

Drainage Maintenance Schedule



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Project	Wicks Farm, Ford
Project Number	23314

By Steve Burgess
Date 24 September 2020

1 General

- 1.1 A copy of the Jackson Purdue Lever SuDS Operation and Maintenance Statement is attached at the rear of this documents. Where discrepancies are present between the Jackson Purdue Lever SuDS Operation and Maintenance Statement and this document this document will take precedent.
- 1.2 Any reference to designs or drawings within either document must be made to the current set of drawings.

2 System Summary

2.1 Catchment 1

- 2.1.1 Surface water runoff from the hardstanding areas to the south of the glasshouses drains via ACO channels into the conveyance swale located along the southern edge of the adjacent access road and then discharges to the pond located at the south western corner of the site.
- 2.1.2 Surface water runoff from the gravel car park to the south of the glasshouses drains via a fin drain the conveyance swale located along the southern edge of the adjacent access road and then discharges to the pond located at the south western corner of the site.
- 2.1.3 Surface water runoff from the southern site access road falls into the adjacent conveyance swale located along the southern edge of the access road and then discharges to the pond located at the south western corner of the site.
- 2.1.4 Surface water from the pond at the south western corner of the site discharges at a restricted rate via a Hydrobrake flow control device into an existing ditch along the western boundary of the site.
- 2.1.5 The existing ditch along the western boundary of the site channels surface water flows to the north and finally discharges into the watercourse on the northern side of the adjacent railway line.

2.2 Catchment 2

- 2.2.1 Surface water runoff from the glasshouses drains from the roofs via a siphonic rainwater pipe system.
- 2.2.2 Surface water runoff from the glasshouses is then discharged into the large lined reservoir at the north eastern corner of the site.
- 2.2.3 The reservoir has been designed to retain a level of water for operational use within the development. Any additional volume of surface water runoff then discharges though a high level restricted overflow via a Hydrobrake flow control device into an existing ditch along the northern boundary of the site.



- 2.2.4 The existing ditch along the northern boundary of the site channels surface water flows to the west and finally discharges into the watercourse on the northern side of the adjacent railway line.

3 Schedule of Maintenance

- 3.1 Once appointed the Contractor will prepare a site specific method statement for the control of silt and other pollutants during construction. CIRIA Report C532, Control of water pollution from construction sites, provides further guidance on this.
- 3.2 The Contractor will maintain the proposed drainage system during construction and until the handing over of the site.
- 3.3 Upon completion, responsibility for regular and corrective maintenance of all elements of the drainage system will be passed on to a Site Operator and managed by them.
- 3.4 An initial pre-handover inspection of the scheme will be undertaken to ensure that it has been constructed as designed.
- 3.5 Provisions will be made to replace any infrastructure that has reached the end of its serviceable design life and will be replaced on a like for like basis as far as reasonably practicable.
- 3.6 The following maintenance schedules detail the typical tasks to be undertaken at different intervals and is based on the maintenance requirements outline in Chapter 32 of CIRIA document C753 'The SuDS Manual'.

Maintenance Schedule	Required Action	Frequency
Regular / Occasional Maintenance	Inspections and reporting on the whole drainage system	2 monthly or after significant storm events*
	Litter and debris removal – trash screen, catch pits, Hydrobrake control device, swales, permitter ditches, pond and reservoir	Monthly or as required
	Grass Cutting – swales, pond and reservoir	Monthly or as required
	Weed and invasive plant control – swales, pond and reservoir	As required
	Shrub Control – swales, pond, permitter ditches and reservoir	As required
	Aquatic and shoreline vegetation management	As required
	Surface and foul water pipework, channel drains, headwalls and fin drains – jetting / rodding	Every 2 years or as required
	Remove sediment and debris from silt trap chambers, channel drains and inlet chambers	6 monthly
	Remove sediment and debris from swales, pond and permitter ditches and reservoir	Once a year
	Inspection of foul pumping station	Once a year

* During the first year of operation inspections will usually be carried out monthly and/or after significant storm events to ensure that the system is functioning as designed and that no damage is apparent.

