

Application for Approval of Details Reserved by Condition

Town and Country Planning Act 1990 (as amended); Planning (Listed Buildings and Conservation Areas) Act 1990 (as amended)

Publication of applications on planning authority websites

Please note that the information provided on this application form and in supporting documents may be published on the Authority's website. If you require any further clarification, please contact the Authority's planning department.

Site Location

Disclaimer: We can only make recommendations based on the answers given in the questions.

If you cannot provide a postcode, the description of site location must be completed. Please provide the most accurate site description you can, to help locate the site - for example "field to the North of the Post Office".

Number

Suffix

Property Name

Address Line 1

Address Line 2

Address Line 3

Town/city

Postcode

Description of site location must be completed if postcode is not known:

Easting (x)

Northing (y)

Description

Applicant Details

Name/Company

Title

First name

Surname

Company Name

Address

Address line 1

Address line 2

Address line 3

Town/City

Country

Postcode

Are you an agent acting on behalf of the applicant?

Yes

No

Contact Details

Primary number

Secondary number

Fax number

Email address

Agent Details

Name/Company

Title

First name

Surname

Company Name

Address

Address line 1

Address line 2

Address line 3

Town/City

Country

Postcode

Contact Details

Primary number

Secondary number

Fax number

Email address

Description of the Proposal

Please provide a description of the approved development as shown on the decision letter

Demolition of existing housing (23 units) and redevelopment of site to provide 46 no. new build dwellings (16 no. 1 bedroom apartments, 24 no. 2 bedroom apartments, 4 no. 3 bedroom houses and 2 no. 3 bedroom bungalows), formation of new access to North Upton Lane and provision of parking, landscaping, external works and stores for bikes, refuse, plant etc.

Reference number

Date of decision (date must be pre-application submission)

Please state the condition number(s) to which this application relates

Condition number(s)

Has the development already started?

- Yes
 No

Part Discharge of Conditions

Are you seeking to discharge only part of a condition?

- Yes
 No

Discharge of Conditions

Please provide a full description and/or list of the materials/details that are being submitted for approval

17. SUDS maintenance plan
18. Foul drainage
19. Levels

Site Visit

Can the site be seen from a public road, public footpath, bridleway or other public land?

Yes

No

If the planning authority needs to make an appointment to carry out a site visit, whom should they contact?

The agent

The applicant

Other person

Pre-application Advice

Has assistance or prior advice been sought from the local authority about this application?

Yes

No

Declaration

I / We hereby apply for Approval of details reserved by a condition (discharge) as described in this form and accompanying plans/drawings and additional information. I / We confirm that, to the best of my/our knowledge, any facts stated are true and accurate and any opinions given are the genuine options of the persons giving them. I / We also accept that: Once submitted, this information will be transmitted to the Local Planning Authority and, once validated by them, be made available as part of a public register and on the authority's website; our system will automatically generate and send you emails in regard to the submission of this application.

I / We agree to the outlined declaration

Signed

philip staddon

Date

06/05/2022

Project Name	Manor Farm, Barnwood, Gloucester		
Clients	The Barnwood Trust and Stonewater Limited		
Design Note Title	Planning Condition 17 – SuDS Maintenance		
Document Reference	05926-HYD-XX-XX-RP-D-5003		
Author	[REDACTED]		
Revision	P03		
Date	27 April 2022	Approved	✓

1. INTRODUCTION

This Technical Note has been prepared in connection with planning application reference 19/00672/FUL for the above scheme on behalf of The Barnwood Trust and Stonewater Limited.

Planning Approval has been granted in respect of the conversion of the demolition and redevelopment of Manor Gardens, Barnwood, Gloucester. Condition 17 of the Approval states the following;

Condition 17

“No dwelling hereby permitted shall be occupied until a SuDS maintenance plan for all SuDS/attenuation features and associated pipework has been submitted to and approved in writing by the Local Planning Authority. The maintenance plan shall fully detail the access that is required to meet surface water management components for maintenance purposes as well as showing safe and sustainable removal and disposal of waste from the drainage system, detailing the materials to be used and standard of work required including a method statement. The approved SuDS maintenance plan shall be implemented in full for the lifetime of the development”.

This Technical Note addresses these items and presents the relevant information to discharge the condition.

Although not expressly referred to in the wording of the condition, it is assumed that the details presented should include the design of the surface water system.

2. DEVELOPMENT PROPOSALS

The proposal is for the demolition of existing housing and redevelopment of site to provide 46 no. new build dwellings, formation of new access to North Upton Lane, provision of parking, associated landscaping and improvement works to the existing Manor House.

SURFACE WATER DRAINAGE PROPOSALS

- 2.1 A proposed drainage strategy was prepared by Hydrock to accompany the original planning application for the site, report reference 05926-HYD-XX-XX-RP-D-5002, which included proposals for the surface water drainage system and identified points of discharge.
- 2.2 The proposals contained within this Technical Note are based on the original strategy and the details have been expanded and enhanced in accordance with the approved proposed site layout.
- 2.3 The site currently contains the Manor Centre and Manor House, a retirement village of sheltered housing interspaced with gardens, other soft landscaping, paths, parking areas, and an access road that winds through the site from Barnwood Road.

A drainage connectivity survey carried out at the time of the original application determined that surface water runoff from the existing developed site discharged to both the Wotton Brook, in the southern part of the site, and to the public surface water sewer in North Upton Lane to the east.

- 2.4 The approved Drainage Strategy, referred to above, proposed discharge rates from the redevelopment that are set to no more than 50% of the original discharge rates, thus providing a significant reduction on the current situation.

Additionally, the existing discharge to the public sewer in North Upton Lane will be removed and all surface water will be discharged to the Wotton Brook.

As set out in the approved Drainage Strategy, the design discharge rate for the catchment to the north of the Wotton Brook has been set at 33.4 l/s and for the catchment to the south at 5.0 l/s.

Attenuation of excess storm water volumes is provided in underground geocellular tanks located in parking areas.

- 2.5 The surface water system has been designed to accommodate the 1 in 100 year storm event with an allowance of +40% for climate change.
- 2.6 The whole of the site is drained by gravity systems with no pumping requirements.
- 2.7 The proposed drainage network will be maintained by a private management company.
- 2.8 The proposed drainage layout for the site and accompanying calculations are included in Appendix A of this Technical Note.

3. SUDS MAINTENANCE PLAN

- 3.1 The Developer intends to offer either the surface water drainage systems to Severn Trent Water for adoption.

The proposed SuDS features comprise underground tanks, flow controls and traditional drainage systems, as described in the approved Drainage Strategy and as shown on the drawings attached in Appendix A.

The Operation and Maintenance Manual that will accompany the final work shall include the following specific maintenance measures.

3.2 Trapped Gulleys

Maintenance Schedule	Responsibility	Required Action	Typical Frequency*
Regular Maintenance	Maintenance Company	Inspect for sediment and debris in sump	Annually
		Cleaning of any surface debris and inlet blockages.	Every four months, including after autumn leaf fall, frequency subject to site specific conditions and should be adjusted accordingly
Occasional Maintenance	Maintenance Company	Remove sediment and debris from gully trap	As required, based on inspection (Every two years minimum)
Remedial Action	Maintenance Company	Reconstruct gully	As required
		Replace/remediate damaged gully grating.	As required
Monitoring	Maintenance Company	Inspect silt traps and note rate of sediment accumulation.	Monthly in first six months then annually
		Inspect gully structure and grating.	Every three months for first year then annually
* Frequency of maintenance is dependent upon site specific circumstance and activities should be undertaken as necessary.			

3.3 Flow Controls

Maintenance Schedule	Responsibility	Required Action	Typical Frequency*
Inspection	Maintenance Company	Inspect sump and benching in flow control chamber and note rate of sediment accumulation.	Three times a year or after significant rainfall events
		Inspect pull cables in flow control chamber and any moving parts to ensure operational.	Three times a year or after significant rainfall events
		Inspect inlets, outlets and overflows for blockages.	Three times a year or after significant rainfall events
		Observe condition of flow control chamber and carry out CCTV survey to check condition of pipes.	Every two years or if issues are identified.
Maintenance	Maintenance Company	Remove sediment and debris from sump	As required, based on inspection
		Grease moving parts in flow control chamber as appropriate	As required, based on inspection.
		Jet through pipelines	As required, based on inspection.
Remedial Action	Maintenance Company	Reconstruct inspection chamber structure	As required
		Replacement of flow control device and/or overflow pipe	As required

		Repair damaged joints in pipes or relay new pipes	As required
* Frequency of maintenance is dependent upon site specific circumstance and activities should be undertaken as necessary.			

3.4 Underground Storage Tanks

Maintenance Schedule	Responsibility	Required Action	Typical Frequency*
Regular Maintenance	Maintenance Company	Inspection of tanks via access chambers.	Three times a year or after significant rainfall events.
Occasional Maintenance	Maintenance Company	Remove silt build up by jetting out.	Two times a year or after significant rainfall events
		Check upstream catchpit chambers.	Two times a year or after significant rainfall events
Remedial Action	Maintenance Company	Remove defective cells and replace. Reconstruct surfacing.	As required
* Frequency of maintenance is dependent upon site specific circumstance and activities should be undertaken as necessary.			

3.5 Channel Drainage Units

Maintenance Schedule	Responsibility	Required Action	Typical Frequency*
Regular Maintenance	Maintenance Company	Check gratings for blockages and remove debris.	Once a month.
Occasional Maintenance	Maintenance Company	Jet out slot drains. Empty out sumps and remove water and silt. Check lock bolts for tightness.	Three times a year or after significant rainfall events.
		Check upstream catchpit chambers.	Two times a year or after significant rainfall events
Remedial Action	Maintenance Company	Replace broken/missing lock bolts.	As required
		Remove defective units and replace	As required
* Frequency of maintenance is dependent upon site specific circumstance and activities should be undertaken as necessary.			

3.6 Pipes and Manholes

Maintenance Schedule	Responsibility	Required Action	Typical Frequency*
Regular Maintenance	Maintenance Company	Inspect manholes for blockages of inlets and outlets and clear as necessary.	Every three months.
Occasional Maintenance	Maintenance Company	Jet through pipelines and carry out CCTV survey to check condition.	Every 12 months.
Remedial Action	Maintenance Company	Replace/repair defective sections of pipework.	As required
		Repair joints.	As required
* Frequency of maintenance is dependent upon site specific circumstance and activities should be undertaken as necessary.			

- 3.7 Additional maintenance regimes may be required by Severn Trent Water as part of their standard adoption procedures.
- 3.8 All elements of the drainage system requiring access are located in publicly accessible areas and within close proximity of vehicular/foot access routes.
- 3.9 Removal and disposal of waste from any inspection/remedial works will be the responsibility of the maintenance company and the specialist contractor employed.

Waste materials shall be removed to a licence tip in accordance with the relevant regulations.

END

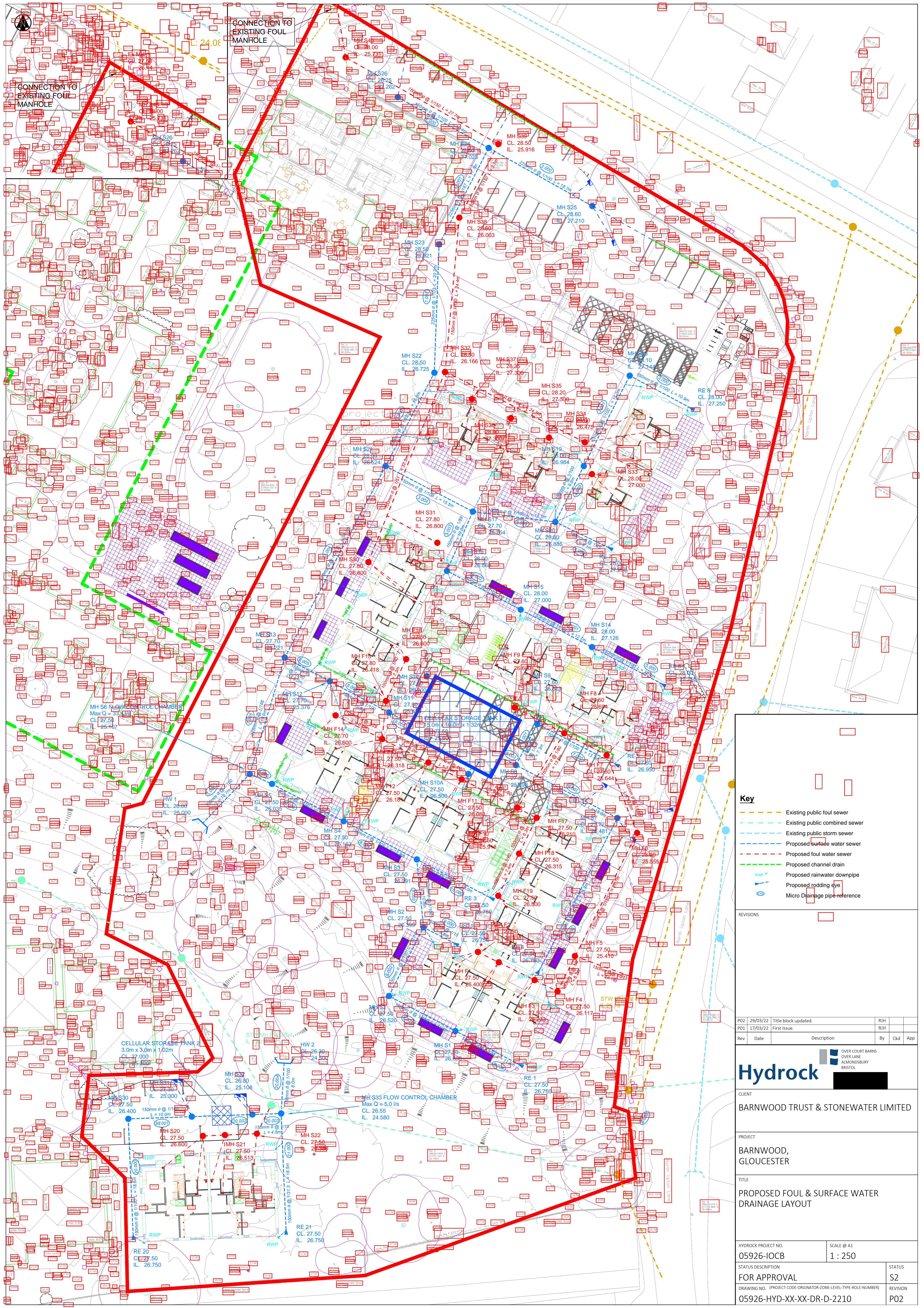
APPENDIX A

Drawing No. 059260-HYD-XX-XX-DR-D-2210-P02

Drawing No. 059260-HYD-XX-XX-DR-D-2211-P02

Drawing No. 059260-HYD-XX-XX-DR-D-2212-P02

Micro Drainage Calculations



CONNECTION TO EXISTING FOUL MANHOLE

CONNECTION TO EXISTING FOUL MANHOLE

Key

- Existing public foul sewer
- Existing public combined sewer
- Existing public storm sewer
- Proposed surface water sewer
- Proposed foul water sewer
- Proposed channel drain
- Proposed rainwater downpipe
- Proposed rodding eye
- Micro Drainage pipe-reference

REVISIONS

Rev	Date	Description	By	Ckd	App
PO2	29/03/22	Title block updated.	RJH		
PO1	17/03/22	First issue.	RJH		

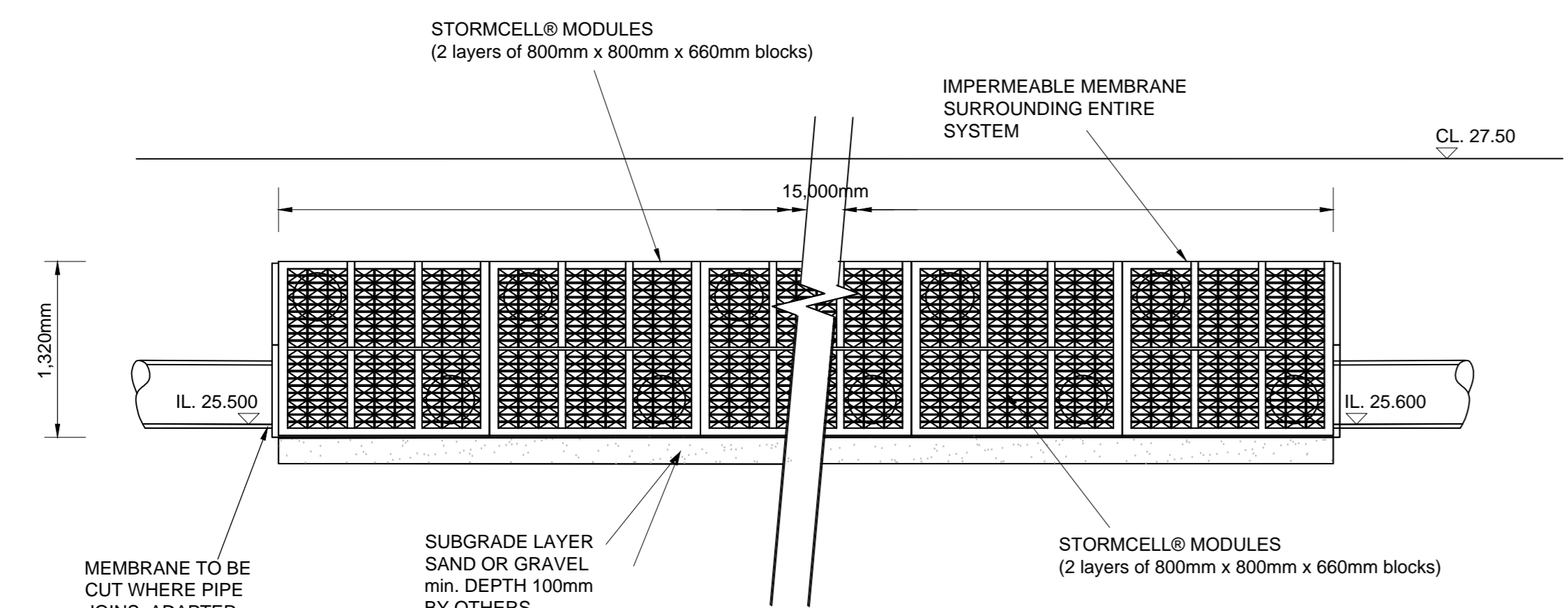
OVER COURT BARN
 OVER LANE
 ALMONDSBURY
 BRISTOL

CLIENT
BARNWOOD TRUST & STONEWATER LIMITED

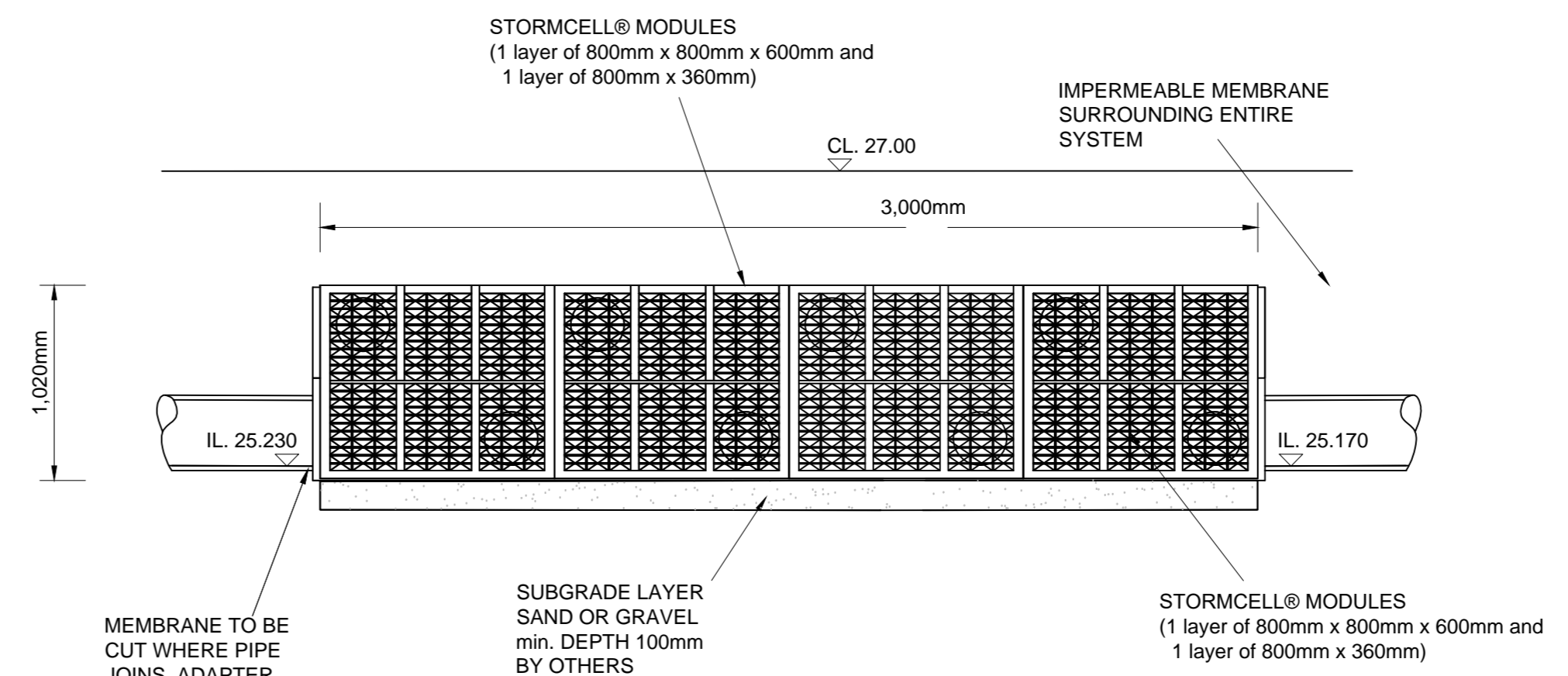
PROJECT
**BARNWOOD,
 GLOUCESTER**

TITLE
**PROPOSED FOUL & SURFACE WATER
 DRAINAGE LAYOUT**

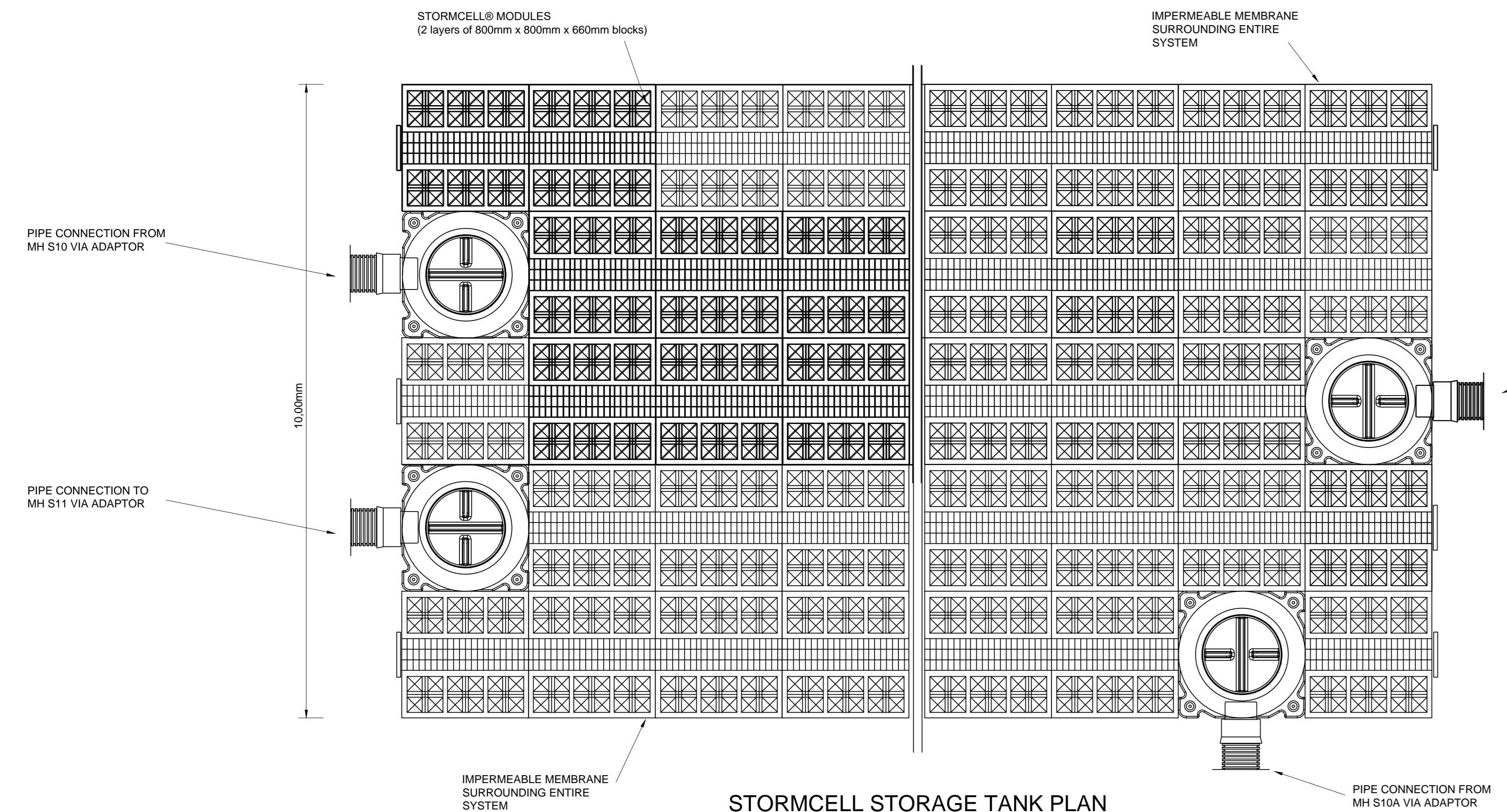
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STATUS DESCRIPTION FOR APPROVAL	REVISION PO2	
DRAWING NO. (PROJECT CODE-ORIGINATOR ZONE-LEVEL-TYPE-ROLE-NUMBER) 05926-HYD-XX-XX-DR-D-2210		



