



advant
ENGINEERS

**916 HALIFAX ROAD
HARTSHEAD MOOR
BD19 6LR**

Drainage Strategy

DOCUMENT No:
22091-DSR-001-B

20th OCTOBER 2025



Issue Sheet.

Prepared	Date		Checked	Date
M M	13-05-25		M M	13-05-25

Revisions	Comment	Date
A	Initial Issue	13-05-25
B	Updated to LLFA comments	20-10-25

The report is based on the information that has been acquired and / or made available to Advant Engineers via the various searches and consultations undertaken as part of the Drainage Strategy. In some cases, anecdotal information has been relied upon, where documented evidence has been lacking.

The conclusions drawn in the above report are considered correct although any subsequent additional information may allow refinement of the conclusions.

All work carried out in preparing this report has utilised and is based upon Advant Engineers current professional knowledge and understanding of current UK standards and codes, technology and legislation. Changes in this legislation and guidance may occur at any time in the future and cause any conclusions to become inappropriate or incorrect.

This report has been prepared using information contained in maps and documents prepared by others. Advant Engineers can accept no responsibility for the accuracy of such information.



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1. Introduction

- 1.1. Advant Engineers Ltd has been commissioned by Barnes Homes Ltd, to undertake a Drainage Strategy in connection with the proposed development at the land at 916 Halifax Road, Hartshead Moor. The proposal consists of 11 new build dwellings with associated parking and access road.
- 1.2. This report should be read in conjunction with drawing 22091-104 and associated architectural and engineering drawings.

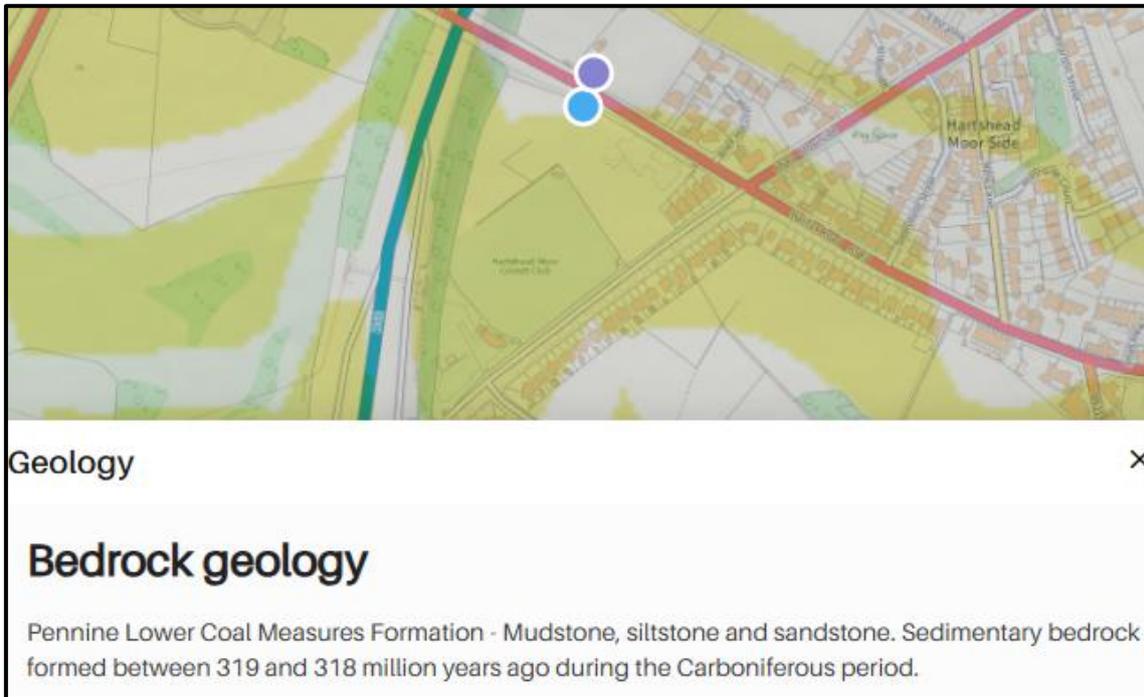
2. Existing Site

- 2.1. The site is currently forms part of the garden to 916 Halifax Road, and is therefore classed as a greenfield site, the access to the site will be from Halifax Road. The overall site area is 3,939m² (0.394ha).
- 2.2. This site can be located at the following co-ordinates 417089E 424709N and the nearest postcode is BD19 6LR and can be seen on the below extract.





2.3. At the time of writing this report a site investigation had not been undertaken, we have therefore referred to the BGS website to determine the expected ground conditions, which are described as follows:



2.4. The site falls from the South to the North with a high point of 157.49 and a low point of 149.78 which gives an approximate gradient of 1:10. (See Appendix A for Survey).

3. Proposed Development

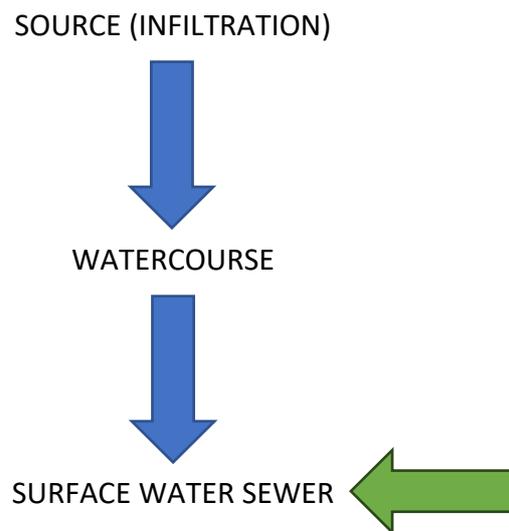
3.1. The proposed development is for 11 new build dwellings with associated parking and a new access road into the site, the access road is to be adopted. (See Appendix B for layout)



4. Drainage Strategy

4.1. Surface Water

4.2. The surface water drainage should be designed in accordance with the SUD hierarchy providing evidence to each step before moving on to the next one, the SUDS hierarchy is as follows:



4.3. From the BGS website it is inconclusive as to the infiltration factors of the ground, however it has been considered due to the very steep nature of the ground and the elevated position of the site compared to the field down hill of the site that any concentrated infiltration would have a high probability of breaching the surface further downhill, therefore the use of soakaways has been discounted.

4.4. Next in the hierarchy is to discharge to a water course, as there are no watercourses in the vicinity then this has also been discounted.

4.5. Therefore, the surface water is proposed to discharge to the existing public surface water sewer located in the adjacent field which then flows down Moorside Road. (See Appendix C for sewer records).

4.6. The site is currently a field therefore it will be treated as Greenfield and Greenfield rates should be calculated.



- 4.7. The existing greenfield runoff rates for the site and restrict the proposed discharge to the equivalent rate, the greenfield rates for the site are as follows (See Appendix D for Greenfield Calc):

$$\begin{aligned} Q_{bar} &= 2.3 \text{ l/s} \\ 1 \text{ in } 1 \text{ Year} &= 1.99 \text{ l/s} \\ 1 \text{ in } 30 \text{ Year} &= 4.05 \text{ l/s} \\ 1 \text{ in } 100 \text{ Year} &= 4.81 \text{ l/s} \end{aligned}$$

- 4.8. We are unable to achieve the Q_{bar} rate, therefore we are proposing as rate of **3.5l/s** via a vortex flow control and provide attenuation on site to accommodate the 1 in 100 year + 45% climate change rainfall event. (See Appendix E for Calcs).
- 4.9. The main drainage will be offered for adoption, due to Kirklees Councils Highway department not allowed structures over 900mm in size, it is proposed to provide the attenuation in the form of a tank under the private driveway. (See Appendix F for drainage layout).

4.10. Foul Drainage

- 4.11. The foul drainage is proposed to connect into the public foul sewer located in the adjacent field.



5. SUDS Elements

5.1. All new surface water drainage systems should implement SUDS features where reasonably possible, these features are incorporated to offer benefits in Water Quality, Water Quantity, Amenity and Biodiversity. Below we have considered each SUDS element and determined its use within this particular development.

COMPONENT	SUITABILITY	REASON
Green Roof	X	Roof structure not suitable.
Blue Roof	X	Roof structure not suitable.
Infiltration Systems	X	Not suitable due to levels.
Proprietary Treatment Systems	✓	Flow control device to be utilised.
Filter Strips	X	Not suitable due to levels.
Filter Drains	X	Not suitable due to levels.
Swales	X	Not suitable due to levels.
Bioretention Systems	X	Insufficient land available.
Trees	✓	Trees are included on the layout
Rain Garden	X	Layout not suitable for the use of rain gardens
Pervious Pavements	X	Not suitable due to levels.
Attenuation Storage Tanks	✓	Tank proposed under private driveway for attenuation.
Detention Basins	X	Insufficient land available.
Ponds and Wetlands	X	Insufficient land available.



6. SUDS Operations and Maintenance

- 6.1. Responsibility of the adopted drainage system, flow control and attenuation tank will be with Yorkshire Water post adoption, however during construction and up to the point of adoption the developer will be responsible for the operation and maintenance of the drainage system and its various SUDS elements.
- 6.2. The convention drainage system, consisting of standard manholes and pipework, are maintained by sub-contractors using specialist machinery to clear gullies, pipework and storage zones of rubbish and sediment. The frequency of this task is determined by the need, this can be identified by a reduced flow through the pipework, water surcharging or the visible sight of sediment or buildup in the manholes.
- 6.3. Across the adoptable drainage system corrective maintenance should be undertaken on an ad hoc basis defendant on need, these task should include:
- Repair to access chambers / manhole covers
 - Jetting and clearing of blockages
 - Repair any broken pipes, manhole sections, step irons
- 6.4. Beyond the convention drainage manholes and pipework, the adoptable system also has a Flow Control manhole and a concrete attenuation tank that requires routine inspection and maintenance as outlined below.



FLOW CONTROL MANHOLE – HYDROBRAKE UNIT AND PENSTOCK

MAINTENANCE SCHEDULE	REQUIRED ACTION	FREQUENCY
Regular Maintenance	Vacuum clean the sump in the manhole.	Annually
	Inspect pipework for silt accumulation and jet-vac clean.	Annually
	Clean spindle threads on penstock by hosing down with clean water, then apply grease to the spindle.	Every 6 months
	All other moving parts should be lightly oiled / greased.	As required.
Remedial Actions	Repair / rehabilitate inlets, outlets and vents.	As required.
	Replace hydrobrake unit should it become damage and fail to operate.	As required.
	Anytime the hydrobrake unit is removed then new neoprene seals should be installed.	As required.
Monitoring	Check that flow control manhole is emptying, there should be little or no water after consecutive days of dry weather.	Twice in the first year, once after heavy rainfall, and then once after consecutive days of dry weather. After that annual inspections.
	The hydrobrake has one moving part which is the bypass gate, and the penstock has a gate operated by a rising spindle, both elements should be opened and closed to check their operation.	Every 3 months
	Check for any leakages between the hydrobrake / penstock units and the concrete mounting block.	Annually
	Check tightness of all fixing bolts.	Annually
	Whilst the penstock is in the fully open position, inspect the seals and the sealing surface.	Annually



- 6.5. The above is scheduled maintenance, additional inspections and cleaning of the hydrobrake chamber should be undertaken in the event of a failure or after every extreme flood event.
- 6.6. Access is provided to the tank via the private shared driveway to plots 3-5, maintenance vehicles can safely pull off the public highway and park over the tank to undertake maintenance / remedial works.
- 6.7. Most inspections and maintenance operations can be undertaken from above ground, man entry into the tank should be avoided whenever possible, however if this is unavoidable then there are 2 access chambers on the tank that can be used.
- 6.8. Anyone entering the attenuation tank should be suitable trained in confined spaces, they should never undertake solo inspections, and they should utilise a fall arrest harness attached to a tripod mounted over the manhole.
- 6.9. See Appendix H for the Hydrobrake technical data and company brochure.

CONCRETE ATTENUATION TANK

MAINTENANCE SCHEDULE	REQUIRED ACTION	FREQUENCY
Regular Maintenance	Inspect and identify areas that are not operating correctly. If required take remedial action.	Monthly for the first 3 months and then annually.
	Jet clean the inside of the tank for sediment removal	Annually
Remedial Actions	Repair / rehabilitate inlets, outlets and vents.	As required.
Monitoring	Inspect / check all inlets, outlets and vents to ensure that they are in good condition and operating as designed.	Annually

- 6.10. The above is scheduled maintenance, additional inspections and cleaning of the tank should be undertaken in the event of a failure or after every extreme flood event.
- 6.11. Access is provided to the tank via the private shared driveway to plots 9-12, maintenance vehicles can safely pull off the public highway and park over the tank to undertake maintenance / remedial works.



6.12. Most inspections and maintenance operations can be undertaken from above ground, man entry into the tank should be avoided whenever possible, however if this is unavoidable then there are 2 access chambers on the tank that can be used.

6.13. Anyone entering the attenuation tank should be suitable trained in confined spaces, they should never undertake solo inspections, and they should utilise a fall arrest harness attached to a tripod mounted over the manhole.