Maintenance Schedule	Required Action	Frequency
Corrective Maintenance	Remove debris and/or blockages from the drainage systems including, trash screen, silt traps, channel drains, fin drains, Hydrobrake control device	As required
	Repairs to access chambers, pipework, silt traps, manhole covers, fin drains, channel drains, headwalls, trash screens and grilles	As required
	Inspect inlet, outlet from downpipe and gullies for blockages, standing water and clear	As required
	Service and/or repair foul pumping station apparatus	As required/ when alarm indicates
	Replace Hydrobrake control device	As required/every 25 years
	Replace foul pumping station	As required/every 10 years

Indicative Schedule of Maintenance for the Proposed Drainage System

3.7 A copy of the Hydrobrake specifications are attached at the rear of this document.

4 Financing

4.1 The regular and corrective maintenance of all elements of the drainage system will be managed and funded through by the Site Operator.

Inspection / Action Required	Gullies, Channels , Fin Drains and Gutters	Catchpits / Inspection Chambers	Surface and Foul Water Pipework	Headwalls and Trash Screen	Pond / Swales / Reservoir	Hydrobrake Control Device	Foul Pumping Station
After leaf fall in Autumn	✓	✓					
Monthly	✓				✓		
2 Monthly	✓	✓	✓	✓	✓	✓	✓
6 Months	✓	✓		✓			
1 Year					✓		✓
2 Years			✓				
10 Years							✓
25 Years						✓	
When alarm indicates							✓

Drainage System Maintenance Summary



SuDS Operation and Maintenance Statement

Drainage Design
Wicks Farm, Arundel
JDI01679-1HI



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A	Proposed Drainage Layout
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1.0 Terms of Reference

1.1 Report Details

Jackson Purdue Lever has been appointed by Envireau to prepare a SuDS Operation and Maintenance Statement. No liability is accepted to any third party for all or part of this report in connection with this or any other development.

This document has been produced, the contents of which are based on current best practice guidance, to demonstrate the effectiveness and longevity of the SuDS features designed within the drainage strategy.

The surface water network has been designed to accommodate the 1 in 100 year storm rainfall event plus an allowance of 40% for climate change. As the flows are generally being attenuated on site, and within SuDS features, there will be a period of time after storm events where the network is still partially or fully surcharged and is discharging runoff. Should any surcharging still be present 48 hours after the end of the storm, appropriate action should be taken as noted within the following sections.

This document is intended to give an overview of the operation and maintenance for the range of SuDS features included within the drainage strategy and in relation to typical/standard details only. Where proprietary products are specified the manufacturer's recommendations should be followed in the first instance, unless specifically noted otherwise due to project constraints.

The recommended operation and maintenance intervals are indicative only and should initially be undertaken on a more frequent basis to ensure that there are no unforeseen issues with the construction and early operation. The frequency can then be adjusted to suit the Client's wider site maintenance programme.

1.2 Report History

Status - Revision	Author	Approved	Issued Date	Purpose
A1-C01	MPW	TSL	27/03/2020	Issued for Planning
A1-C02	MPW	TSL	24/06/2020	Updated following comments received from LLFA.



2.0 Pipes and Manholes

2.1 Location and Description

The proposed pipes and manholes are shown on the drainage layout drawing included within Appendix A.

The pipes and manholes have been designed in accordance with CIRIA C753 and all current British Standards. Where specified, proprietary products are to be installed and maintained in accordance with the manufacturer's recommendations.

2.2 Operation

The pipes are intended to be surface water conveyance features. These features are intended to be dry except during rainfall events and have been designed to be self-cleansing as a result of the gradients proposed.

Access for maintenance has been provided through inspection chambers, manholes and rodding eyes.

2.3 Inspection and Maintenance Regime

Regular inspection and maintenance are an important factor for the effective operation of these features and to identify areas which may have been obstructed/clogged and are not operating correctly.