STORMCELL STORAGE TANK LONGSECTION

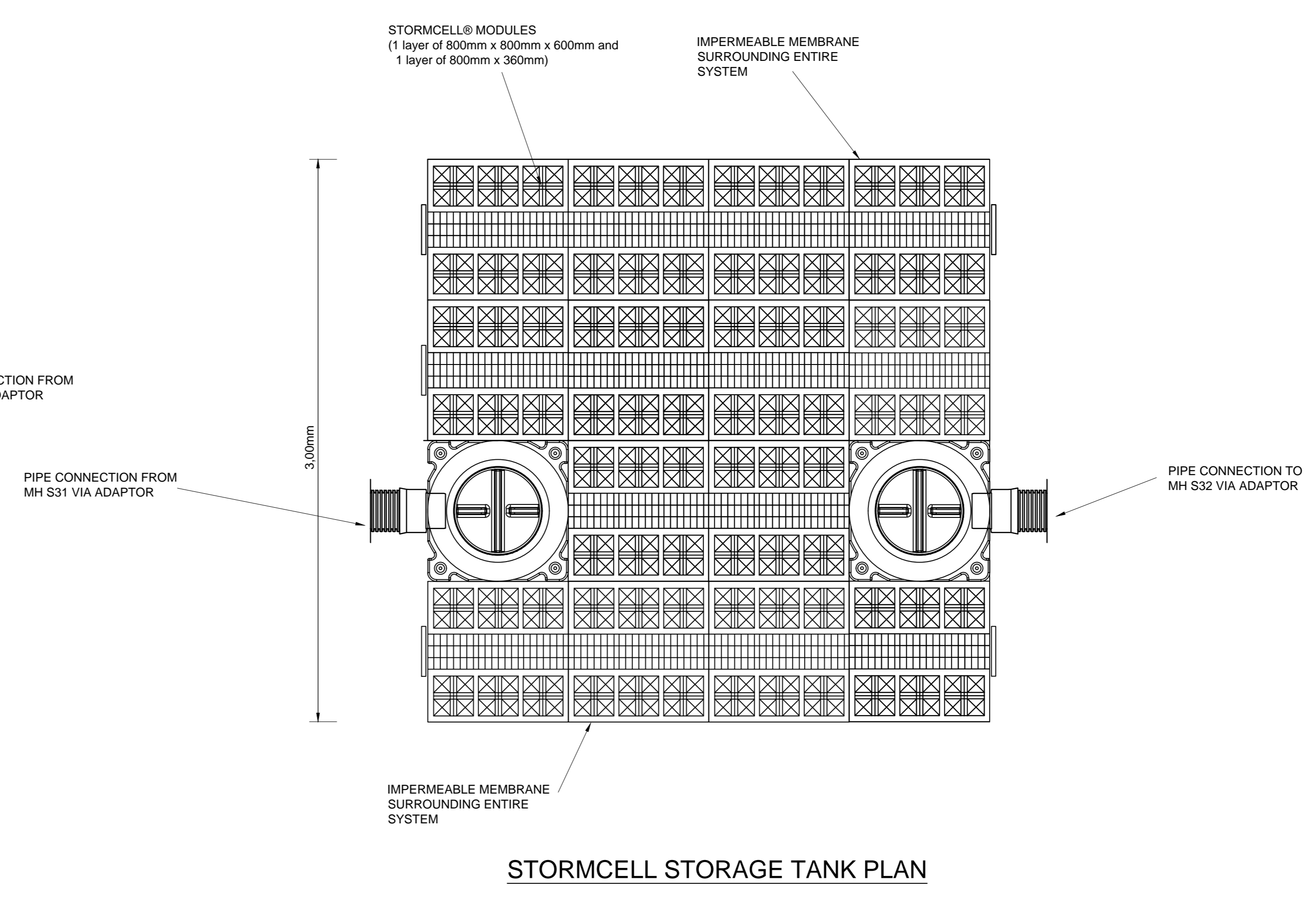


STORMCELL STORAGE TANK LONGSECTION



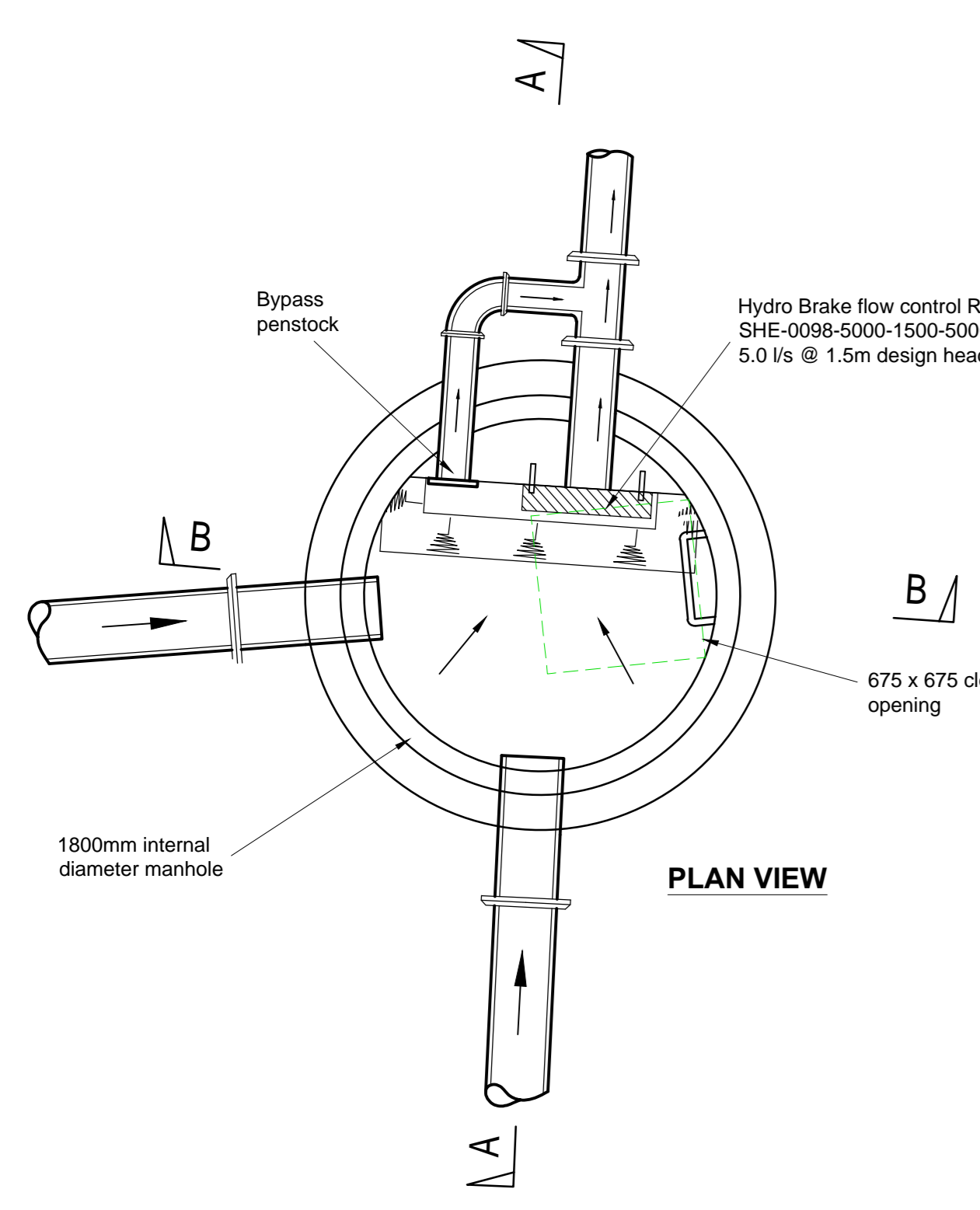
STORMCELL STORAGE TANK PLAN

STORAGE TANK 1
SCALE 1:20

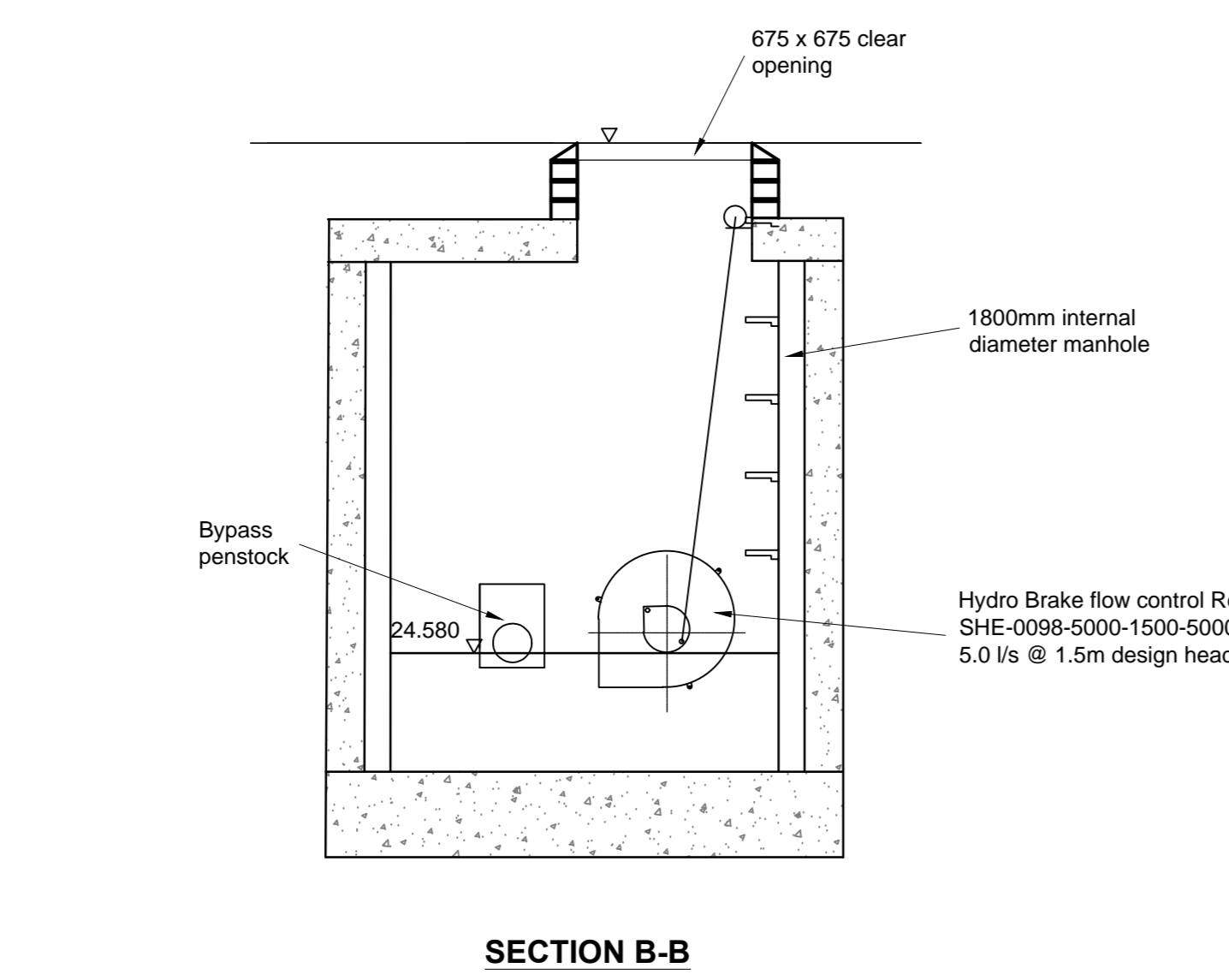


STORMCELL STORAGE TANK PLAN

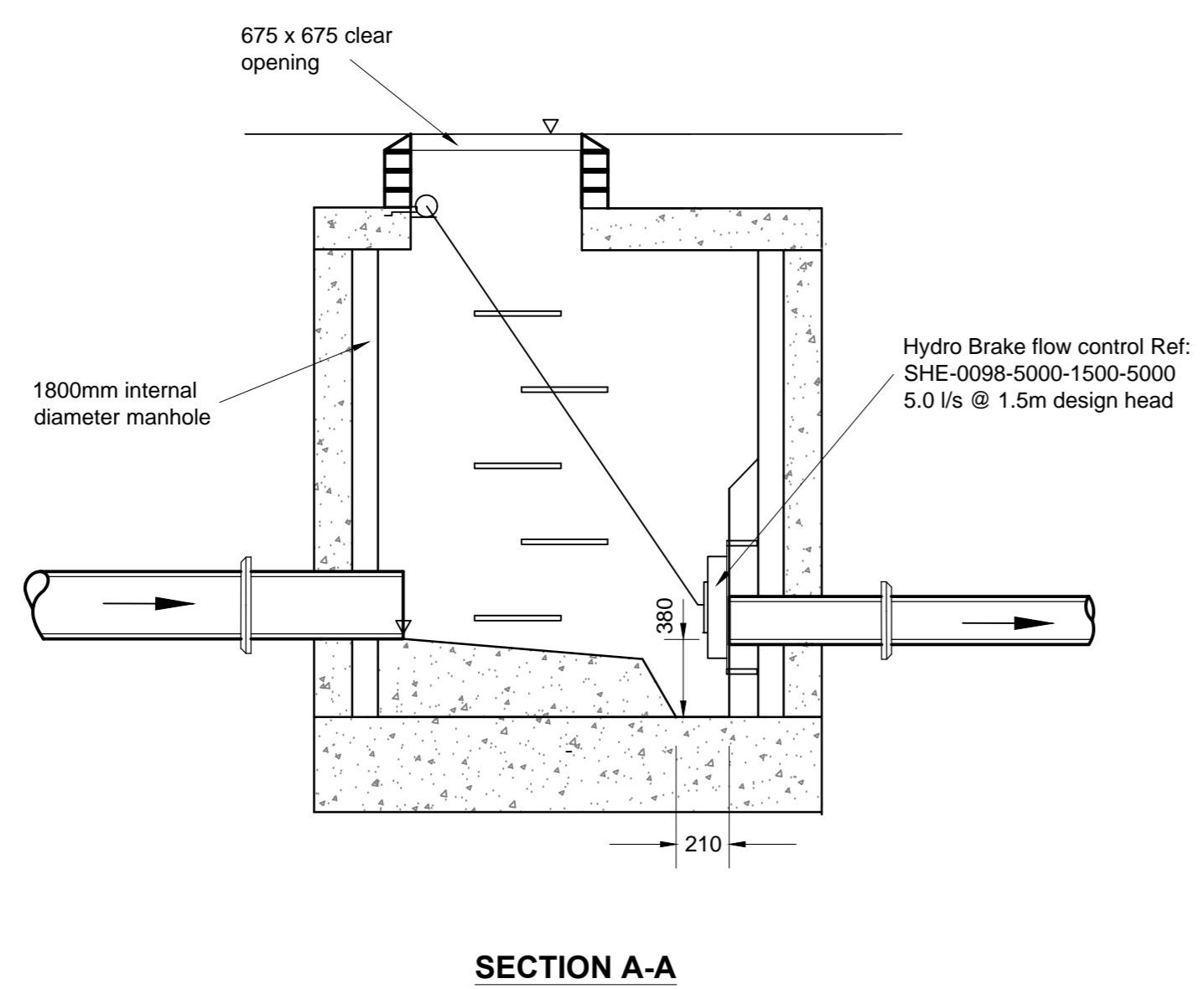
STORAGE TANK 2
SCALE 1:20



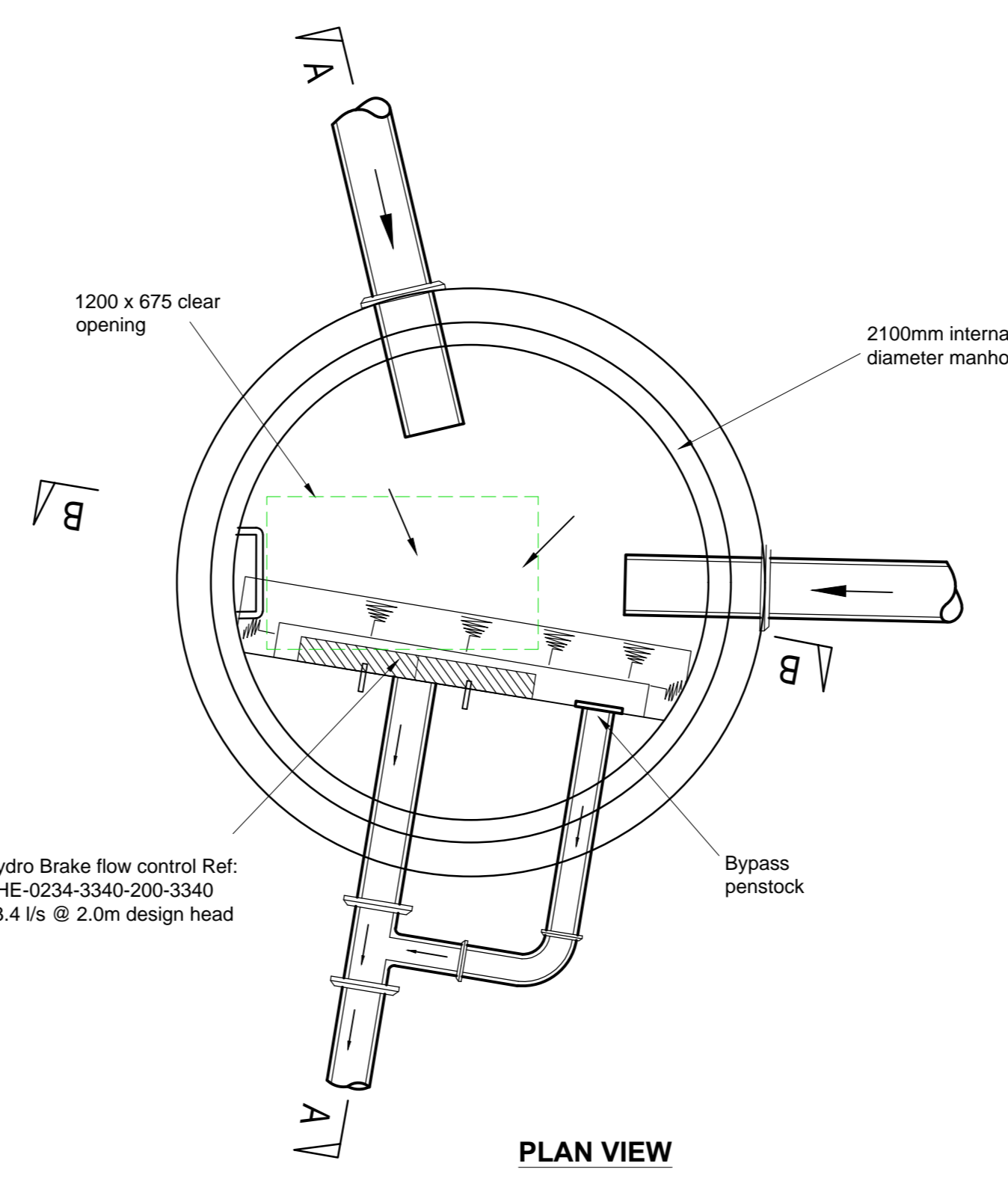
FLOW CONTROL MANHOLE S33
Scale 1:25



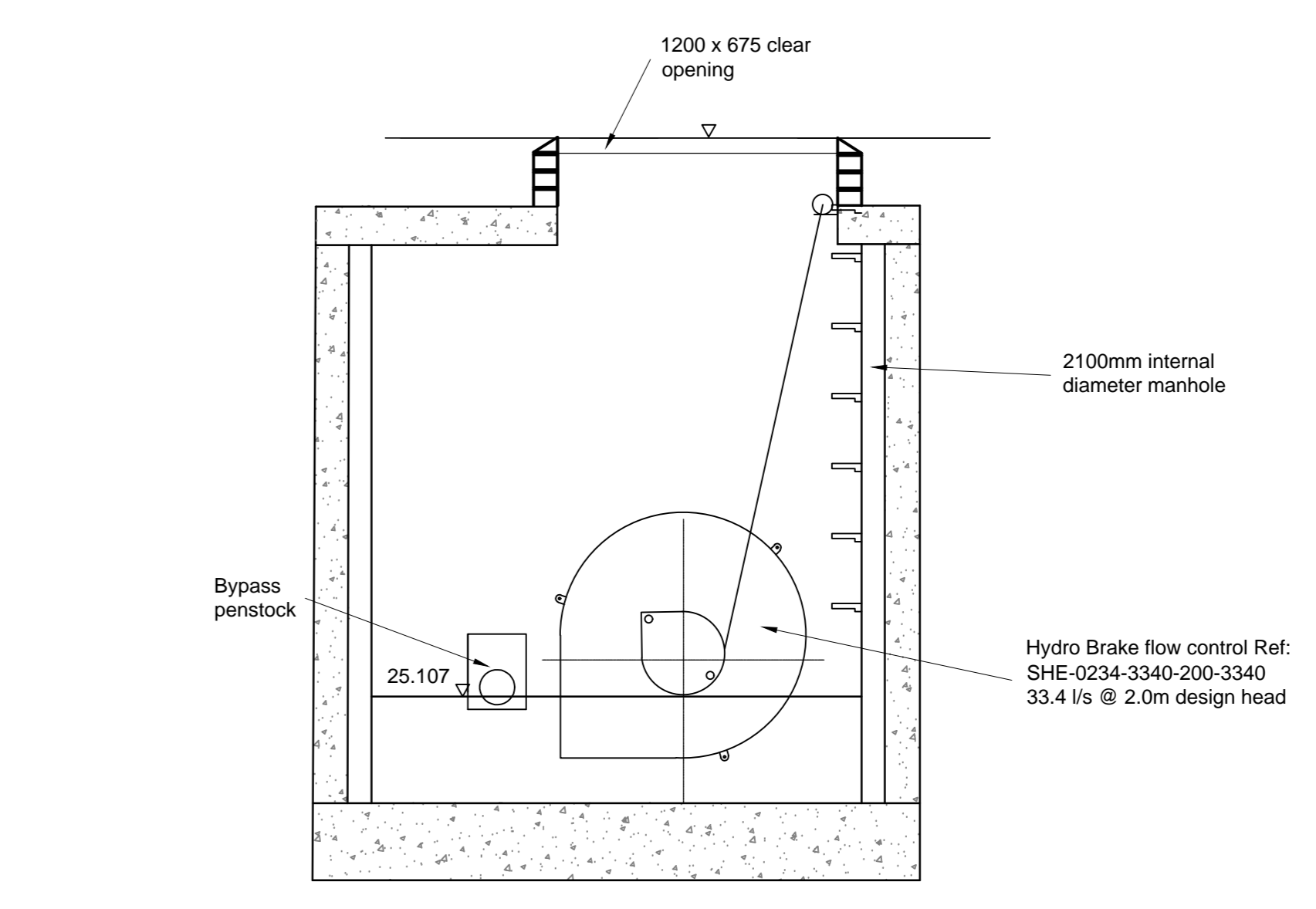
SECTION B-B



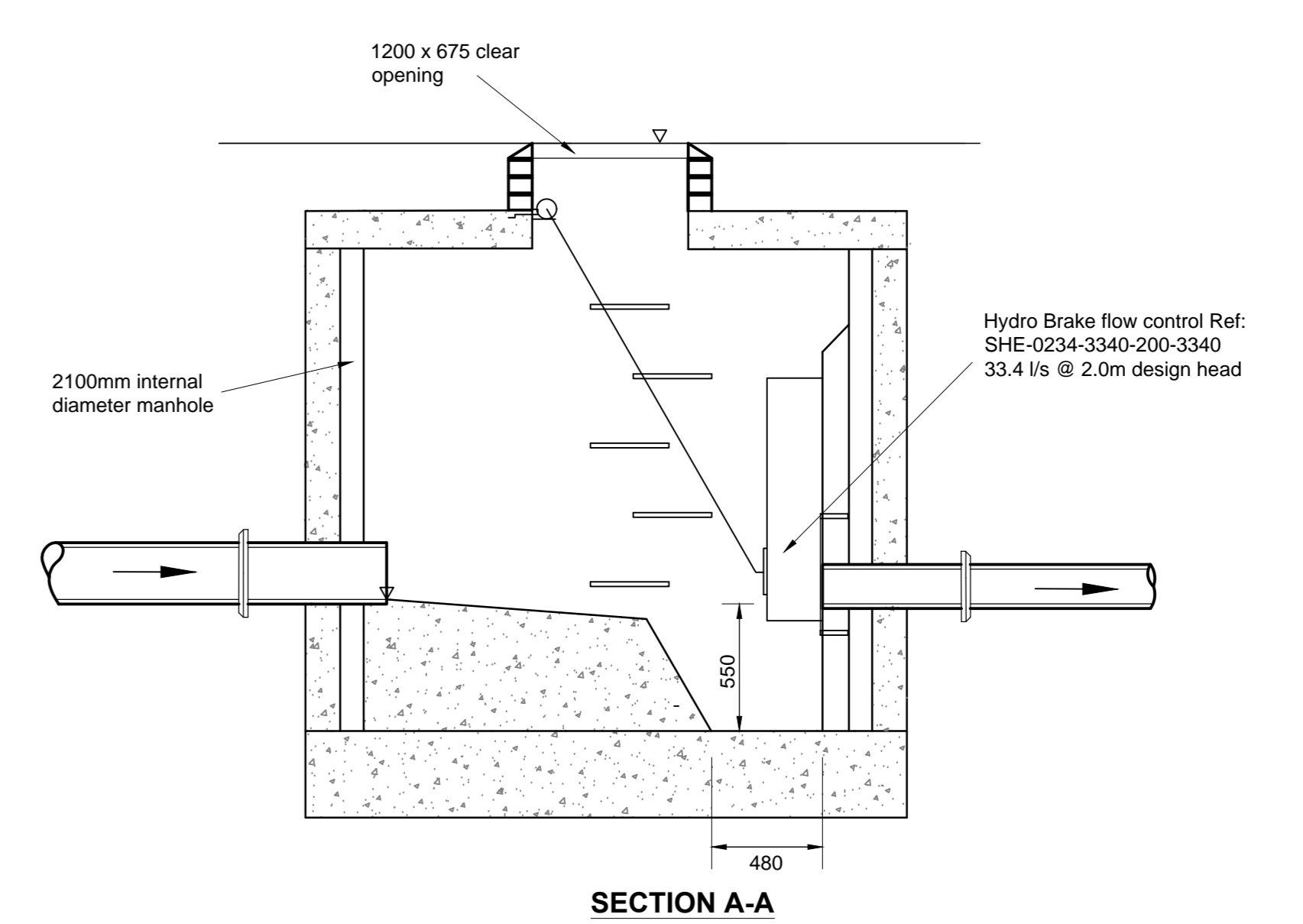
SECTION A-A



FLOW CONTROL MANHOLE S6
Scale 1:25



SECTION B-B



SECTION A-A

