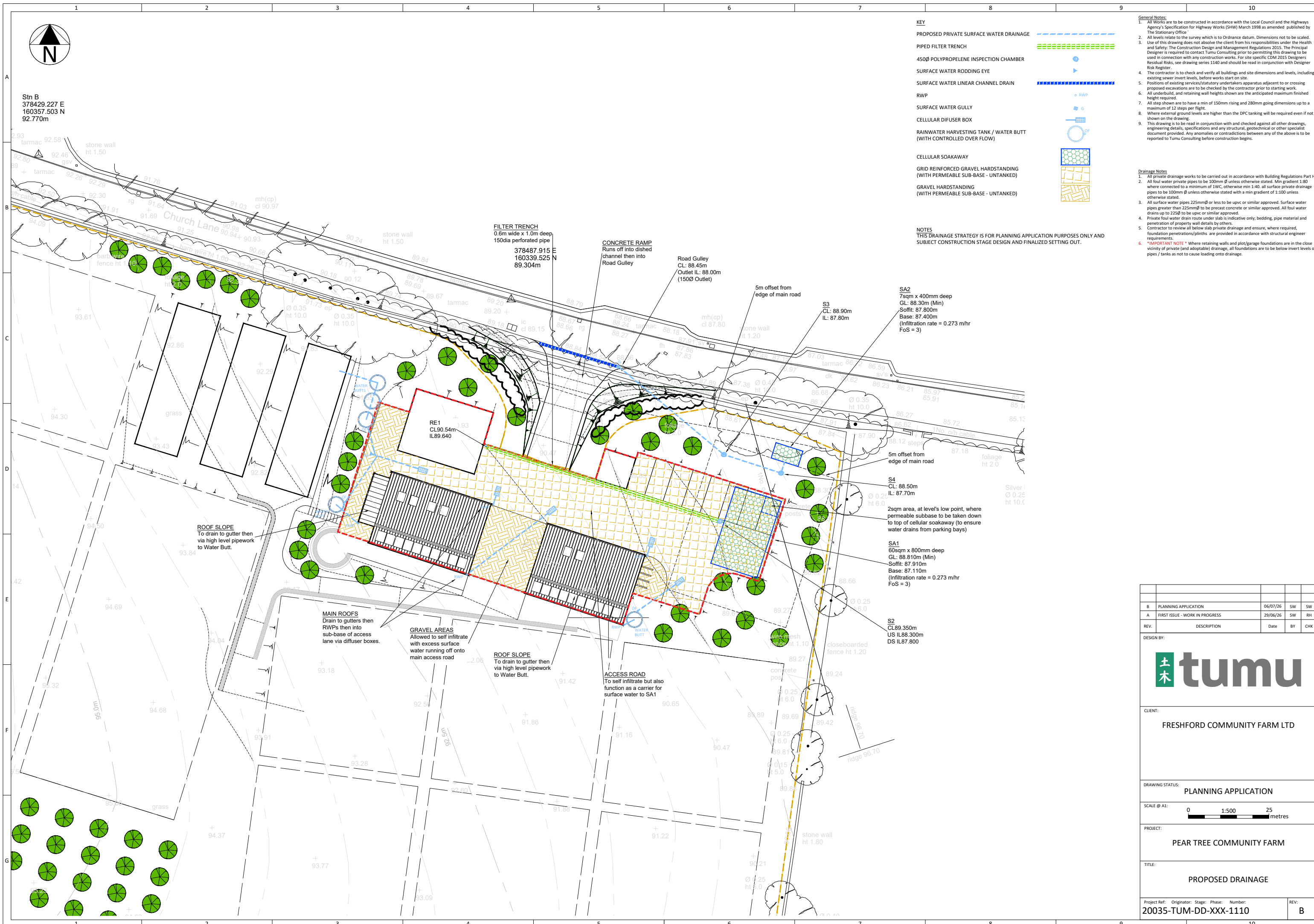
NOTES
THIS DRAINAGE STRATEGY IS FOR PLANNING APPLICATION PURPOSES ONLY AND
SUBJECT CONSTRUCTION STAGE DESIGN AND FINALIZED SETTING OUT.

