

TECHNICAL NOTE

Drainage Calculations

237 London Road, Chippenham

Lanmor Consulting has been appointed to provide the below ground Drainage Design and Calculations for the proposed development at 237 London Road, Chippenham, SN15 3AP. The proposed development is for the construction of a single, detached 3-bed house in the rear garden of the existing property. Planning permission was granted by Wiltshire Council in 2025 and this report is to address condition 3 of that approval [ref PL/2024/05413].

3. *No development shall commence on site until a scheme for the discharge of surface water from the site (including surface water from the access/driveway), incorporating sustainable drainage details, has been submitted to and approved in writing by the Local Planning Authority. The development shall not be first brought into use until surface water drainage has been constructed in accordance with the approved scheme.*

REASON: To ensure that the development can be adequately drained without leading to increased flood risks elsewhere.

Existing Drainage

A CCTV survey of the drainage serving the existing property has been undertaken. This found that the building is drained via several manholes to the side of the house that connect to the public sewer in the road. The public sewer is identified on the records as a 225mm diameter foul sewer.

Proposed Foul Drainage

A new below ground network will be provided to collect wastewater from the proposed dwelling. This will be routed down the new footpath to the side of the existing garden and will connect into the existing manhole IC1. As the proposed house is situated higher than the existing, a gravity connection to the existing manhole is achievable. The new connection will be subject to a Section 106 application with the sewerage authority (Wessex Water).

Proposed Surface Water Drainage

Rainwater harvesting was first considered to reuse water on site. The development is for a single house which offers only a limited catchment area for the harvesting tank. Calculations have shown that the volume of runoff is not sufficient for the expected water usage of the 3-bed dwelling, and therefore mains water would be used instead for the majority of the time. This shows that the use of rainwater harvesting cannot successfully be achieved on this site.

Percolation testing has been undertaken to confirm if the use of soakaways will be viable, and to assist in their design. 2 no. trial pits were excavated, one in the location of the new driveway and one in the rear garden. These were then testing 4 times to identify the infiltration rate. The results are tabled below.

Infiltration Rates (m/s)	Trial Pit A (Driveway)	Trial Pit B (Rear garden)
Test 1	1.24×10^{-5}	4.96×10^{-5}
Test 2	1.33×10^{-5}	2.26×10^{-5}
Test 3	8.33×10^{-6}	1.92×10^{-5}
Test 4	1.06×10^{-5}	7.94×10^{-6}

Table 1 – Percolation Test Results

The lowest infiltration rate was the final test in trial pit B (rear garden) at 7.94×10^{-6} m/s (0.02857 m/h) and this rate has been used in the design of the soakaways.

The proposed surface water drainage will utilise 2 no. soakaways, one under the front driveway and one in the rear garden, to discharge surface water runoff from the roof to ground. The front soakaway will drain the front sloping roof, and the rear soakaway will drain the rear sloping roof and the flat roof over the living/dining room. Drainage calculations have been completed for the soakaways to show that no flooding will occur for the 1 in 100-year storm event plus 45% allowance for climate change.

The driveway will be formed from permeable materials to allow rainwater to pass through directly into the ground below. It will have a 150mm thick sub-base formed from granular Type 3 material with 30% voids. The calculations have shown that this is sufficient storage for the 1 in 100-year storm event plus 45% allowance for climate change, and that no flooding will occur on site.

Following completion of the development, the proposed SuDS on site (soakaway and permeable paving) will be owned by the homeowner, and it will be their responsibility to maintain these structures over the lifetime of the development. The following tables provide information on the recommended maintenance schedules required for the relevant SuDS features.

For the soakaways, the following maintenance is recommended.

Soakaway Maintenance Schedule		
	Required Action	Typical Frequency
Regular maintenance	Inspect for sediment debris in pre-treatment components and floor of inspection tube / chamber and inside soakaway	Annually
	Cleaning of gutters and any filters on downpipes	Annually (or as required based on inspections)
	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 / chamber and inside soakaway	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 soakaway to ensure emptying is occurring	Annually

For permeable paving areas, the following maintenance is recommended.

Permeable Paving Maintenance Schedule		
	Required Action	Typical Frequency
Regular maintenance	Remove debris and leaves etc.	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 surfaces 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	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 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting etc	As required
	Rehabilitation of surface and upper substructure	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 hours after large storms in the first six months
	Inspect silt accumulation rates and establish appropriate frequencies for rehabilitation	Annually
	Monitor inspection chambers	Annually

The above maintenance regimes are recommended for the SuDS features in the development and should be adjusted to suit site requirements following the initial inspections if required.

This report and the accompanying drawing and calculations has therefore provided sufficient information to satisfy condition 3 of the approval, and we see no reason why this condition cannot be discharged.

APPENDIX A

Wessex Water Network Map

Wessex Water Network Map



Reproduced from the Ordnance Survey map with the permission of the Controller of His Majesty's Stationery Office. © Crown copyright and database rights (2026) OS AC0000848304

WATER MAINS		SEWERS		STRATEGIC PUBLIC		PRIVATE		SECTION 104		OTHER WESSEX PIPES		NON-WESSEX / UNKNOWN	
Distribution	Washout	Foul	Surface	Foul	Surface	Foul	Surface	Foul	Surface	Rising Mains	Standby Rising Mains	Culverted Watercourse	Culverted Watercourse
Raw Water	Abandoned	Combined	Abandoned	Combined	Abandoned	Combined	Abandoned	Combined	Abandoned	EDM	Effluent Disposal	Highway Drain	Highway Drain
Private										Overflow	Overflow	Overflow	Overflow
FITTINGS		STRUCTURES		STRUCTURES		STRUCTURES		STRUCTURES		OTHER STRUCTURES		OTHER STRUCTURES	
Hydrant	Other	Manhole - Foul	Manhole - Surface	Manhole - Foul	Manhole - Surface	Manhole - Foul	Manhole - Surface	Manhole - Foul	Manhole - Surface	Attenuation Tank	Storage Tank	Chamber	Interceptor
		Manhole - Combined	Inlet	Manhole - Combined	Inlet	Manhole - Combined	Inlet	Manhole - Combined	Inlet			Tunnel	Interceptor
		Outfall	Outfall	Outfall	Outfall	Outfall	Outfall	Outfall	Outfall				
		Lamphole	Bifurcation - Foul	Lamphole	Bifurcation - Foul	Lamphole	Bifurcation - Foul	Lamphole	Bifurcation - Foul				
		Bifurcation - Surface	Bifurcation - Combined	Bifurcation - Surface	Bifurcation - Combined	Bifurcation - Surface	Bifurcation - Combined	Bifurcation - Surface	Bifurcation - Combined				
		Combined Sewage Overflow	Combined Sewage Overflow	Combined Sewage Overflow	Combined Sewage Overflow	Combined Sewage Overflow	Combined Sewage Overflow	Combined Sewage Overflow	Combined Sewage Overflow				
			Air Valve		Air Valve		Air Valve		Air Valve				
			Hatch Box		Hatch Box		Hatch Box		Hatch Box				
			Washout		Washout		Washout		Washout				

Information in this map is provided for identification purposes only. No warranty as to accuracy is given or implied. The precise route of pipe work may not exactly match that shown. Wessex Water does not accept liability for inaccuracies. Sewers and lateral drains adopted by Wessex Water under the Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011 are to be plotted over time and may not yet be shown. In carrying out any works, you accept liability for the cost of any repairs to Wessex Water apparatus damaged as a result of your works. You are advised to commence excavations using hand tools only. Mechanical digging equipment should not be used until pipe work has been precisely located. If you are considering any form of building works and pipe work is shown within the boundary of your property or a property to be purchased (or very close by) a surveyor should plot its exact position prior to commencing works or purchase. If you are proposing to build over or near Wessex Water's apparatus you should contact the Developer Services Team, tel: 01225 526333 or e-mail: developer.enquiries@wessexwater.co.uk to discuss your proposals. Details of assets within Wessex Water's land ownership are unavailable through this service.

Wessex Water
YTL GROUP

Date: 01/04/2026
Centre: 393063E, 172452N
Scale: 1:625
(when printed at A4 size)

APPENDIX B

Drainage CCTV Survey

Mega-Rod
admin@mega-rod.co.uk

Project Name:
Jonathan Hull
237 London Rd
Chippenham
SN15 3AP

Report Date:
15 April 2026



Project Information

Job Number
1521488

Surveyed by (Operator)
A Anderson

Base Unit
HITAR4XYJT

Date
15/04/2026

Client Details:

Jonathan Hull
237 London Rd
Chippenham
SN15 3AP

Site Details:

237 London Rd
Chippenham
SN15 3AP

Contractor Details:

Mega-Rod
admin@mega-rod.co.uk

Office Contact Number: 01225 422 980

Purpose of Survey:

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Job Number 1521488	Surveyed by (Operator) A Anderson	Base Unit HITAR4XYJT	Date 15/04/2026
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Page 22 Survey Run Sheet(Survey 6 - IC2 to Connection 2 (Toilet).)

[View via iTouch Live](#) 

Page 25 Survey Run Sheet(Survey 7 - IC2 to Main sewer)

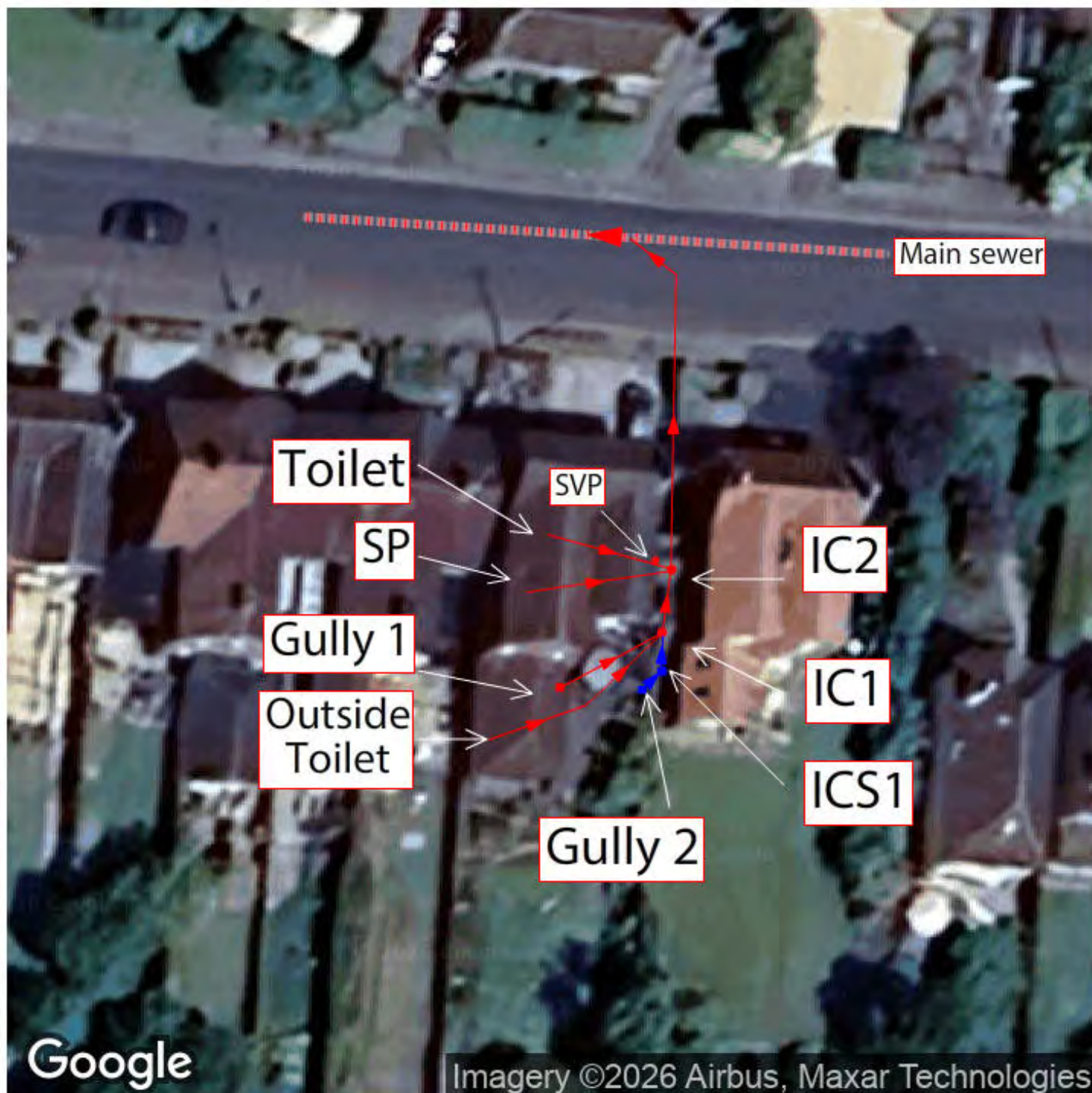
[View via iTouch Live](#) 

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Site Drawings/Photos

Job Number 1521488	Surveyed by (Operator) A Anderson	Base Unit HITAR4XYJT	Date 15/04/2026
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This sketch is not to scale and does not represent the exact routing of the drainage system



Site Photos

Job Number 1521488	Surveyed by (Operator) A Anderson	Base Unit HITAR4XYJT	Date 15/04/2026
 Manhole / Access Point: ICS1 (CATCH-PIT ?). Location		 Manhole / Access Point: ICS1 (CATCH-PIT ?). Internal	
 Manhole / Access Point: CONNECTION 2 (GULLY 1) Location		 Manhole / Access Point: CONNECTION 2 (GULLY 1) Internal	
 Manhole / Access Point: CONNECTION 1 (OUTSIDE TOILET). Location		 Manhole / Access Point: IC1 Location	

Site Photos

Job Number 1521488	Surveyed by (Operator) A Anderson	Base Unit HITAR4XYJT	Date 15/04/2026
 Manhole / Access Point: IC1 Internal		 Manhole / Access Point: IC2 Internal	
 Manhole / Access Point: IC2 Location		 Property: Front Elevation	
 Property: Rear Elevation		 Property: Left Elevation	

Site Photos

Job Number 1521488	Surveyed by (Operator) A Anderson	Base Unit HITAR4XYJT	Date 15/04/2026
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Other Site Photos: Gully 2



Other Site Photos: SVP

Report Summary

Job Number 1521488	Surveyed by (Operator) A Anderson	Base Unit HITAR4XYJT	Date 15/04/2026
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Job Information

Total Distance Surveyed: **50.89 meters**
Engineer: **A Anderson**
Number of Surveys: **7**
Number of Surveys grade 4 or above: **0**

Section 1 Overview (15/04/2026)

Manholes: **IC1 to Connection 1 (Outside Toilet).**
Pipe Length: **9.5 metres**
Structural Grade: **3**
Service Grade: **0**
Material: **Vitrified clay**
Pipe Size: **100mm**
Use: **Foul**

In this section the survey identified Fractures in the pipe work at 0.38 + 0.62mtrs.