7. Post Adoption SUDS Operations and Maintenance

7.1. The above operation and maintenance requirements are a minimum guidance and as it is noted above both of these SUDS features are to be adopted by Yorkshire Water who will have their own maintenance schedule that we have faith will be concise and robust to maintain their own assets.

7.2. In addition, it is expected that Yorkshire Water will have a standard set of Risk Assessments and Health & Safety guidance on the maintenance of all of their drainage assets to ensure a safe working environment for their employees when undertaking such tasks.

7.3. In the event of a blockage or asset failure then Yorkshire Water should be contacted who will then be responsible for the timely repair of the failure and reinstating the asset to its working status.

8. Flood Exceedance Events

8.1. Although the surface water drainage has been designed to accommodate the 1 in 100 year + 45% climate change rainfall event with no flooding, we have to consider events that exceed this and what happens to any flooding that may occur.

8.2. To illustrate this event, we have produced a Flood Exceedance Layout plan (See Appendix G for layout) and from this we can see that flood would occur at manhole (S4) and then would downhill, this mimics how the site would operate pre-development as per the original contours of the site.



9. Conclusion

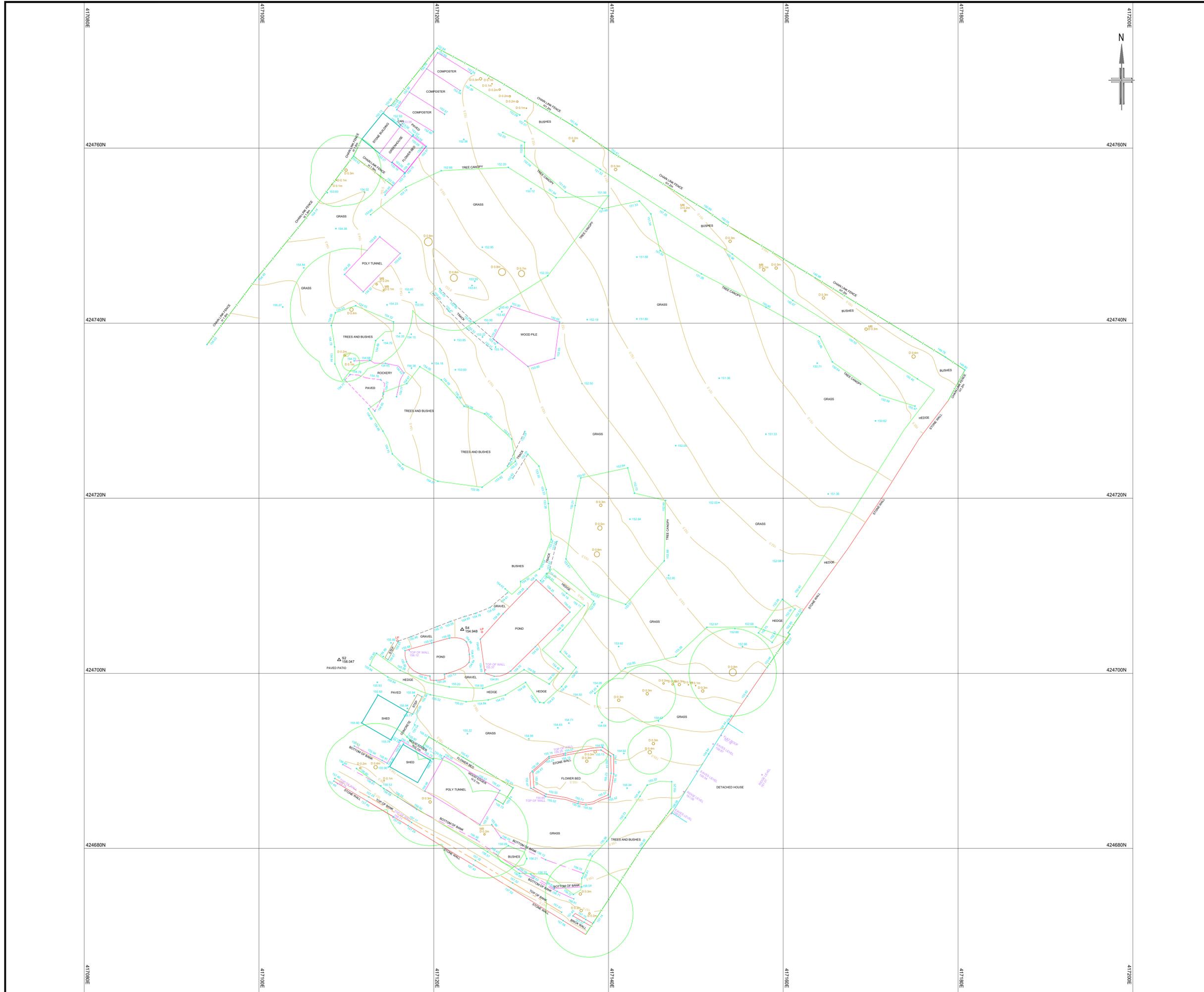
- 9.1. Advant Engineers were commissioned by Barnes Homes Ltd to undertake a Drainage Strategy for the proposed residential development at Halifax Road in Hartshead Moor. This report will be provided as supporting documentation as part of a planning application.
- 9.2. The site currently forms part of the garden to No 916 Halifax Road and therefore Greenfield runoff rates apply.
- 9.3. It is proposed to discharge the surface water to the public surface water sewer in the adjacent field 3.5 l/s and to accommodate the 1 in 100 year + 45% climate change rainfall event on site.
- 9.4. Foul drainage is to be discharged to the public foul sewer located in the adjacent field.
- 9.5. All public surface water/foul water drainage should be designed in accordance with the Water Authority and Sewers for Adoption.
- 9.6. All private surface water and surface water/foul water drainage should be designed in accordance with the current Building Regulations Part H.

10. References

- 10.1. CIRIA C753 The SuDS Manual



**APPENDIX A
TOPOGRAPHICAL SURVEY**



Notes
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Grid : OS National Grid.
 Using the OS GPS Network and applying OSTN15 transformation and then removing the scale factor for true distances with a one-step transformation centred on S2

Datum : OS Level Datum.
 Using the OS GPS Network and applying OSGM15 National Geoid Model to obtain local area corrections.

Station Listing

Station	Easting	Northing	Level
S2	417109.177	424701.547	156.047
S4	417123.260	424705.019	154.948

KEY

AIR VALVE	AV	KERB OUTLET	KO
BENCH MARK	BM	LAMP POST	LP
BN	BN	MANHOLE (CIRCULAR)	MH
		MANHOLE (RECTANGULAR)	MH
BOLLARD	BL	MANHOLE (TRIANGULAR)	MH
BORE HOLE	BH	MARKER POST	MKR
BRITISH TELECOM COVER	BT	GULLY	GU
BUS STOP	BS	RODDING EYE	RE
CABLE TV COVER	CATV	SIGN POST	SP
CABLE TV SUPPLY	CA	TELECOM COVER	TEL
COLUMN	COL	TELEGRAPH POLE	TP
DROPPED KERB	DK	THRESHOLD LEVEL	TL
EARTHING POINT	ER	TRAFFIC LIGHT	TL
ELECTRICITY COVER	ELEC	TRIAL PIT	TP
ELECTRICITY POLE	EP	WASH OUT	WO
FIRE HYDRANT	FH	WATER METER	WM
GAS VALVE	GAS	WATER STOP COCK	WSC
GATE	G	WATER STOP VALVE	WSV
INSPECTION COVER (CIRCULAR)	IC		
INSPECTION COVER (RECTANGULAR)	IC		
COVER LEVEL	CL	CHAMBER BASE LEVEL	CBL
INVERT LEVEL	IL	WATER SURFACE LEVEL	WSL
UNABLE TO RAISE	UTR	UNABLE TO MEASURE	UTM
GIRTH OF TREE TRUNK	G	DIAMETER OF TREE TRUNK	D
HEIGHT TO TOP OF TREE CANOPY	H	MULTI BOLE TREE	MB

Rev	Date	Drawn	Description	Check
-	---/---/----	--	--	--

Southgate House
 Pontefract Road T: +44 [0] 1132 008 900
 Stourton F: +44 [0] 1132 008 901
 Leeds E: admin@metgeoenvironmental.com
 West Yorkshire W: www.metgeoenvironmental.com
 LS10 1SW

Client
 AHURU HOMES LIMITED
 LEEDS

Site
 WARREN COTTAGE, 916 HALIFAX ROAD
 SCHOLES, CLECKHEATON

Title
 TOPOGRAPHICAL
 SURVEY

Surveyed	SB, JM, AH	Drawn	SB
Check	KZ	Date	29/10/2021
Scale	Job No	Sheet Size	Rev
1:200	P21-01350	A1	01

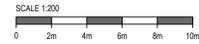
DWG Ref

Project Number	Origin	Zone	Level	Desc	Type	Role	Sheet
P21-01350	MET	EXT	XX	TOP	M2	G	001



**APPENDIX B
PROPOSED LAYOUT**

Proposed Site Plan
1 : 200



EXISTING TREE LINE TO BE RETAINED.
PRUNED BACK WHERE NECESSARY.

EASEMENT

EXISTING HEDGE TO BE RETAINED

NEW SHRUB LINE TO BE
INTRODUCED TO PROVIDE
SCREENING TO 916 HALIFAX
ROAD

EXISTING HEDGE TO BE RETAINED

157.9m

HALIFAX ROAD

157.5m

CLIENT

Barnes Homes

PROJECT

Land adjacent to 916 Halifax Road
Harthead Moor
Cleckheaton
BD19 6LR

DRAWING TITLE

Proposed Site Plan

STATUS

S4 - Planning

Proj Ref	Origin	Zone	Level	Type	Role	Num	Status	Rev
24005	BAS	00	XX	DR	A	00100	S4	P9
Sheet	Scale	Issue Date	Drawn by	Ckd by				
A1	As indicated	11-02-24	WD	AB				



AFFORDABLE HOUSING KEY:

- PLOT 3 - AFFORDABLE INTERMEDIATE HOUSING (A FIRST HOME)
- PLOT 4 - AFFORDABLE/SOCIAL RENT

SCHEDULE OF ACCOMMODATION:

- PLOT 1:**
2 BED BUNGALOW
GIA: 75m²
 - PLOT 2:**
2 BED DORMER BUNGALOW
GIA: 109m²
 - PLOT 3:**
2 BED SEMI-DETACHED (FIRST HOME)
GIA: 85m²
 - PLOT 4:**
2 BED SEMI-DETACHED (AFFORDABLE)
GIA: 85m²
 - PLOT 5:**
4 BED DETACHED
GIA: 180m²
 - PLOT 6:**
4 BED DETACHED
GIA: 164 m²
 - PLOT 7:**
3 BED SEMI-DETACHED
GIA: 105m²
 - PLOT 8:**
3 BED SEMI-DETACHED
GIA: 105m²
 - PLOT 9:**
3 BED DETACHED
GIA: 138m²
 - PLOT 10:**
3 BED SEMI-DETACHED
GIA: 114m²
 - PLOT 11:**
3 BED SEMI-DETACHED
GIA: 114m²
 - PLOT 12:**
3 BED DORMER BUNGALOW
GIA: 110m²
- 2 BEDS - 4**
3 BEDS - 6
4 BEDS - 2
TOTAL: 12

REV	DESCRIPTION	DATE	DRAWN
01	Issue	15-08-23	AB
02	Drawings updated for council comment	11-08-23	AB
03	Drawings updated	25-09-23	AB
04	Drawings updated	25-12-23	AB
05	Drawings updated	06-12-24	AB
06	Drawings updated	18-08-24	AB
07	Drawings updated	18-02-24	AB
08	Drawings updated	25-02-24	AB
09	Drawings updated	11-02-24	AB
10	First Issue	04-02-24	AB

ISSUE/REVISION HISTORY



Unit 10, Victoria Spring Business Park
Liversidge, West Yorkshire WF15 8BU

NOTES

Do not scale from this drawing. Only figured dimensions are to be taken from this drawing. Contractor must verify all dimensions on site before commencing any work or shop drawings. Report any discrepancies to the architect before commencing work. If this drawing exceeds the quantities taken in any way the architects are to be informed before the work is initiated. Work within the Construction (Design & Management) Regulations 2015 is not to start until a Health and Safety Plan has been produced. This drawing is copyright and must not be reproduced without consent of BARNES ARCHITECTURAL SERVICES.