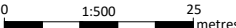
General Notes:

1. All Works are to be constructed in accordance with the Local Council and the Highways Agency's Specification for Highway Works (SDS) March 1998 as amended published by the Highways Agency's Engineering Office
2. All levels relate to the survey which is to Ordnance datum. Dimensions not to be scaled.
3. Use of this drawing does not absolve the Client or Managers responsibilities under the Health and Safety at Work Act 1974 and Construction (Design and Management) Regulations 2015. The Principal Designer is required to contact Tumlu Consulting prior to permitting this drawing to be used in connection with any construction works. For site specific CDM 2015 Designs Residual Risks, see drawing series 1140 and should be read in conjunction with Designer Risk Register.
4. The contractor is to check and verify all buildings and site dimensions and levels, including existing sewer invert levels, before works start on site.
5. Protection of existing structures and services is the contractor's responsibility and any crossing proposed excavations are to be checked by the contractor prior to starting work.
6. All underbuidl, and retaining wall heights shown are the anticipated maximum finished ground level required.
7. All slopes shown are to have a min of 150mm rising and 280mm going dimensions up to a maximum of 12 degrees steep going.
8. Where external ground levels are higher than the DPC tanking will be required even if not shown on the drawing.
9. This drawing is to be read in conjunction with the DCK against all other drawings, engineering details, specifications and any structural, geotechnical or other specialist drawings. Any discrepancy between drawings shall be referred to any of the above is to be reported to Tumlu Consulting before construction begins.

Drainage Notes

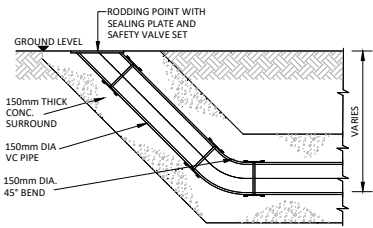
1. All private drainage works to be carried out in accordance with Building Regulations Part 1
2. All foul water private pipes to be 100mm Ø unless otherwise stated. Min gradient 1:80
3. All foul water pipes to be connected to a minimum 150mm Ø sewerline min 1.40. All surface drainage pipes to be 100mm Ø unless otherwise stated with a min gradient of 1:100 unless otherwise stated.
4. All floor surface pipes 225mmØ or less to be up or similar approved. All surface water pipes greater than 225mmØ to be precast concrete or similar approved. All foul water drains up to 225Ø to be up or similar approved.
5. Private foul water drains to be installed in a separate, active, only bedding, pipe material and penetration of property wall details by others.
6. Contractor to review all above slab private drainage and ensure, where required, foundation penetrations/plinths are provided in accordance with structural engineering requirements.
7. **IMPORTANT NOTE** Where retaining walls and plot/garage foundations are in the close proximity of the foul water drain, the above foundations are to be below invert levels of pipes / tanks as not to cause rainfall into the drainage.



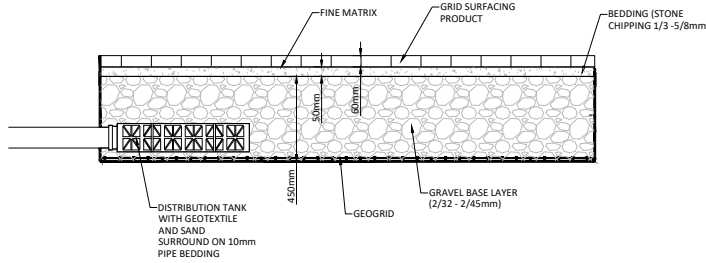
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A	FIRST ISSUE - WORK IN PROGRESS	29/06/26	SW	RH					
REV.	DESCRIPTION	Date	BY	CHK					
DESIGN BY:									
									