Section 2 Overview (15/04/2026)

Manholes: **IC1 to Connection 2 (Gully 1)**
Pipe Length: **4.33 metres**
Structural Grade: **0**
Service Grade: **4**
Material: **Vitrified clay**
Pipe Size: **100mm**
Use: **Foul**

In this section the survey identified Grease build-up on the outlet of the Gully.

Section 3 Overview (15/04/2026)

Manholes: **IC1 to ICS1 (Catch-pit ?).**
Pipe Length: **2.79 metres**
Structural Grade: **0**
Service Grade: **0**
Material: **Vitrified clay**
Pipe Size: **100mm**
Use: **Surface water**

Generally in good condition.

Section 4 Overview (15/04/2026)

Manholes: **IC1 to IC2**
Pipe Length: **3.86 metres**
Structural Grade: **0**
Service Grade: **0**
Material: **Vitrified clay**
Pipe Size: **100mm**
Use: **Combined**

Generally in good condition.

Section 5 Overview (15/04/2026)

Manholes: **IC2 to Connection 1 (Soil pipe SP).**
Pipe Length: **6.12 metres**
Structural Grade: **0**
Service Grade: **0**
Material: **Vitrified clay**
Pipe Size: **100mm**
Use: **Foul**

Generally in good condition.

Report Summary

Job Number 1521488	Surveyed by (Operator) A Anderson	Base Unit HITAR4XYJT	Date 15/04/2026
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Section 6 Overview (15/04/2026)

Manholes: **IC2 to Connection 2 (Toilet).**

Pipe Length: **5.79 metres**

Structural Grade: **0**

Service Grade: **0**

Material: **Vitrified clay**

Pipe Size: **100mm**

Use: **Foul**

Generally in good condition.

Section 7 Overview (15/04/2026)

Manholes: **IC2 to Main sewer**

Pipe Length: **18.5 metres**

Structural Grade: **0**

Service Grade: **0**

Material: **Vitrified clay**

Pipe Size: **100mm**

Use: **Combined**

Generally in good condition.

CCTV Inspection Report

Surveyed by (Operator) A Anderson	Job Number 1521488	Pipe Length Reference(PLR) ConnectionX	Date 15/04/2026	Pre Cleaned Not Cleaned
Weather 1 - Dry	Customer Present	Service Grade/Structural Grade 0/3	Base Unit HITAR4XYJT	Section Number 1
Road 237 London Rd Place Chippenham Location SN15 3AP		Division District Location Details		
Purpose Duty Foul Catchment	Shape/Size 100mm Material Vitrified clay Category		Start Node IC1 End Node Connection 1 (Outside Toilet). Total length 9.5 metres	
Scale 1:0.50 Direction Upstream		View via iTouch Live  Download 		

Start Node Ref:IC1 | I/L : metres | Depth: 0.48 metres

Position	Code	Description	Photo	Type/Grade
0.00	IC	Start node type, inspection chamber, reference IC1	14653312	Comment / 0
0.00	WL	Water level 0% height/diameter	14653315	Comment / 0
0.38	FC	Fracture circumferential from 12 to 12 o'clock	14653322	Structural / 3
0.62	FC	Fracture circumferential from 12 to 12 o'clock	14653328	Structural / 3
0.62	CL	Crack longitudinal at 12 o'clock	14653333	Structural / 2
1.31	LR	Line of drain/sewer deviates right	14653339	Comment / 0
8.79	CN	Connection other than junction at 3 o'clock, diameter 100mm	14653341	Comment / 0
9.50	LU	Line of drain/sewer deviates up	14653346	Comment / 0
9.50	WL	Water level 0% height/diameter	14653351	Comment / 0
9.50	REM	End of survey: At Rest-bend to the sink waste outlet (outside Toilet).	14653355	Comment / 0

End Node Ref:Connection 1 (Outside Toilet). | I/L : metres

CCTV Inspection Photos

Job Number 1521488	Surveyed by (Operator) A Anderson	Base Unit HITAR4XYJT	Date 15/04/2026
 0.00 M Start node type, inspection chamber, reference IC1		 0.00 M Water level 0% height/diameter	
From: IC1 / To: Connection 1 Size: 100mm  0.38 M Fracture circumferential from 12 to 12 o'clock		From: IC1 / To: Connection 1 Size: 100mm  0.62 M Fracture circumferential from 12 to 12 o'clock	
From: IC1 / To: Connection 1 Size: 100mm  0.62 M Crack longitudinal at 12 o'clock		From: IC1 / To: Connection 1 Size: 100mm  1.31 M Line of drain/sewer deviates right	

CCTV Inspection Photos

Job Number 1521488	Surveyed by (Operator) A Anderson	Base Unit HITAR4XYJT	Date 15/04/2026
From: IC1 / To: Connection 1 Size: 100mm  8.79 M Connection other than junction at 3 o'clock, diameter 100mm			
From: IC1 / To: Connection 1 Size: 100mm  9.50 M Line of drain/sewer deviates up			
From: IC1 / To: Connection 1 Size: 100mm  9.50 M Water level 0% height/diameter			
From: IC1 / To: Connection 1 Size: 100mm  9.50 M End of survey: At Rest-bend to the sink waste outlet (outside Toilet).			

CCTV Inspection Report

Surveyed by (Operator) A Anderson	Job Number 1521488	Pipe Length Reference(PLR) ConnectionX	Date 15/04/2026	Pre Cleaned Not Cleaned
Weather 1 - Dry	Customer Present	Service Grade/Structural Grade 4/0	Base Unit HITAR4XYJT	Section Number 2
Road 237 London Rd Place Chippenham Location SN15 3AP		Division District Location Details		
Purpose Duty Foul Catchment	Shape/Size 100mm Material Vitrified clay Category	Start Node IC1 End Node Connection 2 (Gully 1) Total length 4.33 metres		
Scale 1:0.23 Direction Upstream		View via iTouch Live  Download 		

Start Node Ref:IC1 | I/L : metres | Depth: 0.48 metres

Position	Code	Description	Photo	Type/Grade
	0.00 IC	Start node type, inspection chamber, reference IC1	14653362	Comment / 0
	0.00 WL	Water level 0% height/diameter	14653367	Comment / 0
	1.76 LL	Line of drain/sewer deviates left	14653371	Comment / 0
	4.33 DEG	Attached deposits, grease from 4 to 10 o'clock 50% cross-sectional area loss - Remark: Build up on outlet to Gully 1.	14653379	Service / 4
	4.33 REM	End of survey: At outlet to Gully 1.	14653381	Comment / 0

End Node Ref:Connection 2 (Gully 1) | I/L : metres

CCTV Inspection Photos

Job Number 1521488	Surveyed by (Operator) A Anderson	Base Unit HITAR4XYJT	Date 15/04/2026
 0.00 M Start node type, inspection chamber, reference IC1		 0.00 M Water level 0% height/diameter	
From: IC1 / To: Connection 2 Size: 100mm  1.76 M Line of drain/sewer deviates left		From: IC1 / To: Connection 2 Size: 100mm  4.33 M Attached deposits, grease from 4 to 10 o'clock 50% cross-sectional area loss - Remark: Build up on outlet to Gully 1.	
From: IC1 / To: Connection 2 Size: 100mm  4.33 M End of survey: At outlet to Gully 1.			

CCTV Inspection Report

Surveyed by (Operator) A Anderson	Job Number 1521488	Pipe Length Reference(PLR) ICS1 (CatcX	Date 15/04/2026	Pre Cleaned Not Cleaned
Weather 1 - Dry	Customer Present	Service Grade/Structural Grade 0/0	Base Unit HITAR4XYJT	Section Number 3
Road 237 London Rd Place Chippenham Location SN15 3AP		Division District Location Details		
Purpose Duty Surface water Catchment	Shape/Size 100mm Material Vitrified clay Category	Start Node IC1 End Node ICS1 (Catch-pit ?) . Total length 2.79 metres		
Scale 1:0.15 Direction Upstream		View via iTouch Live  Download 		

Start Node Ref:IC1 | I/L : metres | Depth: 0.48 metres

Position	Code	Description	Photo	Type/Grade
	0.00	IC		14653394 Comment / 0
	0.00	WL		14653399 Comment / 0
				
1.57	LR	Line of drain/sewer deviates right		14653402 Comment / 0
				
2.79	WL	Water level 0% height/diameter		14653408 Comment / 0
2.79	ICF	Finish node type, inspection chamber, reference ICS1 (Catch-pit ?).		14653410 Comment / 0

End Node Ref:ICS1 (Catch-pit ?). | I/L : metres

End Node Ref:ICS1 (Catch-pit ?). | I/L : metres

CCTV Inspection Photos

Job Number 1521488	Surveyed by (Operator) A Anderson	Base Unit HITAR4XYJT	Date 15/04/2026
 0.00 M Start node type, inspection chamber, reference IC1			
 0.00 M Water level 0% height/diameter			
 From: IC1 / To: upstream Size: 100mm 1.57 M Line of drain/sewer deviates right			
 From: IC1 / To: upstream Size: 100mm 2.79 M Water level 0% height/diameter			
 From: IC1 / To: upstream Size: 100mm 2.79 M Finish node type, inspection chamber, reference ICS1 (Catch-pit ?).			

CCTV Inspection Report

Surveyed by (Operator) A Anderson	Job Number 1521488	Pipe Length Reference(PLR) IC1 X	Date 15/04/2026	Pre Cleaned Not Cleaned
Weather 1 - Dry	Customer Present	Service Grade/Structural Grade 0/0	Base Unit HITAR4XYJT	Section Number 4
Road 237 London Rd Place Chippenham Location SN15 3AP			Division District Location Details	
Purpose Duty Combined Catchment	Shape/Size 100mm Material Vitrified clay Category		Start Node IC1 End Node IC2 Total length 3.86 metres	
Scale 1:0.20 Direction Downstream			View via iTouch Live Download	

Start Node Ref:IC1 | I/L : metres | Depth: 0.48 metres

Position	Code	Description	Photo	Type/Grade
0.00	IC	Start node type, inspection chamber, reference IC1	14653424	Comment / 0
0.00	WL	Water level 0% height/diameter	14653425	Comment / 0
3.86	WL	Water level 0% height/diameter	14653427	Comment / 0
3.86	ICF	Finish node type, inspection chamber, reference IC2	14653428	Comment / 0

End Node Ref:IC2 | I/L : metres

CCTV Inspection Photos

Job Number 1521488	Surveyed by (Operator) A Anderson	Base Unit HITAR4XYJT	Date 15/04/2026
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Start node type, inspection chamber, reference IC1



Water level 0% height/diameter



Water level 0% height/diameter



Finish node type, inspection chamber, reference IC2

CCTV Inspection Report

Surveyed by (Operator) A Anderson	Job Number 1521488	Pipe Length Reference(PLR) ConnectionX	Date 15/04/2026	Pre Cleaned Not Cleaned
Weather 1 - Dry	Customer Present	Service Grade/Structural Grade 0/0	Base Unit HITAR4XYJT	Section Number 5
Road 237 London Rd Place Chippenham Location SN15 3AP		Division District Location Details		
Purpose Duty Foul Catchment	Shape/Size 100mm Material Vitrified clay Category	Start Node IC2 End Node Connection 1 (Soil pipe SP) . Total length 6.12 metres		
Scale 1:0.32 Direction Upstream		View via iTouch Live  Download 		

Start Node Ref:IC2 | I/L : metres | Depth: 0.55 metres

Position	Code	Description	Photo	Type/Grade
0.00	IC	Start node type, inspection chamber, reference IC2	14653720	Comment / 0
0.00	WL	Water level 0% height/diameter	14653725	Comment / 0
0.00	LR	Line of drain/sewer deviates right	14653727	Comment / 0
				
4.55	CN	Connection other than junction at 3 o'clock, diameter 100mm	14653728	Comment / 0
6.12	LU	Line of drain/sewer deviates up	14653730	Comment / 0
6.12	WL	Water level 0% height/diameter	14653731	Comment / 0
6.12	REM	End of survey: At Rest-bend to Soil pipe (SP).	14653734	Comment / 0

End Node Ref:Connection 1 (Soil pipe SP). | I/L : metres

CCTV Inspection Photos

Job Number 1521488	Surveyed by (Operator) A Anderson	Base Unit HITAR4XYJT	Date 15/04/2026
 0.00 M Start node type, inspection chamber, reference IC2			
 0.00 M Water level 0% height/diameter			
 From: IC2 / To: Connection 1 Size: 100mm 0.00 M Line of drain/sewer deviates right			
 From: IC2 / To: Connection 1 Size: 100mm 4.55 M Connection other than junction at 3 o'clock, diameter 100mm			
 From: IC2 / To: Connection 1 Size: 100mm 6.12 M Line of drain/sewer deviates up			
 From: IC2 / To: Connection 1 Size: 100mm 6.12 M Water level 0% height/diameter			

CCTV Inspection Photos

Job Number 1521488	Surveyed by (Operator) A Anderson	Base Unit HITAR4XYJT	Date 15/04/2026
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End of survey: At Rest-bend to Soil pipe (SP).