A recommended schedule of maintenance activities is included in the table below:

Maintenance Schedule	Required Action	Typical Frequency
Occasional Maintenance	Remove or control tree roots where they are encroaching pipe runs, using recommended methods (e.g. NJUG, 2018 or BS 3998:2010)	As required
Remedial Actions	Clear pipework of blockages	As required
Monitoring	Initial inspection should be provided using a post-construction CCTV survey	Once (post-construction)
	Inspect for evidence of poor operation	Monthly (during the first year), then annually



3.0 Channel Drains

3.1 Location and Description

The proposed channel drains are shown on the drainage layout drawing included within Appendix A.

The channel drains have been designed in accordance with CIRIA C753 and all current British Standards. Where specified, proprietary products are to be installed and maintained in accordance with the manufacturer's recommendations.

3.2 Operation

The channel drains are intended to be surface water collection and conveyance features. These features are intended to be dry except during rainfall events.

The surface water should enter the drainage channel from runoff from adjacent impermeable surfaces and typically consist of a channel with a removable grate.

Access for maintenance has been provided through access chambers, rodding points and the removable cover grates.

3.3 Inspection and Maintenance Regime

Regular inspection and maintenance are an important factor for the effective operation of these features and to identify areas which may have been obstructed/clogged and are not operating correctly.

A recommended schedule of maintenance activities is included in the table below:

Maintenance Schedule	Required Action	Typical Frequency
Routine Maintenance	Remove litter and debris and inspect for sediment accumulation	Six monthly
Remedial Actions	Clear pipework of blockages	As required
Monitoring	Inspect for evidence of poor operation	Monthly (during the first year), then annually
	Inspect sediment accumulation rates and establish appropriate removal frequencies	Monthly (during the first year), then annually



4.0 Flow Control Chambers/Devices

4.1 Location and Description

The proposed flow control chambers/devices are shown on the drainage layout drawing included within Appendix A.

The flow control chambers/devices have been designed in accordance with CIRIA C753 and all current British Standards. Where specified, proprietary products are to be installed and maintained in accordance with the manufacturer's recommendations.

4.2 Operation

The flow control chamber/device is intended to restrict the discharge rate of surface water leaving the site to a designed rate utilising devices such as an orifice plate, vortex separator or mechanical float control.

Access for maintenance has been provided through the chamber itself.

4.3 Inspection and Maintenance Regime

Regular inspection and maintenance are an important factor for the effective operation of these features and to identify areas which may have been obstructed/clogged and are not operating correctly.

A recommended schedule of maintenance activities is included in the table below:

Maintenance Schedule	Required Action	Typical Frequency
Routine Maintenance	Remove litter and debris and inspect for sediment accumulation	Annually
Regular Maintenance	Check any penstocks and other mechanical devices	Annually
Remedial Actions	Clear pipework of blockages, utilise penstock to clear chamber if required	As required
Monitoring	Initial inspection should be provided using a post-construction CCTV survey	Once (post-construction)
	Inspect for evidence of poor operation	Monthly (during the first year), then annually



5.0 Swales

5.1 Location and Description

The proposed swales are shown on the drainage layout drawing included within Appendix A.

The swales have been designed in accordance with CIRIA C753 and all current British Standards. Where specified, proprietary products are to be installed and maintained in accordance with the manufacturer's recommendations.

5.2 Operation

The swales are intended to be surface water conveyance, water quality improvement and attenuation storage features. These features are intended to be dry except during rainfall events.

Specific access for maintenance has not been provided as the swales are open features that can be accessed from the surrounding area.

5.3 Inspection and Maintenance Regime

Regular inspection and maintenance are an important factor for the effective operation of swales.