DRAWING STATUS/TYPE KEY

S0	Feasibility	S2	Sketch
L	Landscape	D4	Construction
S4	Planning	Z	Marketing
B	Building Survey	B3	As Built
D2	Tender	Z	Tenant
OS	Ordinance Survey		

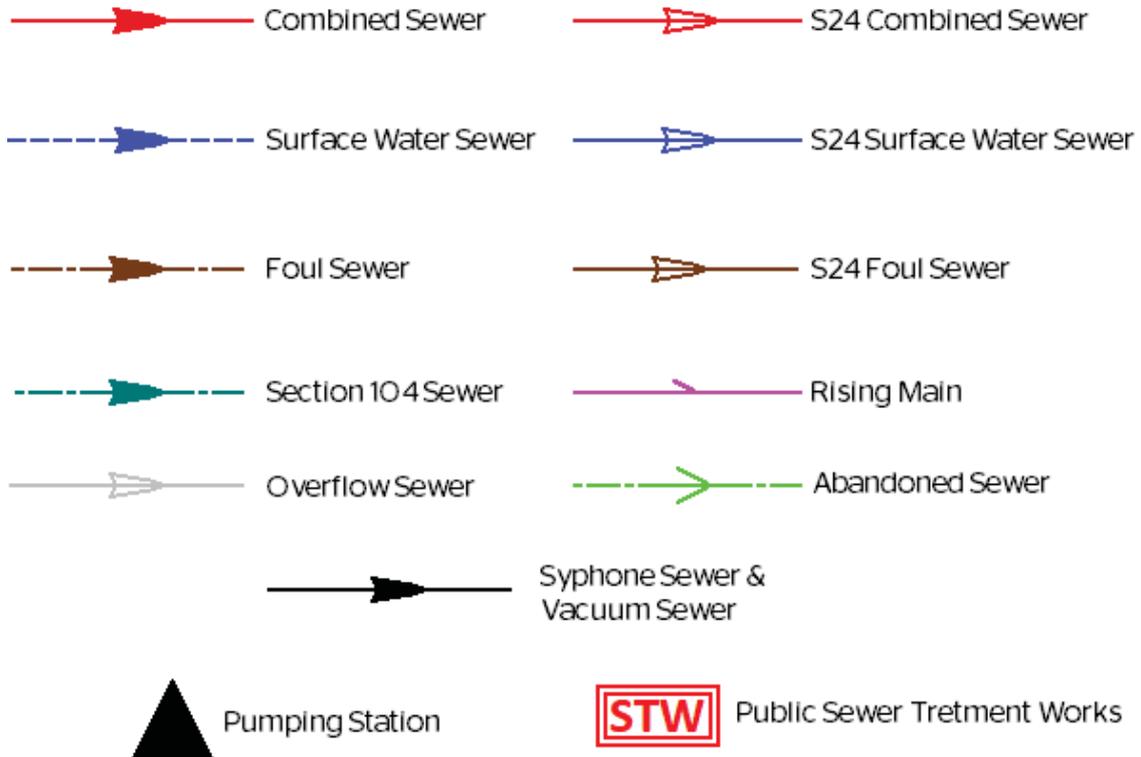


**APPENDIX C
SEWER RECORDS**

Property Identifier

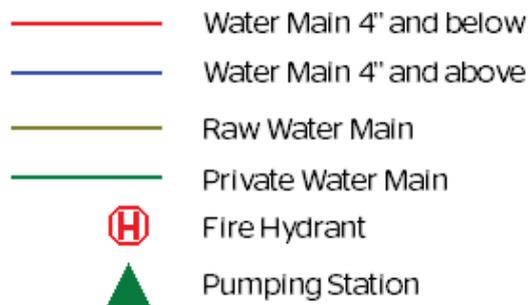


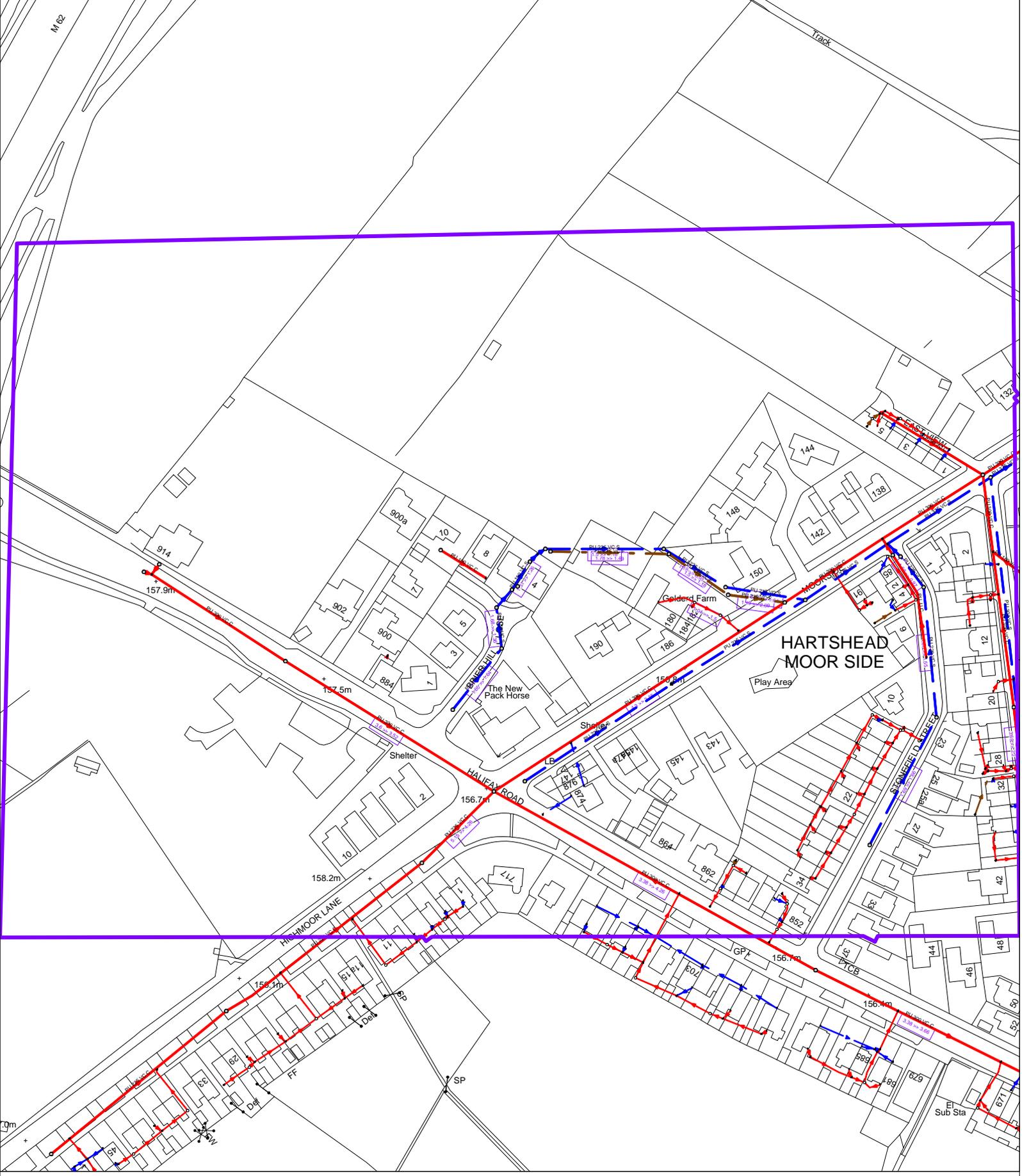
Sewer Legend



Please note that the direction of flow arrows may not always appear depending on the scale of the map.

Water Legend





Public Waste Water Network 27/10/2022 21:44:58 OS Grid Coordinates: 417025 : 424461 Map Name : SE1724SW svcGISSafeMovePD



APPENDIX D
GREENFIELD CALCULATION

Print

Close Report



Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:

Site name:

Site location:

Site Details

Latitude:

Longitude:

Reference:

Date:

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Runoff estimation approach

Site characteristics

Total site area (ha):

Methodology

Q_{BAR} estimation method:

SPR estimation method:

Soil characteristics	Default	Edited
----------------------	---------	--------

SOIL type:	<input type="text" value="4"/>	<input type="text" value="4"/>
------------	--------------------------------	--------------------------------

HOST class:	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>
-------------	----------------------------------	----------------------------------

SPR/SPRHOST:	<input type="text" value="0.47"/>	<input type="text" value="0.47"/>
--------------	-----------------------------------	-----------------------------------

Hydrological characteristics	Default	Edited
------------------------------	---------	--------

SAAR (mm):	<input type="text" value="779"/>	<input type="text" value="779"/>
------------	----------------------------------	----------------------------------

Hydrological region:	<input type="text" value="3"/>	<input type="text" value="3"/>
----------------------	--------------------------------	--------------------------------

Growth curve factor 1 year:	<input type="text" value="0.86"/>	<input type="text" value="0.86"/>
-----------------------------	-----------------------------------	-----------------------------------

Growth curve factor 30 years:	<input type="text" value="1.75"/>	<input type="text" value="1.75"/>
-------------------------------	-----------------------------------	-----------------------------------

Growth curve factor 100 years:	<input type="text" value="2.08"/>	<input type="text" value="2.08"/>
--------------------------------	-----------------------------------	-----------------------------------

Growth curve factor 200 years:	<input type="text" value="2.37"/>	<input type="text" value="2.37"/>
--------------------------------	-----------------------------------	-----------------------------------

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Q _{BAR} (l/s):	<input type="text" value="2.31"/>	<input type="text" value="2.31"/>
1 in 1 year (l/s):	<input type="text" value="1.99"/>	<input type="text" value="1.99"/>
1 in 30 years (l/s):	<input type="text" value="4.05"/>	<input type="text" value="4.05"/>
1 in 100 year (l/s):	<input type="text" value="4.81"/>	<input type="text" value="4.81"/>
1 in 200 years (l/s):	<input type="text" value="5.49"/>	<input type="text" value="5.49"/>

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.



APPENDIX E
SURFACE WATER CALCULATIONS

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	5.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	80.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	1.000
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

Adoptable Manhole Type

Max Width (mm)	Diameter (mm)	Max Width (mm)	Diameter (mm)
374	1200	749	1500
499	1350	900	1800

>900 Link+900 mm

Max Depth (m)	Diameter (mm)	Max Depth (m)	Diameter (mm)
1.500	1050	99.999	1200

Circular Link Type

Template	Freeform Carrier	Auto Increment (mm)	75
Shape	Circular	Follow Ground	x
Barrels	1		

Available Diameters (mm)

100 | 150

Tank 1800 Link Type

Template	Freeform Carrier	Height (mm)	1800
Shape	Closed Rectangular	Auto Increment (mm)	500
Barrels	1	Follow Ground	x

Available Diameters (mm)

500

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
S1	0.076	5.00	155.164	1350	417129.253	424707.595	3.064	152.100
S2	0.029	5.00	153.607	1350	417132.786	424731.129	3.707	149.900
S3	0.070	5.00	153.686	1500	417140.390	424726.183	3.836	149.850
S4			152.668	2400	417156.035	424716.763	2.968	149.700
S5			152.450	1350	417162.427	424712.793	2.800	149.650
S6			152.450	1350	417168.887	424723.290	2.900	149.550
S7			150.249	1350	417176.090	424734.364	1.449	148.800
S8			149.600	1350	417179.925	424740.640	1.250	148.350
S9			149.600	1350	417217.040	424718.750	1.500	148.100
TANK1	0.045	5.00	152.704	1200	417131.280	424746.596	2.704	150.000
TANK2	0.004	5.00	153.260	1200	417125.454	424736.263	3.310	149.950

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S1	S3	21.669	0.600	152.100	150.000	2.100	10.3	150	5.00	54.7
2.000	S2	S3	9.071	0.600	149.900	149.850	0.050	181.4	300	5.00	54.7
1.001	S3	S4	18.262	0.600	149.850	149.750	0.100	182.6	300	5.00	54.7
1.002	S4	S5	7.525	0.600	149.700	149.650	0.050	150.5	225	5.00	54.7
1.003	S5	S6	12.326	0.600	149.650	149.550	0.100	123.3	225	5.00	54.7
1.004	S6	S7	13.210	0.600	149.550	148.800	0.750	17.6	225	5.00	54.7
1.005	S7	S8	7.355	0.600	148.800	148.350	0.450	16.3	225	5.00	54.7
1.006	S8	S9	43.089	0.600	148.350	148.100	0.250	172.4	225	5.00	54.7
1.000_1	TANK1	TANK2	11.862	0.600	150.000	149.950	0.050	237.2	4200	5.00	54.7
1.001_1	TANK2	S2	8.951	0.600	149.950	149.900	0.050	179.0	300	5.00	54.7

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	3.154	55.7	11.3	2.914	3.536	0.076	0.0	45	2.472
2.000	1.164	82.3	11.6	3.407	3.536	0.078	0.0	75	0.826
1.001	1.160	82.0	33.2	3.536	2.618	0.224	0.0	133	1.101
1.002	1.063	42.3	33.2	2.743	2.575	0.224	0.0	151	1.174
1.003	1.176	46.8	33.2	2.575	2.675	0.224	0.0	140	1.273
1.004	3.132	124.5	33.2	2.675	1.224	0.224	0.0	79	2.655
1.005	3.252	129.3	33.2	1.224	1.025	0.224	0.0	78	2.741
1.006	0.993	39.5	33.2	1.025	1.275	0.224	0.0	159	1.109
1.000_1	3.813	28826.3	6.7	0.904	1.510	0.045	0.0	7	0.213
1.001_1	1.172	82.8	7.3	3.010	3.407	0.049	0.0	59	0.727