CCTV Inspection Report

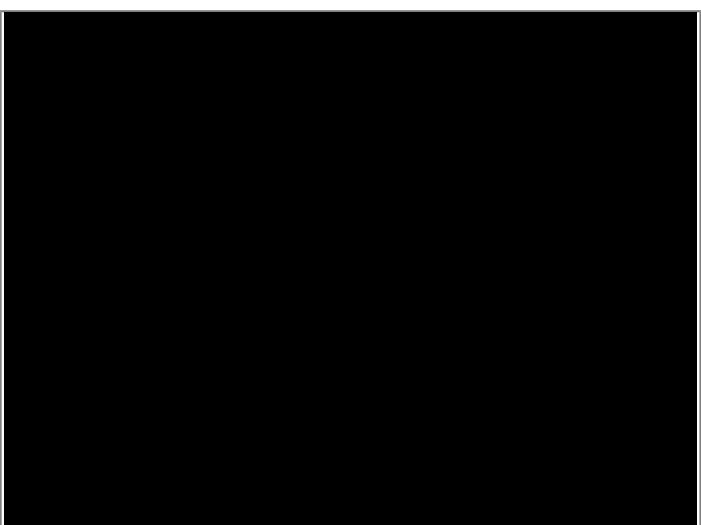
Surveyed by (Operator) A Anderson	Job Number 1521488	Pipe Length Reference(PLR) ConnectionX	Date 15/04/2026	Pre Cleaned Not Cleaned
Weather 1 - Dry	Customer Present	Service Grade/Structural Grade 0/0	Base Unit HITAR4XYJT	Section Number 6
Road 237 London Rd Place Chippenham Location SN15 3AP			Division District Location Details	
Purpose Duty Foul Catchment	Shape/Size 100mm Material Vitrified clay Category		Start Node IC2 End Node Connection 2 (Toilet). Total length 5.79 metres	
Scale 1:0.30 Direction Upstream			View via iTouch Live  Download 	

Start Node Ref:IC2 | I/L : metres | Depth: 0.55 metres

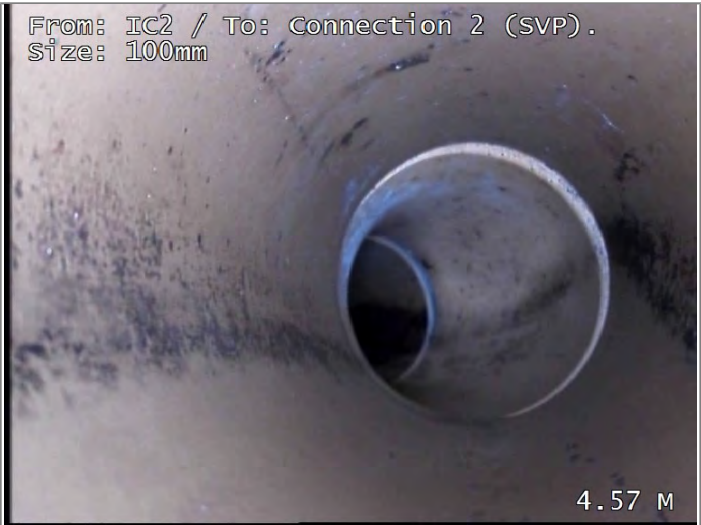
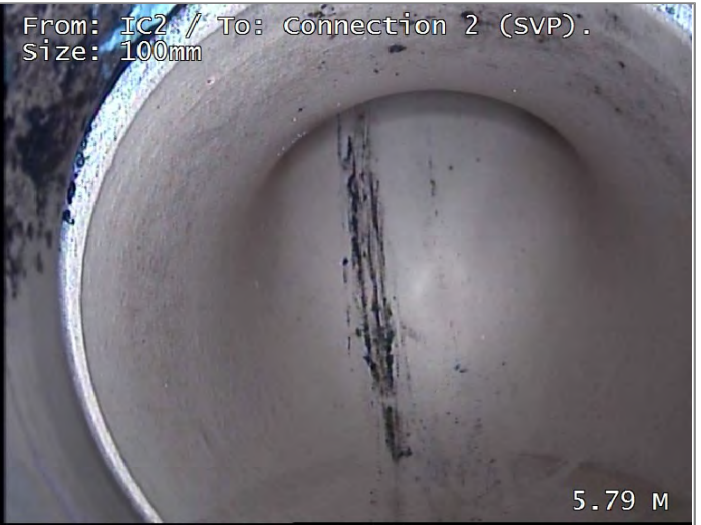
Position	Code	Description	Photo	Type/Grade
	0.00	IC	Start node type, inspection chamber, reference IC2	14653735 Comment / 0
	0.00	WL	Water level 0% height/diameter	14653738 Comment / 0
	0.00	LR	Line of drain/sewer deviates right	14653741 Comment / 0
	0.21	CN	Connection other than junction at 3 o'clock, diameter 100mm - Remark: SVP	14653742 Comment / 0
	0.21	REM	Surrounding connection	14653760 Comment / 0
	1.40	LR	Line of drain/sewer deviates right	14653743 Comment / 0
	4.57	LL	Line of drain/sewer deviates left	14653745 Comment / 0
	5.79	LU	Line of drain/sewer deviates up	14653748 Comment / 0
	5.79	WL	Water level 0% height/diameter	14653750 Comment / 0
	5.79	REM	End of survey: At Rest-bend to the Toilet.	14653752 Comment / 0

End Node Ref:Connection 2 (Toilet). | I/L : metres

CCTV Inspection Photos

Job Number 1521488	Surveyed by (Operator) A Anderson	Base Unit HITAR4XYJT	Date 15/04/2026
 0.00 M Start node type, inspection chamber, reference IC2		 0.00 M Water level 0% height/diameter	
From: IC2 / To: Connection 2 (SVP). Size: 100mm  0.00 M Line of drain/sewer deviates right		From: IC2 / To: Connection 2 (SVP). Size: 100mm  0.21 M Connection other than junction at 3 o'clock, diameter 100mm - Remark: SVP Connection	
 SVP Connection		From: IC2 / To: Connection 2 (SVP). Size: 100mm  1.40 M Line of drain/sewer deviates right	

CCTV Inspection Photos

Job Number 1521488	Surveyed by (Operator) A Anderson	Base Unit HITAR4XYJT	Date 15/04/2026
From: IC2 / To: Connection 2 (SVP). Size: 100mm  4.57 M Line of drain/sewer deviates left From: IC2 / To: Connection 2 (SVP). Size: 100mm  5.79 M Line of drain/sewer deviates up			
From: IC2 / To: Connection 2 (SVP). Size: 100mm  5.79 M Water level 0% height/diameter From: IC2 / To: Connection 2 (SVP). Size: 100mm  5.79 M End of survey: At Rest-bend to the Toilet.			

CCTV Inspection Report

Surveyed by (Operator) A Anderson	Job Number 1521488	Pipe Length Reference(PLR) IC2 X	Date 15/04/2026	Pre Cleaned Not Cleaned
Weather 1 - Dry	Customer Present	Service Grade/Structural Grade 0/0	Base Unit HITAR4XYJT	Section Number 7
Road 237 London Rd Place Chippenham Location SN15 3AP		Division District Location Details		
Purpose Duty Combined Catchment	Shape/Size 100mm Material Vitrified clay Category	Start Node IC2 End Node Main sewer Total length 18.5 metres		
Scale 1:0.97 Direction Downstream		View via iTouch Live  Download 		

Start Node Ref:IC2 | I/L : metres | Depth: 0.55 metres

Position	Code	Description	Photo	Type/Grade
0.00	IC	Start node type, inspection chamber, reference IC2	14653764	Comment / 0
0.00	WL	Water level 0% height/diameter	14653766	Comment / 0
				
8.67	CN	Connection other than junction at 10 o'clock, diameter 100mm	14653768	Comment / 0
11.21	LD	Line of drain/sewer deviates down	14653769	Comment / 0
17.10	REM	Dimension change to 150mm	14653771	Comment / 0
17.10	LL	Line of drain/sewer deviates left	14653772	Comment / 0
17.10	LD	Line of drain/sewer deviates down	14653773	Comment / 0
18.50	WL	Water level 0% height/diameter	14653774	Comment / 0
18.50	REM	End of survey: Entered the Main sewer.	14653778	Comment / 0

End Node Ref:Main sewer | I/L : metres

CCTV Inspection Photos

Job Number 1521488	Surveyed by (Operator) A Anderson	Base Unit HITAR4XYJT	Date 15/04/2026
 0.00 M Start node type, inspection chamber, reference IC2			
 0.00 M Water level 0% height/diameter			
 From: IC2 / To: Downstream Size: 100mm 8.67 M Connection other than junction at 10 o'clock, diameter 100mm			
 From: IC2 / To: Downstream Size: 100mm 11.21 M Line of drain/sewer deviates down			
 From: IC2 / To: Downstream Size: 100mm 17.10 M Dimension change to 150mm			
 From: IC2 / To: Downstream Size: 100mm 17.10 M Line of drain/sewer deviates left			

CCTV Inspection Photos

Job Number 1521488	Surveyed by (Operator) A Anderson	Base Unit HITAR4XYJT	Date 15/04/2026
------------------------------	---	--------------------------------	---------------------------



Line of drain/sewer deviates down



Water level 0% height/diameter



End of survey: Entered the Main sewer.

Important Disclaimer Notes

1. This is a CCTV drainage report and not the same type of extensive survey that a chartered building surveyor might produce. We do not hold professional indemnity insurance like a chartered building surveyor would. The survey is indicative only. Therefore, please do not scale off drawings, plans or sketches as these are furnished as a general guide to illustrate and aid understanding of the report and no warranty as to its correctness is given or implied. Reports and diagrams must not be solely relied upon in the event of excavation or other critical works. This survey should never be used for specialist activities such as pile driving.
2. Meterage is calculated by the camera equipment and is limited by the tolerances of that technology. Meterage and depths produced by the camera or sonde alone should always just be read as a guide. There may be a margin of error dependent on the depth of the drain, ground conditions, other services or external factors.
3. We have used our best endeavours to produce this report. It should be read as such. It reflects what the team were able to ascertain about the drains they had camera access to at a given point in time and their interpretation of what they witnessed in the 3D world being turned into a 2D representation in a typed report. We use the leading industry standard reporting software to achieve this but there are a whole host of factors that can cause something that appeared one way on the day to be different when excavated or revealed subsequently. Mega-Rod is not liable for any damages arising in contract, tort or otherwise from the use of this survey or any material contained in it, or from any action or decision taken based solely on this survey. It should be read as an aid to the condition of the drainage system in conjunction with other information you may have. Sometimes we have to make assumptions about the drain, or the route of the drain. Sometimes conditions prevent a clear image. If you are planning to build over, permanently bury, change the layout, connect new services / fittings or install expensive products such as kitchens or under floor heating etc close to or over the drains then relying on this report alone is very risky. We are never able to make bold statements that the drains will be fine as the conditions of use are beyond our control. Please do not make life changing decisions such as house purchases based solely on this report.

APPENDIX C

Percolation Test Results

Percolation Tests

Site A – Driveway

Site B – Rear garden

Test 1	A	B
7.5cm	10:20	0:58
15cm	31:22	4:43
22.5cm	1:17:27	17:50

Test 2	A	B
7.5cm	9:23	1:51
15cm	30:19	9:12
22.5cm	1:11:51	38:50

Test 3	A	B
7.5cm	13:16	2:32
15cm	45:49	11:44
22.5cm	1:53:22	45:50

Test 4	A	B
7.5cm	10:43	6:13
15cm	38:31	34:26
22.5cm	1:29:18	1:51:12

APPENDIX D

262111-500-01 – Proposed Drainage Layout

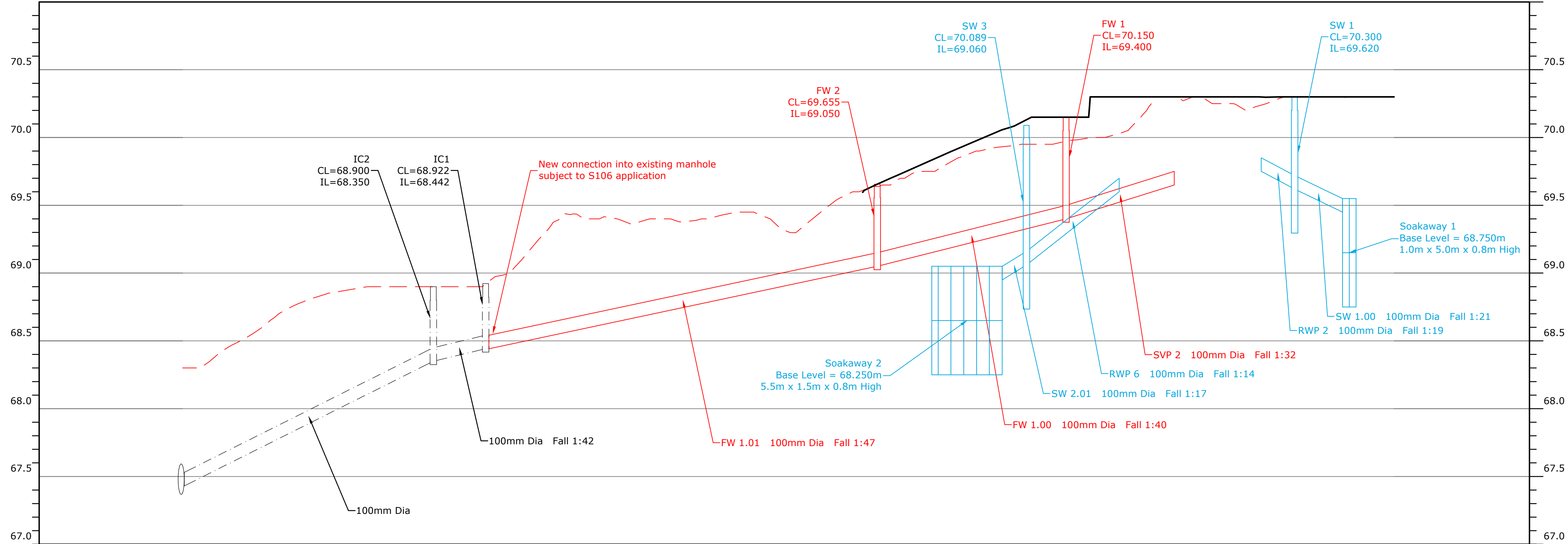
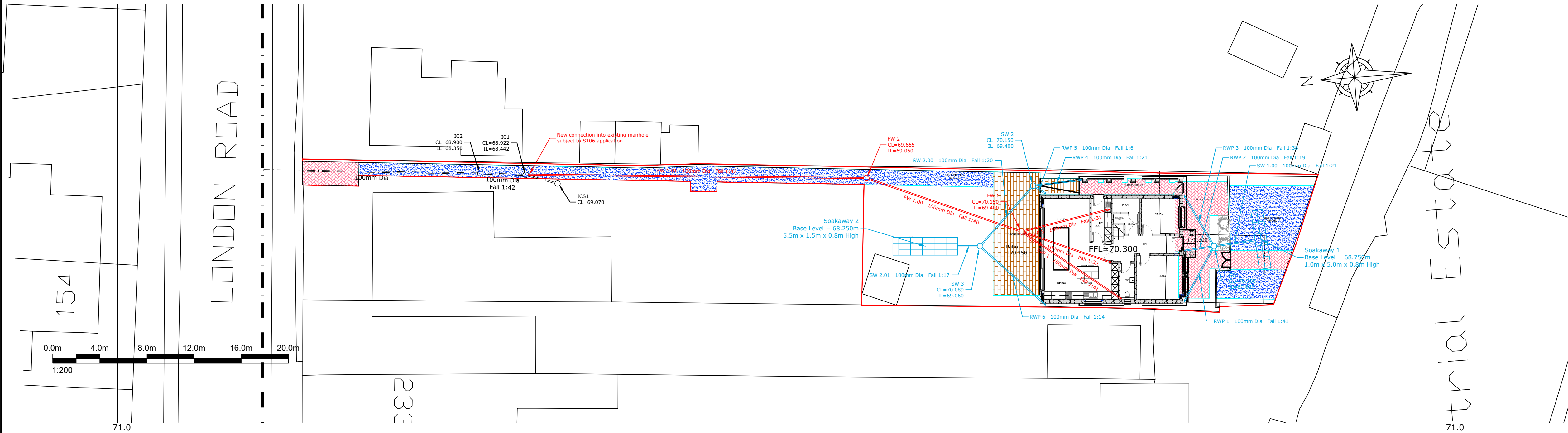
262111-SD-01 – Standard Details