A recommended schedule of maintenance activities is included in the table below:

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter and debris	Monthly, or as required
	Cut grass – to retain grass height within specified design range	Monthly (during growing season), or as required.
	Manage other vegetation and remove nuisance plants	Monthly at start, then as required
	Inspect inlets, outlets and overflows for blockages and clear if required	Monthly
	Inspect infiltration surfaces for ponding, compaction, silt accumulation, record areas where water is ponding for > 48 hours	Monthly, or as required
	Inspect vegetation coverage	Monthly for six months, quarterly for two years, then six monthly
	Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies	Six monthly
Occasional Maintenance	Re-seed areas of poor vegetation growth, alter plant types to better suit conditions if required	As required, or if bare soil is exposed over 10% or more of the swale treatment area
Remedial Actions	Repair erosion or other damage by re-turfing or re-seeding	As required



	Re-level uneven surfaces and reinstate design levels	As required
	Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface	As required
	Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip	As required
	Remove and dispose of oils or petrol residues using safe standard practices	As required



6.0 Ponds and Wetlands

6.1 Location and Description

The proposed ponds and wetlands are shown on the drainage layout drawing included within Appendix A.

The ponds and wetlands have been designed in accordance with CIRIA C753 and all current British Standards. Where specified, proprietary products are to be installed and maintained in accordance with the manufacturer's recommendations.

6.2 Operation

The ponds and wetlands are intended to be surface water conveyance, water quality improvement and attenuation storage features. These features are intended to be wet.

Specific access for maintenance has not been provided as the ponds and wetlands are open features that can be accessed from the surrounding area.

6.3 Inspection and Maintenance Regime

Regular inspection and maintenance are an important factor for the effective operation of ponds and wetlands.

A recommended schedule of maintenance activities is included in the table below:

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter and debris	Monthly, or as required
	Cut the grass – public areas	Monthly (during growing season)
	Cut the meadow grass	Six monthly (spring, before nesting season and autumn)
	Inspect marginal and bankside vegetation and remove nuisance plants (for first three years)	Monthly (at start), then as required
	Inspect inlets, outlets, banksides, structures, pipework, etc. for evidence of blockage and/or physical damage	Monthly
	Inspect water body for signs of poor water quality	Monthly (May-October)
	Inspect silt accumulation rates in any forebay and in main body of the pond and establish appropriate removal frequencies; undertake contamination testing once some build-up has occurred, to inform management and disposal options	Six monthly



	Check any mechanical devices, e.g. penstocks	Six monthly
	Hand cut submerged and emergent aquatic plants (at minimum of 0.1m above pond base; include maximum 25% of pond surface)	Annually
	Remove 25% of bank vegetation from water's edge to a minimum of 1.0m above water level	Annually
	Tidy all dead growth (scrub clearance) before start of growing season (Note: tree maintenance is usually part of overall landscape management contract)	Annually
	Remove sediment from any forebay	Every 1-5 years, or as required
	Remove sediment and planting from one quadrant of the main body of ponds without sediment forebays	Every five years, or as required
Occasional Maintenance	Remove sediment from the main body of big ponds when pool volume is reduced by 20%	With effective pre-treatment, this will only be required rarely, e.g. every 25-50 years
Remedial Actions	Repair erosion or other damage	As required
	Replant, where necessary	As required
	Aerate pond when signs of eutrophication are detected	As required
	Realign riprap or repair other damage	As required
	Repair/rehabilitate inlets, outlets and overflows	As required