REVISIONS

No	Date	Description	By	Chk	App
P02	29/03/22	Title block updated			
P01	17/03/22	First issue			

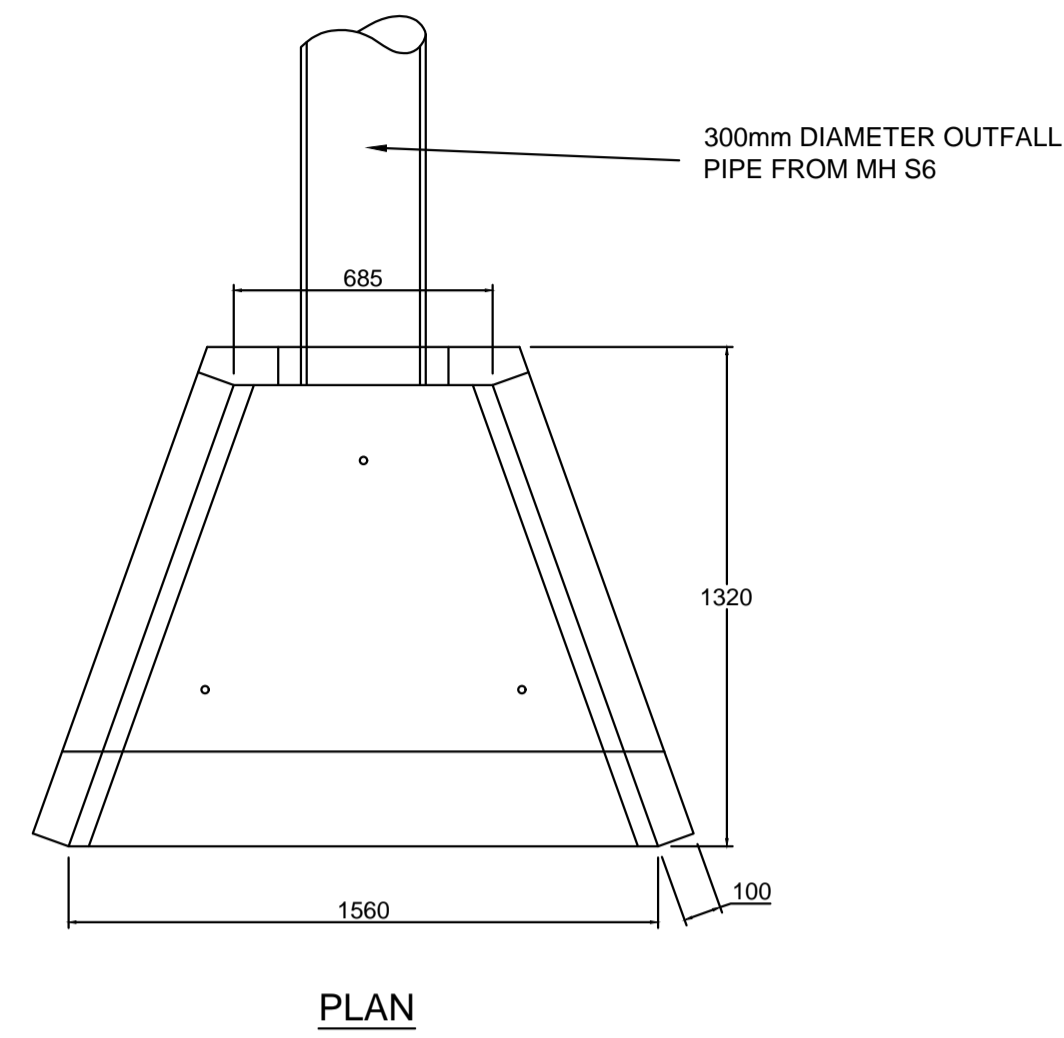


CLIENT
BARNWOOD TRUST & STONewater LIMITED

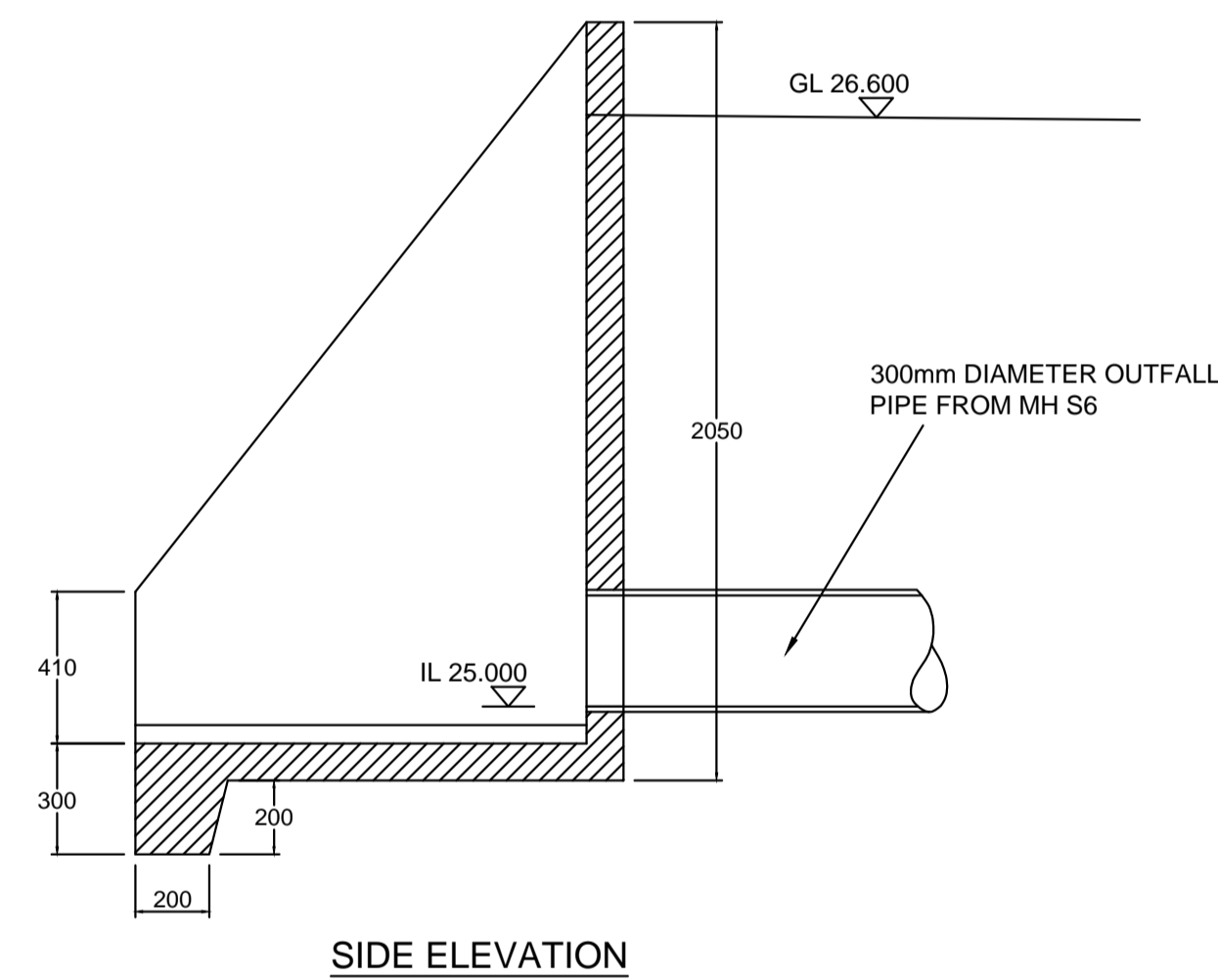
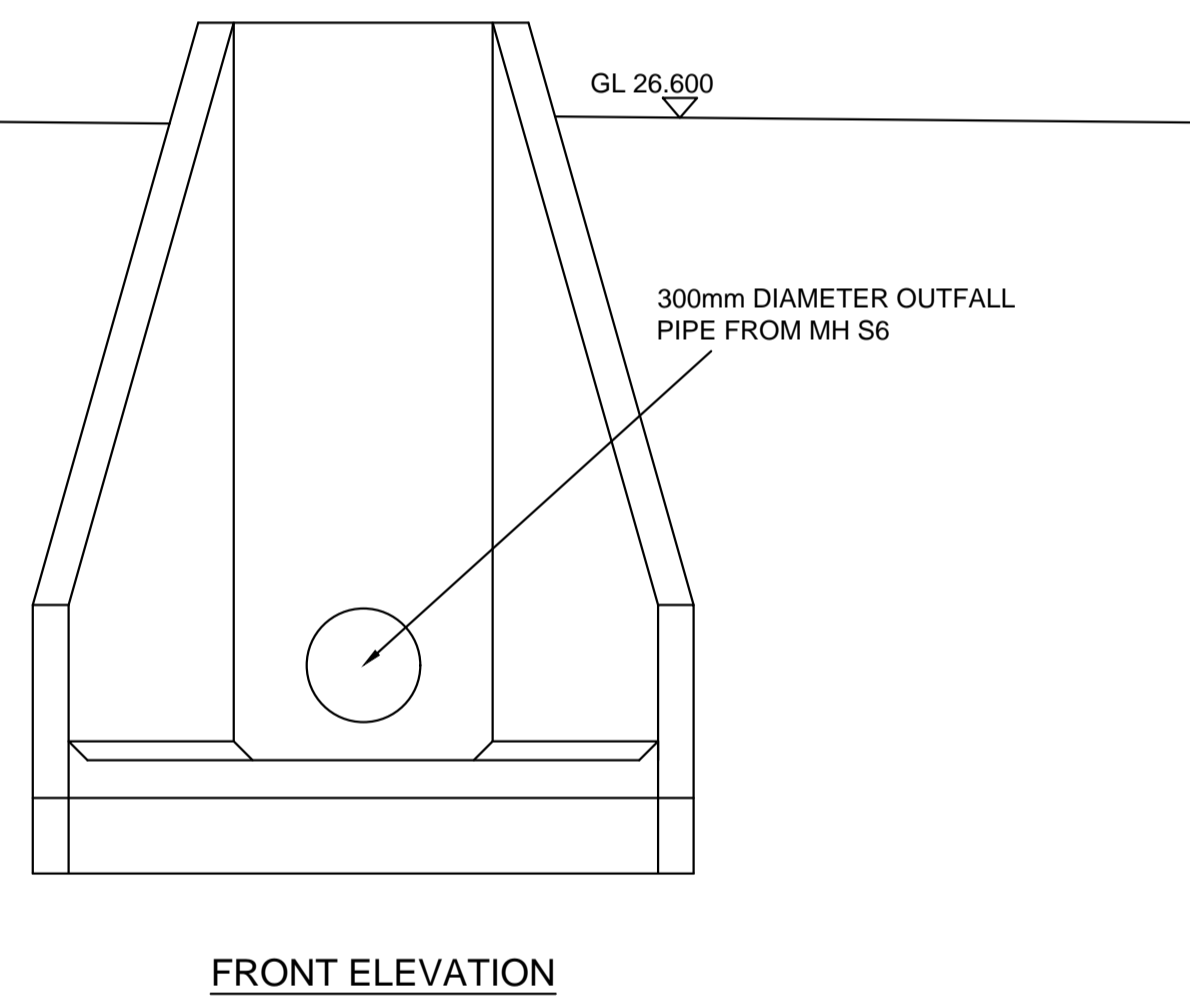
PROJECT
BARNWOOD, GLOUCESTER

TITLE
STORMwater ATTENUATION TANK AND FLOW CONTROL DETAILS

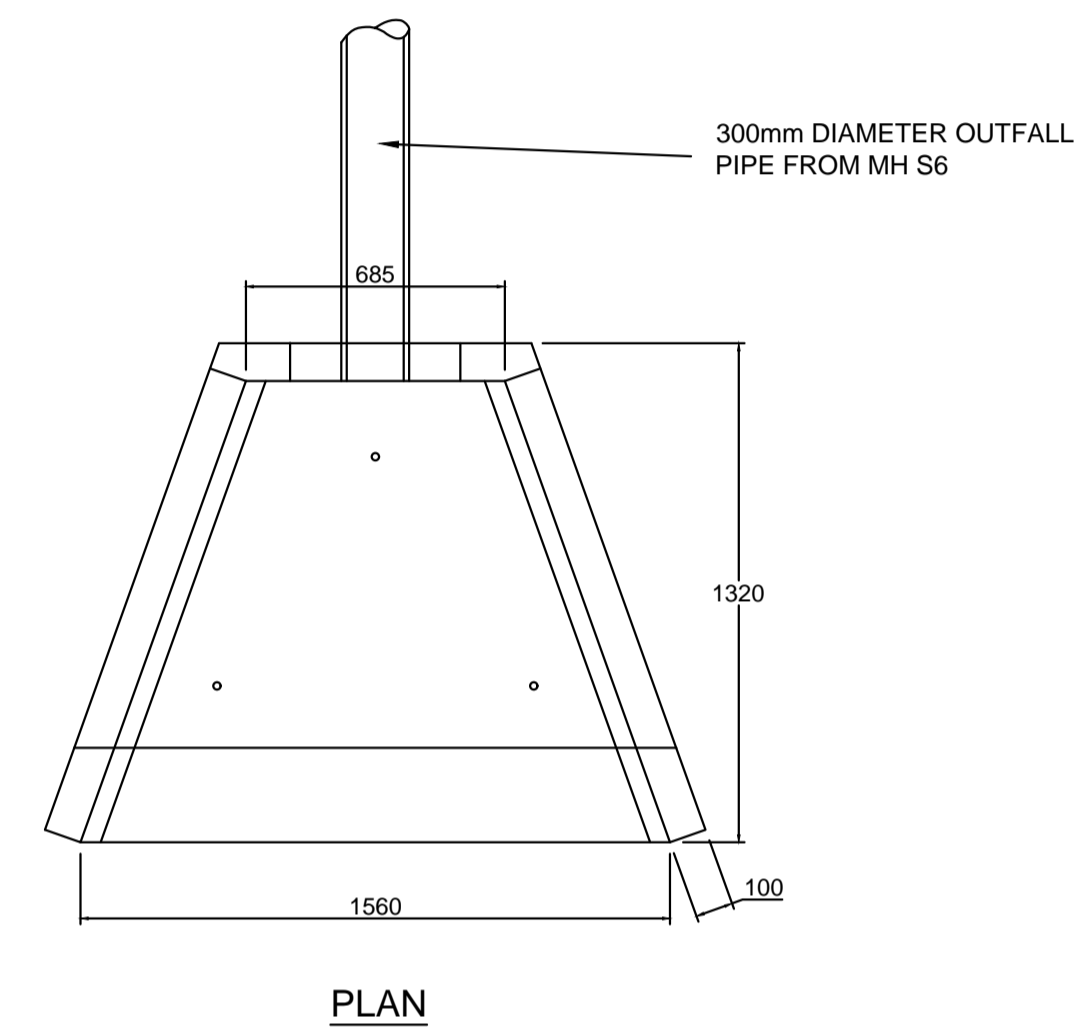
HYDROCK PROJECT NO. 05926-IOCB	SCALE @ AD As Shown
STATUS DESCRIPTION FOR APPROVAL	STATUS S2
DRAWING NO. (PROJECT CODE ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER) 05926-HYD-XX-XX-DR-D-2211	REVISION P02