262111-SK-01 – Overland Exceedance Routes

DWG No. 262111-500-01

FOUL MANHOLE SCHEDULE								FOUL PIPE SCHEDULE									
MH Ref	MH Internal Diameter	Cover Level	Depth of MH	MH Type	MH Cover	Pipe Connections	Comments	Pipe Name	Diameter	Length	Slope	Material	Pipe Bed	Upstream Manhole	Upstream Invert	Downstream Manhole	Downstream Invert
FW 1	450 mm	70.150 m	0.750 m	PVC	Min Opening 430 x 430 Grade B125	No of pipe connections 4 SVP 1 100 mm Dia IL=69.400 m SVP 2 100 mm Dia IL=69.400 m SVP 3 100 mm Dia IL=69.400 m FW 1.00 100 mm Dia IL=69.400 m		FW 1.00	100 mm	13.942 m	1:40	PVC	S or Z	FW 1	69.400 m	FW 2	69.050 m
								FW 1.01	100 mm	28.664 m	1:47	PVC	S or Z	FW 2	69.050 m		68.442 m
								SVP 1	100 mm	10.176 m	1:41	PVC	S or Z		69.650 m	FW 1	69.400 m
FW 2	450 mm	69.655 m	0.605 m	PVC	Min Opening 430 x 430 Grade B125	No of pipe connections 2 FW 1.00 100 mm Dia IL=69.050 m FW 1.01 100 mm Dia IL=69.050 m		SVP 2	100 mm	7.986 m	1:32	PVC	S or Z		69.650 m	FW 1	69.400 m
								SVP 3	100 mm	7.639 m	1:31	PVC	S or Z		69.650 m	FW 1	69.400 m

SURFACE WATER MANHOLE SCHEDULE									SURFACE WATER PIPE SCHEDULE									
MH Ref	MH Internal Diameter	Cover Level	Depth of MH	Sump Depth	MH Type	MH Cover	Pipe Connections	Comments	Pipe Name	Diameter	Length	Slope	Material	Pipe Bed	Upstream Manhole	Upstream Invert	Downstream Manhole	Downstream Invert
SW 1	450 mm	70.300 m	0.980 m	0.300 m	PVC	Min Opening 430 x 430 Grade B125	No of pipe connections 4 RWP 1 100 mm Dia IL=69.620 m RWP 2 100 mm Dia IL=69.620 m RWP 3 100 mm Dia IL=69.620 m SW 1.00 100 mm Dia IL=69.620 m	Catchpit	RWP 1	100 mm	5.270 m	1:41	PVC	S or Z		69.750 m	SW 1	69.620 m
									RWP 2	100 mm	2.469 m	1:19	PVC	S or Z		69.750 m	SW 1	69.620 m
									RWP 3	100 mm	4.943 m	1:38	PVC	S or Z		69.750 m	SW 1	69.620 m
									RWP 4	100 mm	4.103 m	1:21	PVC	S or Z		69.600 m	SW 2	69.400 m
SW 2	450 mm	70.150 m	0.750 m	0.000 m	PVC	Min Opening 430 x 430 Grade B125	No of pipe connections 3 RWP 4 100 mm Dia IL=69.400 m RWP 5 100 mm Dia IL=69.400 m SW 2.00 100 mm Dia IL=69.400 m		RWP 5	100 mm	1.210 m	1:6	PVC	S or Z		69.600 m	SW 2	69.400 m
									RWP 6	100 mm	7.429 m	1:14	PVC	S or Z		69.600 m	SW 3	69.060 m
									SW 1.00	100 mm	3.531 m	1:21	PVC	S or Z	SW 1	69.620 m		69.450 m
SW 3	450 mm	70.089 m	1.329 m	0.300 m	PVC	Max Opening 300 x 300 Grade B125	No of pipe connections 3 SW 2.00 100 mm Dia IL=69.060 m RWP 6 100 mm Dia IL=69.060 m SW 2.01 100 mm Dia IL=69.060 m	Catchpit	SW 2.00	100 mm	6.831 m	1:20	PVC	S or Z	SW 2	69.400 m	SW 3	69.060 m
									SW 2.01	100 mm	1.894 m	1:17	PVC	S or Z	SW 3	69.060 m		68.950 m



NOTES

- All dimensions are in meters unless expressed otherwise and all levels are shown in meters above Ordnance Datum.
- This drawing shall be read in conjunction with the drainage schedules and standard details.
- All existing sewer routes are to be proved on site by the contractor and any discrepancies notified to engineer.
- All sewers shall be constructed in accordance with Part H of the Building Regulations and Sewers for Adoption 7th Edition.
- It is the contractors responsibility to ensure compliance with current building regulations and codes of practice.
- Reference should be made to the structural engineers details for all aspects of foundation design and construction.
- The contractor should check all dimensions on site. Any discrepancies shall be reported to the engineer immediately.
- Connections to the adopted drainage authority sewers shall be made under the supervision of the authority. The contractor shall be responsible for obtaining the necessary consents required from the drainage authority.
- Bed type B,F and N shall be used for rigid pipes. Bed type Z shall be used for all gully connections and pipes under proposed carriageways with less than 700mm cover. The concrete bed and surround is to extend to the side of the trench or be of minimum width and voids filled with well compacted selected backfill.
- All precast concrete manhole units are to conform to B.S. 5911. Precast concrete cover slabs are to be heavy duty.
- Downstream exit pipes of 600mm dia. and over should be fitted with heavy duty safety chains across their mouths.
- Where large differential settlement is probable, several short lengths of pipe with flexible joints should be laid on either side of the chamber.
- Where drains pass through foundations, a flexible joint should be provided within 150mm of the face of the structure.
- Fast setting resin mortars may be used in lieu of cement mortar for bedding manhole frames where agreed with the Engineer to enable early cover loading.
- The concrete base slab shall be 225mm minimum thickness for chambers up to 4500mm deep. Manholes over 4500mm deep require a slab 450mm thick.
- All manholes over 2000mm deep are to be fitted with a "DANGER TEST FOR OXYGEN" sign
- Appropriate measures (to be agreed with the district council's building control section) are to be taken to discourage rodent entry into the properties.
- The contractor is to keep a record of any variations made on site, including the relocation of sewers or drains, so that an as built drawing can be prepared upon completion of the project.
- Location of RWP's and SVP's to be confirmed by the architect, Sub Stacks shall not be used unless connected to a ventilated section of the sewer in accordance with Building Regulations.

P1	PRELIMINARY ISSUE	RS	KBL	KBL	15/05/26
Rev	Amendment	Drawn	Checked	Approved	Date

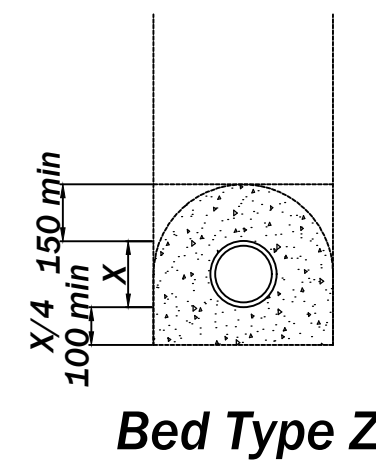
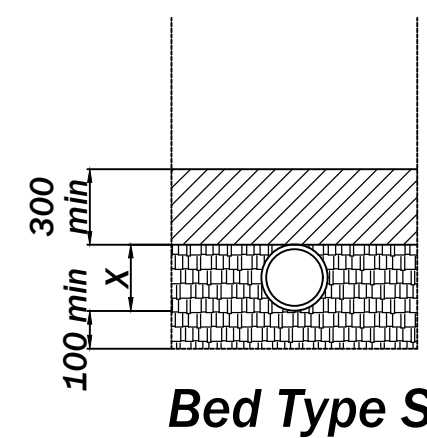
LANMOR Consulting
Civil Engineers & Transport Planning
Thorogood House, 34 Tolworth Close, Surbiton, Surrey, KT6 7EW
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Jonathan Hull

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Drainage Layout
Schedules, Site Plan & Long Section

DRAWN	RS	CHECKED	KBL	APPROVED	KBL
DATE	May-26	DATE	May-26	DATE	May-26
SCALE	H 1:200 V 1:20	PRJ No.	262111	SIZE	REV
DWG No.	262111-500-01			A1	P1