Technical Specification

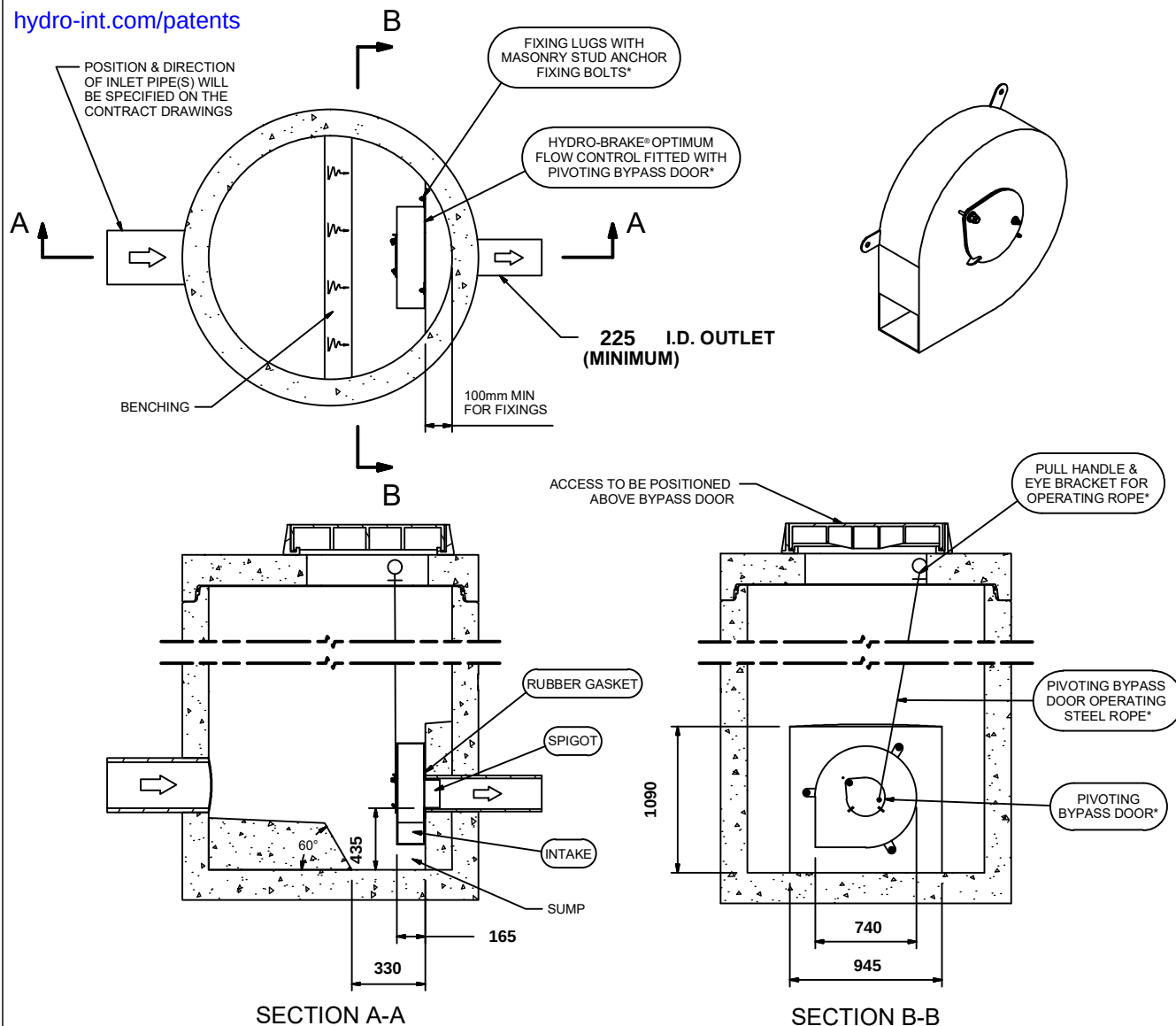
Control Point	Head (m)	Flow (l/s)
Primary Design	1.470	13.000
Flush-Flo™	0.435	12.998
Kick-Flo®	0.936	10.504
Mean Flow		11.296

Hydro-Brake® Optimum Flow Control including:

- 3 mm grade 304L stainless steel
- Integral stainless steel pivoting by-pass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet



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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® FLOW CONTROL & HYDRO-BRAKE® OPTIMUM FLOW CONTROL ARE REGISTERED TRADEMARKS 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-0157-1300-1470-1300 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**