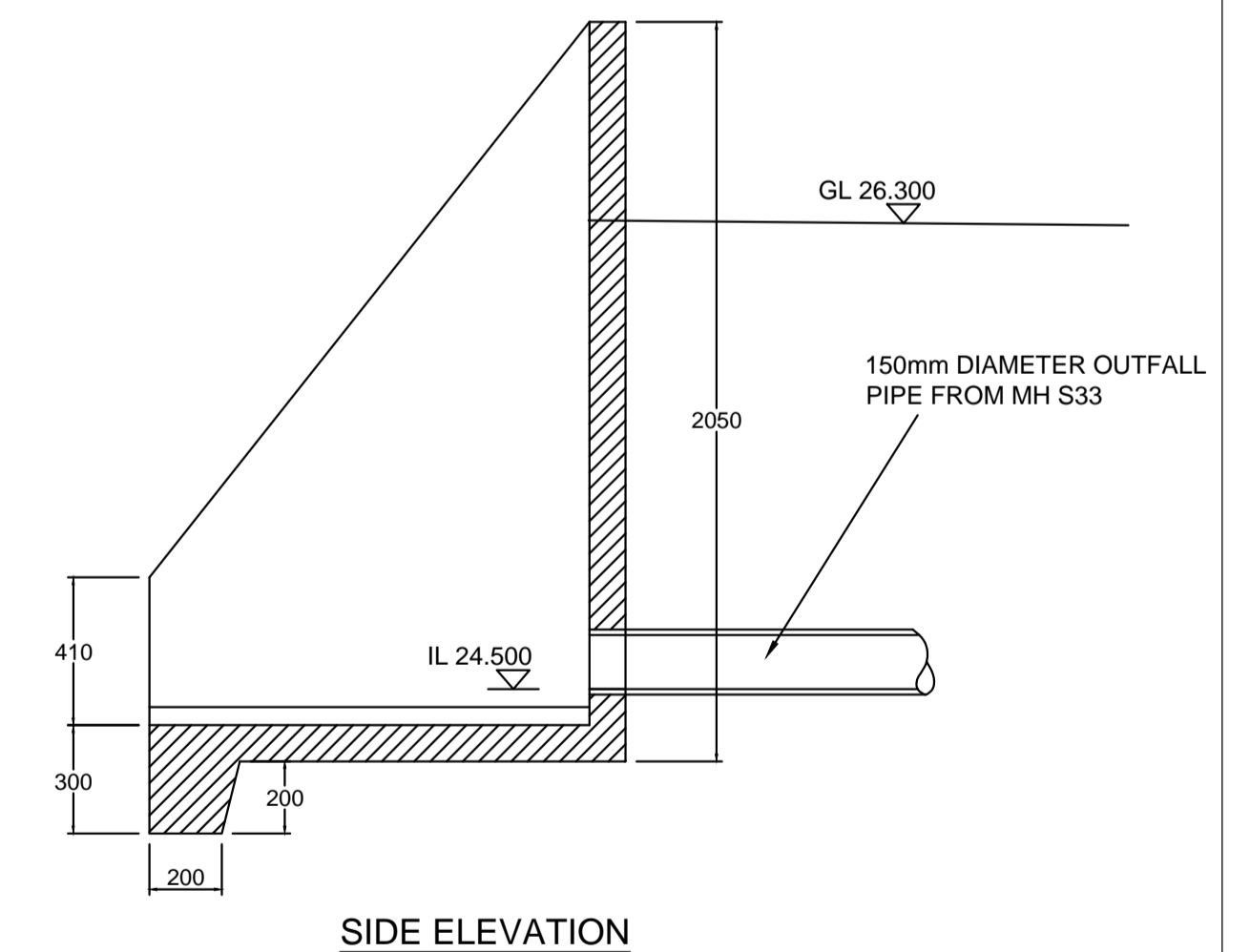
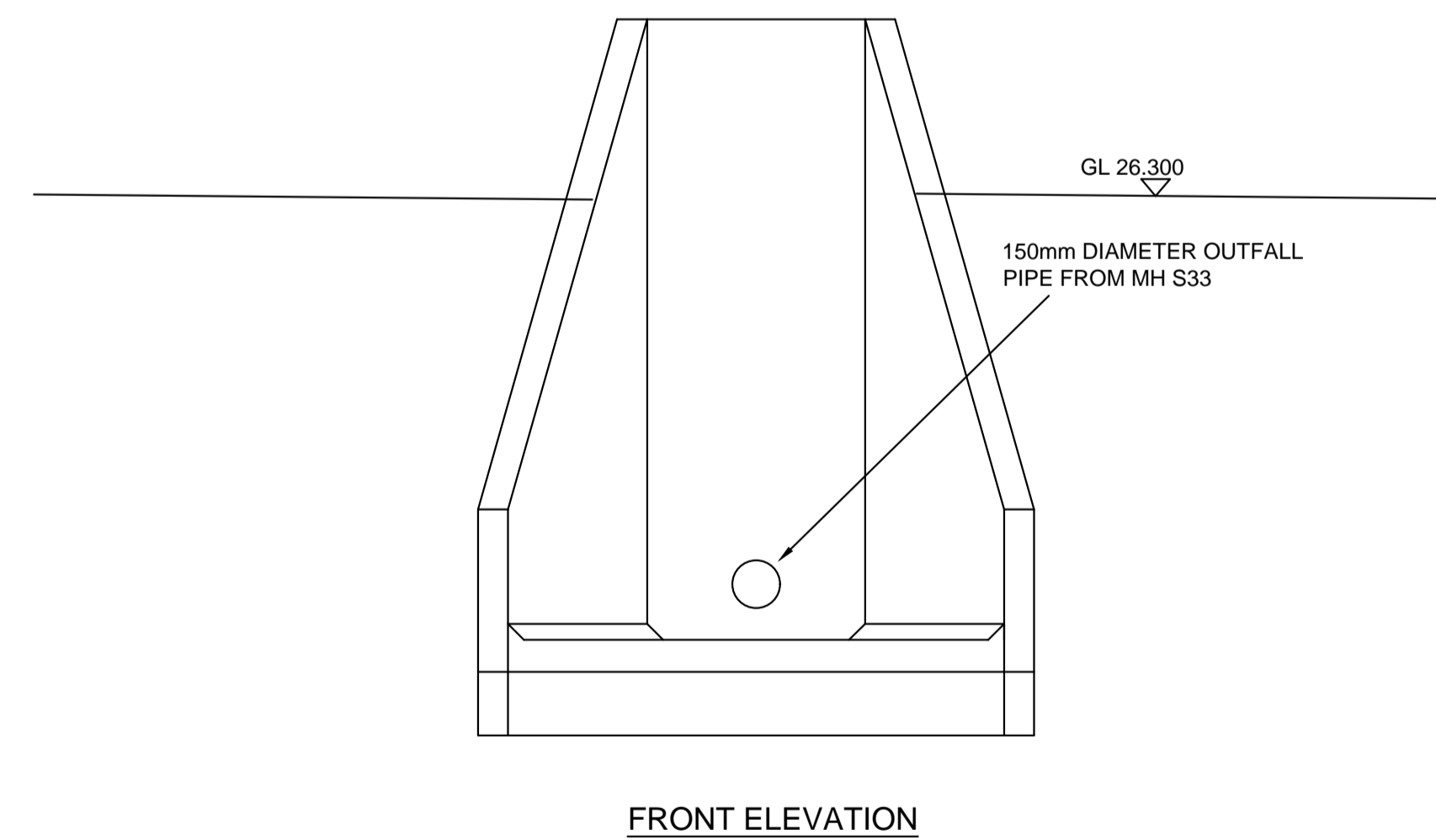
Precast concrete headwall unit
Althon Type H6C or similar approved



HEADWALL HW1
Scale 1:20



Precast concrete headwall unit
Althon Type H6C or similar approved



HEADWALL HW2
Scale 1:20

Rev	Date	Description	By	Ckd	App
P02	29/03/22	Title block updated.	RJH		
P01	17/03/22	First Issue.	RJH		

Hydrock
OVER COURT BARN
OVER LANE
ALMONDSBURY
BRISTOL
BS32 4DF

CLIENT
BARNWOOD TRUST & STONEWATER LIMITED

PROJECT
BARNWOOD,
GLOUCESTER

TITLE STORMWATER ATTENUATION TANK AND FLOW CONTROL DETAILS	
HYDROCK PROJECT NO. 05926-IOCB	SCALE @ A1 As Shown
STATUS DESCRIPTION FOR APPROVAL	STATUS S2
DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER) 05926-HYD-XX-XX-DR-D-2212	REVISION P02

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Manor Gardens, Barnwood
Gloucester
North Catchment



Date 07/03/2022 17:59
File North_V2.MDX

Designed by RJH
Checked by

Innovyze

Network 2018.1

Existing Network Details for Storm

* - Indicates pipe has been modified outside of System 1
- Indicates pipe length does not match coordinates

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
* S1.000	16.400	0.164	100.0	0.033	5.00	0.600	o	150	Pipe/Conduit
* S2.000	18.700#	0.187	100.0	0.070	5.00	0.600	o	225	Pipe/Conduit
* S1.001	17.100#	0.102	167.6	0.006	0.00	0.600	o	225	Pipe/Conduit
* S1.002	20.200#	0.196	103.1	0.028	0.00	0.600	o	225	Pipe/Conduit
* S1.003	16.600#	0.201	82.6	0.007	0.00	0.600	o	225	Pipe/Conduit
* S3.000	10.900#	0.106	102.8	0.004	5.00	0.600	o	150	Pipe/Conduit
* S3.001	16.000#	0.160	100.0	0.005	0.00	0.600	o	150	Pipe/Conduit
* S3.002	9.900#	0.099	100.0	0.004	0.00	0.600	o	150	Pipe/Conduit
* S4.000	9.100#	0.365	24.9	0.004	5.00	0.600	o	150	Pipe/Conduit
* S3.003	13.100#	0.131	100.0	0.007	0.00	0.600	o	150	Pipe/Conduit
* S5.000	12.400#	0.124	100.0	0.006	5.00	0.600	o	150	Pipe/Conduit
* S5.001	12.700#	0.126	100.8	0.004	0.00	0.600	o	150	Pipe/Conduit
* S5.002	13.100#	0.132	99.2	0.003	0.00	0.600	o	150	Pipe/Conduit
* S5.003	10.200#	0.114	89.5	0.013	0.00	0.600	o	150	Pipe/Conduit
* S3.004	15.500#	0.155	100.0	0.005	0.00	0.600	o	150	Pipe/Conduit
* S1.004	34.100#	1.303	26.2	0.009	0.00	0.600	o	225	Pipe/Conduit

PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
* S1.000	S26	28.250	27.262	0.838	28.500	27.098	1.252		1200
* S2.000	S25	28.600	27.210	1.165	28.500	27.023	1.252		1200
* S1.001	S24	28.500	27.023	1.252	28.500	26.921	1.354		1200
* S1.002	S23	28.500	26.921	1.354	28.500	26.725	1.550		1200
* S1.003	S22	28.500	26.725	1.550	28.000	26.524	1.251		1200
* S3.000	RE8	28.000	27.250	0.600	28.100	27.144	0.806		1200
* S3.001	S18	28.100	27.144	0.806	28.000	26.984	0.866		1200
* S3.002	S19	28.000	26.984	0.866	28.000	26.885	0.965		1200
* S4.000	RE7	28.000	27.250	0.600	28.000	26.885	0.965		1200
* S3.003	S20	28.000	26.885	0.965	27.700	26.754	0.796		1200
* S5.000	RE6	28.000	27.250	0.600	28.000	27.126	0.724		1200
* S5.001	S14	28.000	27.126	0.724	28.000	27.000	0.850		1200
* S5.002	S15	28.000	27.000	0.850	28.000	26.868	0.982		1200
* S5.003	S16	28.000	26.868	0.982	27.700	26.754	0.796		1200
* S3.004	S17	27.700	26.754	0.796	28.000	26.599	1.251		1200
* S1.004	S21	28.000	26.524	1.251	27.700	25.221	2.254		1200

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Manor Gardens, Barnwood
Gloucester
North Catchment



Date 07/03/2022 17:59
File North_V2.MDX

Designed by RJH
Checked by

Innovyze

Network 2018.1

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
* S6.000	26.900#	0.269	100.0	0.010	5.00	0.600	o	150	Pipe/Conduit
* S6.001	18.000#	0.783	23.0	0.028	0.00	0.600	o	150	Pipe/Conduit
* S7.000	13.700#	0.137	100.0	0.021	5.00	0.600	o	150	Pipe/Conduit
* S7.001	7.300#	1.115	6.5	0.010	0.00	0.600	o	150	Pipe/Conduit
* S6.002	3.000#	0.098	30.6	0.000	0.00	0.600	o	150	Pipe/Conduit
* S6.003	4.000#	0.118	33.9	0.041	0.00	0.600	o	150	Pipe/Conduit
* S6.004	10.600#	0.106	100.0	0.024	0.00	0.600	o	150	Pipe/Conduit
* S6.005	8.000#	0.080	100.0	0.012	0.00	0.600	o	150	Pipe/Conduit
* S1.005	18.900#	0.114	165.8	0.024	0.00	0.600	o	225	Pipe/Conduit
* S8.000	11.200#	0.112	100.0	0.003	5.00	0.600	o	150	Pipe/Conduit
* S8.001	11.800#	0.118	100.0	0.007	0.00	0.600	o	150	Pipe/Conduit
* S8.002	12.100#	0.121	100.0	0.003	0.00	0.600	o	150	Pipe/Conduit
* S9.000	5.400#	0.351	15.4	0.006	5.00	0.600	o	150	Pipe/Conduit
* S8.003	10.800#	0.108	100.0	0.000	0.00	0.600	o	150	Pipe/Conduit
* S10.000	13.000#	0.459	28.3	0.023	5.00	0.600	o	150	Pipe/Conduit
* S8.004	12.900#	0.129	100.0	0.000	0.00	0.600	o	150	Pipe/Conduit
* S8.005	12.700#	0.127	100.0	0.013	0.00	0.600	o	150	Pipe/Conduit
* S8.006	3.800#	0.928	4.1	0.003	0.00	0.600	o	150	Pipe/Conduit

PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
* S6.000	RE4	27.500	26.750	0.600	27.720	26.481	1.089		1200
* S6.001	S7	27.720	26.481	1.089	27.800	25.698	1.952		1200
* S7.000	RE5	27.600	26.950	0.500	27.600	26.813	0.637		1200
* S7.001	S9	27.600	26.813	0.637	27.800	25.698	1.952		1200
* S6.002	S8	27.800	25.698	1.952	27.800	25.600	2.050		1200
* S6.003	Tank	27.800	25.600	2.050	27.800	25.482	2.168		1200
* S6.004	S11	27.800	25.482	2.168	27.700	25.376	2.174		1200
* S6.005	S12	27.700	25.376	2.174	27.700	25.296	2.254		1200
* S1.005	S13	27.700	25.221	2.254	27.500	25.107	2.168		1200
* S8.000	RE1	27.500	26.750	0.600	27.500	26.638	0.712		1200
* S8.001	S1	27.500	26.638	0.712	27.500	26.520	0.830		1200
* S8.002	S2	27.500	26.520	0.830	27.500	26.399	0.951		1200
* S9.000	RE2	27.500	26.750	0.600	27.500	26.399	0.951		1200
* S8.003	S2	27.500	26.399	0.951	27.500	26.291	1.059		1200
* S10.000	RE3	27.500	26.750	0.600	27.500	26.291	1.059		1200
* S8.004	S3	27.500	26.291	1.059	27.500	26.162	1.188		1200
* S8.005	S4	27.500	26.162	1.188	27.500	26.035	1.315		1200
* S8.006	S5	27.500	26.035	1.315	27.500	25.107	2.243		1200

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Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
* S1.006	10.700#	0.107	100.0	0.000	0.00	0.600	o	300	Pipe/Conduit

PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
* S1.006	S6	27.500	25.107	2.093	26.600	25.000	1.300	Hydro-Brake®	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

- Indicates pipe length does not match coordinates

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	150	SS26	28.250	27.262	0.838	Open Manhole	1200
S2.000	o	225	SS25	28.600	27.210	1.165	Open Manhole	1200
S1.001	o	225	SS24	28.500	27.023	1.252	Open Manhole	1200
S1.002	o	225	SS23	28.500	26.921	1.354	Open Manhole	1200
S1.003	o	225	SS22	28.500	26.725	1.550	Open Manhole	1200
S3.000	o	150	SRE8	28.000	27.250	0.600	Open Manhole	1200
S3.001	o	150	SS18	28.100	27.144	0.806	Open Manhole	1200
S3.002	o	150	SS19	28.000	26.984	0.866	Open Manhole	1200
S4.000	o	150	SRE7	28.000	27.250	0.600	Open Manhole	1200
S3.003	o	150	SS20	28.000	26.885	0.965	Open Manhole	1200
S5.000	o	150	SRE6	28.000	27.250	0.600	Open Manhole	1200
S5.001	o	150	SS14	28.000	27.126	0.724	Open Manhole	1200
S5.002	o	150	SS15	28.000	27.000	0.850	Open Manhole	1200
S5.003	o	150	SS16	28.000	26.868	0.982	Open Manhole	1200
S3.004	o	150	SS17	27.700	26.754	0.796	Open Manhole	1200
S1.004	o	225	SS21	28.000	26.524	1.251	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	16.400	100.0	SS24	28.500	27.098	1.252	Open Manhole	1200
S2.000	18.700#	100.0	SS24	28.500	27.023	1.252	Open Manhole	1200
S1.001	17.100#	167.6	SS23	28.500	26.921	1.354	Open Manhole	1200
S1.002	20.200#	103.1	SS22	28.500	26.725	1.550	Open Manhole	1200
S1.003	16.600#	82.6	SS21	28.000	26.524	1.251	Open Manhole	1200
S3.000	10.900#	102.8	SS18	28.100	27.144	0.806	Open Manhole	1200
S3.001	16.000#	100.0	SS19	28.000	26.984	0.866	Open Manhole	1200
S3.002	9.900#	100.0	SS20	28.000	26.885	0.965	Open Manhole	1200
S4.000	9.100#	24.9	SS20	28.000	26.885	0.965	Open Manhole	1200
S3.003	13.100#	100.0	SS17	27.700	26.754	0.796	Open Manhole	1200
S5.000	12.400#	100.0	SS14	28.000	27.126	0.724	Open Manhole	1200
S5.001	12.700#	100.8	SS15	28.000	27.000	0.850	Open Manhole	1200
S5.002	13.100#	99.2	SS16	28.000	26.868	0.982	Open Manhole	1200
S5.003	10.200#	89.5	SS17	27.700	26.754	0.796	Open Manhole	1200
S3.004	15.500#	100.0	SS21	28.000	26.599	1.251	Open Manhole	1200
S1.004	34.100#	26.2	SS13	27.700	25.221	2.254	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S6.000	o	150	SRE4	27.500	26.750	0.600	Open Manhole	1200
S6.001	o	150	SS7	27.720	26.481	1.089	Open Manhole	1200
S7.000	o	150	SRE5	27.600	26.950	0.500	Open Manhole	1200
S7.001	o	150	SS9	27.600	26.813	0.637	Open Manhole	1200
S6.002	o	150	SS8	27.800	25.698	1.952	Open Manhole	1200
S6.003	o	150	STank	27.800	25.600	2.050	Open Manhole	1200
S6.004	o	150	SS11	27.800	25.482	2.168	Open Manhole	1200
S6.005	o	150	SS12	27.700	25.376	2.174	Open Manhole	1200
S1.005	o	225	SS13	27.700	25.221	2.254	Open Manhole	1200
S8.000	o	150	SRE1	27.500	26.750	0.600	Open Manhole	1200
S8.001	o	150	SS1	27.500	26.638	0.712	Open Manhole	1200
S8.002	o	150	SS2	27.500	26.520	0.830	Open Manhole	1200
S9.000	o	150	SRE2	27.500	26.750	0.600	Open Manhole	1200
S8.003	o	150	SS2	27.500	26.399	0.951	Open Manhole	1200
S10.000	o	150	SRE3	27.500	26.750	0.600	Open Manhole	1200
S8.004	o	150	SS3	27.500	26.291	1.059	Open Manhole	1200
S8.005	o	150	SS4	27.500	26.162	1.188	Open Manhole	1200
S8.006	o	150	SS5	27.500	26.035	1.315	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S6.000	26.900#	100.0	SS7	27.720	26.481	1.089	Open Manhole	1200
S6.001	18.000#	23.0	SS8	27.800	25.698	1.952	Open Manhole	1200
S7.000	13.700#	100.0	SS9	27.600	26.813	0.637	Open Manhole	1200
S7.001	7.300#	6.5	SS8	27.800	25.698	1.952	Open Manhole	1200
S6.002	3.000#	30.6	STank	27.800	25.600	2.050	Open Manhole	1200
S6.003	4.000#	33.9	SS11	27.800	25.482	2.168	Open Manhole	1200
S6.004	10.600#	100.0	SS12	27.700	25.376	2.174	Open Manhole	1200
S6.005	8.000#	100.0	SS13	27.700	25.296	2.254	Open Manhole	1200
S1.005	18.900#	165.8	SS6	27.500	25.107	2.168	Open Manhole	1200
S8.000	11.200#	100.0	SS1	27.500	26.638	0.712	Open Manhole	1200
S8.001	11.800#	100.0	SS2	27.500	26.520	0.830	Open Manhole	1200
S8.002	12.100#	100.0	SS2	27.500	26.399	0.951	Open Manhole	1200
S9.000	5.400#	15.4	SS2	27.500	26.399	0.951	Open Manhole	1200
S8.003	10.800#	100.0	SS3	27.500	26.291	1.059	Open Manhole	1200
S10.000	13.000#	28.3	SS3	27.500	26.291	1.059	Open Manhole	1200
S8.004	12.900#	100.0	SS4	27.500	26.162	1.188	Open Manhole	1200
S8.005	12.700#	100.0	SS5	27.500	26.035	1.315	Open Manhole	1200
S8.006	3.800#	4.1	SS6	27.500	25.107	2.243	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.006	o	300	SS6	27.500	25.107	2.093	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.006	10.700#	100.0	S	26.600	25.000	1.300	Open Manhole	0

Simulation Criteria for Storm

Volumetric Runoff Coeff 0.750 Additional Flow - % of Total Flow 0.000
 Areal Reduction Factor 1.000 MADD Factor * 10m³/ha Storage 0.000
 Hot Start (mins) 0 Inlet Coefficient 0.800
 Hot Start Level (mm) 0 Flow per Person per Day (l/per/day) 0.000
 Manhole Headloss Coeff (Global) 0.500 Run Time (mins) 60
 Foul Sewage per hectare (l/s) 0.000 Output Interval (mins) 1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Profile Type Summer
 Return Period (years) 100 Cv (Summer) 0.750
 Region England and Wales Cv (Winter) 0.840
 M5-60 (mm) 18.000 Storm Duration (mins) 30
 Ratio R 0.350

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: SS6, DS/PN: S1.006, Volume (m³): 3.5

Unit Reference MD-SHE-0234-3340-2000-3340
 Design Head (m) 2.000
 Design Flow (l/s) 33.4
 Flush-Flo™ Calculated
 Objective Minimise upstream storage
 Application Surface
 Sump Available Yes
 Diameter (mm) 234
 Invert Level (m) 25.107
 Minimum Outlet Pipe Diameter (mm) 300
 Suggested Manhole Diameter (mm) 1800

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	33.4	Kick-Flo®	1.284	27.0
Flush-Flo™	0.594	33.4	Mean Flow over Head Range	-	28.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	7.7	0.800	32.9	2.000	33.4	4.000	46.6	7.000	61.1
0.200	23.6	1.000	31.7	2.200	34.9	4.500	49.3	7.500	63.2
0.300	30.9	1.200	29.1	2.400	36.4	5.000	51.9	8.000	65.2
0.400	32.5	1.400	28.1	2.600	37.8	5.500	54.3	8.500	67.1
0.500	33.2	1.600	30.0	3.000	40.5	6.000	56.7	9.000	69.0
0.600	33.4	1.800	31.7	3.500	43.7	6.500	58.9	9.500	70.9

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Storage Structures for Storm

Tank or Pond Manhole: STank, DS/PN: S6.003

Invert Level (m) 25.600

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	150.0	1.200	150.0	2.400	0.0	3.600	0.0	4.800	0.0
0.200	150.0	1.201	0.0	2.600	0.0	3.800	0.0	5.000	0.0
0.400	150.0	1.600	0.0	2.800	0.0	4.000	0.0		
0.600	150.0	1.800	0.0	3.000	0.0	4.200	0.0		
0.800	150.0	2.000	0.0	3.200	0.0	4.400	0.0		
1.000	150.0	2.200	0.0	3.400	0.0	4.600	0.0		

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.350 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status OFF
DVD Status ON
Inertia Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
S1.000	SS26	15 Winter	1	+0%	100/15 Summer				27.312	-0.100
S2.000	SS25	15 Winter	1	+0%	100/15 Summer				27.274	-0.161
S1.001	SS24	15 Winter	1	+0%	100/15 Summer				27.117	-0.131
S1.002	SS23	15 Winter	1	+0%	100/15 Summer				27.011	-0.135
S1.003	SS22	15 Winter	1	+0%	30/15 Summer				26.812	-0.138
S3.000	SRE8	15 Winter	1	+0%	100/15 Summer				27.267	-0.133
S3.001	SS18	15 Winter	1	+0%	100/15 Summer				27.168	-0.126
S3.002	SS19	15 Winter	1	+0%	100/15 Summer				27.014	-0.120
S4.000	SRE7	15 Winter	1	+0%	100/15 Summer				27.261	-0.139
S3.003	SS20	15 Winter	1	+0%	100/15 Summer				26.924	-0.111
S5.000	SRE6	15 Winter	1	+0%	100/15 Summer				27.270	-0.130
S5.001	SS14	15 Winter	1	+0%	100/15 Summer				27.152	-0.124
S5.002	SS15	15 Winter	1	+0%	100/15 Summer				27.030	-0.120
S5.003	SS16	15 Winter	1	+0%	100/15 Summer				26.908	-0.110
S3.004	SS17	15 Winter	1	+0%	30/15 Summer				26.815	-0.089
S1.004	SS21	15 Winter	1	+0%	30/15 Summer				26.598	-0.151
S6.000	SRE4	15 Winter	1	+0%					26.776	-0.124
S6.001	SS7	15 Winter	1	+0%					26.515	-0.116
S7.000	SRE5	15 Winter	1	+0%					26.989	-0.111
S7.001	SS9	15 Winter	1	+0%					26.837	-0.126
S6.002	SS8	480 Winter	1	+0%	1/360 Summer				25.954	0.106
S6.003	STank	480 Winter	1	+0%	1/360 Summer				25.954	0.204
S6.004	SS11	480 Winter	1	+0%	1/180 Summer				25.955	0.323
S6.005	SS12	480 Winter	1	+0%	1/120 Summer				25.969	0.443
S1.005	SS13	480 Winter	1	+0%	1/15 Summer				25.986	0.540
S8.000	SRE1	15 Winter	1	+0%	100/15 Summer				26.765	-0.135
S8.001	SS1	15 Winter	1	+0%	100/15 Summer				26.663	-0.125
S8.002	SS2	15 Winter	1	+0%	100/15 Summer				26.549	-0.121
S9.000	SRE2	15 Winter	1	+0%	100/15 Summer				26.764	-0.136
S8.003	SS2	15 Winter	1	+0%	30/15 Summer				26.435	-0.114
S10.000	SRE3	15 Winter	1	+0%	100/15 Summer				26.780	-0.120
S8.004	SS3	15 Winter	1	+0%	30/15 Summer				26.346	-0.095