CLIENT:									
FRESHFORD COMMUNITY FARM LTD									
DRAWING STATUS:									
PLANNING APPLICATION									
SCALE @ A1:									
									
PROJECT:									
PEAR TREE COMMUNITY FARM									
TITLE:									
PROPOSED DRAINAGE									
Project Ref: Originator: Stage: Phase: Number:								REV:	
2035-TUM-DD-XXX-1110								B	

Appendix D – Standard Drainage Details

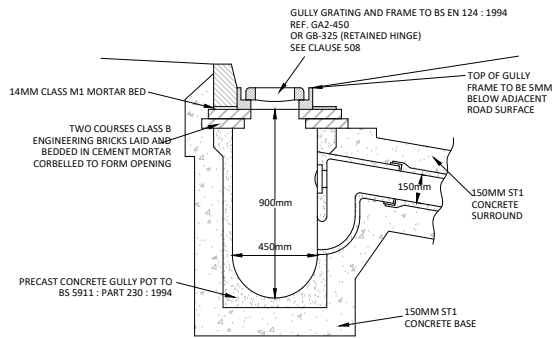
RODDING EYE DETAIL
SCALE 1:20



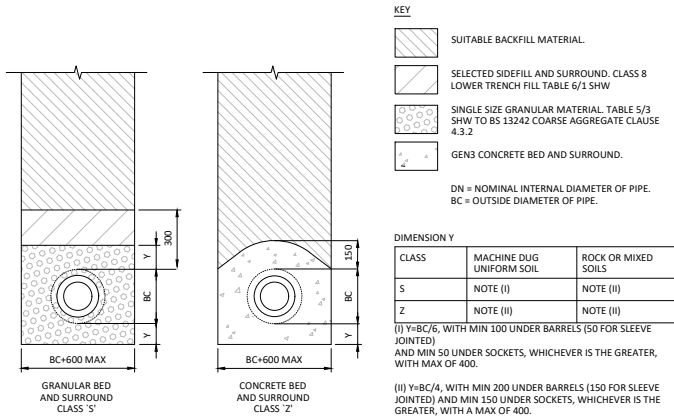
APPROVED INFILTRATING PERMEABLE PAVING
PRODUCT WITH GRID IN-FILL SURFACING AND A
INCOMING DISTRIBUTION BOX
SCALE 1:20



TYPICAL GULLY DETAIL
SCALE 1:20



PIPE BEDDING DETAILS
SCALE 1:20

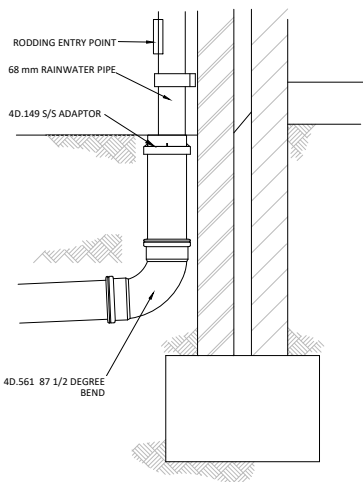


CLASS Z BEDDING IS REQUIRED WHEN THE COVER OF THE PIPE (DEPTH BETWEEN GROUND LEVEL AND PIPE SOFFIT) IS:

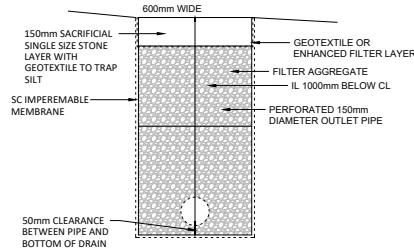
- LESS THAN 0.35m IN DOMESTIC GARDENS AND PATHWAYS WITHOUT ANY POSSIBILITY OF VEHICULAR ACCESS.
- LESS THAN 0.5m IN DOMESTIC DRIVEWAYS, PARKING AREAS, AND YARDS WITH NO POSSIBILITY OF 7.5+ TONNE VEHICLES.
- LESS THAN 0.9m IN DOMESTIC DRIVEWAYS, PARKING AREAS, AND NARROW STREETS WITH LIMITED ACCESS FOR VEHICLES WITH A GROSS WEIGHT OF 7.5+ TONNES.
- LESS THAN 0.9m IN AGRICULTURAL LAND AND PUBLIC OPEN SPACE.
- LESS THAN 1.2m IN HIGHWAYS AND PARKING AREAS WITH UNRESTRICTED ACCESS TO 7.5+ TONNE VEHICLES.