DATE 8/21/2020 8:24 AM

SITE 23314 Wicks Farm

DESIGNER Paul Reynolds

REF SW-06

SHE-0157-1300-1470-1300

Hydro-Brake® Optimum

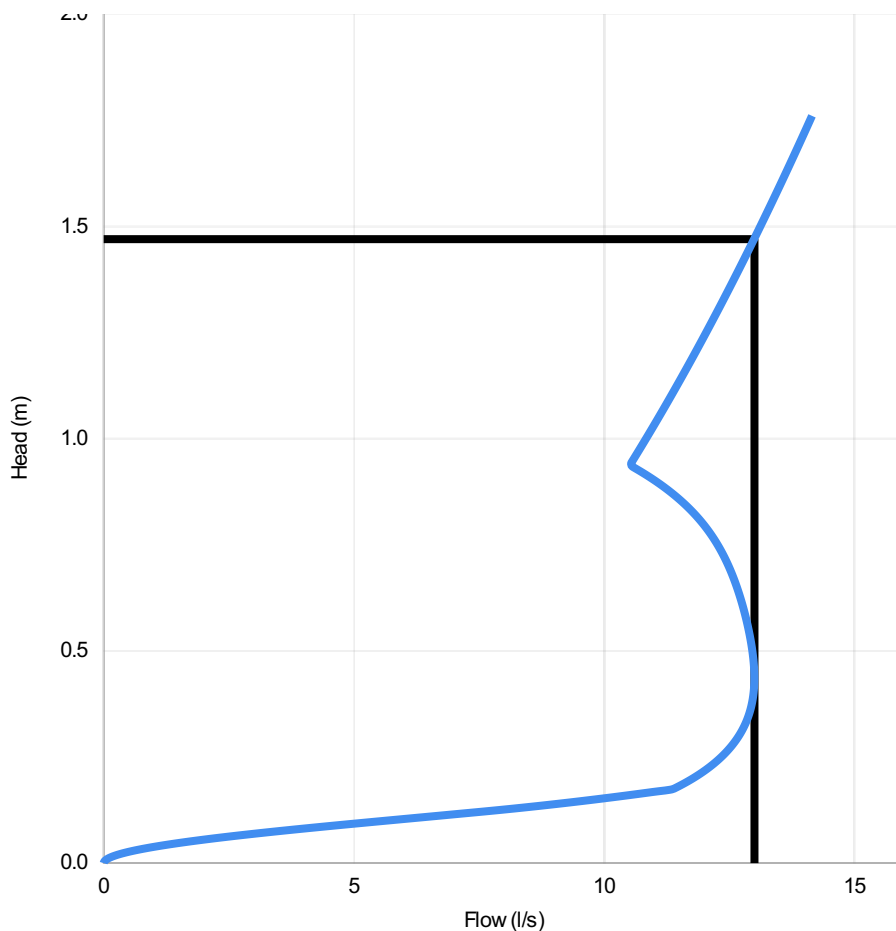
Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	1.470	13.000
Flush-Flo	0.435	12.998
Kick-Flo®	0.936	10.504
Mean Flow		11.296



PT/329/0412

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Head (m)	Flow (l/s)
0.000	0.000
0.051	1.698
0.101	5.765
0.152	9.957
0.203	11.813
0.253	12.368
0.304	12.711
0.355	12.903
0.406	12.986
0.456	12.993
0.507	12.949
0.558	12.869
0.608	12.760
0.659	12.622
0.710	12.445
0.760	12.209
0.811	11.890
0.862	11.454
0.912	10.866
0.963	10.644
1.014	10.904
1.064	11.157
1.115	11.404
1.166	11.645
1.217	11.881
1.267	12.112
1.318	12.338
1.369	12.560
1.419	12.778
1.470	12.991

DESIGN ADVICE



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DATE	21/08/2020 08:24
Site	23314 Wicks Farm
DESIGNER	Paul Reynolds
Ref	SW-06