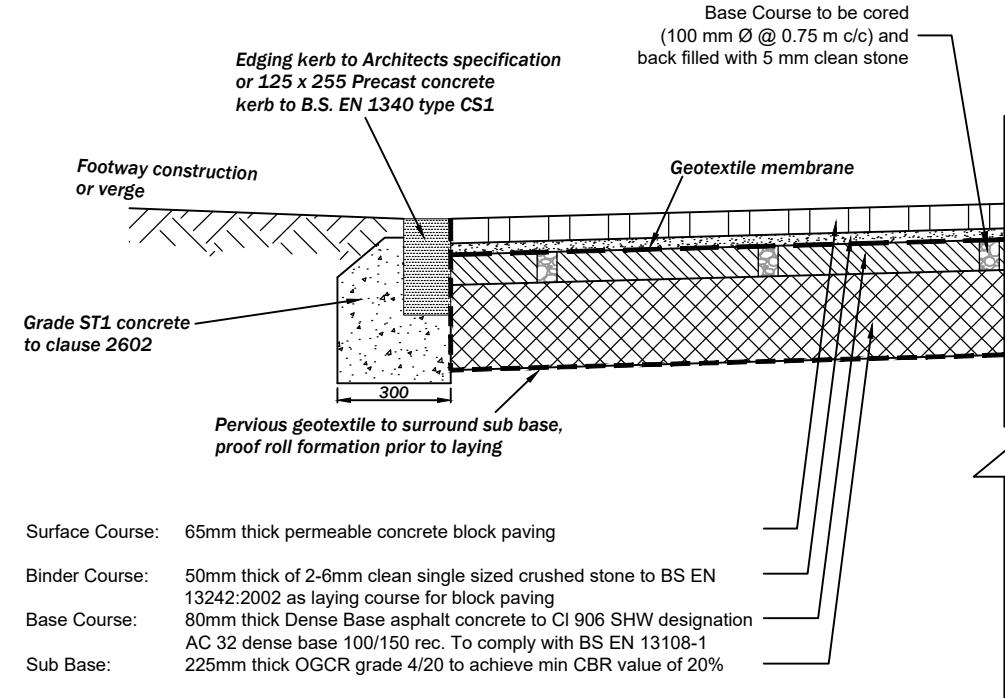
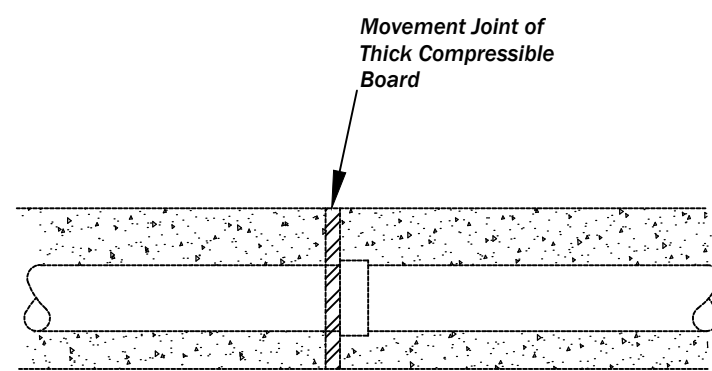
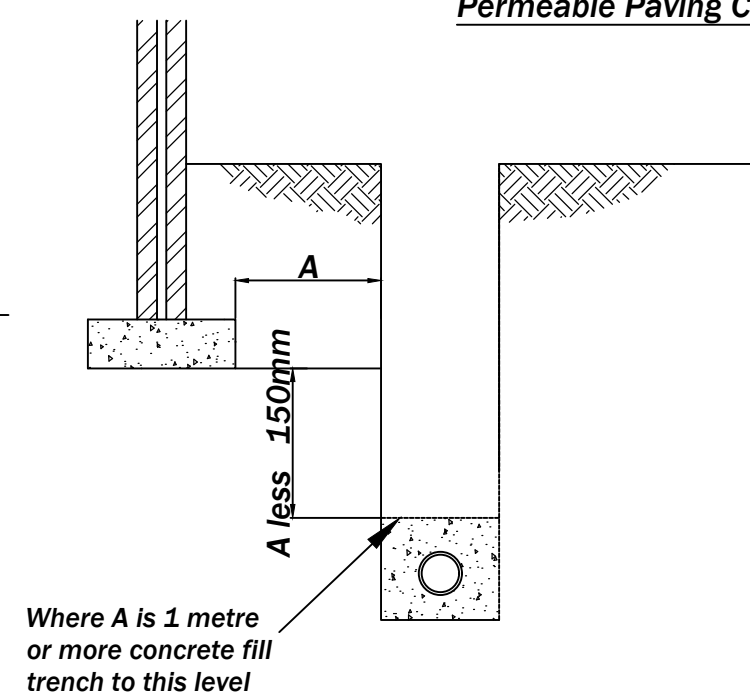
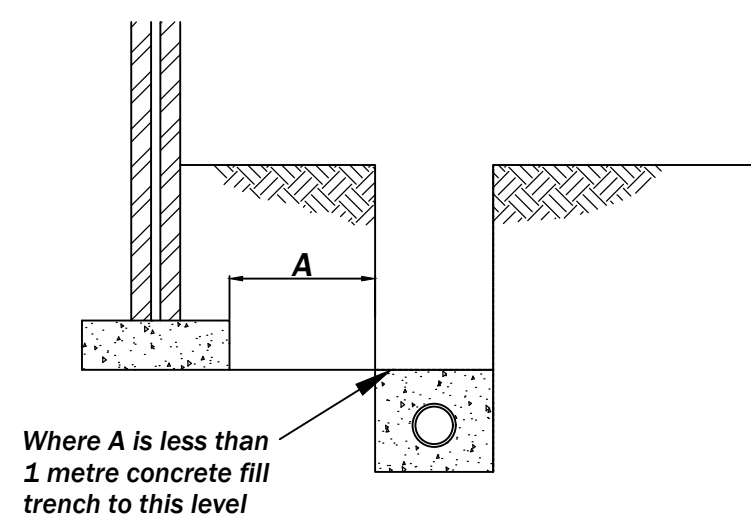
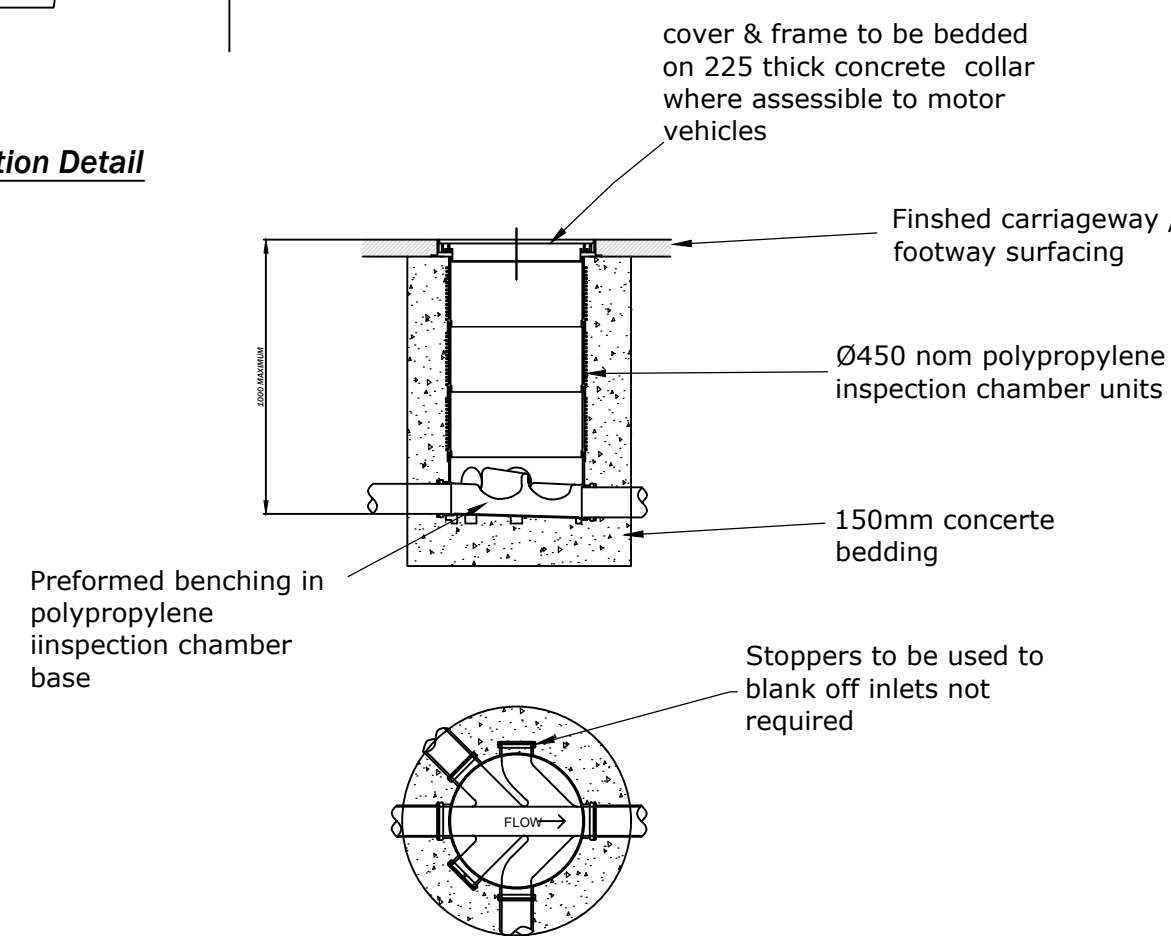
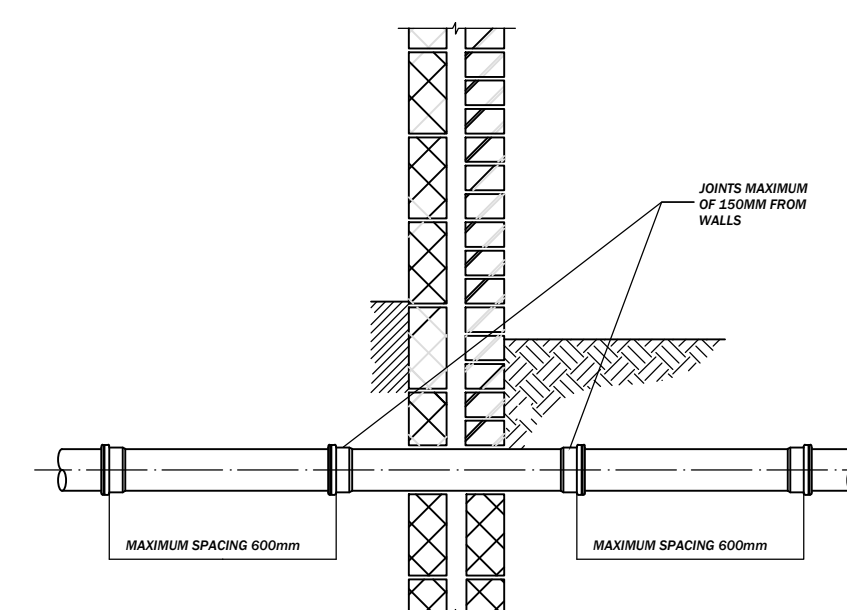
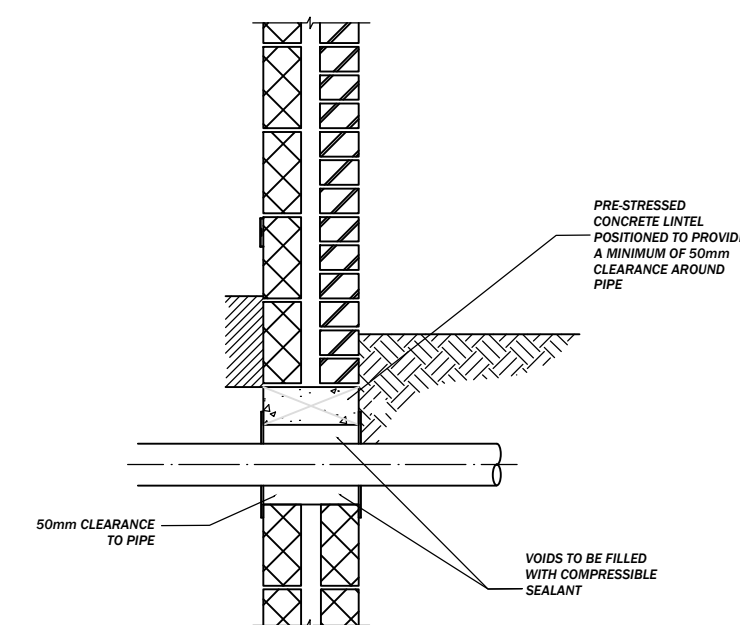
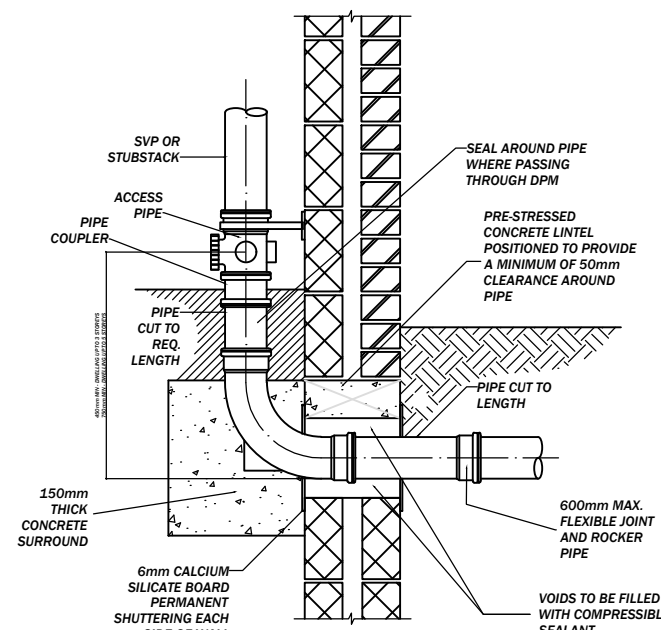
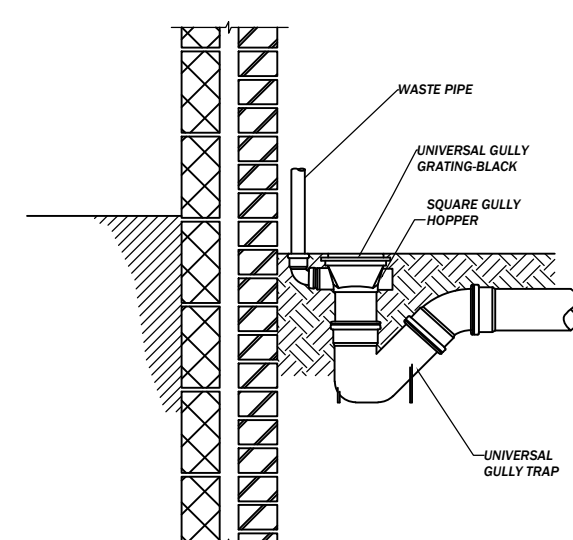
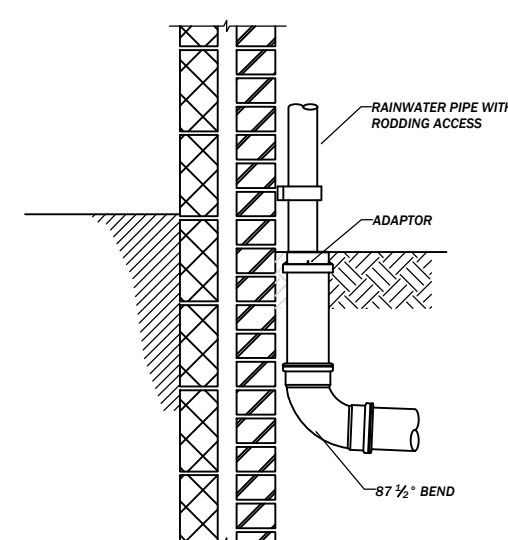
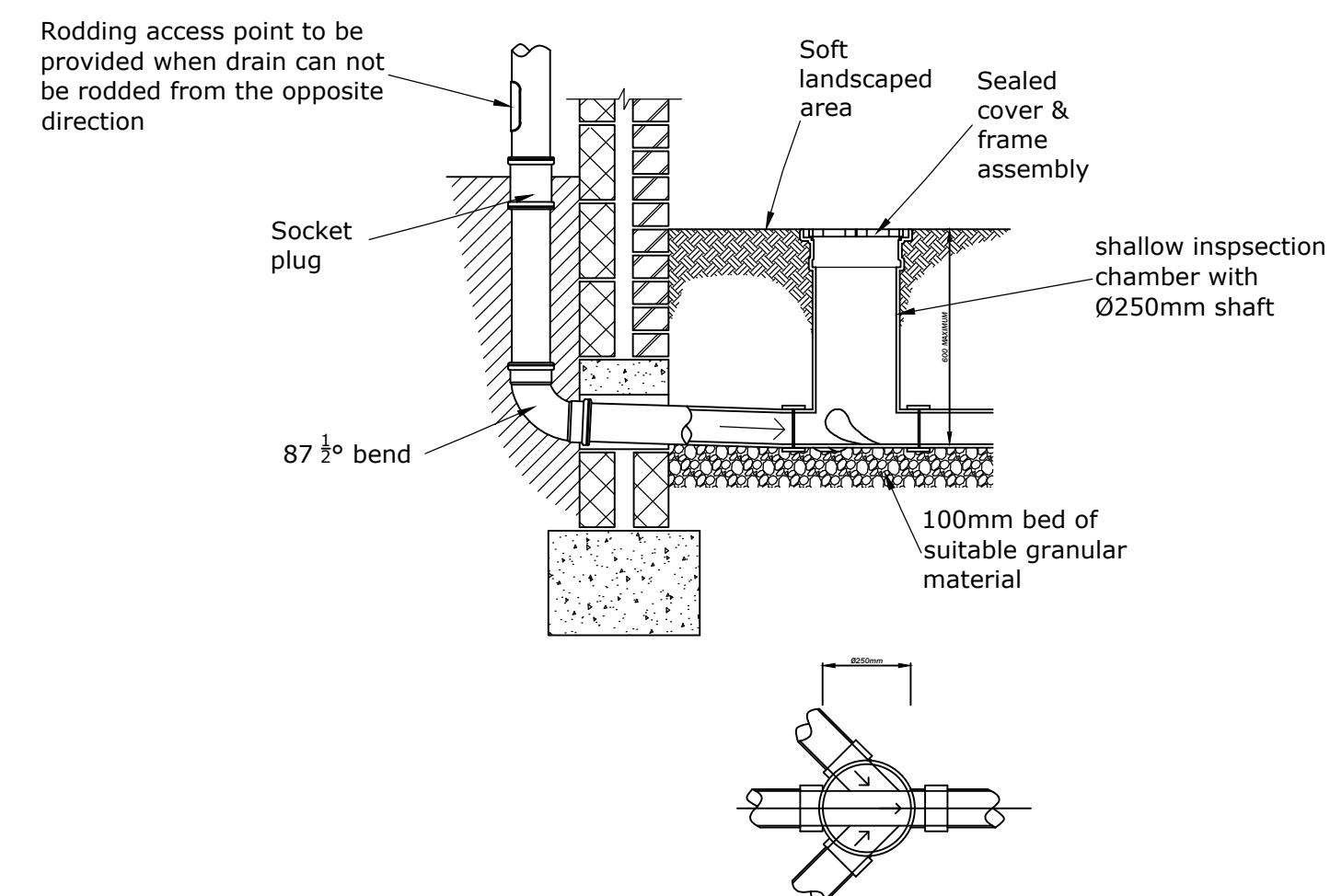
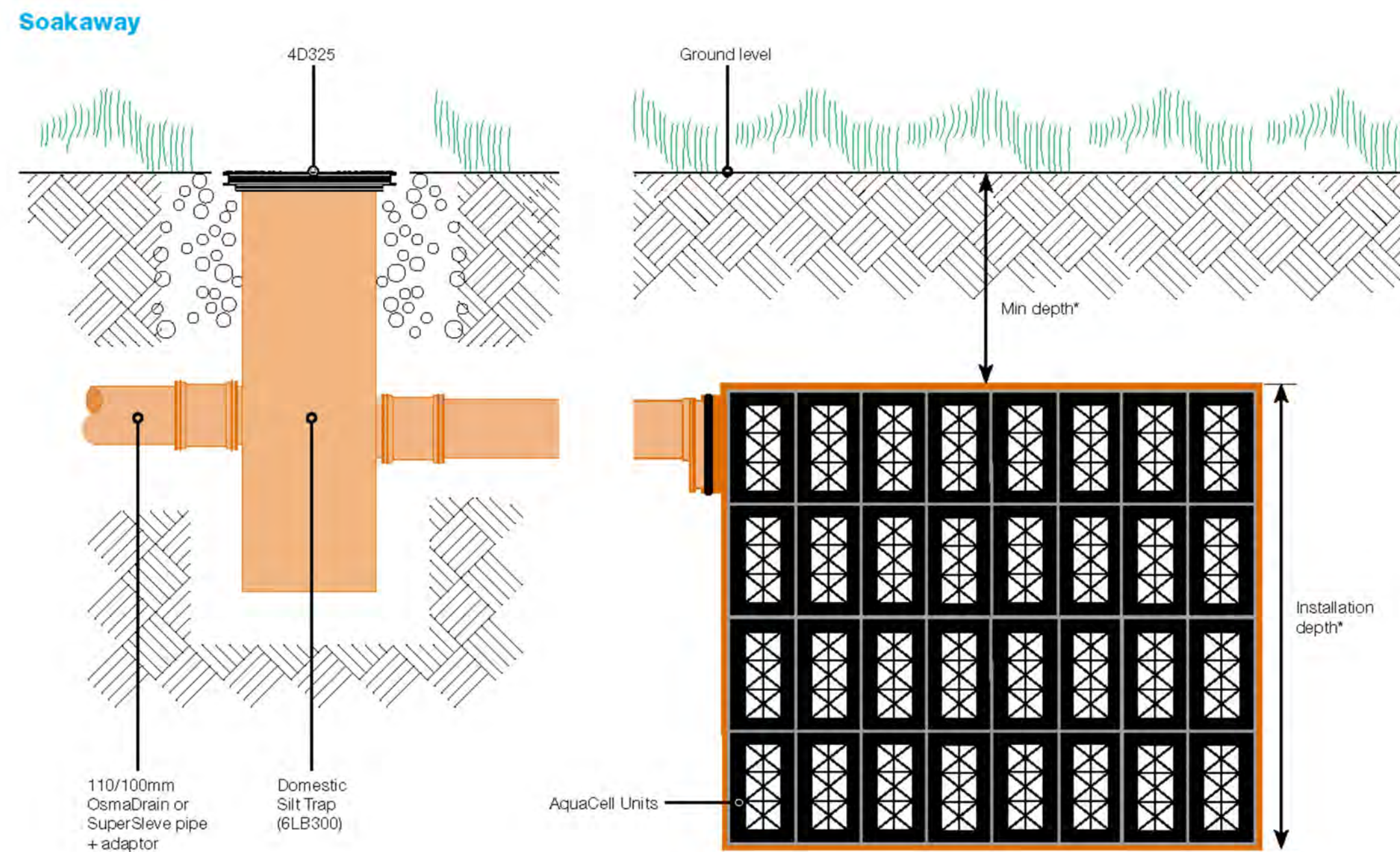
**Notes:**

1. Movements joints shall be formed in Bed Type Z at each socket or sleeve joint

Selected Fill: free from stones larger than 40mm lumps of clay over 100mm, timber, frozen material, vegetable matter.