REFER TO DRAWING 20096-TUM-DD-XXX-1100 FOR BEDDING DETAILS.

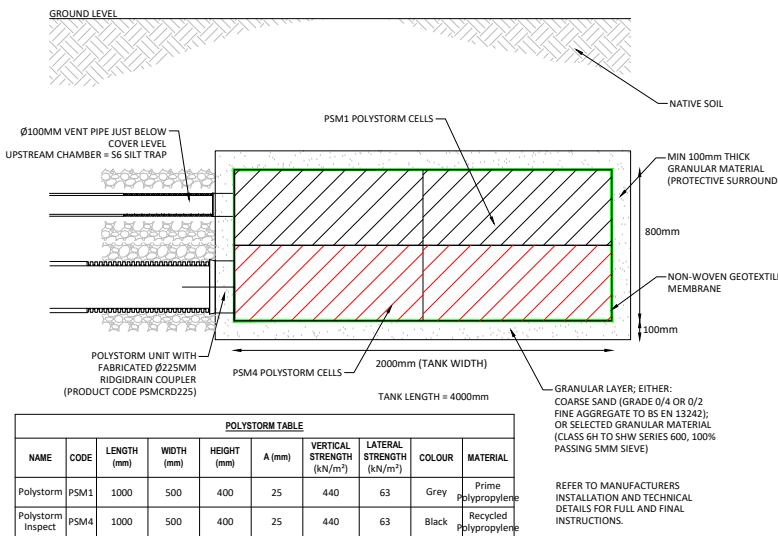
EXTERNAL R.W.P. TO DRAIN
SCALE 1:20



FILTER TRENCH
SCALE 1:20

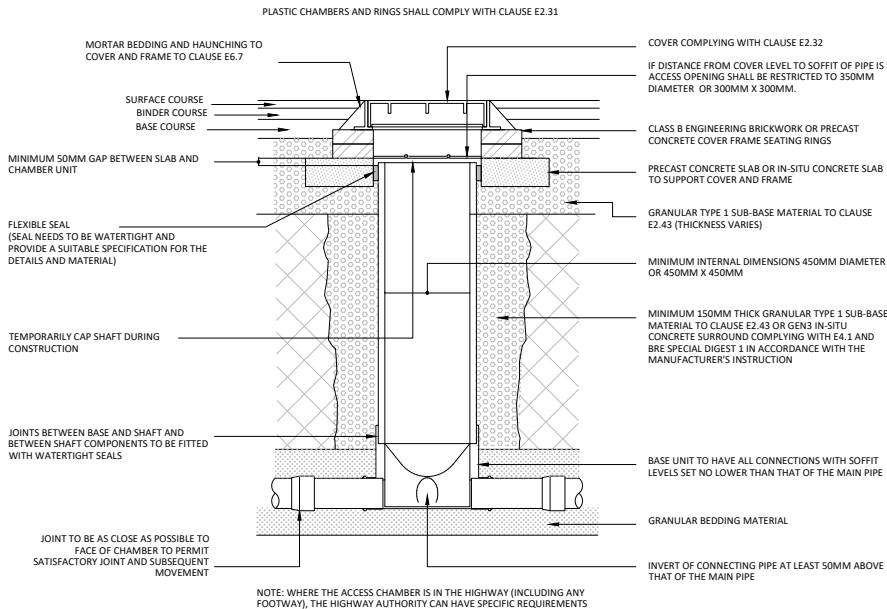


POLYSTORM PSM1 SOAKAWAY
STANDARD DETAIL
SCALE 1:20

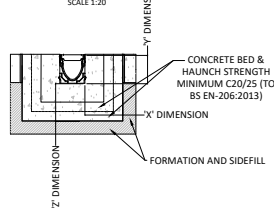


TYPICAL INSPECTOR CHAMBER DETAIL
DEPTH FROM COVER TO SOFFIT OF PIPE UP TO 2m

FLEXIBLE MATERIAL CONSTRUCTION FOR USE IN AREAS SUBJECT TO VEHICLE LOADING
(SCALE 1:20)



ACO MULTIDRAIN M100D CHANNEL
DRAIN OR SIMILAR APPROVED
PRODUCT
SCALE 1:20



Load Class	A15	B 125	C 250	D400*
Minimum Dimensions (mm)	X 100	150	150	200
Y Full Channel Height (Less Y2 where applicable)	Y 100	150	150	200
Maximum Dimensions (mm)	Y2 35	35	35	35
	Y3 100	60	60	60

*e.g. parking areas for all types of road vehicle.

A	FIRST ISSUE	06/07/26	SW	RH
REV.	DESCRIPTION	Date	BY	CHK
DESIGN BY:				
CLIENT:				
FRESHFORD COMMUNITY FARM LTD				
DRAWING STATUS:				
PLANNING APPLICATION				
SCALE @ A1:				
AS SHOWN				
PROJECT:				
PEAR TREE COMMUNITY FARM				
TITLE:				
DRAINAGE CONSTRUCTION DETAILS				
Project Ref: Originator: Stage: Phase: Number:				REV:
20035-TUM-DD-XXX-1080				A

TECHNICAL NOTE



Appendix E – Calculations

Stuart Williamson

From: tania pascoe <tanialpascoe@gmail.com>
Sent: 18 May 2026 09:58
To: Stuart Williamson
Cc: Ian Greenhalgh (ian@greenhalghla.com); Neil Kennedy