SHE-0157-1300-1470-1300
Hydro-Brake Optimum®

Technical Specification

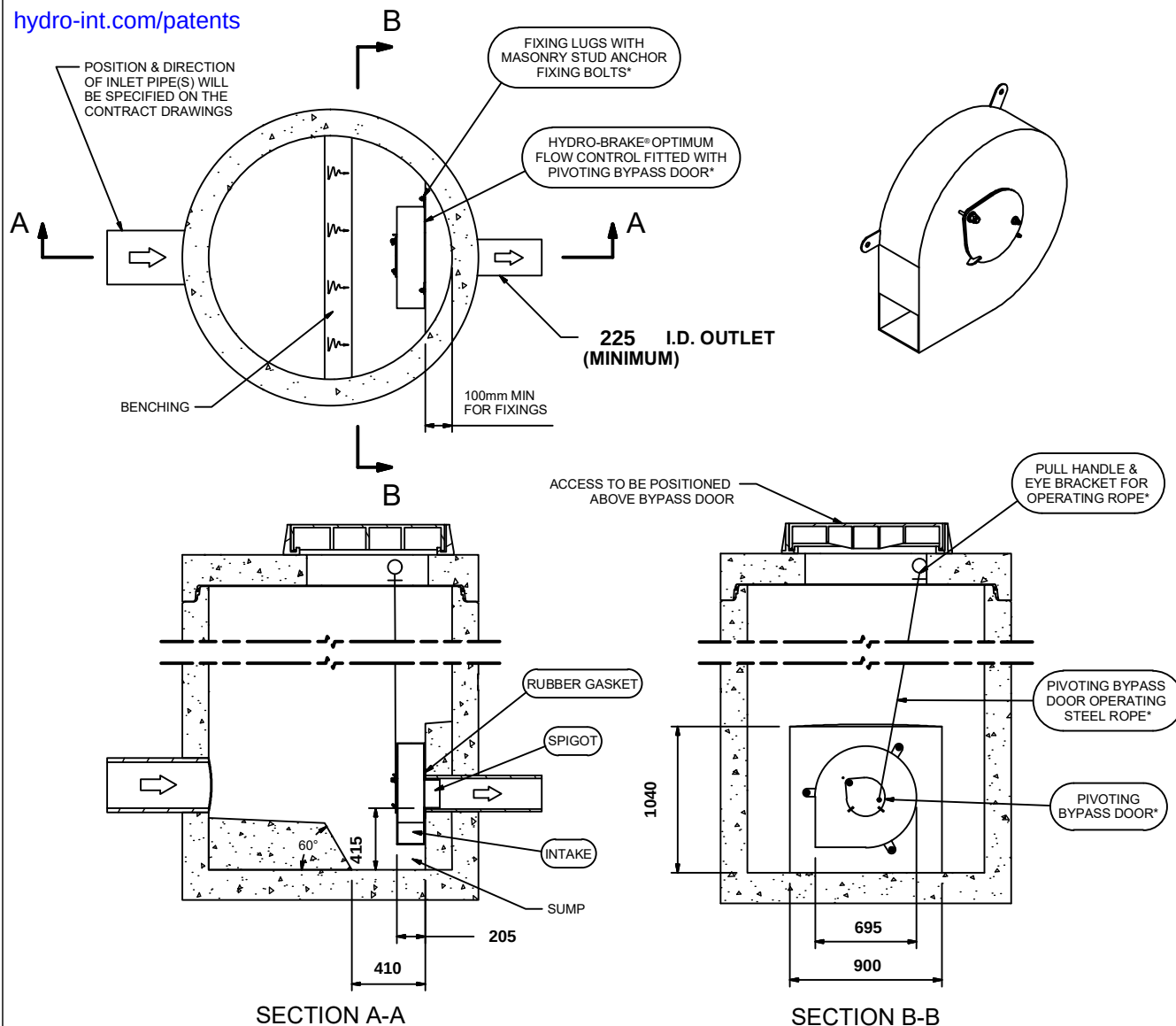
Control Point	Head (m)	Flow (l/s)
Primary Design	1.000	20.000
Flush-Flo™	0.340	19.998
Kick-Flo®	0.721	17.120
Mean Flow		16.823

Hydro-Brake® Optimum Flow Control including:

- 3 mm grade 304L stainless steel
- Integral stainless steel pivoting by-pass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet



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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® FLOW CONTROL & HYDRO-BRAKE® OPTIMUM FLOW CONTROL ARE REGISTERED TRADEMARKS FOR FLOW
 CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY HYDRO INTERNATIONAL

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The head/flow characteristics of this SHE-0199-2000-1000-2000 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.