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m ³)	Flow / Cap.	Flow / (1/s)	Flow (1/s)		
S1.000	SS26	0.000	0.24		3.9	OK	
S2.000	SS25	0.000	0.18		8.3	OK	
S1.001	SS24	0.000	0.36		12.8	OK	
S1.002	SS23	0.000	0.34		15.6	OK	
S1.003	SS22	0.000	0.32		16.3	OK	
S3.000	SRE8	0.000	0.03		0.5	OK	
S3.001	SS18	0.000	0.06		1.0	OK	
S3.002	SS19	0.000	0.09		1.4	OK	
S4.000	SRE7	0.000	0.01		0.5	OK	
S3.003	SS20	0.000	0.16		2.5	OK	
S5.000	SRE6	0.000	0.04		0.7	OK	
S5.001	SS14	0.000	0.07		1.1	OK	
S5.002	SS15	0.000	0.09		1.4	OK	
S5.003	SS16	0.000	0.16		2.7	OK	
S3.004	SS17	0.000	0.34		5.7	OK	
S1.004	SS21	0.000	0.24		22.6	OK	
S6.000	SRE4	0.000	0.07		1.2	OK	
S6.001	SS7	0.000	0.11		4.0	OK	
S7.000	SRE5	0.000	0.15		2.5	OK	
S7.001	SS9	0.000	0.06		3.5	OK	
S6.002	SS8	0.000	0.06		1.1	SURCHARGED	
S6.003	STank	0.000	0.58		12.6	SURCHARGED	
S6.004	SS11	0.000	0.80		12.8	SURCHARGED	
S6.005	SS12	0.000	0.85		13.1	SURCHARGED	
S1.005	SS13	0.000	0.39		14.1	SURCHARGED	
S8.000	SRE1	0.000	0.02		0.4	OK	
S8.001	SS1	0.000	0.07		1.1	OK	
S8.002	SS2	0.000	0.08		1.3	OK	
S9.000	SRE2	0.000	0.02		0.7	OK	
S8.003	SS2	0.000	0.13		2.0	OK	
S10.000	SRE3	0.000	0.09		2.7	OK	
S8.004	SS3	0.000	0.29		4.7	OK	

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH		Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged
	Name	Storm							Level (m)	Depth (m)
S8.005	SS4	15	Winter	1	+0%	30/15	Summer		26.225	-0.087
S8.006	SS5	15	Winter	1	+0%	30/15	Summer		26.067	-0.118
S1.006	SS6	480	Winter	1	+0%	1/15	Winter		25.989	0.582

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m ³)	Flow / Cap. (l/s)	Flow (l/s)			
S8.005	SS4	0.000	0.37	6.0		OK	
S8.006	SS5	0.000	0.10	6.3		OK	
S1.006	SS6	0.000	0.18	14.5		SURCHARGED	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.350 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status OFF
DVD Status ON
Inertia Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Surcharged	
									Level (m)	Depth (m)
S1.000	SS26	15 Winter	30	+0%	100/15 Summer				27.345	-0.067
S2.000	SS25	15 Winter	30	+0%	100/15 Summer				27.315	-0.120
S1.001	SS24	15 Winter	30	+0%	100/15 Summer				27.190	-0.058
S1.002	SS23	15 Winter	30	+0%	100/15 Summer				27.096	-0.050
S1.003	SS22	15 Winter	30	+0%	30/15 Summer				27.004	0.054
S3.000	SRE8	15 Winter	30	+0%	100/15 Summer				27.277	-0.123
S3.001	SS18	15 Winter	30	+0%	100/15 Summer				27.185	-0.109
S3.002	SS19	15 Winter	30	+0%	100/15 Summer				27.035	-0.099
S4.000	SRE7	15 Winter	30	+0%	100/15 Summer				27.269	-0.131
S3.003	SS20	15 Winter	30	+0%	100/15 Summer				26.967	-0.068
S5.000	SRE6	15 Winter	30	+0%	100/15 Summer				27.283	-0.117
S5.001	SS14	15 Winter	30	+0%	100/15 Summer				27.170	-0.106
S5.002	SS15	15 Winter	30	+0%	100/15 Summer				27.050	-0.100
S5.003	SS16	15 Winter	30	+0%	100/15 Summer				26.967	-0.051
S3.004	SS17	15 Winter	30	+0%	30/15 Summer				26.949	0.045
S1.004	SS21	15 Winter	30	+0%	30/15 Summer				26.892	0.143
S6.000	SRE4	15 Winter	30	+0%					26.792	-0.108
S6.001	SS7	15 Winter	30	+0%					26.541	-0.090
S7.000	SRE5	15 Winter	30	+0%					27.014	-0.086
S7.001	SS9	15 Winter	30	+0%					26.852	-0.111
S6.002	SS8	480 Winter	30	+0%	1/360 Summer				26.102	0.254
S6.003	STank	480 Winter	30	+0%	1/360 Summer				26.100	0.350
S6.004	SS11	480 Winter	30	+0%	1/180 Summer				26.097	0.465
S6.005	SS12	15 Winter	30	+0%	1/120 Summer				26.373	0.847
S1.005	SS13	15 Winter	30	+0%	1/15 Summer				26.618	1.172
S8.000	SRE1	15 Winter	30	+0%	100/15 Summer				26.773	-0.127
S8.001	SS1	15 Winter	30	+0%	100/15 Summer				26.682	-0.106
S8.002	SS2	15 Winter	30	+0%	100/15 Summer				26.646	-0.024
S9.000	SRE2	15 Winter	30	+0%	100/15 Summer				26.771	-0.129
S8.003	SS2	15 Winter	30	+0%	30/15 Summer				26.639	0.090
S10.000	SRE3	15 Winter	30	+0%	100/15 Summer				26.798	-0.102
S8.004	SS3	15 Winter	30	+0%	30/15 Summer				26.628	0.187

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m ³)	Flow / Cap.	Flow / (l/s)	Flow (l/s)		
S1.000	SS26	0.000	0.58		9.5	OK	
S2.000	SS25	0.000	0.44		20.4	OK	
S1.001	SS24	0.000	0.88		31.6	OK	
S1.002	SS23	0.000	0.85		39.4	OK	
S1.003	SS22	0.000	0.74		37.8	SURCHARGED	
S3.000	SRE8	0.000	0.07		1.2	OK	
S3.001	SS18	0.000	0.16		2.7	OK	
S3.002	SS19	0.000	0.25		3.9	OK	
S4.000	SRE7	0.000	0.04		1.2	OK	
S3.003	SS20	0.000	0.44		7.2	OK	
S5.000	SRE6	0.000	0.11		1.7	OK	
S5.001	SS14	0.000	0.18		3.0	OK	
S5.002	SS15	0.000	0.24		3.8	OK	
S5.003	SS16	0.000	0.47		7.8	OK	
S3.004	SS17	0.000	0.97		15.9	SURCHARGED	
S1.004	SS21	0.000	0.51		49.1	SURCHARGED	
S6.000	SRE4	0.000	0.17		2.9	OK	
S6.001	SS7	0.000	0.33		11.5	OK	
S7.000	SRE5	0.000	0.38		6.1	OK	
S7.001	SS9	0.000	0.15		9.2	OK	
S6.002	SS8	0.000	0.12		2.4	SURCHARGED	
S6.003	STank	0.000	0.68		14.6	SURCHARGED	
S6.004	SS11	0.000	0.94		14.9	SURCHARGED	
S6.005	SS12	0.000	1.21		18.6	SURCHARGED	
S1.005	SS13	0.000	0.81		29.5	SURCHARGED	
S8.000	SRE1	0.000	0.05		0.9	OK	
S8.001	SS1	0.000	0.19		3.0	OK	
S8.002	SS2	0.000	0.24		3.9	OK	
S9.000	SRE2	0.000	0.05		1.7	OK	
S8.003	SS2	0.000	0.35		5.6	SURCHARGED	
S10.000	SRE3	0.000	0.22		6.7	OK	
S8.004	SS3	0.000	0.65		10.6	SURCHARGED	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Surcharged	
									Level (m)	Depth (m)
S8.005	SS4	15 Winter	30	+0%	30/15 Summer				26.601	0.289
S8.006	SS5	15 Winter	30	+0%	30/15 Summer				26.569	0.384
S1.006	SS6	15 Winter	30	+0%	1/15 Winter				26.555	1.148

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m ³)	Flow / Cap. (l/s)	Flow (l/s)	Overflow (l/s)		
S8.005	SS4	0.000	0.91	14.8		SURCHARGED	
S8.006	SS5	0.000	0.35	20.8		SURCHARGED	
S1.006	SS6	0.000	0.40	32.9		SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.350 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status OFF
DVD Status ON
Inertia Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
S1.000	SS26	15 Winter	100	+40%	100/15 Summer				28.187	0.775
S2.000	SS25	15 Winter	100	+40%	100/15 Summer				28.185	0.750
S1.001	SS24	15 Winter	100	+40%	100/15 Summer				28.094	0.846
S1.002	SS23	15 Winter	100	+40%	100/15 Summer				27.961	0.815
S1.003	SS22	15 Winter	100	+40%	30/15 Summer				27.743	0.793
S3.000	SRE8	15 Winter	100	+40%	100/15 Summer				27.620	0.220
S3.001	SS18	15 Winter	100	+40%	100/15 Summer				27.617	0.323
S3.002	SS19	15 Winter	100	+40%	100/15 Summer				27.610	0.476
S4.000	SRE7	15 Winter	100	+40%	100/15 Summer				27.605	0.205
S3.003	SS20	15 Winter	100	+40%	100/15 Summer				27.603	0.568
S5.000	SRE6	15 Winter	100	+40%	100/15 Summer				27.624	0.224
S5.001	SS14	15 Winter	100	+40%	100/15 Summer				27.620	0.344
S5.002	SS15	15 Winter	100	+40%	100/15 Summer				27.612	0.462
S5.003	SS16	15 Winter	100	+40%	100/15 Summer				27.603	0.585
S3.004	SS17	15 Winter	100	+40%	30/15 Summer				27.588	0.684
S1.004	SS21	15 Winter	100	+40%	30/15 Summer				27.565	0.816
S6.000	SRE4	15 Winter	100	+40%					26.808	-0.092
S6.001	SS7	15 Winter	100	+40%					26.565	-0.066
S7.000	SRE5	15 Winter	100	+40%					27.042	-0.058
S7.001	SS9	15 Winter	100	+40%					26.867	-0.096
S6.002	SS8	600 Summer	100	+40%	1/360 Summer				26.234	0.386
S6.003	STank	600 Summer	100	+40%	1/360 Summer				26.229	0.479
S6.004	SS11	30 Winter	100	+40%	1/180 Summer				26.323	0.691
S6.005	SS12	30 Winter	100	+40%	1/120 Summer				26.812	1.286
S1.005	SS13	15 Winter	100	+40%	1/15 Summer				27.167	1.721
S8.000	SRE1	30 Winter	100	+40%	100/15 Summer				27.200	0.300
S8.001	SS1	30 Winter	100	+40%	100/15 Summer				27.197	0.409
S8.002	SS2	30 Winter	100	+40%	100/15 Summer				27.191	0.521
S9.000	SRE2	30 Winter	100	+40%	100/15 Summer				27.185	0.285
S8.003	SS2	30 Winter	100	+40%	30/15 Summer				27.183	0.634
S10.000	SRE3	30 Winter	100	+40%	100/15 Summer				27.189	0.289
S8.004	SS3	30 Winter	100	+40%	30/15 Summer				27.171	0.730

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m ³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)		
S1.000	SS26	0.000	0.83		13.7	FLOOD RISK	
S2.000	SS25	0.000	0.67		31.3	SURCHARGED	
S1.001	SS24	0.000	1.15		41.1	SURCHARGED	
S1.002	SS23	0.000	1.07		49.6	SURCHARGED	
S1.003	SS22	0.000	0.99		50.4	SURCHARGED	
S3.000	SRE8	0.000	0.13		2.1	SURCHARGED	
S3.001	SS18	0.000	0.27		4.5	SURCHARGED	
S3.002	SS19	0.000	0.41		6.5	SURCHARGED	
S4.000	SRE7	0.000	0.06		1.9	SURCHARGED	
S3.003	SS20	0.000	0.57		9.2	SURCHARGED	
S5.000	SRE6	0.000	0.20		3.1	SURCHARGED	
S5.001	SS14	0.000	0.30		4.8	SURCHARGED	
S5.002	SS15	0.000	0.38		6.2	SURCHARGED	
S5.003	SS16	0.000	0.58		9.7	SURCHARGED	
S3.004	SS17	0.000	1.18		19.5	FLOOD RISK	
S1.004	SS21	0.000	0.55		53.0	SURCHARGED	
S6.000	SRE4	0.000	0.31		5.2	OK	
S6.001	SS7	0.000	0.60		20.9	OK	
S7.000	SRE5	0.000	0.68		11.1	OK	
S7.001	SS9	0.000	0.28		16.6	OK	
S6.002	SS8	0.000	0.27		5.2	SURCHARGED	
S6.003	STank	0.000	0.80		17.3	SURCHARGED	
S6.004	SS11	0.000	1.60		25.4	SURCHARGED	
S6.005	SS12	0.000	1.66		25.6	SURCHARGED	
S1.005	SS13	0.000	0.87		31.5	SURCHARGED	
S8.000	SRE1	0.000	0.07		1.2	SURCHARGED	
S8.001	SS1	0.000	0.23		3.7	SURCHARGED	
S8.002	SS2	0.000	0.34		5.5	SURCHARGED	
S9.000	SRE2	0.000	0.06		2.3	SURCHARGED	
S8.003	SS2	0.000	0.55		8.8	SURCHARGED	
S10.000	SRE3	0.000	0.29		9.0	SURCHARGED	
S8.004	SS3	0.000	0.82		13.2	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
S8.005	SS4	30 Winter	100	+40%	30/15 Summer				27.140	0.828
S8.006	SS5	15 Winter	100	+40%	30/15 Summer				27.103	0.918
S1.006	SS6	15 Winter	100	+40%	1/15 Winter				27.089	1.682

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m ³)	Flow / Cap. (l/s)	Flow (l/s)	Overflow (l/s)		
S8.005	SS4	0.000	1.04	16.8		SURCHARGED	
S8.006	SS5	0.000	0.39	23.8		SURCHARGED	
S1.006	SS6	0.000	0.41	33.2		SURCHARGED	

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Existing Network Details for Storm

- Indicates pipe length does not match coordinates

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type
S1.000	18.600#	0.350	53.1	0.015	5.00	0.0	0.600	o	150	Pipe/Conduit
S1.001	24.100#	1.100	21.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit
S1.002	9.600#	0.192	50.0	0.021	0.00	0.0	0.600	o	150	Pipe/Conduit
S1.003	4.500#	0.528	8.5	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit
S2.000	18.500#	2.170	8.5	0.015	5.00	0.0	0.600	o	150	Pipe/Conduit
S1.004	8.000#	0.080	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
S1.000	26.750	0.015	0.0	1.38	24.4
S1.001	26.400	0.015	0.0	2.16	38.2
S1.002	25.300	0.036	0.0	1.43	25.2
S1.003	25.108	0.036	0.0	3.47	61.4
S2.000	26.750	0.015	0.0	3.47	61.4
S1.004	24.580	0.051	0.0	1.00	17.8

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PIPELINE SCHEDULES for Storm

Upstream Manhole

- Indicates pipe length does not match coordinates

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	150	SRE20	27.500	26.750	0.600	Open Manhole	1200
S1.001	o	150	SS10	27.500	26.400	0.950	Open Manhole	1200
S1.002	o	150	SS11	27.300	25.300	1.850	Open Manhole	1200
S1.003	o	150	SS12	26.800	25.108	1.542	Open Manhole	1200
S2.000	o	150	SS21	27.500	26.750	0.600	Open Manhole	1200
S1.004	o	150	SS11	26.550	24.580	1.820	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	18.600#	53.1	SS10	27.500	26.400	0.950	Open Manhole	1200
S1.001	24.100#	21.9	SS11	27.300	25.300	1.850	Open Manhole	1200
S1.002	9.600#	50.0	SS12	26.800	25.108	1.542	Open Manhole	1200
S1.003	4.500#	8.5	SS11	26.550	24.580	1.820	Open Manhole	1200
S2.000	18.500#	8.5	SS11	26.550	24.580	1.820	Open Manhole	1200
S1.004	8.000#	100.0	S	26.300	24.500	1.650	Open Manhole	0

Simulation Criteria for Storm

Volumetric Runoff Coeff 0.750 Additional Flow - % of Total Flow 0.000
 Areal Reduction Factor 1.000 MADD Factor * 10m³/ha Storage 0.000
 Hot Start (mins) 0 Inlet Coefficient 0.800
 Hot Start Level (mm) 0 Flow per Person per Day (l/per/day) 0.000
 Manhole Headloss Coeff (Global) 0.500 Run Time (mins) 60
 Foul Sewage per hectare (l/s) 0.000 Output Interval (mins) 1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Profile Type Summer
 Return Period (years) 100 Cv (Summer) 0.750
 Region England and Wales Cv (Winter) 0.840
 M5-60 (mm) 18.000 Storm Duration (mins) 30
 Ratio R 0.350

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: SS11, DS/PN: S1.004, Volume (m³): 2.6

Unit Reference MD-SHE-0098-5000-1500-5000
Design Head (m) 1.500
Design Flow (l/s) 5.0
Flush-Flo™ Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 98
Invert Level (m) 24.580
Minimum Outlet Pipe Diameter (mm) 150
Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	5.0	Kick-Flo®	0.878	3.9
Flush-Flo™	0.431	4.9	Mean Flow over Head Range	-	4.3

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.2	0.800	4.3	2.000	5.7	4.000	7.9	7.000	10.3
0.200	4.4	1.000	4.1	2.200	6.0	4.500	8.4	7.500	10.7
0.300	4.8	1.200	4.5	2.400	6.2	5.000	8.8	8.000	11.0
0.400	4.9	1.400	4.8	2.600	6.5	5.500	9.2	8.500	11.3
0.500	4.9	1.600	5.1	3.000	6.9	6.000	9.6	9.000	11.6
0.600	4.8	1.800	5.4	3.500	7.4	6.500	10.0	9.500	11.9

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Storage Structures for Storm

Tank or Pond Manhole: SS12, DS/PN: S1.003

Invert Level (m) 25.108

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	9.0	1.200	0.0	2.400	0.0	3.600	0.0	4.800	0.0
0.200	9.0	1.400	0.0	2.600	0.0	3.800	0.0	5.000	0.0
0.400	9.0	1.600	0.0	2.800	0.0	4.000	0.0		
0.600	9.0	1.800	0.0	3.000	0.0	4.200	0.0		
0.800	9.0	2.000	0.0	3.200	0.0	4.400	0.0		
0.801	0.0	2.200	0.0	3.400	0.0	4.600	0.0		

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Manor Gardens, Barnwood
Gloucester
South Catchment



Date 16/03/2022 18:39
File South_V3.MDX

Designed by RJH
Checked by

Innovyze

Network 2018.1

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.000 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.350 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
S1.000	SRE20	15 Winter	1	+0%					26.778	-0.122
S1.001	SS10	15 Winter	1	+0%					26.421	-0.129
S1.002	SS11	480 Winter	1	+0%	1/360 Summer				25.708	0.258
S1.003	SS12	480 Winter	1	+0%	1/240 Summer				25.707	0.449
S2.000	SS21	15 Winter	1	+0%					26.767	-0.133
S1.004	SS11	480 Winter	1	+0%	1/15 Summer				25.707	0.977

PN	US/MH Name	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SRE20	0.000	0.08	1.8	OK	
S1.001	SS10	0.000	0.05	1.8	OK	
S1.002	SS11	0.000	0.02	0.5	SURCHARGED	
S1.003	SS12	0.000	0.04	1.9	SURCHARGED	
S2.000	SS21	0.000	0.03	1.8	OK	
S1.004	SS11	0.000	0.14	2.1	SURCHARGED	

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Manor Gardens, Barnwood
Gloucester
South Catchment



Date 16/03/2022 18:39

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File South_V3.MDX

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Innovyze

Network 2018.1

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.350 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status OFF
DVD Status ON
Inertia Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
S1.000	SRE20	15 Winter	30	+0%					26.795	-0.105
S1.001	SS10	15 Winter	30	+0%					26.435	-0.115
S1.002	SS11	480 Winter	30	+0%	1/360 Summer				26.074	0.624
S1.003	SS12	480 Winter	30	+0%	1/240 Summer				26.070	0.812
S2.000	SS21	15 Winter	30	+0%					26.777	-0.123
S1.004	SS11	480 Winter	30	+0%	1/15 Summer				26.068	1.338

PN	US/MH Name	Flooded		Pipe		Level Exceeded
		Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)	Status	
S1.000	SRE20	0.000	0.19	4.4	OK	
S1.001	SS10	0.000	0.12	4.3	OK	
S1.002	SS11	0.000	0.05	1.2	SURCHARGED	
S1.003	SS12	0.000	0.04	2.0	SURCHARGED	
S2.000	SS21	0.000	0.08	4.4	OK	
S1.004	SS11	0.000	0.15	2.3	SURCHARGED	

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Manor Gardens, Barnwood
Gloucester
South Catchment



Date 16/03/2022 18:39
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Innovyze

Network 2018.1

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.000 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.350 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
S1.000	SRE20	15 Winter	100	+40%					26.811	-0.089
S1.001	SS10	15 Winter	100	+40%					26.448	-0.102
S1.002	SS11	480 Summer	100	+40%	1/360 Summer				26.183	0.733
S1.003	SS12	480 Summer	100	+40%	1/240 Summer				26.173	0.915
S2.000	SS21	15 Winter	100	+40%					26.787	-0.113
S1.004	SS11	480 Summer	100	+40%	1/15 Summer				26.168	1.438

PN	US/MH Name	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SRE20	0.000	0.35	7.9	OK	
S1.001	SS10	0.000	0.22	7.8	OK	
S1.002	SS11	0.000	0.14	3.1	SURCHARGED	
S1.003	SS12	0.000	0.07	3.0	SURCHARGED	
S2.000	SS21	0.000	0.14	7.9	OK	
S1.004	SS11	0.000	0.27	4.2	SURCHARGED	

Project Name	Manor Farm, Barnwood, Gloucester		
Clients	The Barnwood Trust and Stonewater Limited		
Design Note Title	Planning Condition 18 – Foul Drainage		
Document Reference	05926-HYD-XX-XX-RP-D-5004		
Author	[REDACTED]		
Revision	P02		
Date	29 March 2022	Approved	✓

1. INTRODUCTION

This Technical Note has been prepared in connection with planning application reference 19/00672/FUL for the above scheme on behalf of The Barnwood Trust and Stonewater Limited.

Planning Approval has been granted in respect of the conversion of the demolition and redevelopment of Manor Gardens, Barnwood, Gloucester. Condition 18 of the Approval states the following;

Condition 18

“Prior to the commencement of the development details of the proposed foul water drainage arrangements shall be submitted to and approved in writing by the Local Planning Authority. The approved scheme shall be implemented before the first occupation of the development hereby permitted”.

This Technical Note addresses this item and presents the relevant information to discharge the condition.

2. DEVELOPMENT PROPOSALS

The proposal is for the demolition of existing housing and redevelopment of site to provide 46 no. new build dwellings, formation of new access to North Upton Lane, provision of parking, associated landscaping and improvement works to the existing Manor House.