Subject: Pear Tree Community Farm soakaway testing

Dear Stuart,
Please find attached the testing we did at the weekend.

Pear Tree Community Farm, Church Lane BA2 7WD

Percolation tests 16/05026

Location SA2

Pit dimensions

1400mm Deep

800mm x 800mm wide at bottom

link to photos [here](#)

	Time	Start depth mm	75% depth mm	Time	50% depth mm	Time	25% depth mm	Time	Time at empty
Test 1	10:30am	400	300	10:30:30am	200	10:32:24am	100	10:36:30am	10:44am
Test 2	11:30am	400	300	11:36am	200	11.45am	100	11:58am	12:15am

Best wishes
Tania

--

tanialpascoe@gmail.com

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BRE365 TESTING RESULTS

Project Name: Freshford Community Farm Drainage

Project Reference: 20035

Testing Completed By: The Client

Date of Testing 16/05/2026

	Time	Start depth mm	75% depth mm	Time	50% depth mm	Time	25% depth mm	Time	Time at empty
Test 1	10:30am	400	300	10:30:30am	200	10:32:24am	100	10:36:30am	10:44am
Test 2	11:30am	400	300	11:36am	200	11.45am	100	11:58am	12:15am

Raw Data Received: 18/05/26

Soil Infiltration Rate (m/s) Formula

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

a_{p50}

The effective storage volume of water in the trial pit between 75% and 25% effective depth (m^3)

V_{p75-25}

The internal surface area of the trial pit up to 50% effective depth (m^2)

t_{p75-25}

The time for the water level to fall from 75% to 25% effective (s)