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DATE	8/17/2020 2:17 PM
SITE	23314 Wicks Farm
DESIGNER	Paul Reynolds
REF	SW-07

SHE-0199-2000-1000-2000
 Hydro-Brake® Optimum

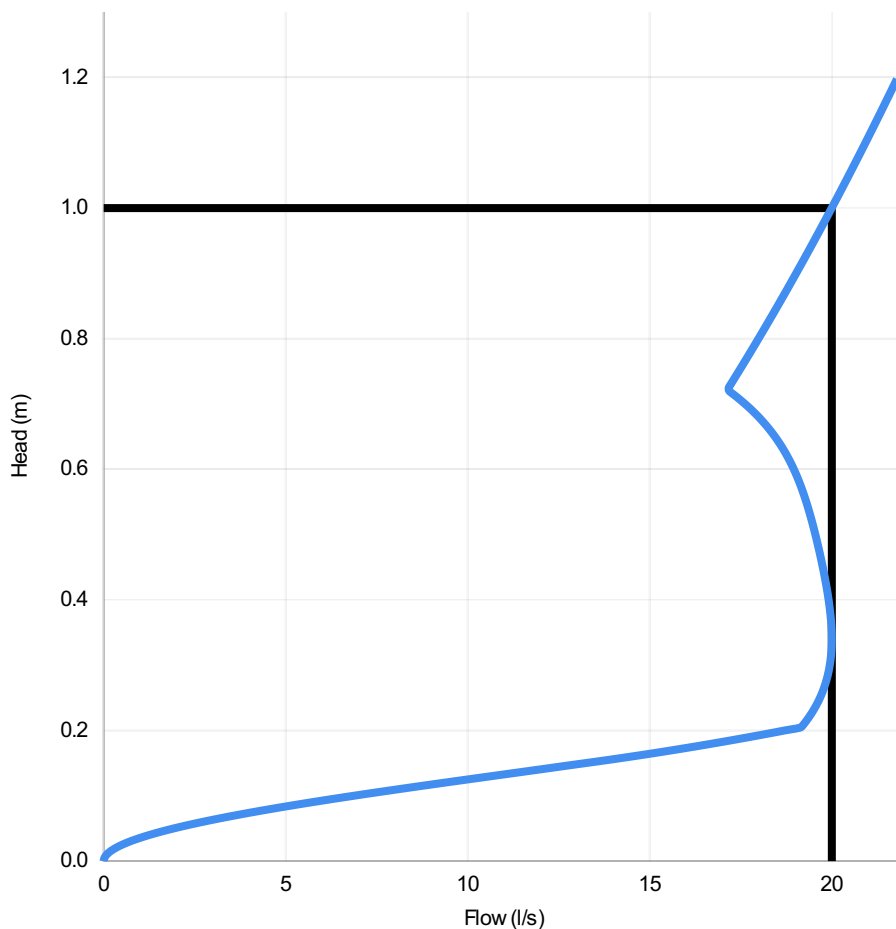
Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	1.000	20.000
Flush-Flo	0.340	19.998
Kick-Flo®	0.721	17.120
Mean Flow		16.823



PT/329/0412

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Head (m)	Flow (l/s)
0.000	0.000
0.034	0.939
0.069	3.511
0.103	7.275
0.138	11.663
0.172	15.908
0.207	19.189
0.241	19.599
0.276	19.846
0.310	19.969
0.345	19.997
0.379	19.958
0.414	19.873
0.448	19.758
0.483	19.622
0.517	19.468
0.552	19.288
0.586	19.064
0.621	18.770
0.655	18.369
0.690	17.819
0.724	17.161
0.759	17.538
0.793	17.911
0.828	18.277
0.862	18.634
0.897	18.984
0.931	19.328
0.966	19.664
1.000	19.995

DESIGN ADVICE



The head/flow characteristics of this SHE-0199-2000-1000-2000 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.

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DATE	17/08/2020 14:17
Site	23314 Wicks Farm
DESIGNER	Paul Reynolds
Ref	SW-07

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Hydro-Brake Optimum®