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	21.669	10.3	150	Circular	155.164	152.100	2.914	153.686	150.000	3.536
2.000	9.071	181.4	300	Circular	153.607	149.900	3.407	153.686	149.850	3.536
1.001	18.262	182.6	300	Circular	153.686	149.850	3.536	152.668	149.750	2.618
1.002	7.525	150.5	225	Circular	152.668	149.700	2.743	152.450	149.650	2.575
1.003	12.326	123.3	225	Circular	152.450	149.650	2.575	152.450	149.550	2.675
1.004	13.210	17.6	225	Circular	152.450	149.550	2.675	150.249	148.800	1.224
1.005	7.355	16.3	225	Circular	150.249	148.800	1.224	149.600	148.350	1.025
1.006	43.089	172.4	225	Circular	149.600	148.350	1.025	149.600	148.100	1.275

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	1350	Manhole	Adoptable	S3	1500	Manhole	Adoptable
2.000	S2	1350	Manhole	Adoptable	S3	1500	Manhole	Adoptable
1.001	S3	1500	Manhole	Adoptable	S4	2400	Manhole	Adoptable
1.002	S4	2400	Manhole	Adoptable	S5	1350	Manhole	Adoptable
1.003	S5	1350	Manhole	Adoptable	S6	1350	Manhole	Adoptable
1.004	S6	1350	Manhole	Adoptable	S7	1350	Manhole	Adoptable
1.005	S7	1350	Manhole	Adoptable	S8	1350	Manhole	Adoptable
1.006	S8	1350	Manhole	Adoptable	S9	1350	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000_1	11.862	237.2	4200	Tank 1800	152.704	150.000	0.904	153.260	149.950	1.510
1.001_1	8.951	179.0	300	Circular	153.260	149.950	3.010	153.607	149.900	3.407

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000_1	TANK1	1200	Manhole	Adoptable	TANK2	1200	Manhole	Adoptable
1.001_1	TANK2	1200	Manhole	Adoptable	S2	1350	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S1	417129.253	424707.595	155.164	3.064	1350					
						0	1.000	152.100	150	
S2	417132.786	424731.129	153.607	3.707	1350		1	1.001_1	149.900	300
						0	2.000	149.900	300	
S3	417140.390	424726.183	153.686	3.836	1500		1	1.000	150.000	150
						2	2.000	149.850	300	
						0	1.001	149.850	300	
S4	417156.035	424716.763	152.668	2.968	2400		1	1.001	149.750	300
						0	1.002	149.700	225	
S5	417162.427	424712.793	152.450	2.800	1350		1	1.002	149.650	225
						0	1.003	149.650	225	
S6	417168.887	424723.290	152.450	2.900	1350		1	1.003	149.550	225
						0	1.004	149.550	225	
S7	417176.090	424734.364	150.249	1.449	1350		1	1.004	148.800	225
						0	1.005	148.800	225	
S8	417179.925	424740.640	149.600	1.250	1350		1	1.005	148.350	225
						0	1.006	148.350	225	
S9	417217.040	424718.750	149.600	1.500	1350		1	1.006	148.100	225
TANK1	417131.280	424746.596	152.704	2.704	1200		0	1.000_1	150.000	4200

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
TANK2	417125.454	424736.263	153.260	3.310	1200	 1	1.000_1	149.950	4200
						0	1.001_1	149.950	300

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Detailed
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	1440
M5-60 (mm)	20.000	Additional Storage (m ³ /ha)	0.0
Ratio-R	0.400	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	0	0	0
100	45	0	0

Node S4 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	149.700	Product Number	CTL-SHE-0075-3500-2100-3500
Design Depth (m)	2.100	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	3.5	Min Node Diameter (mm)	1200

Other (defaults)

Entry Loss (manhole)	0.250	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.250	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Approval Settings

Node Size	✓	Minimum Backdrop Height (m)	
Node Losses	✓	Maximum Backdrop Height (m)	1.500
Link Size	✓	Full Bore Velocity	✓
Minimum Diameter (mm)	150	Minimum Full Bore Velocity (m/s)	
Link Length	✓	Maximum Full Bore Velocity (m/s)	3.000
Maximum Length (m)	100.000	Proportional Velocity	✓
Coordinates	✓	Return Period (years)	
Accuracy (m)	1.000	Minimum Proportional Velocity (m/s)	0.750
Crossings	✓	Maximum Proportional Velocity (m/s)	3.000
Cover Depth	✓	Surcharged Depth	✓
Minimum Cover Depth (m)		Return Period (years)	
Maximum Cover Depth (m)	3.000	Maximum Surcharged Depth (m)	0.100
Backdrops	✓	Flooding	✓

Approval Settings

Return Period (years)	30	100 year 360 minute (m ³)	
Time to Half Empty	x	First Flush	✓
Discharge Rates	✓	Return Period (years)	30
Discharge Volume	✓	First Flush Depth (mm)	5

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute summer	109.521	30.991	30 year 960 minute winter	9.416	3.743
1 year 15 minute winter	76.857	30.991	30 year 1440 minute summer	10.161	2.723
1 year 30 minute summer	71.439	20.215	30 year 1440 minute winter	6.829	2.723
1 year 30 minute winter	50.133	20.215	100 year 15 minute summer	348.738	98.681
1 year 60 minute summer	48.435	12.800	100 year 15 minute winter	244.728	98.681
1 year 60 minute winter	32.179	12.800	100 year 30 minute summer	228.965	64.789
1 year 120 minute summer	30.053	7.942	100 year 30 minute winter	160.677	64.789
1 year 120 minute winter	19.966	7.942	100 year 60 minute summer	153.288	40.510
1 year 180 minute summer	23.233	5.979	100 year 60 minute winter	101.841	40.510
1 year 180 minute winter	15.102	5.979	100 year 120 minute summer	92.562	24.461
1 year 240 minute summer	18.475	4.882	100 year 120 minute winter	61.496	24.461
1 year 240 minute winter	12.274	4.882	100 year 180 minute summer	69.806	17.964
1 year 360 minute summer	14.169	3.646	100 year 180 minute winter	45.376	17.964
1 year 360 minute winter	9.210	3.646	100 year 240 minute summer	54.269	14.342
1 year 480 minute summer	11.185	2.956	100 year 240 minute winter	36.055	14.342
1 year 480 minute winter	7.431	2.956	100 year 360 minute summer	40.484	10.418
1 year 600 minute summer	9.182	2.511	100 year 360 minute winter	26.315	10.418
1 year 600 minute winter	6.274	2.511	100 year 480 minute summer	31.414	8.302
1 year 720 minute summer	8.203	2.199	100 year 480 minute winter	20.871	8.302
1 year 720 minute winter	5.513	2.199	100 year 600 minute summer	25.431	6.956
1 year 960 minute summer	6.768	1.782	100 year 600 minute winter	17.376	6.956
1 year 960 minute winter	4.483	1.782	100 year 720 minute summer	22.452	6.017
1 year 1440 minute summer	4.949	1.326	100 year 720 minute winter	15.089	6.017
1 year 1440 minute winter	3.326	1.326	100 year 960 minute summer	18.166	4.784
30 year 15 minute summer	268.706	76.035	100 year 960 minute winter	12.033	4.784
30 year 15 minute winter	188.566	76.035	100 year 1440 minute summer	12.896	3.456
30 year 30 minute summer	174.929	49.499	100 year 1440 minute winter	8.667	3.456
30 year 30 minute winter	122.757	49.499	100 year +45% CC 15 minute summer	505.670	143.087
30 year 60 minute summer	116.589	30.811	100 year +45% CC 15 minute winter	354.856	143.087
30 year 60 minute winter	77.459	30.811	100 year +45% CC 30 minute summer	332.000	93.944
30 year 120 minute summer	70.438	18.615	100 year +45% CC 30 minute winter	232.982	93.944
30 year 120 minute winter	46.797	18.615	100 year +45% CC 60 minute summer	222.268	58.739
30 year 180 minute summer	53.298	13.715	100 year +45% CC 60 minute winter	147.669	58.739
30 year 180 minute winter	34.645	13.715	100 year +45% CC 120 minute summer	134.215	35.469
30 year 240 minute summer	41.604	10.995	100 year +45% CC 120 minute winter	89.169	35.469
30 year 240 minute winter	27.641	10.995	100 year +45% CC 180 minute summer	101.219	26.047
30 year 360 minute summer	31.221	8.034	100 year +45% CC 180 minute winter	65.795	26.047
30 year 360 minute winter	20.295	8.034	100 year +45% CC 240 minute summer	78.690	20.795
30 year 480 minute summer	24.324	6.428	100 year +45% CC 240 minute winter	52.280	20.795
30 year 480 minute winter	16.160	6.428	100 year +45% CC 360 minute summer	58.701	15.106
30 year 600 minute summer	19.756	5.404	100 year +45% CC 360 minute winter	38.157	15.106
30 year 600 minute winter	13.498	5.404	100 year +45% CC 480 minute summer	45.550	12.038
30 year 720 minute summer	17.490	4.687	100 year +45% CC 480 minute winter	30.262	12.038
30 year 720 minute winter	11.754	4.687	100 year +45% CC 600 minute summer	36.875	10.086
30 year 960 minute summer	14.215	3.743	100 year +45% CC 600 minute winter	25.195	10.086

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +45% CC 720 minute summer	32.556	8.725	100 year +45% CC 960 minute winter	17.448	6.936
100 year +45% CC 720 minute winter	21.879	8.725	100 year +45% CC 1440 minute summer	18.700	5.012
100 year +45% CC 960 minute summer	26.340	6.936	100 year +45% CC 1440 minute winter	12.567	5.012

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.71%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute winter	S1	10	152.145	0.044	10.7	0.0636	0.0000	OK
60 minute winter	S2	58	150.178	0.278	8.5	0.3980	0.0000	OK
60 minute winter	S3	59	150.178	0.328	10.7	0.5802	0.0000	SURCHARGED
60 minute winter	S4	58	150.178	0.478	6.7	2.1625	0.0000	SURCHARGED
240 minute summer	S5	124	149.689	0.038	2.6	0.0551	0.0000	OK
15 minute summer	S6	44	149.573	0.023	2.6	0.0328	0.0000	OK
30 minute winter	S7	86	148.822	0.022	2.6	0.0316	0.0000	OK
15 minute summer	S8	48	148.389	0.039	2.6	0.0560	0.0000	OK
15 minute summer	S9	48	148.139	0.039	2.6	0.0000	0.0000	OK
60 minute winter	TANK1	59	150.179	0.178	9.0	0.2018	0.0000	OK
60 minute winter	TANK2	58	150.178	0.228	8.2	0.2583	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)	Discharge Vol (m ³)
15 minute winter	S1	1.000	S3	10.6	2.340	0.191	0.1751	
60 minute winter	S2	2.000	S3	-6.4	0.274	-0.078	0.6285	
60 minute winter	S3	1.001	S4	6.7	0.513	0.082	1.2860	
60 minute winter	S4	Hydro-Brake®	S5	2.6				
240 minute summer	S5	1.003	S6	2.6	0.798	0.055	0.0407	
15 minute summer	S6	1.004	S7	2.6	1.260	0.021	0.0271	
30 minute winter	S7	1.005	S8	2.6	1.154	0.020	0.0243	
15 minute summer	S8	1.006	S9	2.6	0.564	0.065	0.1972	13.0
60 minute winter	TANK1	1.000_1	TANK2	-5.8	0.041	0.000	10.1221	
60 minute winter	TANK2	1.001_1	S2	-7.9	0.304	-0.095	0.5626	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	152.172	0.072	26.3	0.1035	0.0000	OK
120 minute winter	S2	118	150.790	0.890	14.3	1.2730	0.0000	SURCHARGED
120 minute winter	S3	118	150.790	0.940	15.8	1.6602	0.0000	SURCHARGED
120 minute winter	S4	118	150.789	1.089	4.1	4.9286	0.0000	SURCHARGED
120 minute winter	S5	118	149.689	0.039	2.6	0.0552	0.0000	OK
120 minute winter	S6	120	149.573	0.023	2.6	0.0328	0.0000	OK
120 minute winter	S7	120	148.822	0.022	2.6	0.0316	0.0000	OK
120 minute winter	S8	120	148.389	0.039	2.6	0.0561	0.0000	OK
120 minute winter	S9	120	148.139	0.039	2.6	0.0000	0.0000	OK
120 minute winter	TANK1	118	150.790	0.790	10.9	0.8931	0.0000	OK
120 minute winter	TANK2	118	150.790	0.840	14.1	0.9497	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	1.000	S3	26.2	2.458	0.469	0.2818	
120 minute winter	S2	2.000	S3	-11.2	0.266	-0.136	0.6388	
120 minute winter	S3	1.001	S4	4.1	0.523	0.051	1.2860	
120 minute winter	S4	Hydro-Brake®	S5	2.6				
120 minute winter	S5	1.003	S6	2.6	0.799	0.055	0.0408	
120 minute winter	S6	1.004	S7	2.6	1.262	0.021	0.0272	
120 minute winter	S7	1.005	S8	2.6	1.098	0.020	0.0243	
120 minute winter	S8	1.006	S9	2.6	0.565	0.066	0.1978	70.2
120 minute winter	TANK1	1.000_1	TANK2	-6.1	0.041	0.000	40.5870	
120 minute winter	TANK2	1.001_1	S2	-13.7	0.314	-0.165	0.6303	