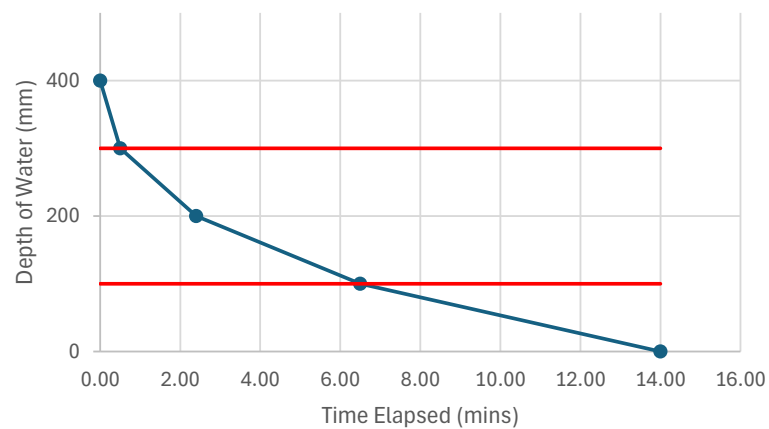
Trial Pit 1 - Test 1

Pit Dimensions (m)

Width	0.8		
Length	0.8	Volume between 25% and 75% Depth	0.128
Starting Depth of Water	0.4		

Time	Time Elapsed (min)	Depth of Water (mm)
10:30:00	0.00	400
10:30:30	0.50	300
10:32:24	2.40	200
10:36:30	6.50	100
10:44:00	14.00	0

Depth of Water Against Time



	Time (mins)		
75% Depth	0.5	Time Elapsed (s)	360
25% Depth	6.5	Int. Surface Area up to 50% (m^2)	1.28
Time Elapsed	6	Infiltration Rate (m/s)	0.000278

Infiltration Rate (m/s) 2.8E-04

Trial Pit 1 - Test 2

Pit Dimensions (m)

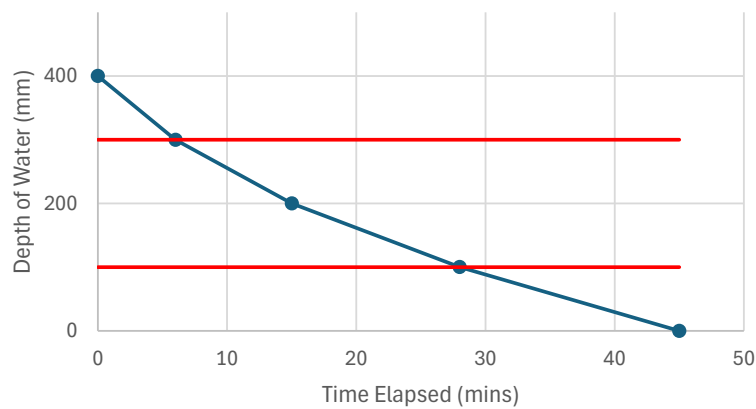
Width	0.8		
Length	0.8	Volume between 25% and 75% Depth	0.128
Starting Depth of Water	0.4		

Date of Test

Weather at Time of Test

Time	Time Elapsed (min)	Depth of Water (mm)
11:30:00	0	400
11:36:00	6	300
11:45:00	15	200
11:58:00	28	100
12:15:00	45	0

Depth of Water Against Time



	Time (mins)		
75% Depth	6	Time Elapsed (s)	1320
25% Depth	28	Int. Surface Area up to 50% (m^2)	1.28
Time Elapsed	22	Infiltration Rate (m/s)	7.58E-05

Infiltration Rate (m/s) 7.6E-05

Final Calculations

Test Pit 1

Test (ID)	Infiltration Rate (m/s)
1	2.8E-04
2	7.6E-05
Lowest Infiltration Rate (m/s)	7.6E-05

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
RE1	0.040	6.00	90.540	100	378484.805	160321.250	0.900	89.640
S2	0.049	5.00	89.350	500	378514.682	160311.708	1.550	87.800
SA1			88.810		378517.898	160310.680	1.700	87.110
Dummy			88.810		378518.833	160313.531	1.710	87.100