Granular Material: should conform to BS EN 1619 Annex B Table B15 and should be single size material from 5mm up to a max of 10mm for 100mm pipes 14mm for 150mm pipes, 20mm for pipes upto 600mm and 40mm for pipes greater than 600mm diameter. Compaction fraction maximum 0.3 for Bed Type N or B and 0.15 for Bed Type F

Concrete bed and surround

**Permeable Paving Construction Detail****Pipe runs near buildings****Inspection chamber.****NOTES**

- All dimensions are given in millimeters.
- This drawing shall be read in conjunction with the drainage schedules and standard details.
- All existing sewer routes are to be proved on site by the contractor and any discrepancies notified to engineer.
- All sewers shall be constructed in accordance with Part H of the Building Regulations and Sewers for Adoption 7th Edition.
- It is the contractors responsibility to ensure compliance with current building regulations and codes of practice.
- Reference should be made to the structural engineers details for all aspects of foundation design and construction.
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- Connections to the adopted drainage authority sewers shall be made under the supervision of the authority. The contractor shall be responsible for obtaining the necessary consents required from the drainage authority.
- Bed type B,F and N shall be used for rigid pipes. Bed type Z shall be used for all gully connections and pipes under proposed carriageways with less than 700mm cover. The concrete bed and surround is to extend to the side of the trench or be of minimum width and voids filled with well compacted selected backfill.
- All precast concrete manhole units are to conform to B.S. 5911. Precast concrete cover slabs are to be heavy duty.
- Downstream exit pipes of 600mm dia. and over should be fitted with heavy duty safety chains across their mouths.
- Where large differential settlement is probable, several short lengths of pipe with flexible joints should be laid on either side of the chamber.
- Where drains pass through foundations, a flexible joint should be provided within 150mm of the face of the structure.
- Fast setting resin mortars may be used in lieu of cement mortar for bedding manhole frames where agreed with the Engineer to enable early cover loading.
- The concrete base slab shall be 225mm minimum thickness for chambers up to 4500mm deep. Manholes over 4500mm deep require a slab 450mm thick.
- All manholes over 2000mm deep are to be fitted with a "DANGER TEST FOR OXYGEN" sign
- Appropriate measures (to be agreed with the district council's building control section) are to be taken to discourage rodent entry into the properties.
- The contractor is to keep a record of any variations made on site, including the relocation of sewers or drains, so that an as built drawing can be prepared upon completion of the project.
- Location of RWP's and SVP's to be confirmed by the architect, Sub Stacks shall not be used unless connected to a ventilated section of the sewer in accordance with Building Regulations.

P1	PRELIMINARY ISSUE	RS	KBL	KBL	07/07/26
Rev	Amendment	Drawn	Checked	Approved	Date

LANMOR Consulting
Civil Engineers & Transport Planning

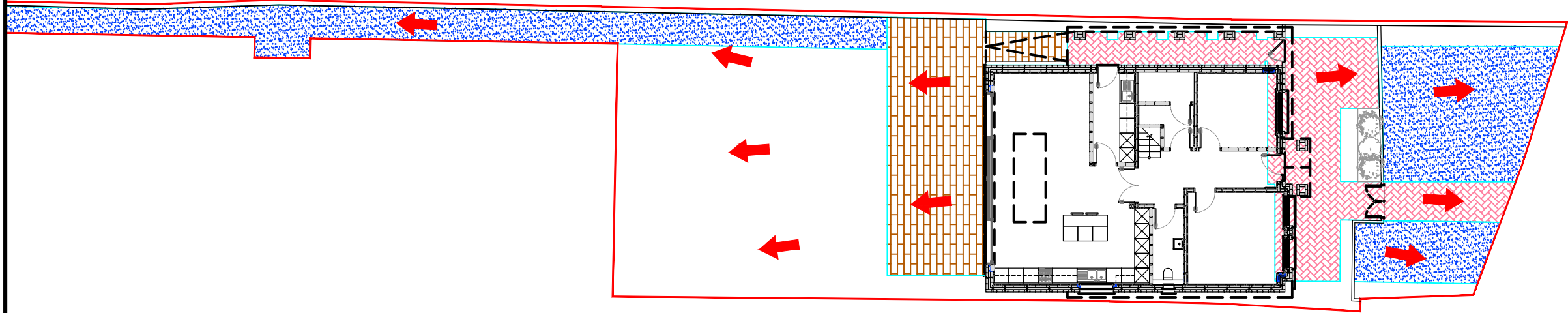
Thorogood House, 34 Tolworth Close, Surbiton, Surrey, KT6 7EW
Telephone: 0208 339 7899 Fax: 0208 339 7898
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www.lanmor.co.uk

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Standard Details

DRAWN	RS	CHECKED	KBL	APPROVED	KBL
DATE	Jul-26	DATE	Jul-26	DATE	Jul-26
SCALE	NTS	PRJ No.	262111	SIZE	REV
DWG No.	262111-SD-01			A1	P1



Jonathan Hull

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Chippenham

Overland Exceedance Routes



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SCALE 1:200	DRAWN BY RS	PRJ No. 262111	DWG No. 262111-SK-01
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APPENDIX E

Rainwater Harvesting Calculations

Drainage Calculations

Quick Links

- Our Systems
- Tank Size Calculator
- Our Exports
- Multi-Dwelling Developments



The Rain Director System Wins Green Apple Award 2013



The Rain Director System Wins Home Building and Renovating Product Innovation Award 2013!

Contact Details
Rainwater Harvesting Ltd

Rainwater Harvesting Ltd
Unit A Harrier Park,
Southgate Way
Peterborough
Cambridgeshire
PE2 6YQ

+44(0)1733 405 111

info@rainwaterharvesting.co.uk

Our Systems Tank Size Calculator Visit Our Webshop

Tank Size Calculator

The tank size calculator service is provided by RainWater Harvesting so you can establish the size of tank you might decide to install. You will need to know the approximate dimensions of your house in metres. If in doubt, just pace out the house length and width.

Insert your building's data in the yellow boxes.
From the roof area of your property, you assess the amount of water available, and equate it to the amount you will use.

If you would prefer us to do the calculation for you, go to our [Contact form](#), select "Tank Size Calculator" as the subject, and supply the information requested.

Collectable Roof Area (m²)

Main Building	Width: 0	Length: 0	Rain Collection Area:	0 m²
Extension one	Width: 0	Length: 0	Rain Collection Area:	0 m²
Extension Two	Width: 0	Length: 0	Rain Collection Area:	0 m²
Extension Three	Width: 0	Length: 0	Rain Collection Area:	0 m²

Or the total roof area, if you already know it: m² Total area of collectable roof space: 80 m²

Select Your Region Average rainfall per year in your region: 64 L

Collectable rainwater per annum in litres - discounted by 20% to account for water loss YIELD 40960 L

Use of rainwater in the building

Washing machines and toilets are the main usage for rain water in domestic systems.

Number of people or bedrooms in the building -	people: 0	bedrooms: 3
☒ Number of clothes washing cycles per day (50 litres each)	1.00 Cycles	50.00 L
☒ Number of toilet flushes per day (4.42 flushes per person, average 5 litres each)	17.68 Flushes	88.40 L
Outdoor use in litres, per person per day (recommended 5 litres per person per day)	5	20.00 L
Amount of water you require every day		158.4 L
Amount of water you require every year	DEMAND	57816 L

Final Figures

How many days drought protection do you need? Typically 21 (18 minimum)	21
Capacity of water storage in litres required for drought protection	3326.40 L
The lesser of YIELD (blue) or DEMAND (green) per annum	40960 L
Therefore, volume of rainwater storage required	2356 L

Conclusion

Is there sufficient roof water available:	NOT ENOUGH RAINWATER
Recommended tank size from our shallow dig range:	F-Line Range: 3000 litre F-Line Tank
Select the carat range if you require a deep dig tank:	Carat Range: 2700 litre Carat Tank

Please save the form. This allows you to return later without losing your entered data.
We do not keep any information you enter here and all data saved is only temporary.

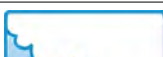
Lanmor Consulting Ltd		Page 1
Thorogood House 34 Tolworth Close Surbition Surrey KT6 7EW	237 London Road Chippenham SN15 3AP	
Date May 2026 File SOAKAWAY 1.SRCX	Designed by RS Checked by KBL	
XP Solutions	Source Control 2015.1	

Summary of Results for 100 year Return Period (+45%)

Half Drain Time : 1321 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	69.045	0.295	0.0	1.4	O K
30 min Summer	69.135	0.385	0.0	1.8	O K
60 min Summer	69.226	0.476	0.0	2.3	O K
120 min Summer	69.312	0.562	0.0	2.7	O K
180 min Summer	69.356	0.606	0.0	2.9	O K
240 min Summer	69.383	0.633	0.0	3.0	O K
360 min Summer	69.418	0.668	0.0	3.2	O K
480 min Summer	69.436	0.686	0.0	3.3	O K
600 min Summer	69.445	0.695	0.0	3.3	O K
720 min Summer	69.449	0.699	0.0	3.3	O K
960 min Summer	69.445	0.695	0.0	3.3	O K
1440 min Summer	69.433	0.683	0.0	3.2	O K
2160 min Summer	69.409	0.659	0.0	3.1	O K
2880 min Summer	69.382	0.632	0.0	3.0	O K
4320 min Summer	69.328	0.578	0.0	2.7	O K
5760 min Summer	69.280	0.530	0.0	2.5	O K
7200 min Summer	69.238	0.488	0.0	2.3	O K
8640 min Summer	69.200	0.450	0.0	2.1	O K
10080 min Summer	69.165	0.415	0.0	2.0	O K
15 min Winter	69.081	0.331	0.0	1.6	O K
30 min Winter	69.182	0.432	0.0	2.1	O K
60 min Winter	69.284	0.534	0.0	2.5	O K
120 min Winter	69.382	0.632	0.0	3.0	O K
180 min Winter	69.432	0.682	0.0	3.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	150.938	0.0	19
30 min Summer	98.983	0.0	34
60 min Summer	61.738	0.0	64
120 min Summer	37.127	0.0	124
180 min Summer	27.171	0.0	182
240 min Summer	21.657	0.0	242
360 min Summer	15.750	0.0	362
480 min Summer	12.545	0.0	482
600 min Summer	10.508	0.0	600
720 min Summer	9.088	0.0	720
960 min Summer	7.221	0.0	896
1440 min Summer	5.214	0.0	1126
2160 min Summer	3.758	0.0	1516
2880 min Summer	2.976	0.0	1932
4320 min Summer	2.139	0.0	2764
5760 min Summer	1.691	0.0	3576
7200 min Summer	1.408	0.0	4392
8640 min Summer	1.212	0.0	5184
10080 min Summer	1.068	0.0	5952
15 min Winter	150.938	0.0	19
30 min Winter	98.983	0.0	33
60 min Winter	61.738	0.0	64
120 min Winter	37.127	0.0	122
180 min Winter	27.171	0.0	180

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Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	69.463	0.713	0.0	3.4	O K
360 min Winter	69.504	0.754	0.0	3.6	O K
480 min Winter	69.527	0.777	0.0	3.7	O K
600 min Winter	69.540	0.790	0.0	3.8	O K
720 min Winter	69.546	0.796	0.0	3.8	O K
960 min Winter	69.547	0.797	0.0	3.8	O K
1440 min Winter	69.529	0.779	0.0	3.7	O K
2160 min Winter	69.499	0.749	0.0	3.6	O K
2880 min Winter	69.463	0.713	0.0	3.4	O K
4320 min Winter	69.388	0.638	0.0	3.0	O K
5760 min Winter	69.320	0.570	0.0	2.7	O K
7200 min Winter	69.260	0.510	0.0	2.4	O K
8640 min Winter	69.207	0.457	0.0	2.2	O K
10080 min Winter	69.161	0.411	0.0	2.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	21.657	0.0	240
360 min Winter	15.750	0.0	356
480 min Winter	12.545	0.0	470
600 min Winter	10.508	0.0	584
720 min Winter	9.088	0.0	696
960 min Winter	7.221	0.0	914
1440 min Winter	5.214	0.0	1168
2160 min Winter	3.758	0.0	1620
2880 min Winter	2.976	0.0	2076
4320 min Winter	2.139	0.0	2980
5760 min Winter	1.691	0.0	3856
7200 min Winter	1.408	0.0	4680
8640 min Winter	1.212	0.0	5528
10080 min Winter	1.068	0.0	6264

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	21.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+45

Time Area Diagram

Total Area (ha) 0.005

Time (mins)	Area
From:	To: (ha)