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.73%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute winter	S1	10	152.185	0.085	34.1	0.1210	0.0000	OK
180 minute winter	S2	176	151.135	1.235	13.5	1.7675	0.0000	SURCHARGED
180 minute winter	S3	176	151.135	1.285	15.2	2.2709	0.0000	SURCHARGED
180 minute winter	S4	176	151.135	1.435	3.9	6.4918	0.0000	SURCHARGED
180 minute winter	S5	176	149.691	0.041	2.9	0.0587	0.0000	OK
180 minute winter	S6	176	149.574	0.024	2.9	0.0349	0.0000	OK
180 minute winter	S7	176	148.824	0.023	2.9	0.0336	0.0000	OK
180 minute winter	S8	176	148.392	0.042	2.9	0.0597	0.0000	OK
180 minute winter	S9	176	148.141	0.041	2.9	0.0000	0.0000	OK
180 minute winter	TANK1	176	151.135	1.135	9.1	1.2839	0.0000	OK
180 minute winter	TANK2	176	151.135	1.185	13.4	1.3405	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)	Discharge Vol (m ³)
15 minute winter	S1	1.000	S3	33.9	2.513	0.609	0.3015	
180 minute winter	S2	2.000	S3	-10.5	0.254	-0.127	0.6388	
180 minute winter	S3	1.001	S4	3.9	0.490	0.048	1.2860	
180 minute winter	S4	Hydro-Brake®	S5	2.9				
180 minute winter	S5	1.003	S6	2.9	0.828	0.063	0.0446	
180 minute winter	S6	1.004	S7	2.9	1.310	0.024	0.0297	
180 minute winter	S7	1.005	S8	2.9	1.046	0.023	0.0266	
180 minute winter	S8	1.006	S9	2.9	0.586	0.075	0.2163	101.2
180 minute winter	TANK1	1.000_1	TANK2	-4.6	0.041	0.000	57.8030	
180 minute winter	TANK2	1.001_1	S2	-13.0	0.309	-0.157	0.6303	

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.56%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute winter	S1	11	152.226	0.126	49.5	0.1802	0.0000	OK
180 minute winter	S2	176	152.082	2.181	20.2	3.1217	0.0000	SURCHARGED
180 minute winter	S3	176	152.083	2.232	22.1	3.9448	0.0000	SURCHARGED
180 minute winter	S4	176	152.083	2.383	5.1	10.7785	0.0000	SURCHARGED
180 minute winter	S5	176	149.696	0.046	3.7	0.0658	0.0000	OK
180 minute winter	S6	176	149.577	0.027	3.7	0.0391	0.0000	OK
180 minute winter	S7	176	148.826	0.026	3.7	0.0375	0.0000	OK
180 minute winter	S8	180	148.397	0.047	3.7	0.0670	0.0000	OK
180 minute winter	S9	180	148.146	0.046	3.7	0.0000	0.0000	OK
180 minute winter	TANK1	176	152.082	2.082	13.5	2.3544	0.0000	SURCHARGED
180 minute winter	TANK2	176	152.080	2.130	20.0	2.4092	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)	Discharge Vol (m ³)
15 minute winter	S1	1.000	S3	48.6	2.788	0.872	0.3617	
180 minute winter	S2	2.000	S3	-15.8	0.225	-0.192	0.6388	
180 minute winter	S3	1.001	S4	5.1	0.544	0.062	1.2860	
180 minute winter	S4	Hydro-Brake®	S5	3.7				
180 minute winter	S5	1.003	S6	3.7	0.888	0.080	0.0526	
180 minute winter	S6	1.004	S7	3.7	1.403	0.030	0.0350	
180 minute winter	S7	1.005	S8	3.7	0.891	0.029	0.0314	
180 minute winter	S8	1.006	S9	3.7	0.628	0.094	0.2551	146.9
180 minute winter	TANK1	1.000_1	TANK2	14.1	0.042	0.000	89.7181	
180 minute winter	TANK2	1.001_1	S2	-19.4	0.291	-0.235	0.6303	



**APPENDIX F
DRAINAGE LAYOUT**

NOTES

1. THIS DRAWING IS PRODUCED FOR USE IN THIS PROJECT ONLY AND MAY NOT BE USED FOR ANY OTHER PURPOSE. THE CONSULTING ENGINEERS ACCEPT NO LIABILITY FOR THE USE OF THIS DRAWING OTHER THAN THE PURPOSE FOR WHICH IT WAS INTENDED IN CONNECTION WITH THIS PROJECT AS RECORDED ON THE TITLE BLOCK FIELDS 'PURPOSE FOR ISSUE' AND 'FILE STATUS CODE'.
2. THIS DRAWING MAY NOT BE REPRODUCED IN ANY FORM WITHOUT PRIOR WRITTEN AGREEMENT FROM ADVANT ENGINEERS
3. DO NOT SCALE FROM THE DRAWING. USE WRITTEN DIMENSIONS ONLY.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
5. DISCREPANCIES MUST BE REPORTED BACK TO THE ENGINEER PRIOR TO CONSTRUCTION.
6. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ADVANT ENGINEERS DRAWINGS AND SPECIFICATIONS.

KEY

-  PROP SW SEWER
-  PROP FW SEWER
-  LINEAR DRAINAGE



B	LAYOUT UPDATED	MJM	20.10.25
A	INITIAL ISSUE	MJM	23.10.24
REV	AMENDMENTS	BY	DATE

FOR COMMENT

STATUS	CHK'D
PRELIMINARY	MJM
FOR COMMENT	MJM
FOR APPROVAL	
FOR CONSTRUCTION	
AS BUILT	



Unit 6 Benton Office Park, Bennett Avenue
 Horbury, Wakefield, West Yorkshire, WF4 5RA
 01924 654108
 wakefield@advantengineers.co.uk

CLIENT
BARNES HOMES

CONTRACT
**HALIFAX ROAD
 HARTSHEAD MOOR**

TITLE
**PRIVATE DRAINAGE
 LAYOUT PLAN**

DRAWN	MJM	CHK'D	MJM
SCALE	1:200 @ A1	DATE	23.10.24

JOB No	DRG No	REV
22091	108	B



157.9m

900a

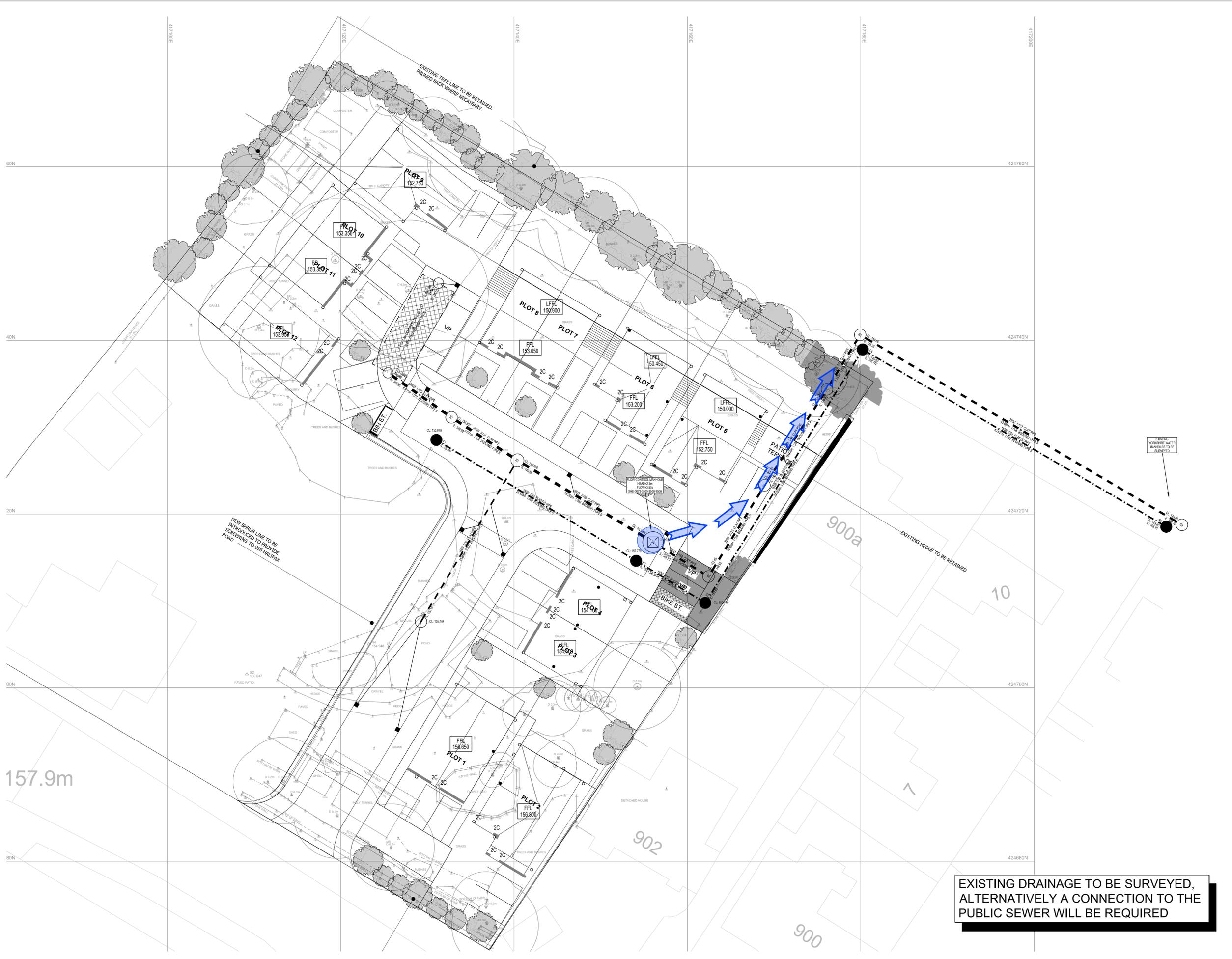
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902

90c



**APPENDIX G
FLOOD EXCEEDANCE PLAN**



- NOTES**
1. THIS DRAWING IS PRODUCED FOR USE IN THIS PROJECT ONLY AND MAY NOT BE USED FOR ANY OTHER PURPOSE. THE CONSULTING ENGINEERS ACCEPT NO LIABILITY FOR THE USE OF THIS DRAWING OTHER THAN THE PURPOSE FOR WHICH IT WAS INTENDED IN CONNECTION WITH THIS PROJECT AS RECORDED ON THE TITLE BLOCK FIELDS 'PURPOSE FOR ISSUE' AND 'FILE STATUS CODE'.
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 6. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ADVANT ENGINEERS DRAWINGS AND SPECIFICATIONS.

- KEY**
- FLOOD EXCEEDANCE EVENT
 - FLOOD FLOW PATH



B	LAYOUT UPDATED	MJM	10.10.25
A	INITIAL ISSUE	MJM	13.05.25
REV	AMENDMENTS	BY	DATE

FOR APPROVAL

STATUS	CHK'D
PRELIMINARY	MJM
FOR COMMENT	MJM
FOR APPROVAL	MJM
FOR CONSTRUCTION	
AS BUILT	

advant ENGINEERS

Unit 6 Benton Office Park, Bennett Avenue
 Horbury, Wakefield, West Yorkshire, WF4 5RA
 01924 654108
 wakefield@advantengineers.co.uk