FOUL DRAINAGE PROPOSALS

- 2.1 A proposed drainage strategy was prepared by Hydrock to accompany the original planning application for the site, report reference 05926-HYD-XX-XX-RP-D-5002, which included proposals for the foul drainage system and identified points of connection to the existing Severn Trent Water sewerage network.
- 2.2 The proposals contained within this Technical Note are based on the original strategy and the details have been expanded and enhanced in accordance with the approved proposed site layout.
- 2.3 The existing site is served by two existing foul water connections, one to the north in Barnwood Road and one to the south-east in North Upton Lane. These connection points were identified by a site connectivity survey carried out at the time of the original application.

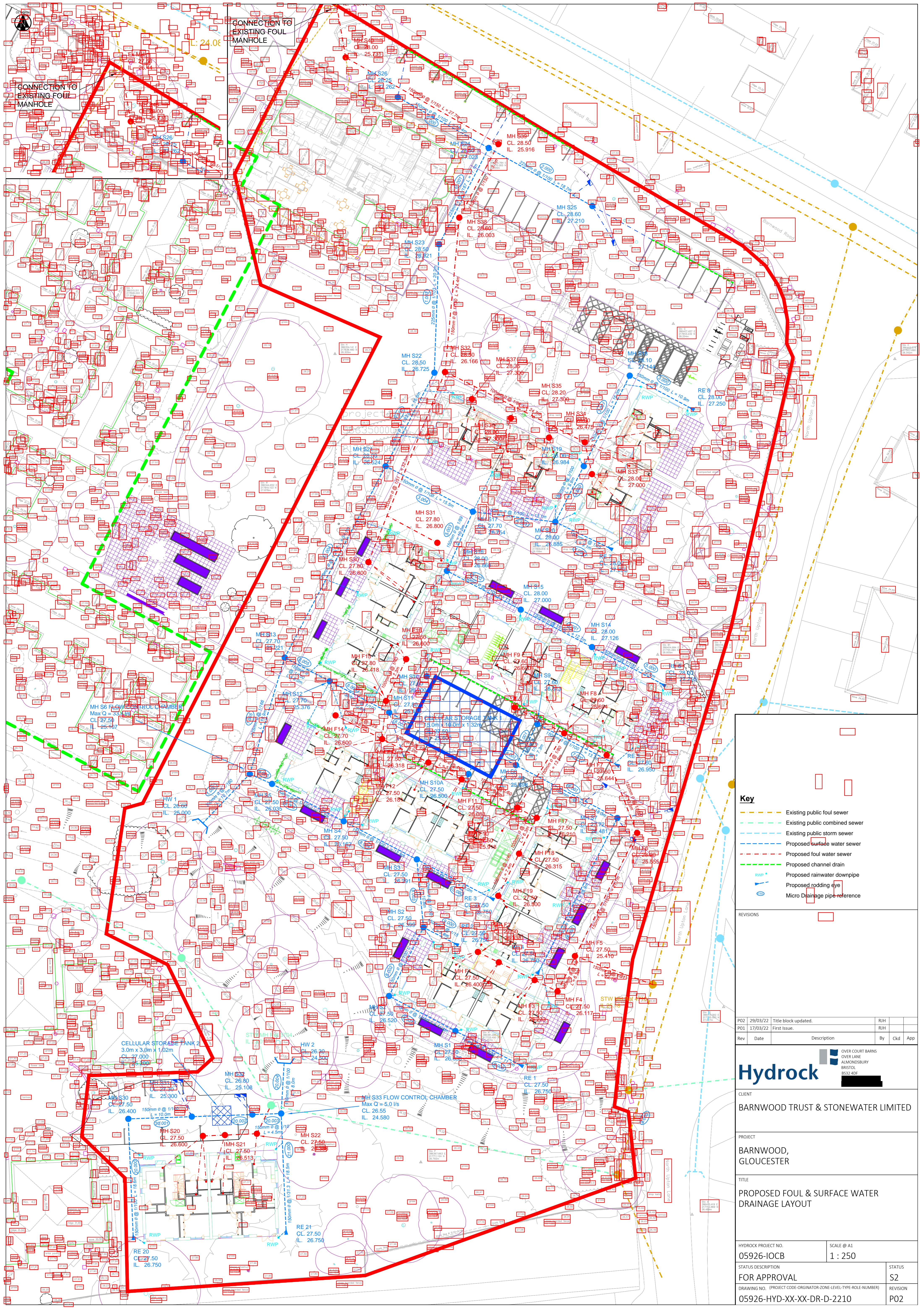
The proposed foul drainage scheme reuses these current connections.
- 2.4 The site catchment is effectively split into two parts, one to the north and one to the south-east.

In addition, there are two new bungalows to the south of the Wotton Brook, which runs through the southern part of the site. These units are proposed to connect to the existing public combined sewer immediately to the north-west of the buildings.
- 2.5 The whole of the site is drained by gravity systems with no pumping requirements.
- 2.6 The proposed drainage network will be offered to Severn Trent Water for adoption upon completion of the works.
- 2.7 The proposed drainage layout for the site is included in Appendix A of this Technical Note.

END

APPENDIX A

Drawing No. 059260-HYD-XX-XX-DR-D-2210-P02



CONNECTION TO EXISTING FOUL MANHOLE

CONNECTION TO EXISTING FOUL MANHOLE

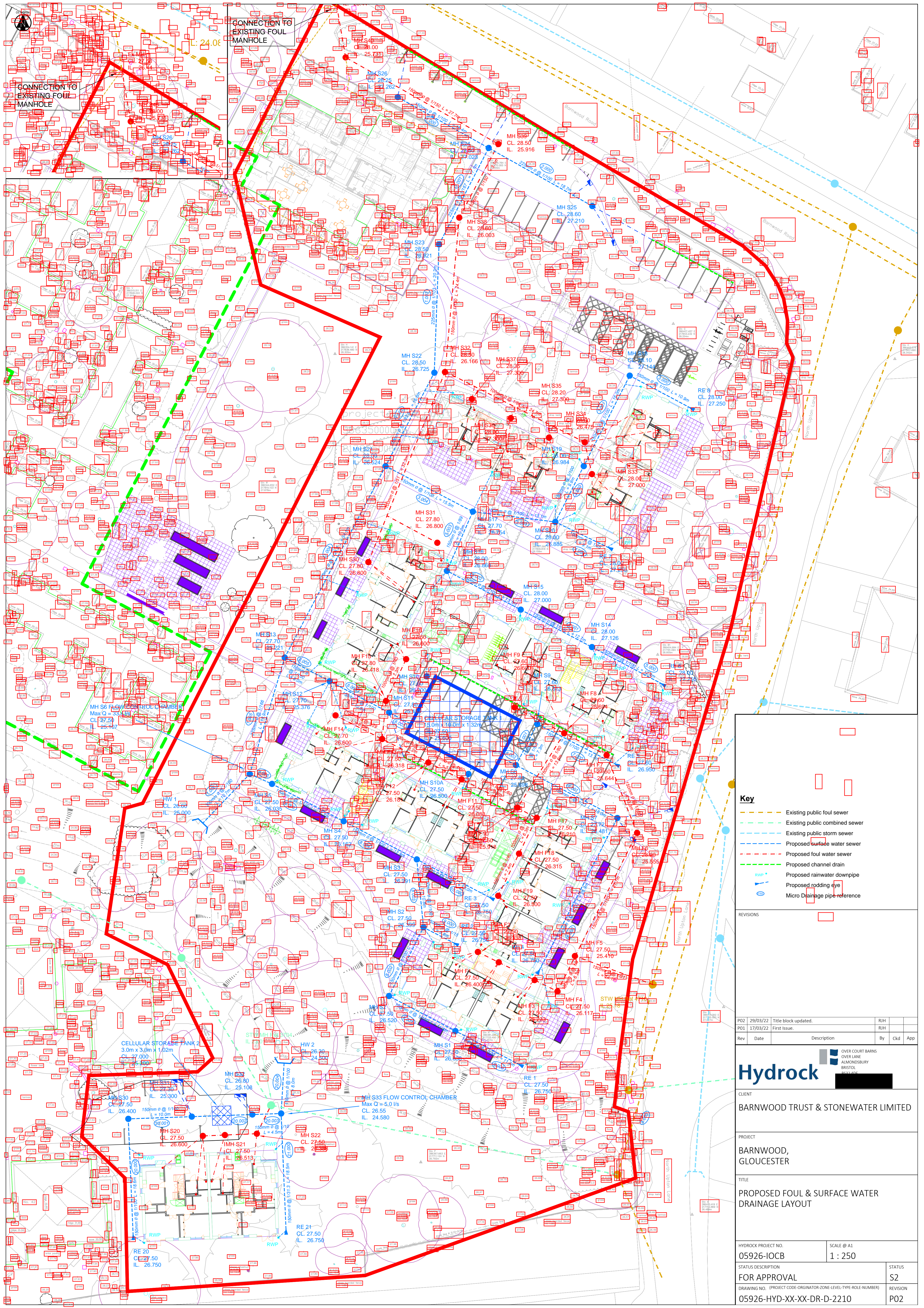
Key

- Existing public foul sewer
- Existing public combined sewer
- Existing public storm sewer
- Proposed surface water sewer
- Proposed foul water sewer
- Proposed channel drain
- Proposed rainwater downpipe
- Proposed rodding eye
- Micro Drainage pipe-reference

REVISIONS

Rev	Date	Description	By	Ckd	App
P02	29/03/22	Title block updated.	RJH		
P01	17/03/22	First issue.	RJH		

		OVER COURT BARN OVER LANE ALMONDSBURY BRISTOL BS32 4DF	
CLIENT BARNWOOD TRUST & STONEWATER LIMITED			
PROJECT BARNWOOD, GLOUCESTER			
TITLE PROPOSED FOUL & SURFACE WATER DRAINAGE LAYOUT			
HYDROCK PROJECT NO. 05926-IOCB		SCALE @ A1 1 : 250	
STATUS DESCRIPTION FOR APPROVAL			STATUS S2
DRAWING NO. (PROJECT CODE-ORIGINATOR ZONE-LEVEL-TYPE-ROLE-NUMBER) 05926-HYD-XX-XX-DR-D-2210			REVISION P02



Key

- - - Existing public foul sewer
- - - Existing public combined sewer
- - - Existing public storm sewer
- - - Proposed surface water sewer
- - - Proposed foul water sewer
- - - Proposed channel drain
- RWP Proposed rainwater downpipe
- RE Proposed rodding eye
- Micro Drainage pipe-reference

REVISIONS				
PO2	Date	Description	By	App
PO2	29/03/22	Title block updated.	RJH	
PO1	17/03/22	First issue.	RJH	

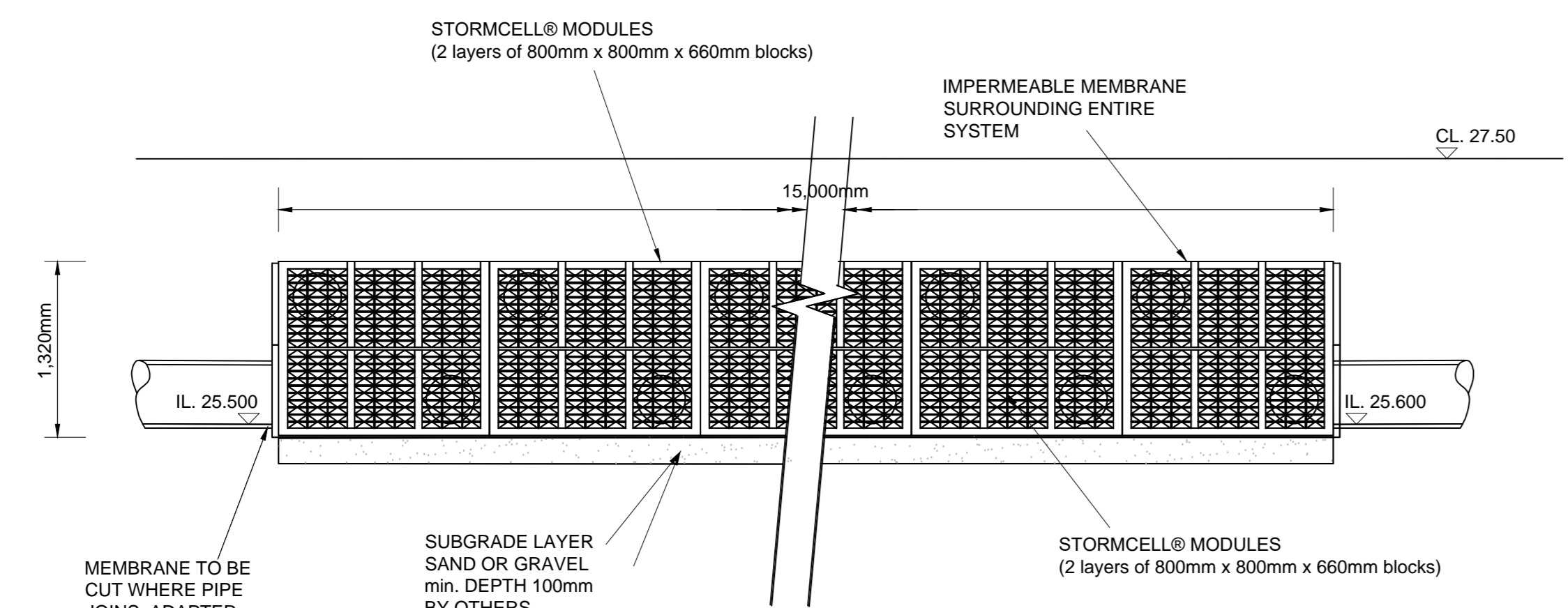
Hydrock OVER COURT BARNES
OVER LANE
ALMONDSBURY
BRISTOL
BS31 4DE

CLIENT
BARNWOOD TRUST & STONEWATER LIMITED

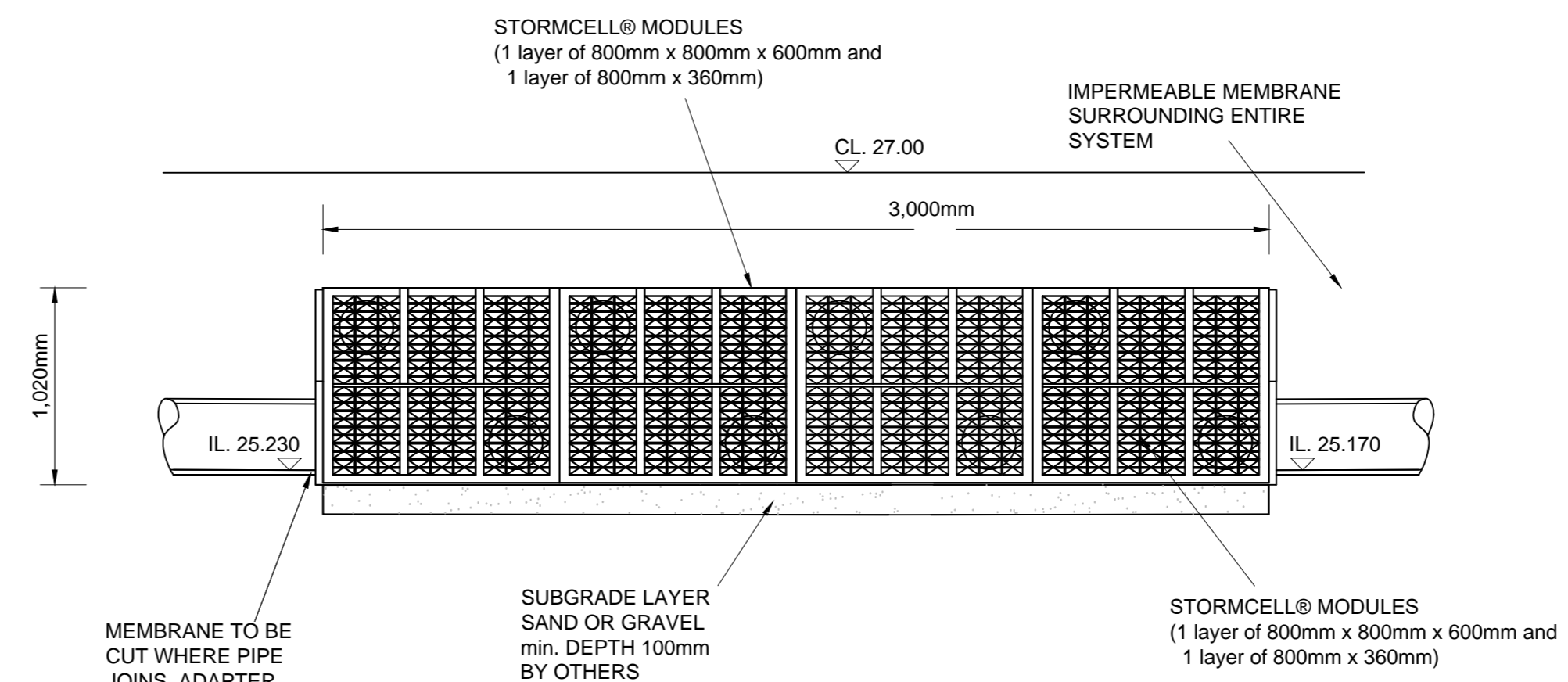
PROJECT
**BARNWOOD,
GLOUCESTER**

TITLE
**PROPOSED FOUL & SURFACE WATER
DRAINAGE LAYOUT**

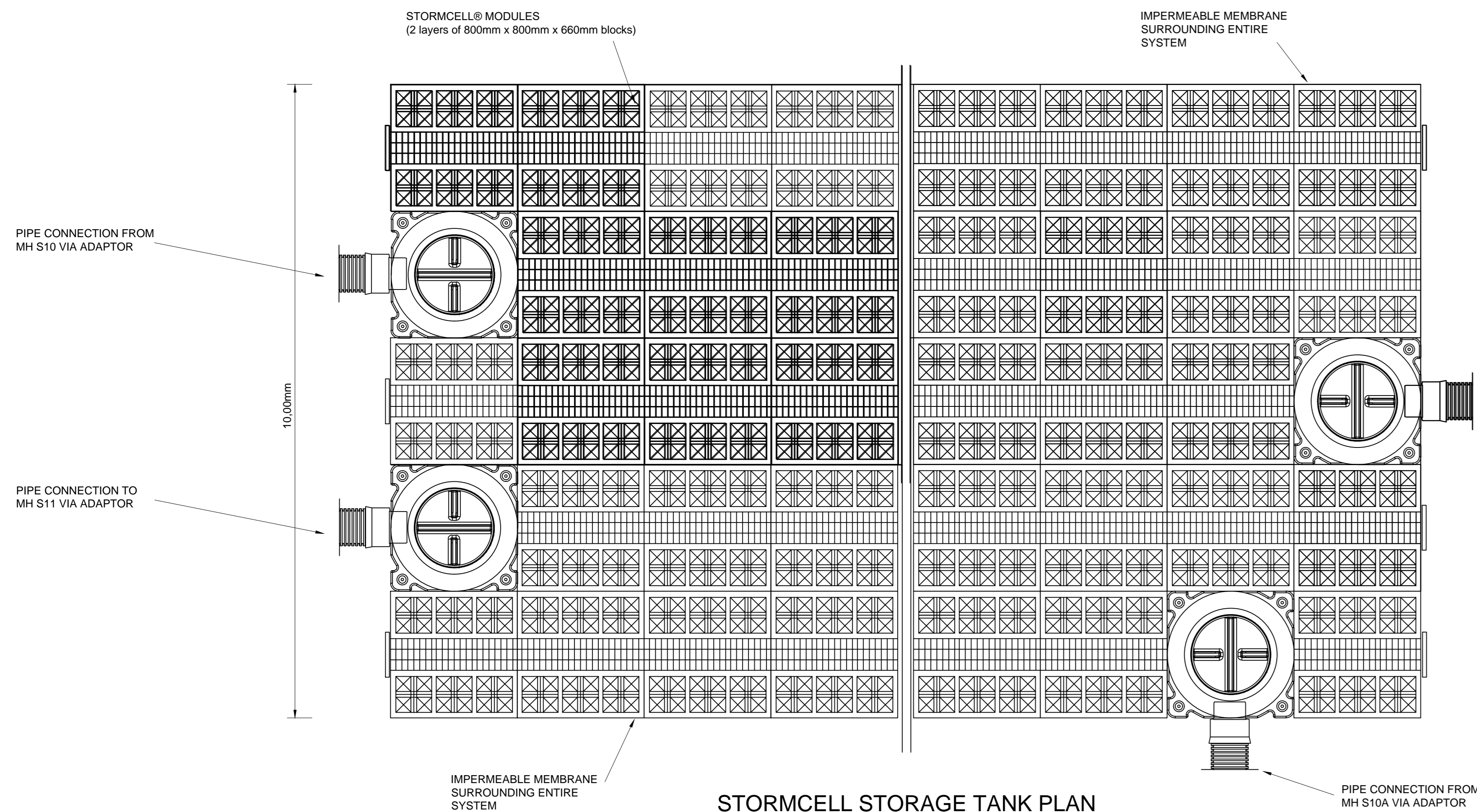
HYDROCK PROJECT NO. 05926-IOCB	SCALE @ A1 1 : 250
STATUS DESCRIPTION FOR APPROVAL	STATUS S2
DRAWING NO. (PROJECT CODE-ORIGINATOR ZONE-LEVEL-TYPE-ROLE-NUMBER) 05926-HYD-XX-XX-DR-D-2210	REVISION PO2