0	4 0.005
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Model Details

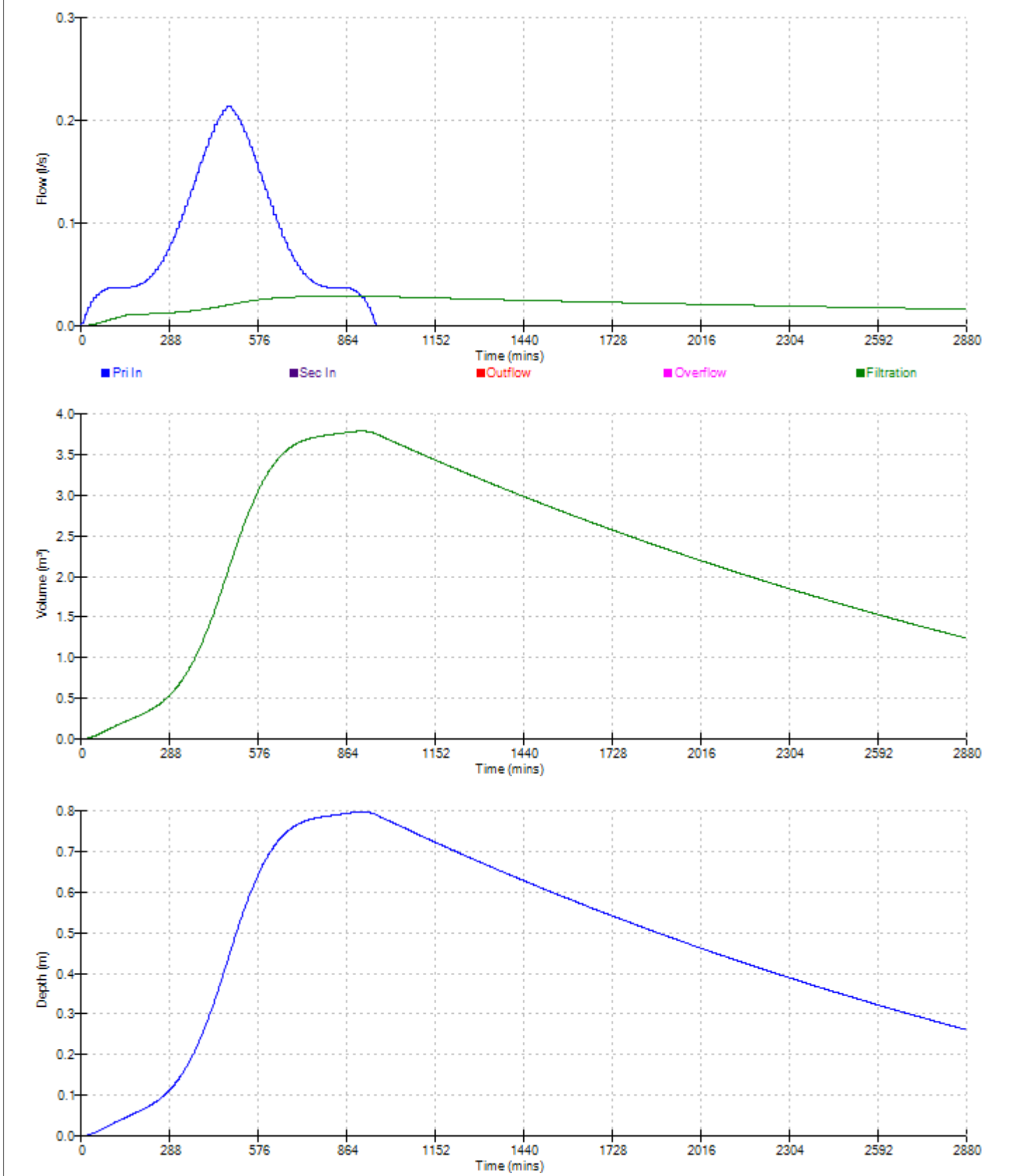
Storage is Online Cover Level (m) 70.300

Cellular Storage Structure

Invert Level (m) 68.750 Safety Factor 4.0
Infiltration Coefficient Base (m/hr) 0.02857 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.02857

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	5.0	5.0	0.800	5.0	14.6	0.801	0.0	14.6

Event: 960 min Winter



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Summary of Results for 100 year Return Period (+45%)

Half Drain Time : 1603 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	68.536	0.286	0.0	2.2	O K
30 min Summer	68.623	0.373	0.0	2.9	O K
60 min Summer	68.711	0.461	0.0	3.6	O K
120 min Summer	68.796	0.546	0.0	4.3	O K
180 min Summer	68.840	0.590	0.0	4.6	O K
240 min Summer	68.868	0.618	0.0	4.9	O K
360 min Summer	68.905	0.655	0.0	5.1	O K
480 min Summer	68.926	0.676	0.0	5.3	O K
600 min Summer	68.939	0.689	0.0	5.4	O K
720 min Summer	68.945	0.695	0.0	5.5	O K
960 min Summer	68.947	0.697	0.0	5.5	O K
1440 min Summer	68.935	0.685	0.0	5.4	O K
2160 min Summer	68.913	0.663	0.0	5.2	O K
2880 min Summer	68.889	0.639	0.0	5.0	O K
4320 min Summer	68.840	0.590	0.0	4.6	O K
5760 min Summer	68.795	0.545	0.0	4.3	O K
7200 min Summer	68.754	0.504	0.0	4.0	O K
8640 min Summer	68.717	0.467	0.0	3.7	O K
10080 min Summer	68.683	0.433	0.0	3.4	O K
15 min Winter	68.570	0.320	0.0	2.5	O K
30 min Winter	68.668	0.418	0.0	3.3	O K
60 min Winter	68.767	0.517	0.0	4.1	O K
120 min Winter	68.863	0.613	0.0	4.8	O K
180 min Winter	68.914	0.664	0.0	5.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	150.938	0.0	19
30 min Summer	98.983	0.0	34
60 min Summer	61.738	0.0	64
120 min Summer	37.127	0.0	124
180 min Summer	27.171	0.0	184
240 min Summer	21.657	0.0	242
360 min Summer	15.750	0.0	362
480 min Summer	12.545	0.0	482
600 min Summer	10.508	0.0	602
720 min Summer	9.088	0.0	722
960 min Summer	7.221	0.0	960
1440 min Summer	5.214	0.0	1224
2160 min Summer	3.758	0.0	1596
2880 min Summer	2.976	0.0	1992
4320 min Summer	2.139	0.0	2812
5760 min Summer	1.691	0.0	3640
7200 min Summer	1.408	0.0	4464
8640 min Summer	1.212	0.0	5272
10080 min Summer	1.068	0.0	6056
15 min Winter	150.938	0.0	19
30 min Winter	98.983	0.0	34
60 min Winter	61.738	0.0	64
120 min Winter	37.127	0.0	122
180 min Winter	27.171	0.0	180

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Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	68.946	0.696	0.0	5.5	O K
360 min Winter	68.989	0.739	0.0	5.8	O K
480 min Winter	69.015	0.765	0.0	6.0	O K
600 min Winter	69.031	0.781	0.0	6.1	O K
720 min Winter	69.041	0.791	0.0	6.2	O K
960 min Winter	69.048	0.798	0.0	6.3	O K
1440 min Winter	69.038	0.788	0.0	6.2	O K
2160 min Winter	69.009	0.759	0.0	6.0	O K
2880 min Winter	68.978	0.728	0.0	5.7	O K
4320 min Winter	68.911	0.661	0.0	5.2	O K
5760 min Winter	68.847	0.597	0.0	4.7	O K
7200 min Winter	68.789	0.539	0.0	4.2	O K
8640 min Winter	68.737	0.487	0.0	3.8	O K
10080 min Winter	68.690	0.440	0.0	3.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	21.657	0.0	240
360 min Winter	15.750	0.0	356
480 min Winter	12.545	0.0	472
600 min Winter	10.508	0.0	588
720 min Winter	9.088	0.0	702
960 min Winter	7.221	0.0	924
1440 min Winter	5.214	0.0	1344
2160 min Winter	3.758	0.0	1684
2880 min Winter	2.976	0.0	2136
4320 min Winter	2.139	0.0	3068
5760 min Winter	1.691	0.0	3928
7200 min Winter	1.408	0.0	4824
8640 min Winter	1.212	0.0	5624
10080 min Winter	1.068	0.0	6456

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	21.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+45

Time Area Diagram

Total Area (ha) 0.008

Time (mins)	Area
From:	To: (ha)

0	4 0.008
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Model Details

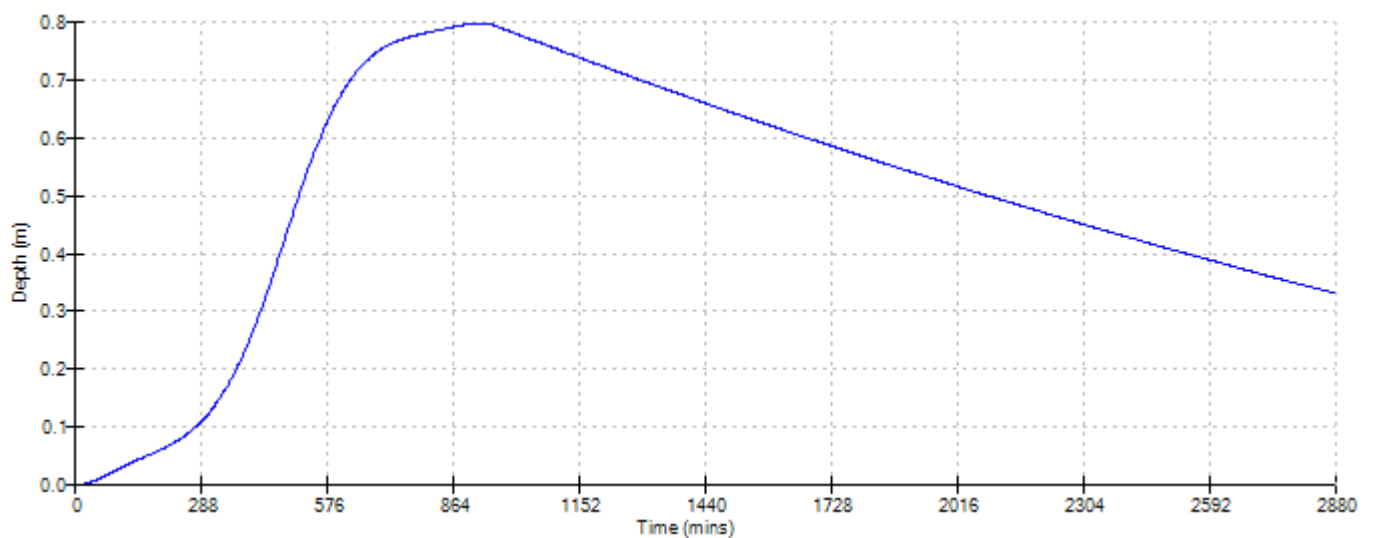
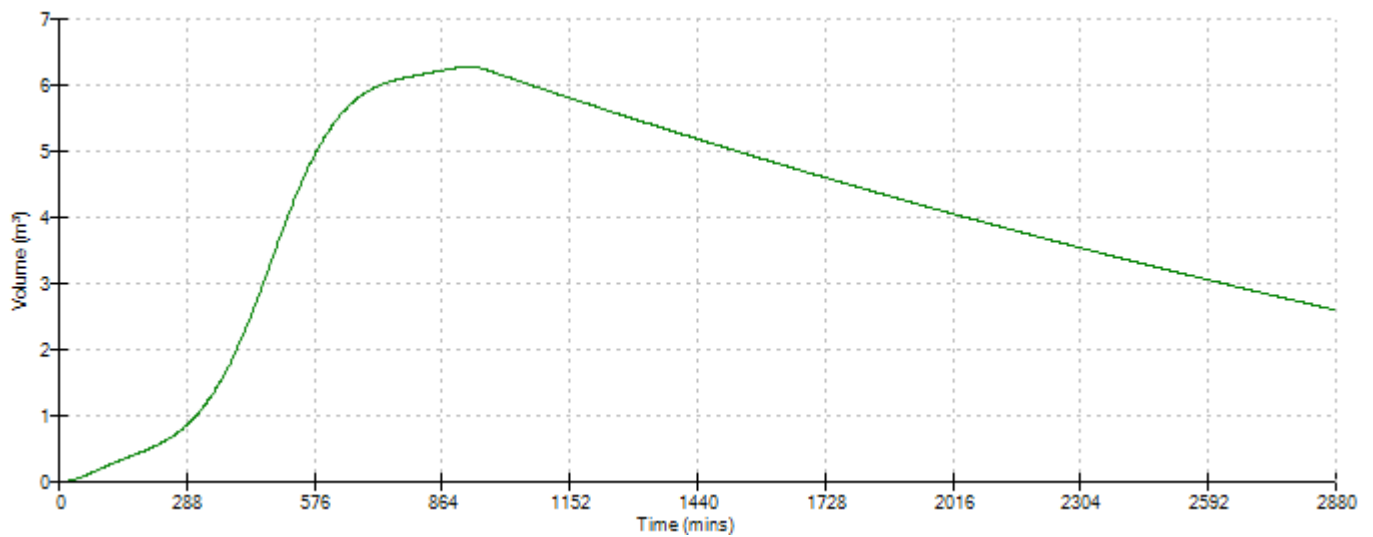
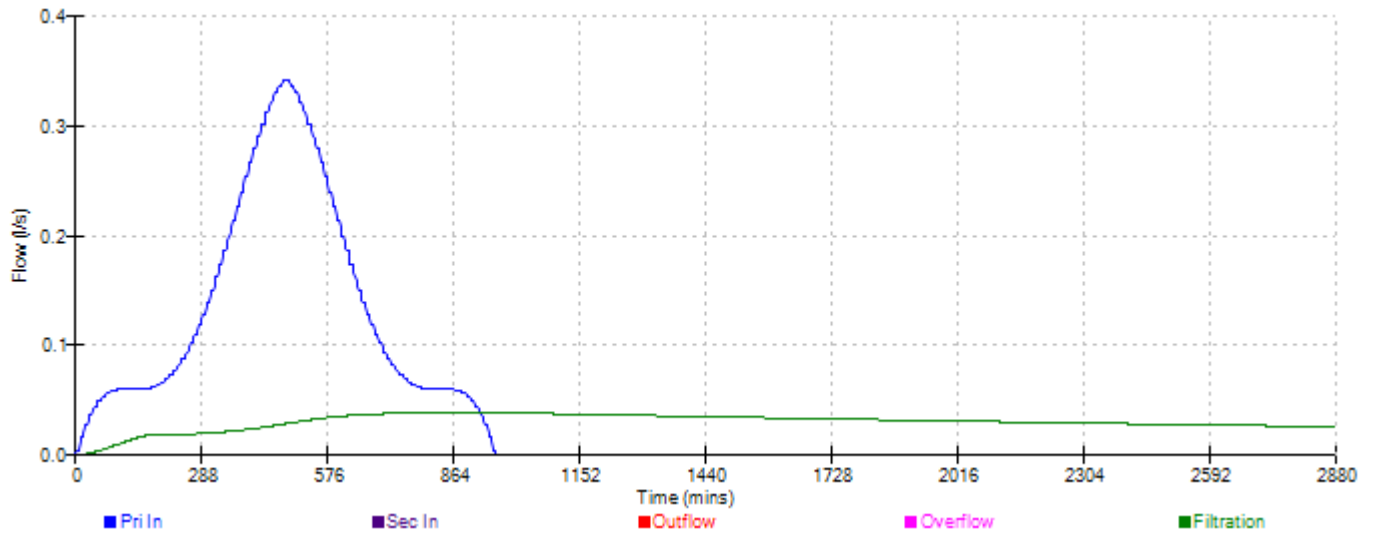
Storage is Online Cover Level (m) 70.089