CLIENT
BARNES HOMES

CONTRACT
**HALIFAX ROAD
 HARTSHEAD MOOR**

TITLE
**FLOOD EXCEEDANCE
 LAYOUT PLAN**

DRAWN	MJM	CHK'D	MJM
SCALE	1:200 @ A1	DATE	13.05.25

JOB No	DRG No	REV
22091	113	B

**EXISTING DRAINAGE TO BE SURVEYED,
 ALTERNATIVELY A CONNECTION TO THE
 PUBLIC SEWER WILL BE REQUIRED**



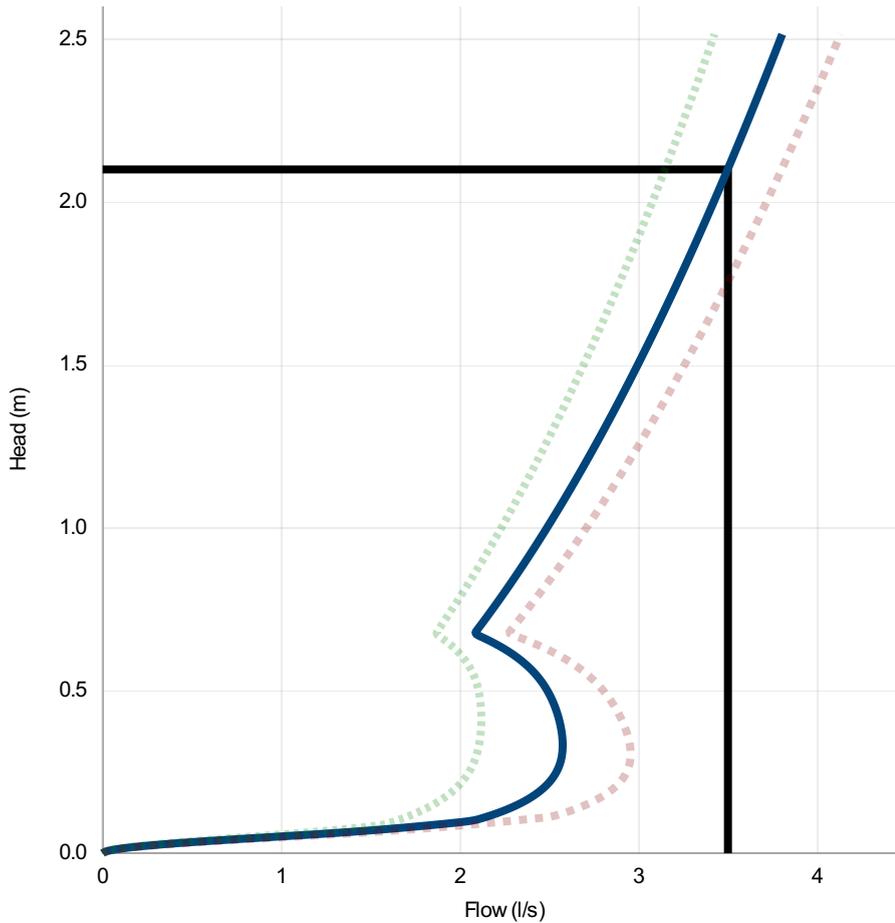
**APPENDIX H
HYDROBRAKE INFORMATION**

Technical Specification

	Original Setting		Minimum Setting		Maximum Setting	
Control Point	Head (m)	Flow (l/s)	Head (m)	Flow (l/s)	Head (m)	Flow (l/s)
Primary Design	2.100	3.500	2.100	3.148	2.100	3.800
Flush-Flo™	0.332	2.575	0.413	2.120	0.305	2.955
Kick-Flo®	0.674	2.079	0.673	1.862	0.674	2.268
Mean Flow		2.656		2.338		2.923



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Head (m)	Flow (l/s)
0.000	0.000
0.072	1.549
0.145	2.306
0.217	2.498
0.290	2.567
0.362	2.572
0.434	2.542
0.507	2.481
0.579	2.370
0.652	2.168
0.724	2.148
0.797	2.243
0.869	2.333
0.941	2.420
1.014	2.503
1.086	2.583
1.159	2.660
1.231	2.735
1.303	2.808
1.376	2.879
1.448	2.947
1.521	3.014
1.593	3.079
1.666	3.143
1.738	3.205
1.810	3.266
1.883	3.326
1.955	3.384
2.028	3.442
2.100	3.498

DESIGN ADVICE

The head/flow characteristics of this SHE-0075-3500-2100-3500 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.



The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.



DATE	20/10/2025 08:03
Site	Halifax Road
DESIGNER	Michael Micklethwaite
Ref	22091

SHE-0075-3500-2100-3500
Hydro-Brake® Optimum

Technical Specification

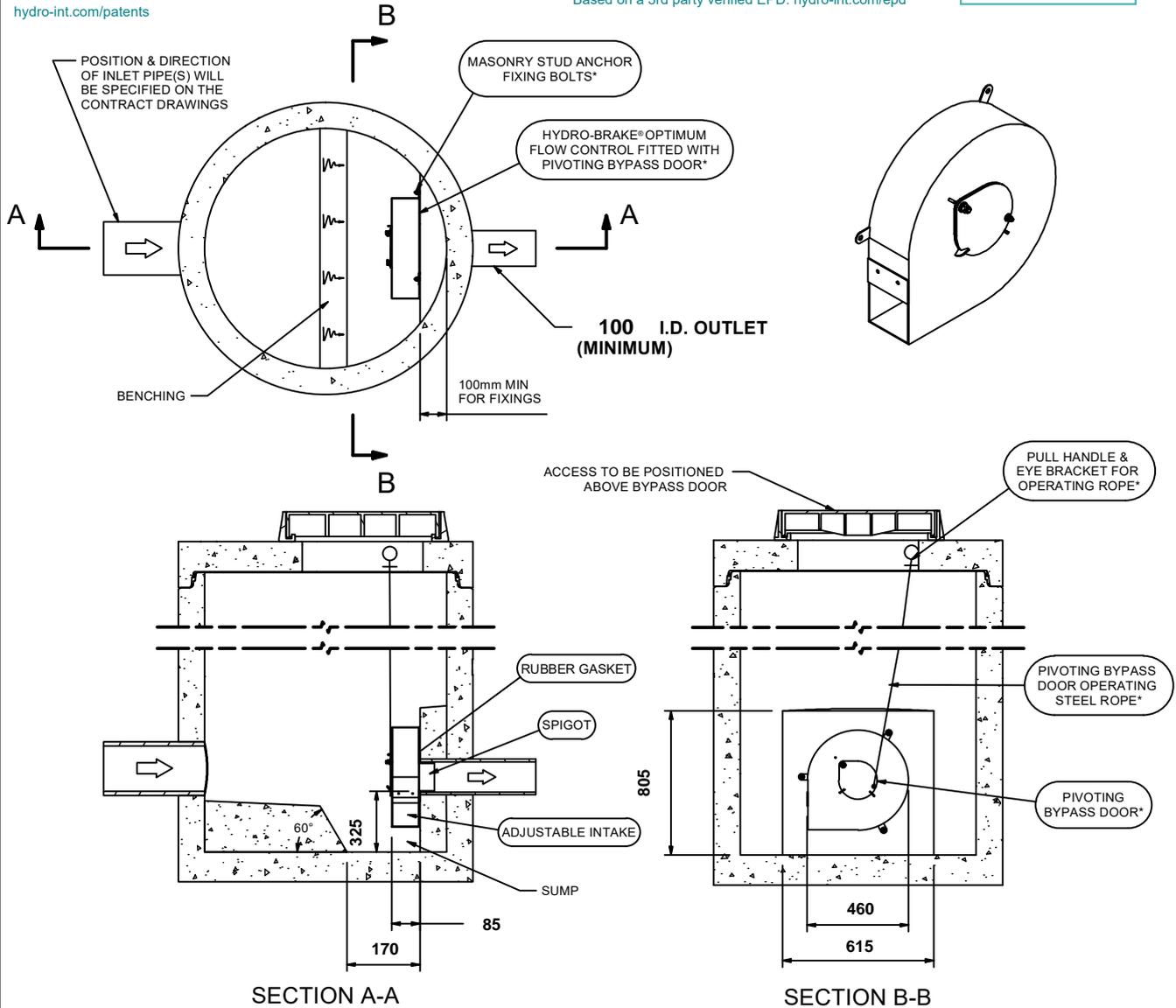
Control Point	Head (m)	Flow (l/s)
Primary Design	2.100	3.500
Flush-Flo™	0.332	2.575
Kick-Flo®	0.674	2.079
Mean Flow		2.656

hydro-int.com/patents

This Hydro-Brake® Optimum includes:

- All in 3 mm Grade 304L stainless steel
- Integral pivoting by-pass door allowing clear line of sight through to outlet, c/w operating rope
- Media blasted for corrosion resistance
- Variable flow rate post installation via adjustable inlet (if necessary)
- Indicative Weight: 15 kg
- Product Carbon Footprint: 48.01 kgCO2e

Based on a 3rd party verified EPD: hydro-int.com/epd



IMPORTANT: ○ LIMIT OF HYDRO INTERNATIONAL SUPPLY
 THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS
 FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL
 ALL CIVIL AND INSTALLATION WORK BY OTHERS
 * WHERE SUPPLIED
 HYDRO-BRAKE® IS A REGISTERED TRADEMARK FOR FLOW CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY
 HYDRO INTERNATIONAL

THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.

DESIGN ADVICE

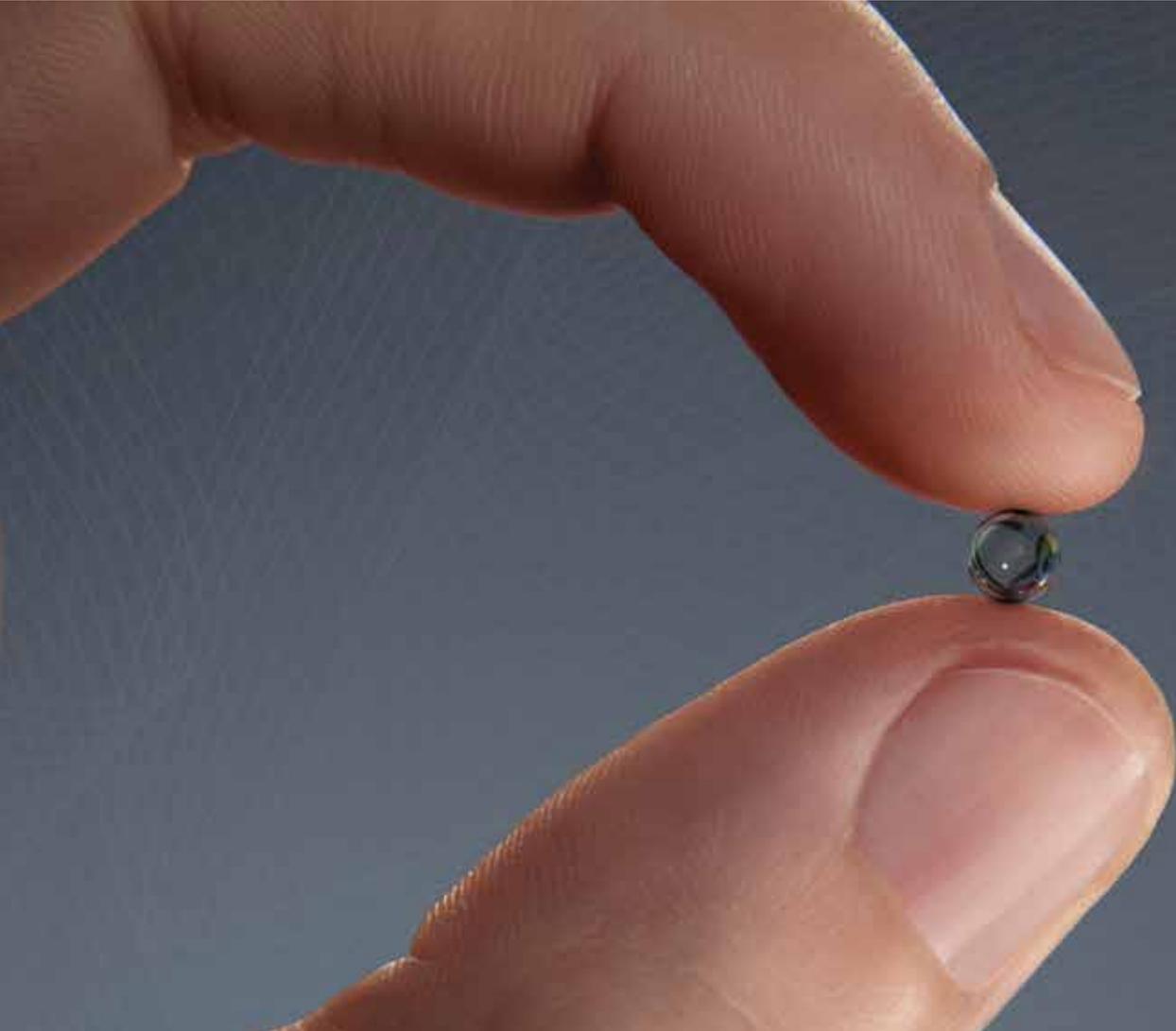


The head/flow characteristics of this SHE-0075-3500-2100-3500 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.
The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