Links

Name	US Node	DS Node	Length (m)	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)
1.000	RE1	S2	31.364	89.640	88.300	1.340	23.4	150	Circular	6.25
1.001	S2	SA1	3.376	87.800	87.760	0.040	84.4	150	Circular	6.30
1.002	SA1	Dummy	3.000	87.110	87.100	0.010	300.0	150	Circular	6.39

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	2.090	36.9	7.2	0.750	0.900	0.040	0.0	45	1.626
1.001	1.095	19.3	16.1	1.400	0.900	0.089	0.0	105	1.222
1.002	0.575	10.2	16.1	1.550	1.560	0.089	0.0	150	0.586

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	x	Check Discharge Rate(s)	x
Rainfall Events	Singular	Drain Down Time (mins)	1440	Check Discharge Volume	x
Summer CV	1.000	Additional Storage (m³/ha)	0.0		
Analysis Speed	Normal	Starting Level (m)			

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0	100	0	0	0
10	0	0	0	100	25	0	0

Node SA1 Online Head/Flow Control

Flap Valve x | Replaces Downstream Link ✓ | Invert Level (m) 87.110

Head (m)	Flow (l/s)	Head (m)	Flow (l/s)
0.001	0.000	6.000	0.000

Node SA1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.27300	Safety Factor	3.0	Invert Level (m)	87.110
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	256

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	60.0	60.0	0.800	60.0	60.0	0.801	0.0	60.0

Node S2 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.27300	Invert Level (m)	88.750	Slope (1:X)	20.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.450
Safety Factor	3.0	Width (m)	9.000	Inf Depth (m)	
Porosity	0.30	Length (m)	31.000		

Results for 2 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	RE1	11	89.680	0.040	5.5	0.0003	0.0000	OK
15 minute summer	S2	10	87.897	0.097	13.0	0.0191	0.0000	OK
240 minute summer	SA1	156	87.258	0.148	5.1	8.4526	0.0000	OK
15 minute summer	Dummy	1	87.100	0.000	0.0	0.0000	0.0000	OK

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	RE1	1.000	S2	5.5	1.491	0.149	0.1157	
15 minute summer	S2	1.001	SA1	12.9	1.124	0.669	0.0389	
15 minute summer	S2	Infiltration		0.0				
240 minute summer	SA1	Head/Flow	Dummy	0.0				0.0
240 minute summer	SA1	Infiltration		1.5				

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	RE1	11	89.699	0.059	11.6	0.0005	0.0000	OK
15 minute summer	S2	10	88.017	0.217	27.3	0.0425	0.0000	SURCHARGED
180 minute summer	SA1	140	87.435	0.325	10.3	18.5162	0.0000	SURCHARGED
15 minute summer	Dummy	1	87.100	0.000	0.0	0.0000	0.0000	OK
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	RE1	1.000	S2	11.6	1.830	0.314	0.1989	
15 minute summer	S2	1.001	SA1	27.1	1.542	1.403	0.0587	
15 minute summer	S2	Infiltration		0.0				
180 minute summer	SA1	Head/Flow	Dummy	0.0				0.0
180 minute summer	SA1	Infiltration		1.5				

Results for 100 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	RE1	11	89.720	0.080	19.7	0.0006	0.0000	OK
15 minute summer	S2	10	88.233	0.433	46.6	0.0849	0.0000	SURCHARGED
180 minute summer	SA1	180	87.723	0.613	16.6	34.9562	0.0000	SURCHARGED
15 minute summer	Dummy	1	87.100	0.000	0.0	0.0000	0.0000	OK
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	RE1	1.000	S2	19.7	2.089	0.533	0.2958	
15 minute summer	S2	1.001	SA1	46.1	2.619	2.383	0.0588	
15 minute summer	S2	Infiltration		0.0				
180 minute summer	SA1	Head/Flow	Dummy	0.0				0.0
180 minute summer	SA1	Infiltration		1.5				