Cellular Storage Structure

Invert Level (m) 68.250 Safety Factor 4.0
Infiltration Coefficient Base (m/hr) 0.02857 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.02857

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	8.3	8.3	0.800	8.3	19.5	0.801	0.0	19.5

Event: 960 min Winter



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Summary of Results for 100 year Return Period (+45%)

Half Drain Time : 143 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	70.149	0.049	0.0	0.2	Flood Risk
30 min Summer	70.166	0.066	0.0	0.3	Flood Risk
60 min Summer	70.182	0.082	0.0	0.3	Flood Risk
120 min Summer	70.191	0.091	0.0	0.4	Flood Risk
180 min Summer	70.192	0.092	0.0	0.4	Flood Risk
240 min Summer	70.192	0.092	0.0	0.4	Flood Risk
360 min Summer	70.190	0.090	0.0	0.4	Flood Risk
480 min Summer	70.187	0.087	0.0	0.4	Flood Risk
600 min Summer	70.182	0.082	0.0	0.3	Flood Risk
720 min Summer	70.177	0.077	0.0	0.3	Flood Risk
960 min Summer	70.168	0.068	0.0	0.3	Flood Risk
1440 min Summer	70.153	0.053	0.0	0.2	Flood Risk
2160 min Summer	70.143	0.043	0.0	0.2	Flood Risk
2880 min Summer	70.136	0.036	0.0	0.1	Flood Risk
4320 min Summer	70.128	0.028	0.0	0.1	Flood Risk
5760 min Summer	70.122	0.022	0.0	0.1	Flood Risk
7200 min Summer	70.119	0.019	0.0	0.1	Flood Risk
8640 min Summer	70.116	0.016	0.0	0.1	Flood Risk
10080 min Summer	70.115	0.015	0.0	0.1	Flood Risk
15 min Winter	70.157	0.057	0.0	0.2	Flood Risk
30 min Winter	70.177	0.077	0.0	0.3	Flood Risk
60 min Winter	70.195	0.095	0.0	0.4	Flood Risk
120 min Winter	70.206	0.106	0.0	0.4	Flood Risk
180 min Winter	70.207	0.107	0.0	0.4	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	150.938	0.0	18
30 min Summer	98.983	0.0	32
60 min Summer	61.738	0.0	62
120 min Summer	37.127	0.0	112
180 min Summer	27.171	0.0	142
240 min Summer	21.657	0.0	174
360 min Summer	15.750	0.0	242
480 min Summer	12.545	0.0	308
600 min Summer	10.508	0.0	374
720 min Summer	9.088	0.0	440
960 min Summer	7.221	0.0	566
1440 min Summer	5.214	0.0	796
2160 min Summer	3.758	0.0	1148
2880 min Summer	2.976	0.0	1528
4320 min Summer	2.139	0.0	2248
5760 min Summer	1.691	0.0	2952
7200 min Summer	1.408	0.0	3680
8640 min Summer	1.212	0.0	4416
10080 min Summer	1.068	0.0	5144
15 min Winter	150.938	0.0	18
30 min Winter	98.983	0.0	32
60 min Winter	61.738	0.0	60
120 min Winter	37.127	0.0	116
180 min Winter	27.171	0.0	164

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Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
240 min Winter	70.205	0.105	0.0	0.4	Flood Risk
360 min Winter	70.201	0.101	0.0	0.4	Flood Risk
480 min Winter	70.194	0.094	0.0	0.4	Flood Risk
600 min Winter	70.186	0.086	0.0	0.4	Flood Risk
720 min Winter	70.179	0.079	0.0	0.3	Flood Risk
960 min Winter	70.165	0.065	0.0	0.3	Flood Risk
1440 min Winter	70.147	0.047	0.0	0.2	Flood Risk
2160 min Winter	70.136	0.036	0.0	0.1	Flood Risk
2880 min Winter	70.129	0.029	0.0	0.1	Flood Risk
4320 min Winter	70.122	0.022	0.0	0.1	Flood Risk
5760 min Winter	70.117	0.017	0.0	0.1	Flood Risk
7200 min Winter	70.114	0.014	0.0	0.1	Flood Risk
8640 min Winter	70.112	0.012	0.0	0.0	Flood Risk
10080 min Winter	70.111	0.011	0.0	0.0	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
240 min Winter	21.657	0.0	186
360 min Winter	15.750	0.0	262
480 min Winter	12.545	0.0	336
600 min Winter	10.508	0.0	406
720 min Winter	9.088	0.0	472
960 min Winter	7.221	0.0	596
1440 min Winter	5.214	0.0	812
2160 min Winter	3.758	0.0	1188
2880 min Winter	2.976	0.0	1556
4320 min Winter	2.139	0.0	2248
5760 min Winter	1.691	0.0	2968
7200 min Winter	1.408	0.0	3672
8640 min Winter	1.212	0.0	4328
10080 min Winter	1.068	0.0	5096

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	21.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+45

Time Area Diagram

Total Area (ha) 0.001

Time (mins) Area
From: To: (ha)

0 4 0.001

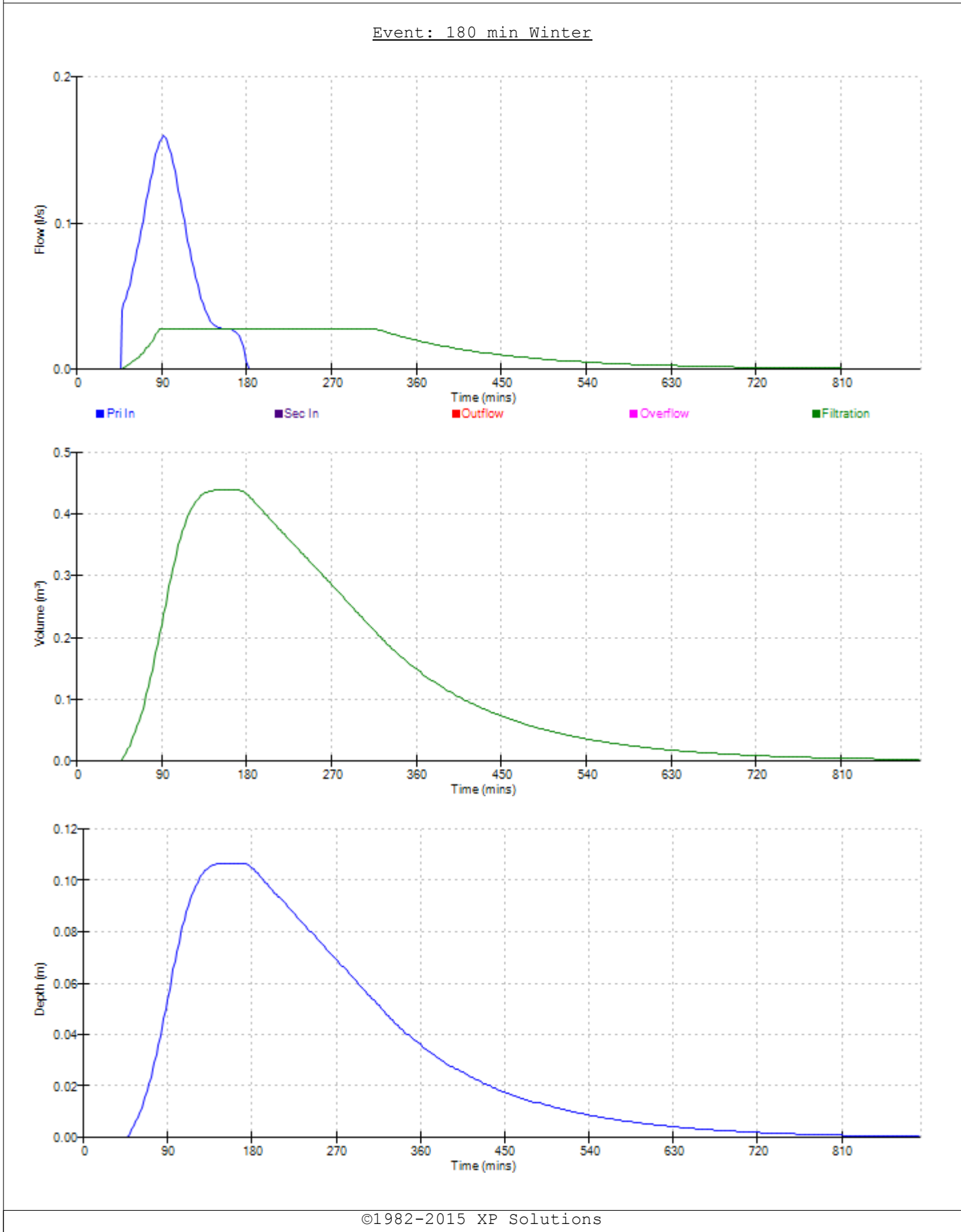
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Model Details

Storage is Online Cover Level (m) 70.300

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.02857	Width (m)	2.5
Membrane Percolation (mm/hr)	1000	Length (m)	5.5
Max Percolation (l/s)	3.8	Slope (1:X)	0.0
Safety Factor	4.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	70.100	Cap Volume Depth (m)	0.150



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Summary of Results for 100 year Return Period (+45%)

Half Drain Time : 174 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	70.161	0.061	0.1	0.6	Flood Risk
30 min Summer	70.183	0.083	0.1	0.9	Flood Risk
60 min Summer	70.203	0.103	0.1	1.1	Flood Risk
120 min Summer	70.215	0.115	0.1	1.2	Flood Risk
180 min Summer	70.217	0.117	0.1	1.2	Flood Risk
240 min Summer	70.217	0.117	0.1	1.2	Flood Risk
360 min Summer	70.215	0.115	0.1	1.2	Flood Risk
480 min Summer	70.211	0.111	0.1	1.1	Flood Risk
600 min Summer	70.206	0.106	0.1	1.1	Flood Risk
720 min Summer	70.200	0.100	0.1	1.0	Flood Risk
960 min Summer	70.189	0.089	0.1	0.9	Flood Risk
1440 min Summer	70.170	0.070	0.1	0.7	Flood Risk
2160 min Summer	70.151	0.051	0.1	0.5	Flood Risk
2880 min Summer	70.143	0.043	0.1	0.4	Flood Risk
4320 min Summer	70.133	0.033	0.0	0.3	Flood Risk
5760 min Summer	70.127	0.027	0.0	0.3	Flood Risk
7200 min Summer	70.123	0.023	0.0	0.2	Flood Risk
8640 min Summer	70.120	0.020	0.0	0.2	Flood Risk
10080 min Summer	70.118	0.018	0.0	0.2	Flood Risk
15 min Winter	70.171	0.071	0.1	0.7	Flood Risk
30 min Winter	70.196	0.096	0.1	1.0	Flood Risk
60 min Winter	70.218	0.118	0.1	1.2	Flood Risk
120 min Winter	70.233	0.133	0.1	1.4	Flood Risk
180 min Winter	70.236	0.136	0.1	1.4	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	150.938	0.0	18
30 min Summer	98.983	0.0	33
60 min Summer	61.738	0.0	62
120 min Summer	37.127	0.0	120
180 min Summer	27.171	0.0	154
240 min Summer	21.657	0.0	184
360 min Summer	15.750	0.0	250
480 min Summer	12.545	0.0	318
600 min Summer	10.508	0.0	386
720 min Summer	9.088	0.0	452
960 min Summer	7.221	0.0	580
1440 min Summer	5.214	0.0	824
2160 min Summer	3.758	0.0	1164
2880 min Summer	2.976	0.0	1524
4320 min Summer	2.139	0.0	2248
5760 min Summer	1.691	0.0	2952
7200 min Summer	1.408	0.0	3680
8640 min Summer	1.212	0.0	4408
10080 min Summer	1.068	0.0	5144
15 min Winter	150.938	0.0	18
30 min Winter	98.983	0.0	32
60 min Winter	61.738	0.0	60
120 min Winter	37.127	0.0	118
180 min Winter	27.171	0.0	172

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Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
240 min Winter	70.234	0.134	0.1	1.4	Flood Risk
360 min Winter	70.229	0.129	0.1	1.3	Flood Risk
480 min Winter	70.222	0.122	0.1	1.3	Flood Risk
600 min Winter	70.214	0.114	0.1	1.2	Flood Risk
720 min Winter	70.206	0.106	0.1	1.1	Flood Risk
960 min Winter	70.189	0.089	0.1	0.9	Flood Risk
1440 min Winter	70.161	0.061	0.1	0.6	Flood Risk
2160 min Winter	70.143	0.043	0.1	0.5	Flood Risk
2880 min Winter	70.135	0.035	0.0	0.4	Flood Risk
4320 min Winter	70.126	0.026	0.0	0.3	Flood Risk
5760 min Winter	70.121	0.021	0.0	0.2	Flood Risk
7200 min Winter	70.117	0.017	0.0	0.2	Flood Risk
8640 min Winter	70.115	0.015	0.0	0.2	Flood Risk
10080 min Winter	70.113	0.013	0.0	0.1	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
240 min Winter	21.657	0.0	198
360 min Winter	15.750	0.0	272
480 min Winter	12.545	0.0	346
600 min Winter	10.508	0.0	420
720 min Winter	9.088	0.0	490
960 min Winter	7.221	0.0	624
1440 min Winter	5.214	0.0	852
2160 min Winter	3.758	0.0	1188
2880 min Winter	2.976	0.0	1552
4320 min Winter	2.139	0.0	2288
5760 min Winter	1.691	0.0	2992
7200 min Winter	1.408	0.0	3672
8640 min Winter	1.212	0.0	4488
10080 min Winter	1.068	0.0	5144

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XP Solutions		
Source Control 2015.1		

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	21.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+45

Time Area Diagram

Total Area (ha) 0.003

Time (mins)	Area
From:	To: (ha)

0	4 0.003
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Model Details

Storage is Online Cover Level (m) 70.300

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.02857	Width (m)	5.5
Membrane Percolation (mm/hr)	1000	Length (m)	6.3
Max Percolation (l/s)	9.6	Slope (1:X)	0.0
Safety Factor	4.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	70.100	Cap Volume Depth (m)	0.150