Hydro International
 A CRH COMPANY

DATE	20/10/2025 08:03
SITE	Halifax Road
DESIGNER	Michael Micklethwaite
REF	22091

SHE-0075-3500-2100-3500
 Hydro-Brake® Optimum



The Hydro-Brake® Flow Control Series

Hydro-Brake®
Flood



Hydro-Brake®
Optimum



Hydro-Brake®
Agile

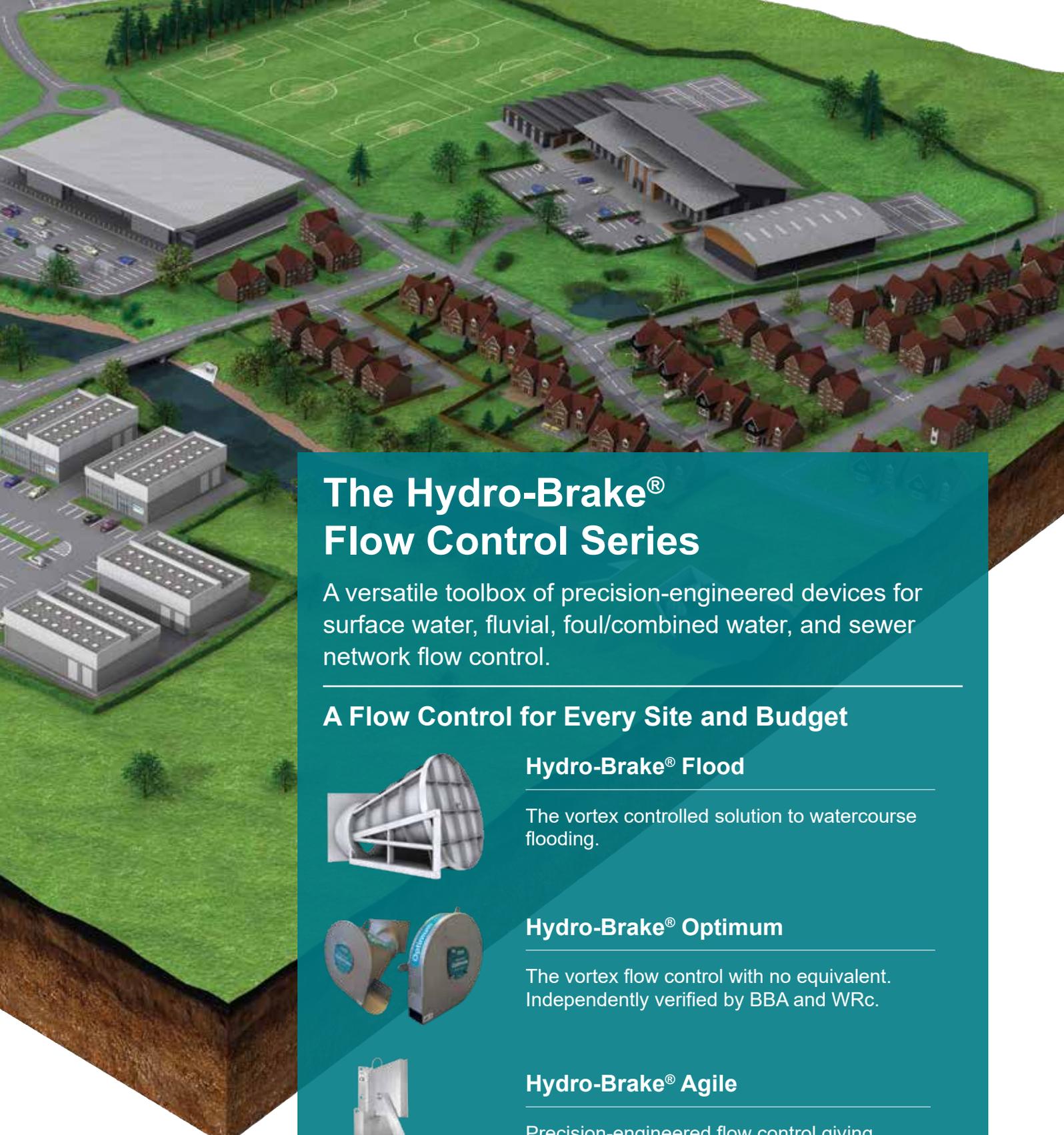


Hydro-Brake®
Orifice



The element of control

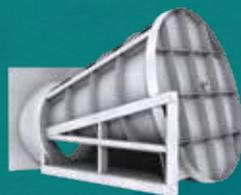
Turning Water Around®



The Hydro-Brake® Flow Control Series

A versatile toolbox of precision-engineered devices for surface water, fluvial, foul/combined water, and sewer network flow control.

A Flow Control for Every Site and Budget



Hydro-Brake® Flood

The vortex controlled solution to watercourse flooding.



Hydro-Brake® Optimum

The vortex flow control with no equivalent. Independently verified by BBA and WRc.



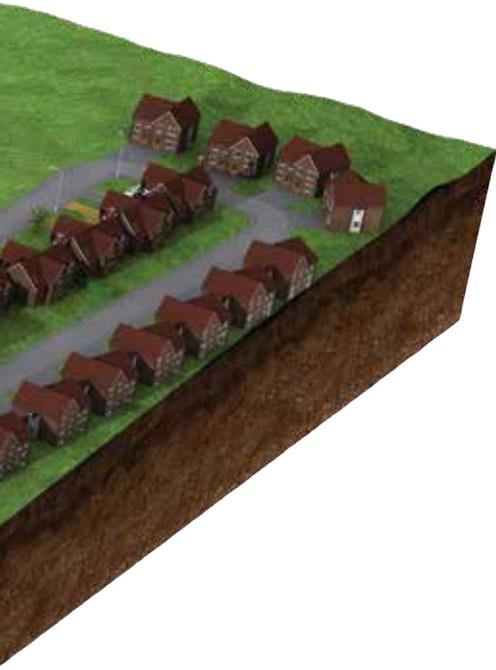
Hydro-Brake® Agile

Precision-engineered flow control giving reduced on-site storage for highly constrained applications.



Hydro-Brake® Orifice

The low cost option for unconstrained sites.



The Element of Control

Hydro International has set the highest standards in flow control technology during more than 40 years of specialist water engineering. When it comes to understanding, predicting and controlling the flow of water, Hydro works with scientific rigour.

Our customers are constantly challenged to deliver imaginative solutions, despite tough commercial and physical constraints. Committed to precision in product development and manufacture, we partner with you to engineer the best-possible water management solutions.

Hydro International's unrivalled knowledge and outstanding technical design support give our customers complete reassurance of system performance and value.

We give you the element of control.

Precision-Engineered for Reliable, Repeatable Performance

The Hydro-Brake® Flow Control Series offers a comprehensive choice for sustainable, performance-optimised attenuation and control whatever the project. Fully scalable and adaptable to your site conditions, there is no need to compromise on your project requirements.

All Hydro International flow controls are manufactured to the same exacting standards of quality. Tested, proven and independently accredited by regulatory bodies across the world, they offer the reassurance of reliable, repeatable performance.

Technical Design Support

Faced with increasingly varied environmental and planning stipulations, engineers need to adapt their solutions accordingly and balance flow rates with storage requirements and optimise the drainage system performance over the duration of a storm. In these circumstances, Hydro International's expert design support can advise on the correct flow control selection and design.

A full range of technical services, including detailed hydraulic modelling, easy-to-use design tools and integration into industry-standard software, all help engineers to achieve optimum hydraulic performance.

Buildable, Maintainable, Adoptable

Hydro International flow controls are designed and manufactured for ease of installation and reliable through-life performance with minimum intervention. Simple, predictable, low-maintenance regimes make them straightforward for management organisations to take on, and remove any concerns for adopting authorities.

For peace of mind and to make maintenance easier and more cost effective Hydro-Logic® Smart Maintenance can be added to any of our flow control chambers. This sophisticated sensor and telemetry package enables remote, monitoring of water levels and alerts will be triggered when abnormal water level activity is detected.

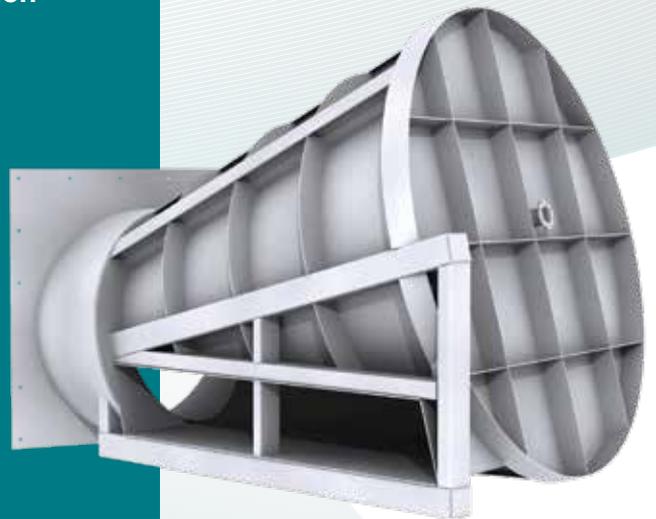
Hydro-Brake® Flood

Hydro-Brake® Flood is a highly sustainable, precision-engineered vortex technology for preventing watercourse flooding.

Hydro-Brake® Flood flow controls have been installed at the heart of low-maintenance, self-activating flood defences since the 1990s, and now protect more than 6,000 properties from an estimated £200m of flood damage in pioneering schemes across the UK.



Watercourse
flood prevention



- ✓ No external power.
- ✓ No moving parts.
- ✓ Upstream flood storage minimised.
- ✓ Minimal maintenance.

Bespoke, Precision Engineering

Each Hydro-Brake® Flood is a bespoke solution that precisely manages watercourse flows, right up to major dams with pass forward flow rates of 30 m³/s. The same technology is used just as successfully in smaller, dispersed schemes.

Each Hydro-Brake® Flood scheme is purpose-designed to optimise flow control performance characteristics and precisely calculate the amount of upstream storage required. Using Hydro-Brake® Flood vortex technology can reduce the volume of floodwater to be stored by up to 30% compared to fixed orifice controls.

A Simple, Elegant Solution

The internal geometry of Hydro-Brake® Flood is designed so that water can flow through it without restriction for as long as possible, minimising the upstream storage required. A self-activating vortex is created when the water reaches the pre-determined hydraulic head, holding back excess water, and releasing it at a controlled rate.

Expert Design and Manufacture

Designing fluvial interventions, whether on a large or small scale, requires expert engineering and hydraulic modelling in line with the flood risk management strategy. Hydro International can support with detailed design using Computational Fluid Dynamics and structural design using Finite Element Analysis, scale testing and production of detailed design drawings and specifications.

Hydro-Brake® Flood vortex flow controls are manufactured in high-grade stainless steel to be structurally fit-for-purpose, using modern production and control methods to ensure the design and performance objectives are delivered.

Low Impact, Minimal Maintenance

The Hydro-Brake® Flood has a large open area at all flow rates, resulting in a low risk of blockages. With no power or moving parts, the flow controls require minimal operational attention and maintenance.

Future-Proofed

Hydro-Brake® Flood schemes can be designed to allow for future variances in fluvial flows. A facility for future adjustment to allow for climate change can be incorporated without necessitating new engineering or construction works.

Monitoring

Flood alleviation at the fluvial level can be demonstrated to deliver a level of protection that is worth far more than the project costs. We can offer support and advice on post-installation monitoring of the value of the intervention.

Case Studies



Flood Prevention Scheme Protects 1,750 Properties in Glasgow

Glasgow City Council's £53 m White Cart Water Flood Prevention scheme protects 1,750 properties in the south of the city. Normally a shallow river, White Cart Water is prone to flash flooding. As little as twelve hours of rain can cause water levels to rise by six metres.

New manufacturing and installation techniques were developed as part of the project that saw the world's five largest-ever Hydro-Brake® Flood vortex flow controls installed in 3 dams in the highlands above the city. The final scheme controls flow rates and velocities up to a 1 in 200 year flood event, with a 45% maximum reduction in peak flows, holding back more than 2.5 billion litres of floodwater in upstream storage areas that make best use of the natural environment.



Vortex Technology Protects Northallerton Homes and Businesses

In the North Yorkshire town of Northallerton, a £3.1 million flood alleviation scheme is using Hydro-Brake® Flood technology to protect 170 homes and businesses. Two large Hydro-Brake® Flood vortex flow controls were installed in refurbished culverts on town's outskirts.

They enable excess water to be held back in specially-built flood storage basins. Before the scheme was built, excess floodwaters could overtop the watercourse in the agricultural land on its approach to the culverts sending flows to cause flooding in the east of the town. Hydro International carefully-sized the flow controls to minimise upstream storage requirements.

Hydro-Brake® Flood Selection Criteria

Suitability:	For rivers & watercourses; Flood storage reservoirs		
Flow Range (l/s)	Head Range (m)	Ability to match greenfield discharge rate	On-site water storage requirement
550 – 12,000 *	1.5 – 10 *	n/a	Low
Moving Parts?	External Power?	Risk of blockage?	
No	No	Very low	

* higher flows and heads may be possible (contact Hydro International to discuss)

Hydro-Brake® Optimum

The Hydro-Brake® Optimum is Hydro International's flagship passive flow control device and the most advanced vortex flow control available.

Hydro-Brake® Optimum is the only vortex flow control for which the head and discharge relationship can be fine-tuned to optimise your design. Designers can size a Hydro-Brake® Optimum to achieve the perfect hydraulic performance curve and engineer the best possible passive flow control performance.



Surface water management and SuDS



Combined drainage systems and CSOs



Watercourse flood prevention



Sewer network optimisation



Wastewater treatment plants



- ✓ No external energy source.
- ✓ No moving parts.
- ✓ Future-proof.
- ✓ Large outlet clearances prevent blockages.

There is No Equivalent

Hydro-Brake® Optimum dispenses with the need to choose from a range of sizes and types and instead offers built-in flexibility to size each unit for absolute fit. Each Hydro-Brake® Optimum is individually-sized, so you achieve performance without compromise for every project.