Results for 100 year +25% CC 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
30 minute summer	RE1	18	89.731	0.091	24.0	0.0007	0.0000	OK
240 minute summer	S2	240	88.649	0.849	17.6	0.1664	0.0000	SURCHARGED
240 minute summer	SA1	240	88.649	1.539	17.5	45.6285	0.0000	FLOOD RISK
15 minute summer	Dummy	1	87.100	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	RE1	1.000	S2	23.9	2.179	0.646	0.3434	
240 minute summer	S2	1.001	SA1	17.5	1.191	0.907	0.0594	
240 minute summer	S2	Infiltration		0.0				
240 minute summer	SA1	Head/Flow	Dummy	0.0				0.0
240 minute summer	SA1	Infiltration		1.5				

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	4.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
Gully	0.008	4.00	88.450	300	378501.133	160331.209	0.650	87.800
SA2			89.350		378509.729	160327.130	1.950	87.400
Dummy			88.500		378512.439	160325.843	1.100	87.400

Links

Name	US Node	DS Node	Length (m)	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)
1.000	Gully	SA2	9.515	87.800	87.700	0.100	95.1	100	Circular	4.20
1.001	SA2	Dummy	3.000	87.400	87.400	0.000	0.0	100	Circular	4.25

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	0.788	6.2	1.4	0.550	1.550	0.008	0.0	33	0.646
1.001	1.000	7.9	1.4	1.850	1.000	0.008	0.0	100	0.000

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)	1440	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0	100	0	0	0
10	0	0	0	100	25	0	0

Node SA2 Online Head/Flow Control

Flap Valve x | Replaces Downstream Link ✓ | Invert Level (m) 87.400

Head (m)	Flow (l/s)	Head (m)	Flow (l/s)
0.001	0.000	6.000	0.000

Node SA2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.27300	Safety Factor	3.0	Invert Level (m)	87.400
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	132

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	7.0	7.0	0.400	7.0	7.0	0.401	0.0	7.0

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	Gully	10	87.825	0.025	0.8	0.0017	0.0000	OK
240 minute summer	SA2	144	87.463	0.063	0.3	0.4176	0.0000	OK
15 minute summer	Dummy	1	87.400	0.000	0.0	0.0000	0.0000	OK
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	Gully	1.000	SA2	0.8	0.542	0.129	0.0140	
240 minute summer	SA2	Head/Flow	Dummy	0.0				0.0
240 minute summer	SA2	Infiltration		0.2				

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	Gully	10	87.849	0.049	2.9	0.0035	0.0000	OK
180 minute summer	SA2	132	87.639	0.239	1.0	1.5872	0.0000	SURCHARGED
15 minute summer	Dummy	1	87.400	0.000	0.0	0.0000	0.0000	OK
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	Gully	1.000	SA2	2.9	0.768	0.468	0.0359	
180 minute summer	SA2	Head/Flow	Dummy	0.0				0.0
180 minute summer	SA2	Infiltration		0.2				

Results for 100 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
180 minute winter	Gully	168	87.923	0.123	1.0	0.0088	0.0000	SURCHARGED
180 minute winter	SA2	168	87.923	0.523	1.0	2.6633	0.0000	SURCHARGED
15 minute summer	Dummy	1	87.400	0.000	0.0	0.0000	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
180 minute winter	Gully	1.000	SA2	1.0	0.577	0.162	0.0744	
180 minute winter	SA2	Head/Flow	Dummy	0.0				0.0
180 minute winter	SA2	Infiltration		0.2				

Results for 100 year +25% CC 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
180 minute winter	Gully	172	88.440	0.640	1.3	0.0455	0.0000	FLOOD RISK
180 minute winter	SA2	172	88.440	1.040	1.3	2.6633	0.0000	SURCHARGED
15 minute summer	Dummy	1	87.400	0.000	0.0	0.0000	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
180 minute winter	Gully	1.000	SA2	1.3	0.621	0.210	0.0744	
180 minute winter	SA2	Head/Flow	Dummy	0.0				0.0
180 minute winter	SA2	Infiltration		0.2				