STORMCELL STORAGE TANK LONGSECTION

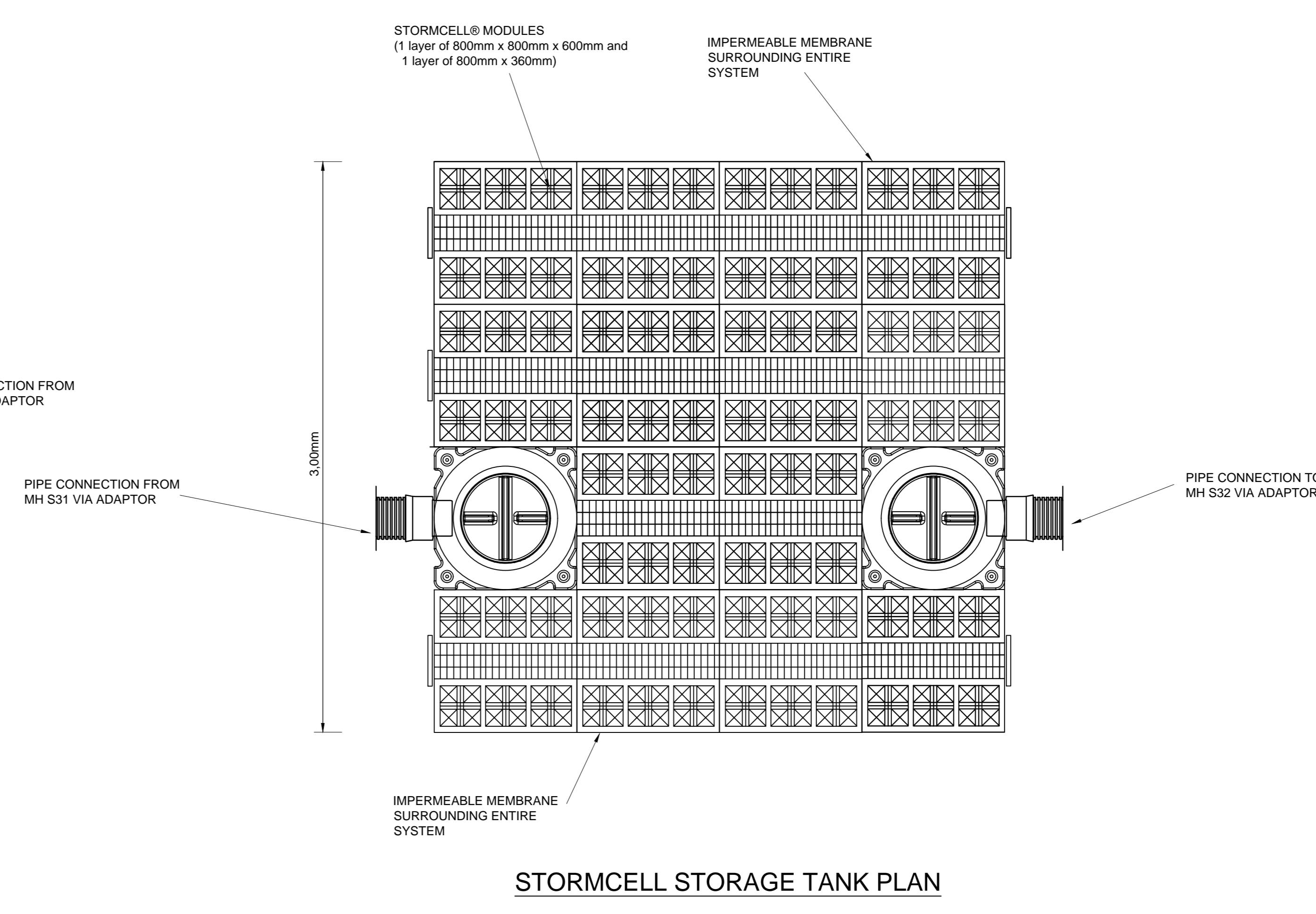


STORMCELL STORAGE TANK LONGSECTION



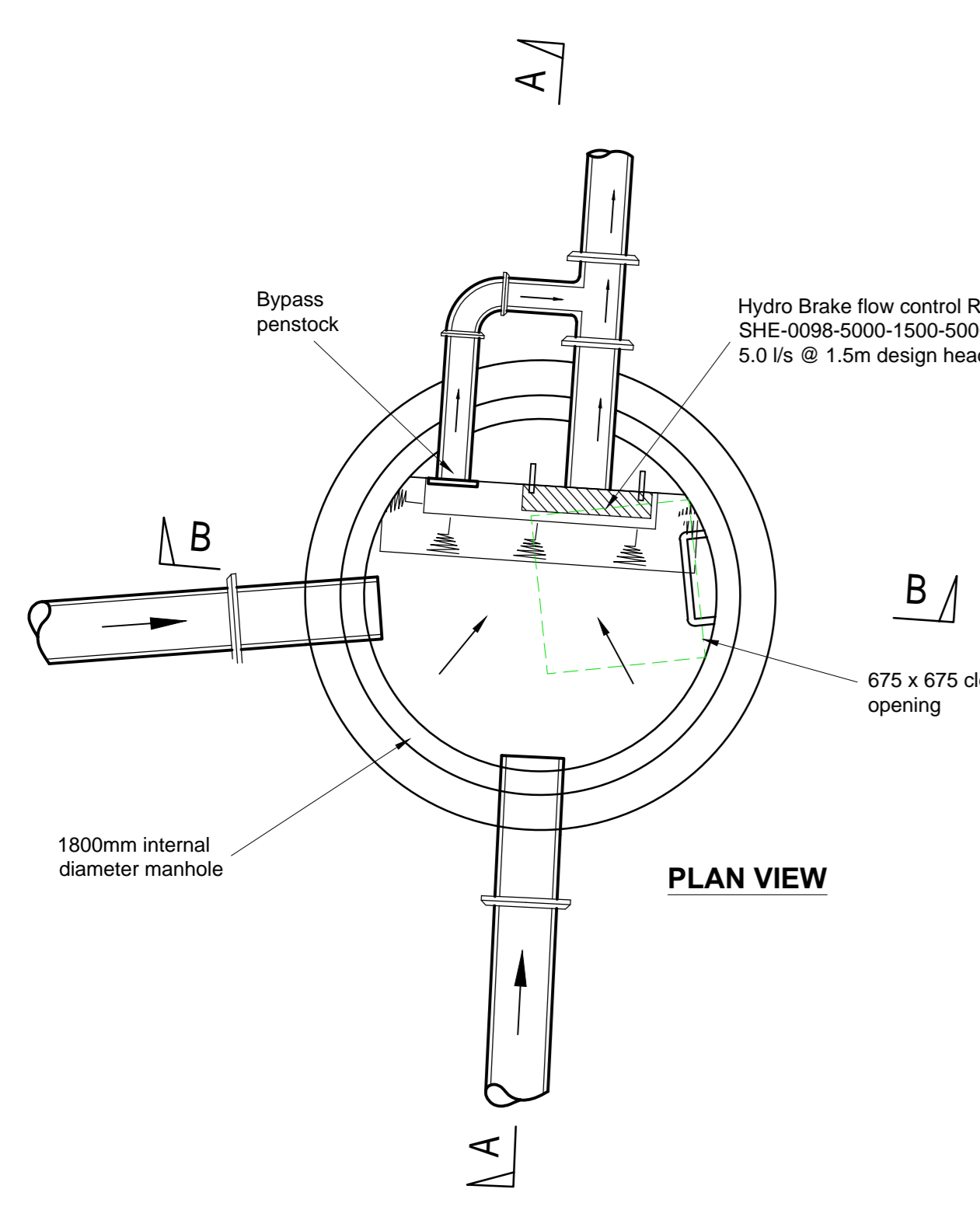
STORMCELL STORAGE TANK PLAN

STORAGE TANK 1
SCALE 1:20

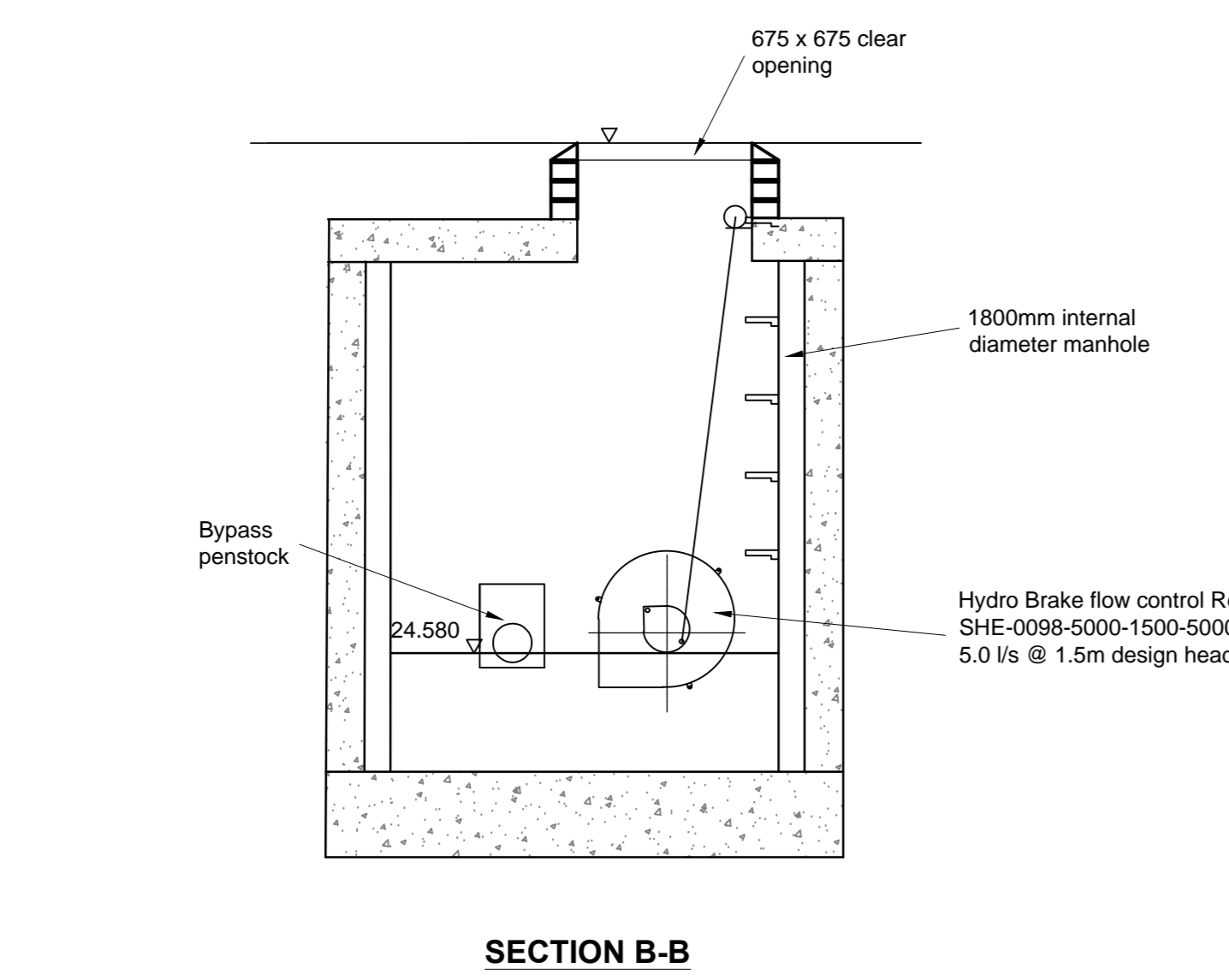


STORMCELL STORAGE TANK PLAN

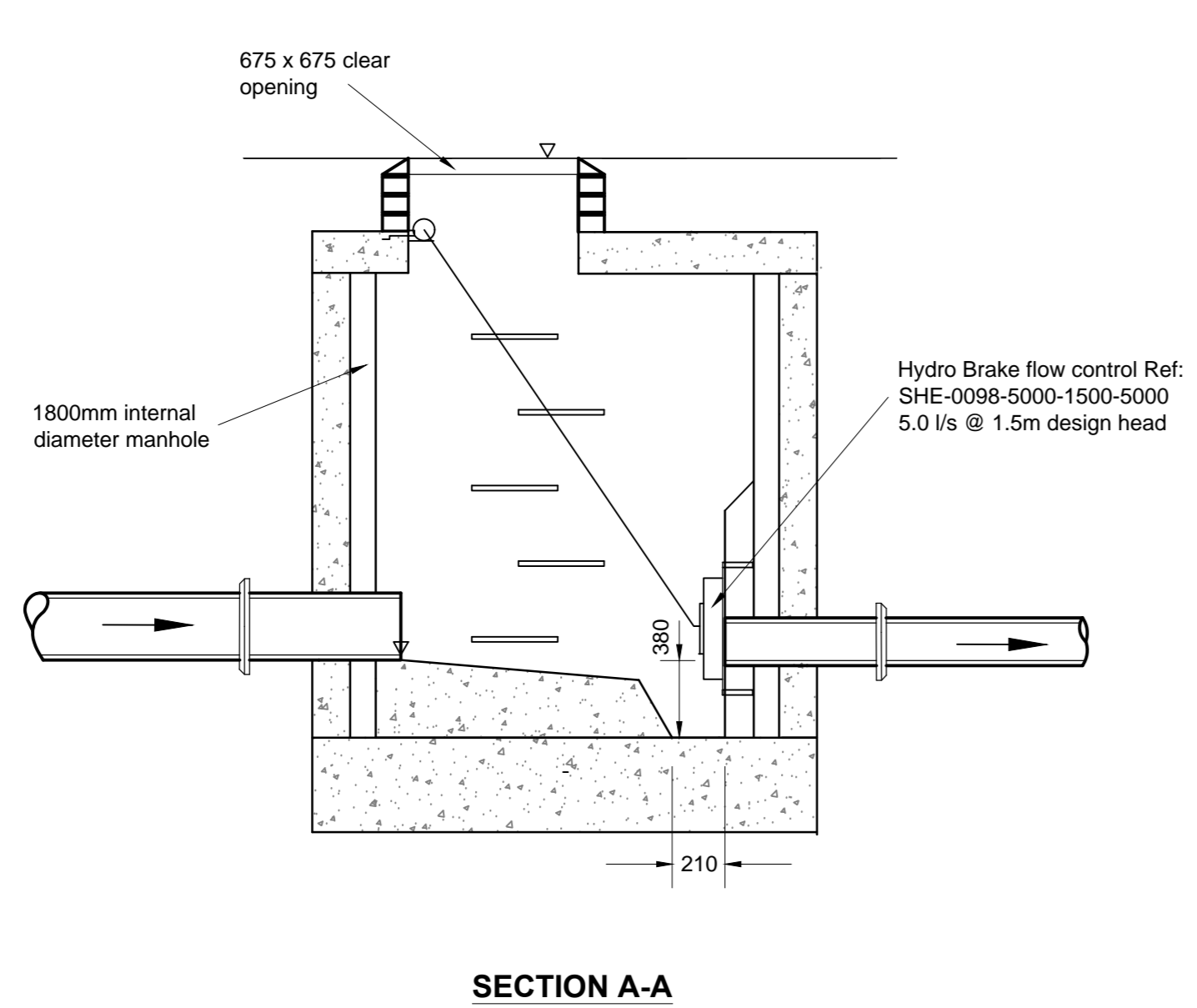
STORAGE TANK 2
SCALE 1:20



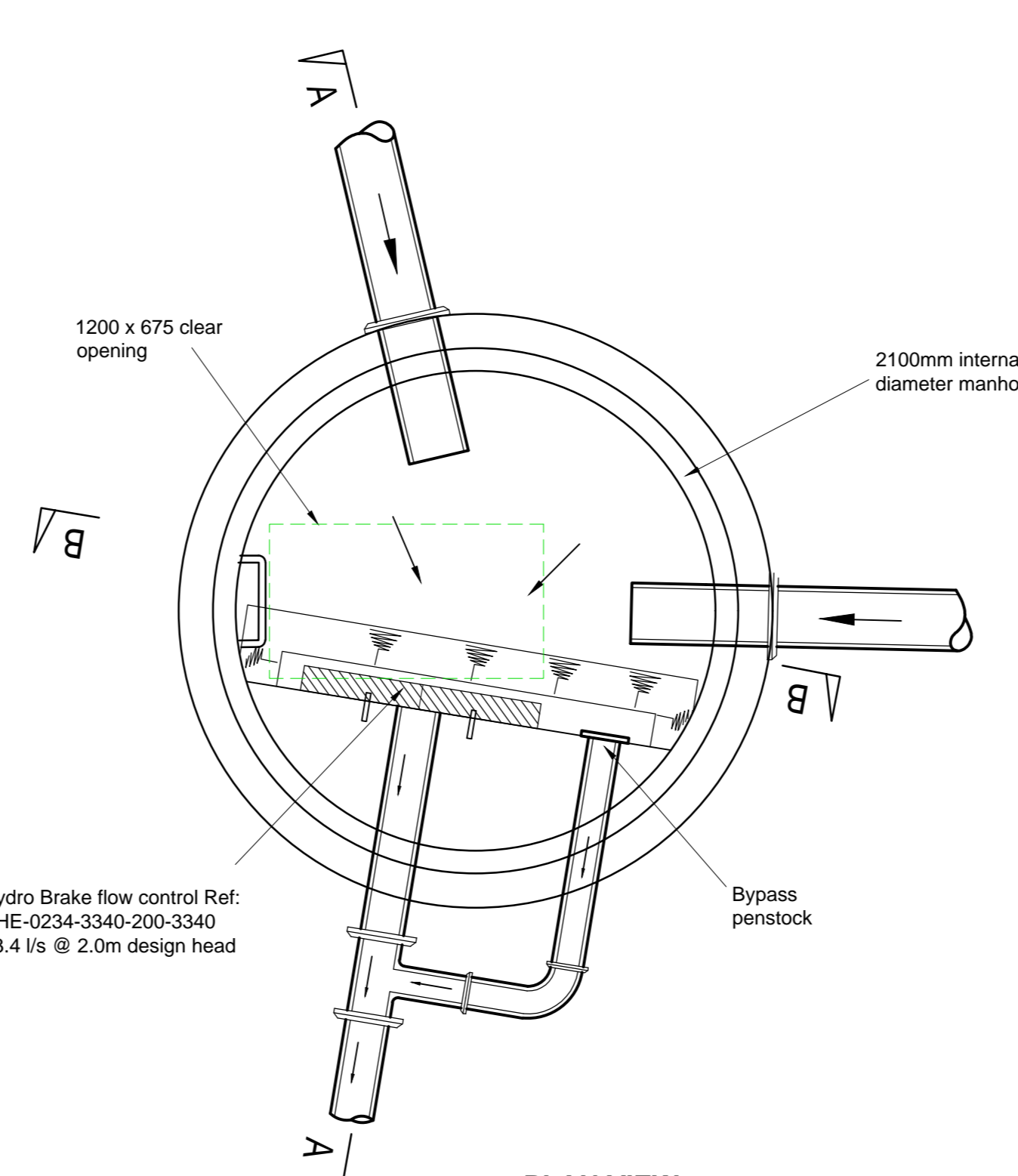
FLOW CONTROL MANHOLE S33
Scale 1:25



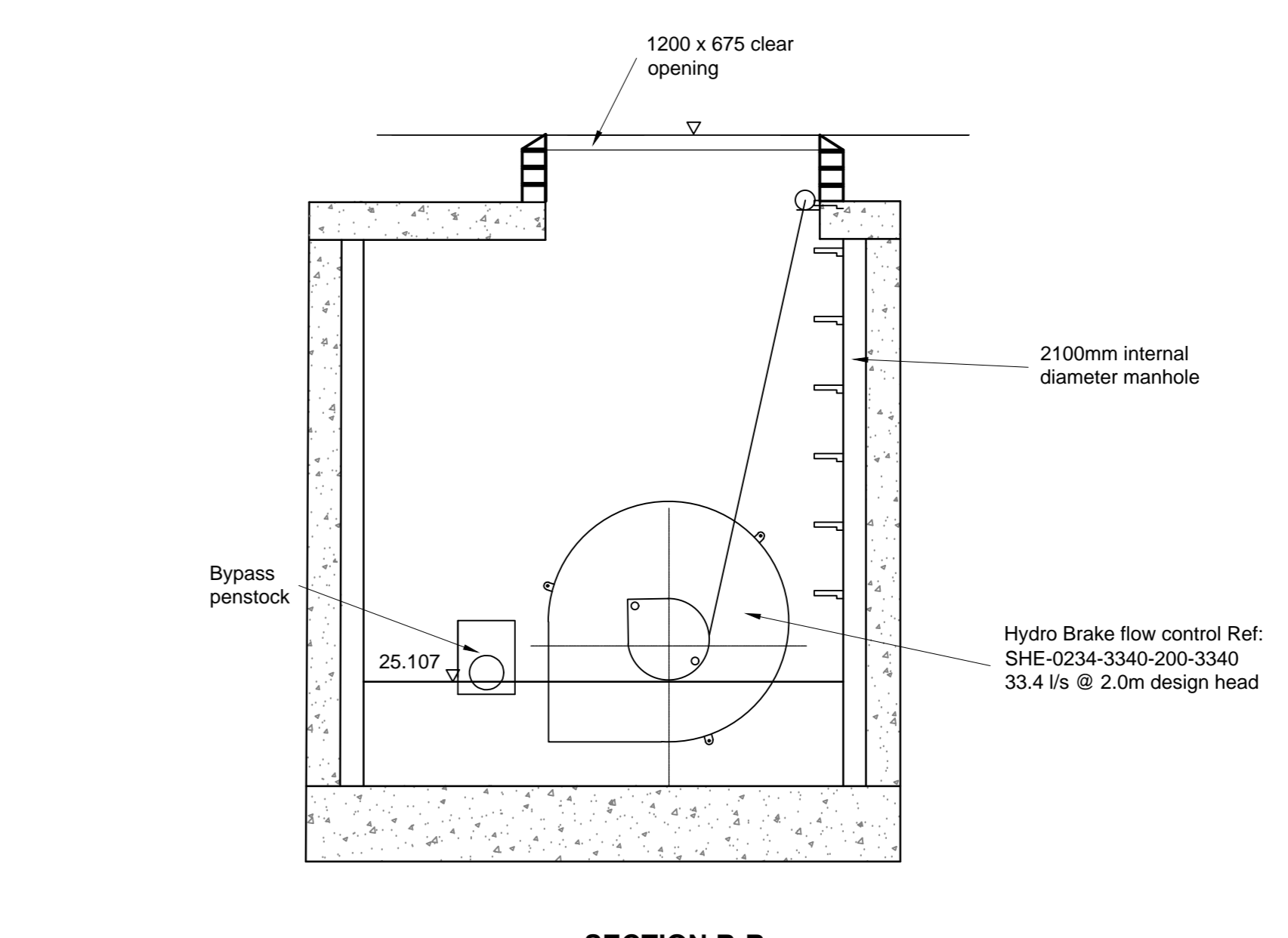
SECTION B-B



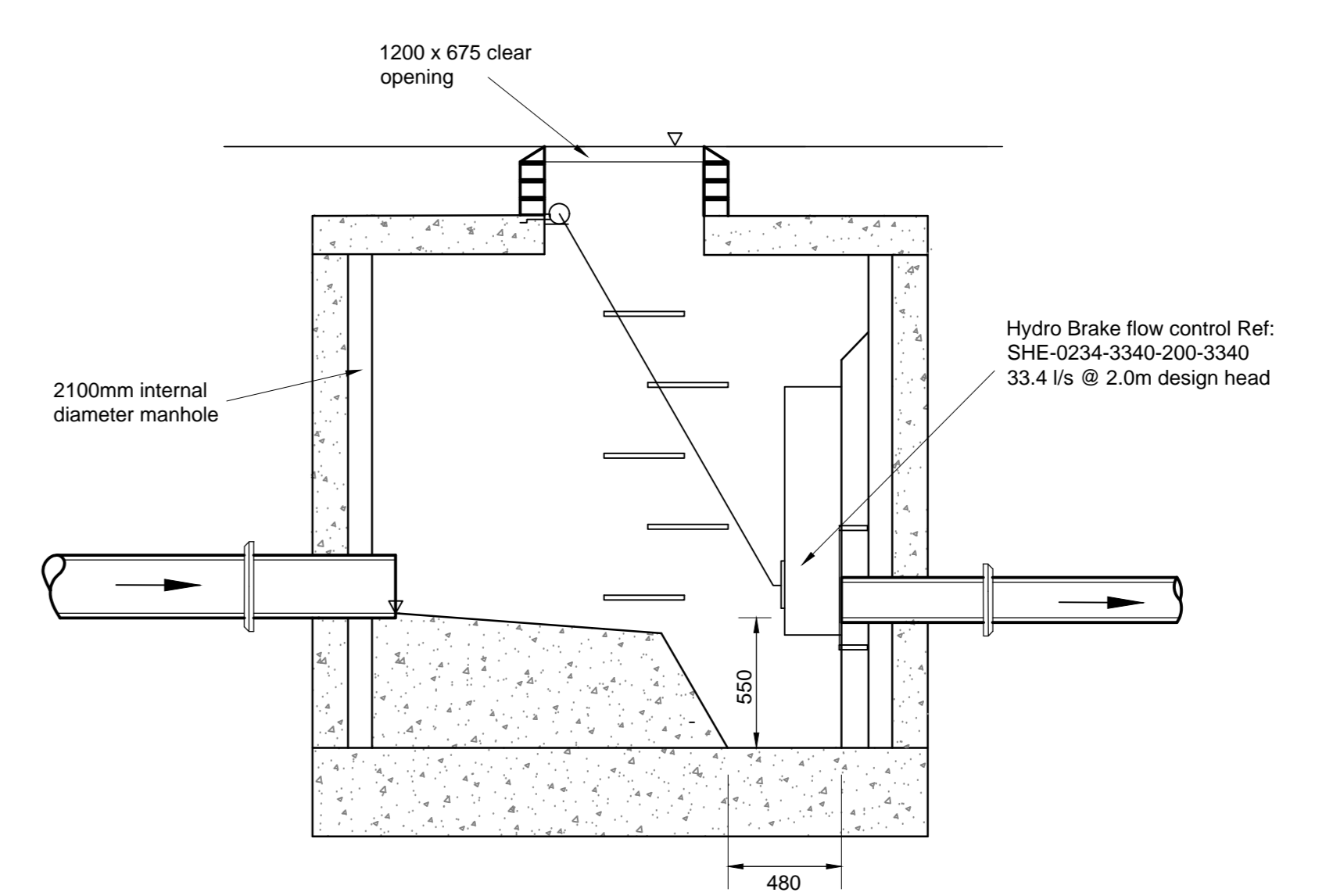
SECTION A-A



FLOW CONTROL MANHOLE S6
Scale 1:25



SECTION B-B



SECTION A-A

REVISIONS

No	Date	Description	By	Chk	App
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P01	17/03/22	First issue			