Maximise Storage Savings

The increased hydraulic efficiency of the Hydro-Brake® Optimum means you can reduce on-site storage by up to 15% than if an alternative vortex control is used. With reduced storage, you can lower construction and excavation costs as well as saving project time and overall land-use.

Best Value for Every Project

Selecting the superior performance of Hydro-Brake® Optimum does not mean a higher cost for your project. On the contrary, because your upstream storage can be fine-tuned to achieve the smallest volumes, construction, excavation and material costs are reduced.

Easy to Install

Hydro-Brake® Optimum comes with a range of installation options and accessories to make construction and installation as simple as possible.

Setting the Standard

The Hydro-Brake® Optimum is the culmination of more than 40 years of research and development by Hydro International, and the company continues to take an international lead in vortex technology and expertise. Hydro-Brake® Optimum is the only vortex flow control to be independently certified by BBA and WRc for the control of stormwater or combined flows.



Minimal Maintenance

With up to 20% larger outlet clearances compared to other vortex devices, there is significantly less risk of blockage with a Hydro-Brake® Optimum. With no power source or moving parts, it offers minimal, predictable maintenance.

Future-Proofed

Standard, Hydraulically Efficient, Hydro-Brake® Optimum units are supplied with an adjustable inlet, allowing post-installation flow adjustments without the need to replace the whole device.

Flow Control Chamber

A Hydro-Brake® Optimum flow control can be supplied prefitted in a precast reinforced concrete chamber. Custom options including high level emergency bypass, rodding pipe and removable units are also available.

Case Studies



Tight Fit for New Homes

Engineers challenged to solve a “tight fit” surface water management challenge on a West Yorkshire housing development used the Hydro-Brake® Optimum Design Tool to calculate a solution that optimised the limited pipe storage area. Using conventional flow control devices would have required more back up storage than would fit in the space available, but by using Hydro-Brake® Optimum flood protection measures, challenging discharge limits were met for a 1 in 100 year storm.



‘Optimum’ Savings for Developer with 21st Century Drainage

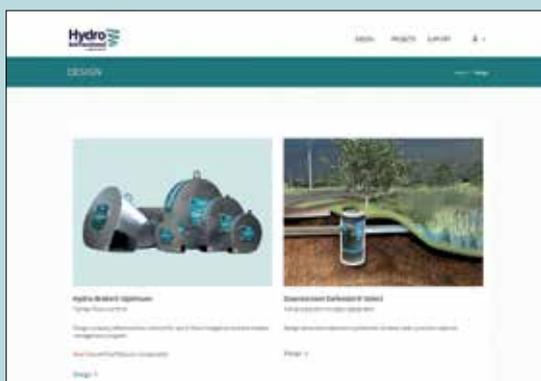
The first phase of Edinburgh City Council's 21st Century Homes project, the Gracemount development showcases sustainable construction. A major feature of the drainage solution is Hydro International's high performance Hydro-Brake Optimum® to control surface water which saved the developers over 30% in storage construction costs.

Photo courtesy of Edinburgh City Council

Hydro-Brake® Optimum Selection Criteria

Suitability:	Most sites, from very low to very high flow rates		
Flow Range (l/s)	Head Range (m)	Ability to match greenfield discharge rate	On-site water storage requirement
0.7 – 550 *	0.4 – 4.0	Very good	Low
Moving Parts?	External Power?	Risk of blockage?	
No	No	Very low	

* lower flows may be possible (contact Hydro International to discuss)



Explore the Options with our Online Design Tool

Our online design tool is a sizing engine that gives you the flexibility to compare flow control design options, output detailed design drawings and hydraulic data and import the results into commercially-available hydraulic modelling software.

The tool also has the option to design and customise our latest stormwater treatment separator, the Downstream Defender® Select.

hydro-int.design

Hydro-Brake® Agile

The Hydro-Brake® Agile flow control delivers precision engineering with best value for even the most constrained sites.

The Hydro-Brake® Agile flow control is a float-activated flow control that maintains a constant discharge to deliver precise performance over a wide range of heads. It is ideally suited to applications with constrained discharge requirements or where the flood storage area available through attenuation is very limited.



Surface water
management
and SuDS



Watercourse
flood
prevention



- ✓ No external energy source.
- ✓ Rapid drain-down provides resilience to subsequent rainfall events.
- ✓ Future-proof – simple adjustments possible for future changes in operating conditions.
- ✓ Repeatable, predictable maintenance regime.

Meet Stringent Discharge Consents

Designing flood storage, whether above or below ground, is dependent on the rate at which excess water can be controlled and discharged. The Hydro-Brake® Agile flow control is the only flow control design that achieves a constant rate of discharge and therefore the minimum possible upstream storage.

Whether controlling surface water on a housing development, or regulating flows in a wastewater treatment works, investment in a precision-engineered device can result in considerable savings in total project costs.

Sustainable Solution

The Hydro-Brake® Agile flow control provides sustainable control of flood storage without the need for external power sources or control circuits. Simple adjustments can be made to future-proof the device to allow for climate change.

Quality Manufacture

The Hydro-Brake® Agile flow control is precision-engineered using high-grade stainless steel with long-life, durable components and CE marked in accordance with the EU Machinery Directive (2006/42/EC). Manufactured in the UK, the flow control can be transported quickly to site to meet project timescales.

Easy to Install and Maintain

During dry weather periods, and especially during the first flush of a storm, the outlet area is at its largest, reducing the risk of blockages.

In the event of a blockage, an integrated release mechanism can be operated from surface level, enabling the gate to be fully opened and returned to its operating position.

Hydro-Brake® Agile Flow Control Chamber

The Hydro-Brake® Agile flow control can be supplied pre-fitted in a precast reinforced concrete chamber for quick and easy installation on site.

A range of outlet pipe sizes is also available to suit site requirements. Once lifted into position, the connecting pipework can be connected and a cover slab installed. To suit the location and invert required, the chamber depth can be easily varied with concrete rings.

Example Solutions

Constrained Space

For an urban in-fill housing project in a heavily-developed inner city area, the design team were keen to deliver an effective drainage strategy. However, there was limited space available, conflicting demands from new and existing services, and an existing drainage infrastructure with very limited capacity to accept additional flows.

Using a flow control that provided a near-constant discharge rate within the parameters of the available downstream capacity, the surface water was moved off-site as quickly and effectively as possible, enabling the on-site storage to be reduced to a level that could be accommodated in the heavily constrained space available.

Constant Discharge

Providing temporary flood storage through attenuation was the solution to a known surface water flooding problem. A flow control was needed to limit flow to the existing drainage network, with the excess rainwater overflowing into an off-line attenuation tank. Implementation costs had to be kept to an absolute minimum or the project may not have been feasible. In addition, any surcharge to the upstream drainage network would have moved flooding to a different part of the catchment.

A constant discharge flow control was therefore used to pass forward an appropriate amount of flow at all times, minimising pressure on the upstream network and only putting floodwater into the attenuation structure when absolutely necessary.

Hydro-Brake® Agile Selection Criteria

Suitability:	Constrained sites with stringent discharge consents		
Flow Range (l/s)	Head Range (m)	Ability to match greenfield discharge rate	On-site water storage requirement
4.5 – 100	0.4 – 2.4	Good	Very low
Moving Parts?	External Power?	Risk of blockage?	
Yes	No	Not suited to all sites	

Hydro-Brake® Orifice

The Hydro-Brake® Orifice delivers cost-effective, precise, repeatable flow control and is suitable for unconstrained sites with generous discharge consents

The Hydro-Brake® Orifice is a precision-cut orifice plate flow control, available in a broad range of configurations. A low-cost, low-complexity flow control, it is the ideal choice where there is minimal limitation on space available for on-site flood storage and attenuation, or where there are generous discharge consents.



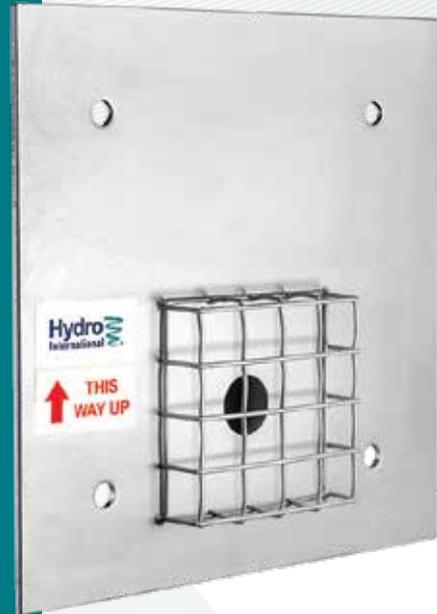
Surface water management and SuDS



Watercourse flood prevention



Sewer network optimisation



Flexible and Versatile

Already trusted as part of Hydro International's family of precision-engineered flow control devices, the Hydro-Brake® Orifice can be designed and manufactured to meet a wide variety of configurations. With the Hydro-Brake® Orifice there is no need to compromise on your project needs.

Configured for Each Site

Each Hydro-Brake® Orifice is manufactured to suit the precise hydraulic requirements specified for the application. Our experienced professional engineering team will work with you to understand the needs of your site and recommend the best solution.

A wide variety of configurations and mounting options is available, for example integrated mesh guards, curve mount, pipe inserts and slide- or pivot-mounts. Hydro International can advise on sizing and flow rates and recommend the best solution for your site.

Quality Manufacture

The Hydro-Brake® Orifice is manufactured from high-grade stainless steel under strict Quality Assurance to the exacting methods and tolerances set out in the international standard BS EN ISO 5167-2: 2003.

Simple to Install

The Hydro-Brake® Orifice is simple to install. It can also be supplied pre-fitted in a precast reinforced concrete chamber for 'plug-and-play' installation on site.

Resilience by Design

The Hydro-Brake® Orifice can be supplied with integrated protection against the risk of blockages. Alternatively, the Hydro-Brake® Orifice can be mounted on moveable or removable structures to allow for manual intervention to drain the control chamber from surface level and clear any blockages that do occur.

Hydro-Brake® Orifice Selection Criteria

Suitability:	Unconstrained sites with generous discharge consents		
Flow Range (l/s)	Head Range (m)	Ability to match greenfield discharge rate	On-site water storage requirement
2.5 – 100 *	0.25 – 2.0 *	Not suited to all sites	Unconstrained
Moving Parts?	External Power?	Risk of blockage?	
No	No	Not suited to all sites	

* flows and heads may be possible outside of these ranges (contact Hydro International to discuss)

Hydro-Brake® Flow Control Series Selection Guide

The Hydro-Brake® Flow Control Series is a versatile toolbox for surface water, fluvial, foul water, and sewer network flow control. No matter what the site and budget, every flow control offers the same precision-engineered performance.

Features	Hydro-Brake® Flood	Hydro-Brake® Optimum	Hydro-Brake® Agile	Hydro-Brake® Orifice
Suitability	For watercourses; Flood storage reservoirs	Most sites, from very low to very high flow rates	Constrained sites with stringent discharge consents	Unconstrained sites with generous discharge consents
Flow Range (l/s) *	550 – 12,000	0.7 – 550	4.5 – 100	2.5 – 100
Head Range (m) *	1.5 – 10	0.4 – 4.0	0.4 – 2.4	0.25 – 2.0
Ability to Match Greenfield Discharge Rate	n/a	Very good	Good	Not suited to all sites
Moving Parts	No	No	Yes	No
Future Proof	Option that can be designed in	Adjustable inlet fitted as standard on Hydraulically Efficient units	No	No
External Power Requirement	No	No	No	No
Constant Discharge	No	No	Yes	No
On-site Storage	Low	Low	Very low	Unconstrained
Risk of Blockage	Very low	Very low	Not suited to all sites	Not suited to all sites

* flows and heads outside of these ranges may be possible (contact Hydro International to discuss)

Expert Design Support

No matter how big or small the project, Hydro International's professional engineers are on hand to provide free support to designers and specifiers to aid with the correct selection and configuration of Hydro flow controls for each project design.

Our dedicated design support team advises on best-practice sizing, flow and storage calculations for the Hydro-Brake® Flow Control Series within your surface water, fluvial, sewer or wastewater plant design.

Data, Insight and Analysis Services

Our Hydro-Logic® smart monitoring equipment provides a remote data collection capability that delivers real-world climate, water level, water flow and water quality data in near real time.

Documentation

Our dedicated design support team can assist with the output of hydraulic data to support your system design and dimensioned installation drawings, as well as advising on successful integration with other Hydro International water treatment and storage products.

Call the Hydro-Brake® Hotline 01275 337937
or email stormwater@hydro-int.com.

For Flow Control
Product and Design Advice:

Tel: 01275 337937

Email: stormwater@hydro-int.com

Hydro-Brake[®] Flow Control Series

Unit 2
Rivermead Court
Kenn Business Park
Windmill Road
Kenn
Clevedon
BS21 6FT

Tel: **01275 878371**

hydro-int.com

Turning Water Around...[®]



Unit 6

Benton Office Park

Bennett Avenue

Horbury, Wakefield

West Yorkshire

WF4 5RA

01924 654108

mail@advantengineers.co.uk

www.advantengineers.co.uk