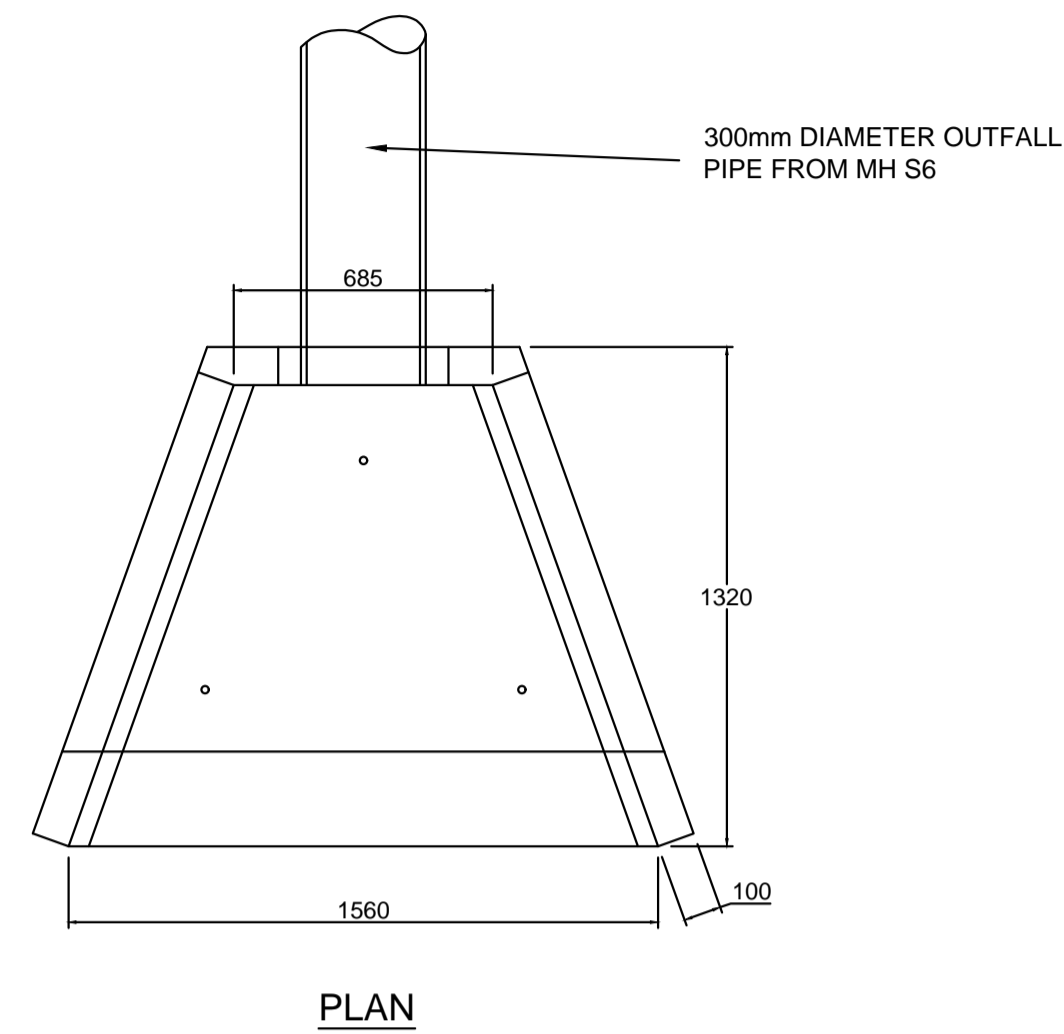
Hydrock
OVER COURT BARRS
OVER LAKE
ALMONDSBURY
WICK
GLoucestershire

CLIENT
BARNWOOD TRUST & STONewater LIMITED

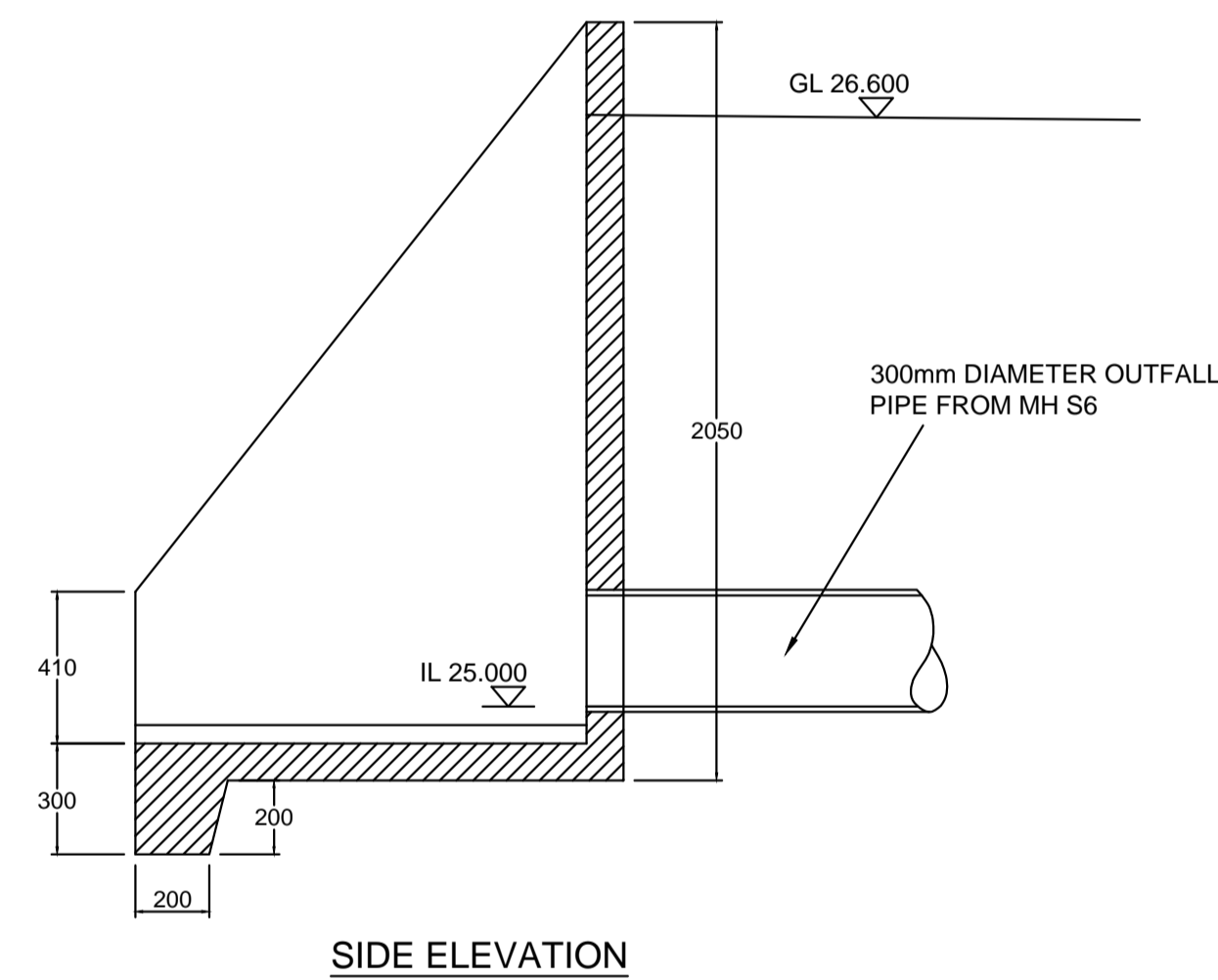
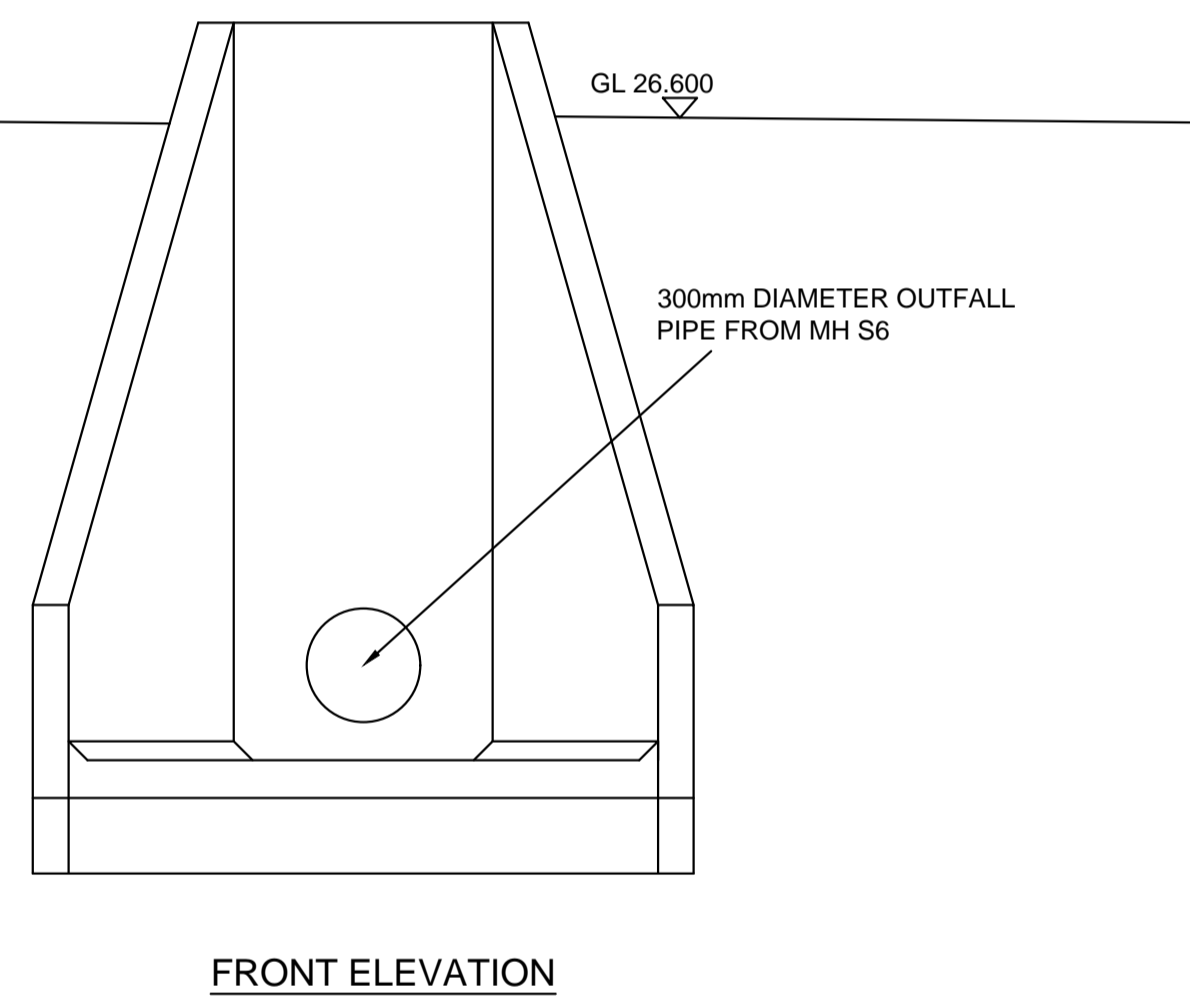
PROJECT
BARNWOOD,
GLOUCESTER

TITLE
STORMwater ATTENUATION TANK AND
FLOW CONTROL DETAILS

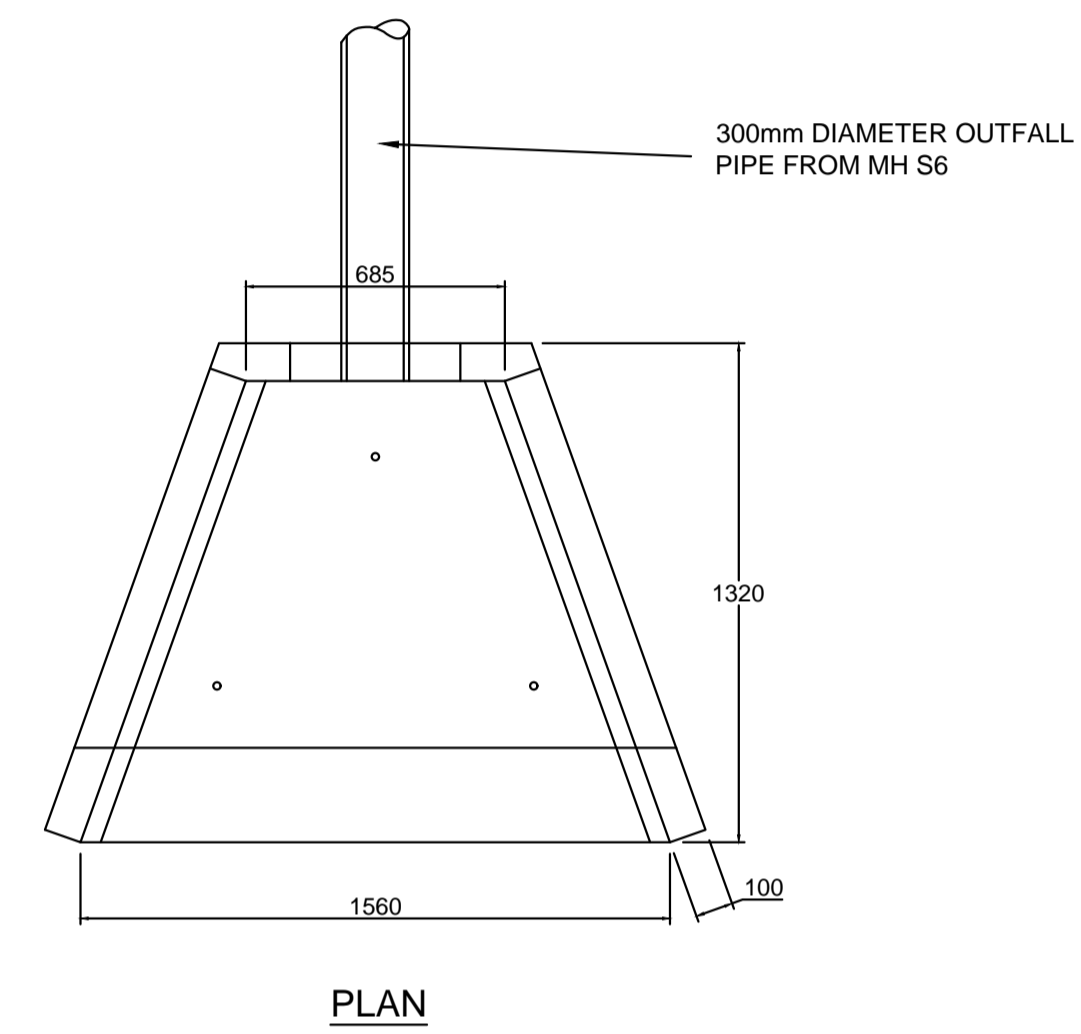
HYDROCK PROJECT NO. 05926-IOCB	SCALE @ AD As Shown
STATUS DESCRIPTION FOR APPROVAL	STATUS S2
DRAWING NO. (PROJECT CODE ORIGINATOR ZONE LEVEL TYP ROLE NUMBER) 05926-HYD-XX-XX-DR-D-2211	REVISION P02



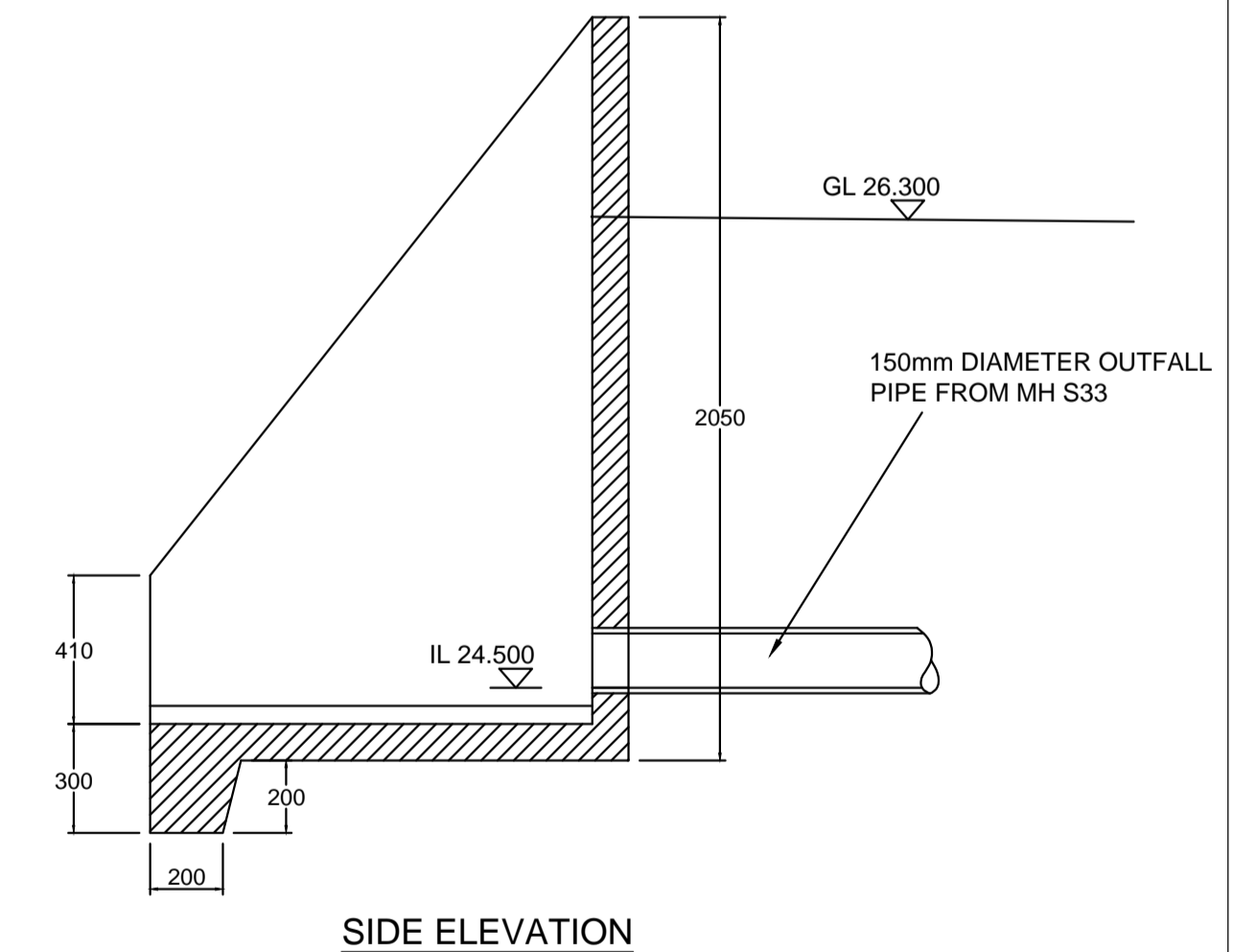
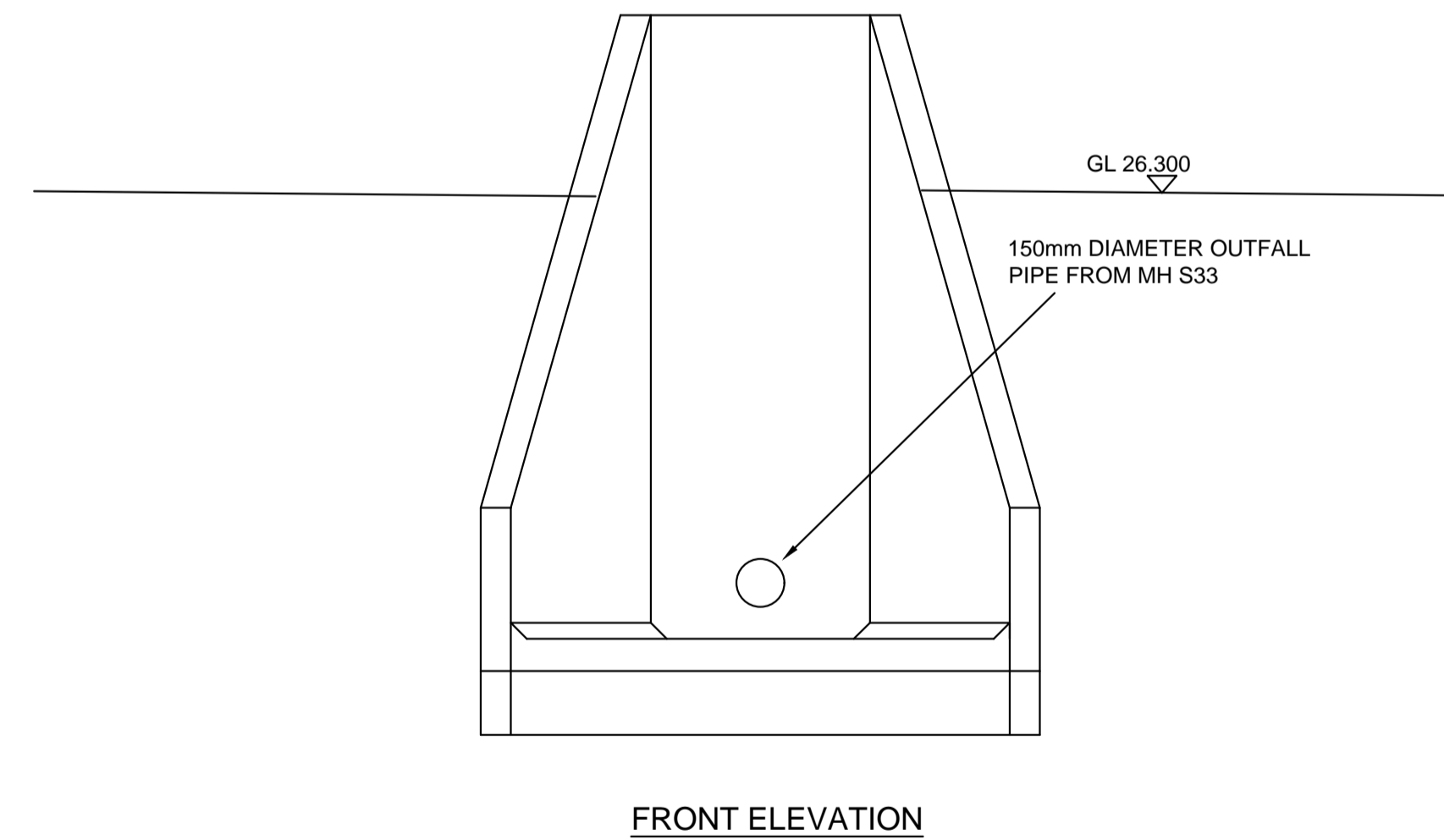
Precast concrete headwall unit
Althon Type H6C or similar approved



HEADWALL HW1
Scale 1:20



Precast concrete headwall unit
Althon Type H6C or similar approved



HEADWALL HW2
Scale 1:20

Rev	Date	Description	By	Ckd	App
P02	29/03/22	Title block updated.	RJH		
P01	17/03/22	First Issue.	RJH		

Hydrock
OVER COURT BARN
OVER LANE
ALMONDSBURY
BRISTOL
BS32 4DF

CLIENT
BARNWOOD TRUST & STONEWATER LIMITED

PROJECT
BARNWOOD,
GLOUCESTER

TITLE STORMWATER ATTENUATION TANK AND FLOW CONTROL DETAILS	
HYDROCK PROJECT NO. 05926-IOCB	SCALE @ A1 As Shown
STATUS DESCRIPTION FOR APPROVAL	STATUS S2
DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER) 05926-HYD-XX-XX-DR-D-2212	REVISION P02

