Curtins | Building a better future

Oldham Road, Newton Heath Phase 2

Drainage Verification Report & Maintenance Strategy

Curtins Ref: **074031-CUR-00-XX-T-C-92110**
Revision: P01
Issue Date: 10 April 2026

Client Name: The Casey Group

Site Address: Oldham Road, Newton Heath, Manchester, M40 1EZ

Rev	Description	Issued by	Checked	Date
P01	First Issue	JC	CS	10 April 2026

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Authors	Signature	Date
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Reviewed	Signature	Date
Charlie Smith MEng (Hons) Senior Engineer	[redacted]	10 April 2026

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1 Introduction

1.1 Project Background

Curtins have been appointed by The Casey Group to provide a verification and maintenance plan for the below ground drainage design for Oldham Road, Newton Heath Phase 2.

The report is based on currently available information and best practice guidance.

1.2 Planning Condition

This report has been produced in order to satisfy the discharge requirements of planning permission Condition 13 which is as follows:

'The development hereby approved shall not be occupied until details of the implementation, maintenance and management of the sustainable drainage scheme have been submitted to and approved by the City Council as Local Planning Authority. The scheme shall be implemented and thereafter managed and maintained in accordance with the approved details. Those details shall include:

- Verification report providing photographic evidence of construction as per design drawings.

- Final construction drawings if different from design construction drawings.

- Management and maintenance plan for the lifetime of the development which shall include the arrangements for adoption by any public body or statutory undertaker, or any other arrangements to secure the operation of the sustainable drainage scheme throughout its lifetime.

Reason- To manage flooding and pollution and to ensure that a managing body is in place for the sustainable drainage system and there is funding and maintenance mechanism for the lifetime of the development, pursuant to policy EN17 of the Manchester Core Strategy.'

1.3 Scope of the Maintenance Strategy

This report demonstrates the below ground drainage which has been installed for the development site and provides product information to inform future maintenance requirements.

This manual is intended to give an overview of the operation and maintenance for the drainage features included with the drainage strategy and in relation to typical details only. Where proprietary products are specified the manufacturer's instructions and recommendations should be followed in priority to this document unless specifically noted otherwise due to project constraints.

The recommended operations and frequencies are typical only and should be more frequent initially to ensure that there are no unforeseen issues with the operation and then adjusted to suit the site requirements.

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2 Drainage Strategy

2.1 General

The drainage network on site is a private drainage network. The network is a separate foul and surface water system.

The proposed network to serve Phase 2 of the development has 4 outfalls: two foul and two surface water. The plots south of the access road have a foul and surface water outfall which connects to the private drainage network installed under Phase 1 of the development. The Phase 1 design accounted for the flows for this area and was approved under the combined Phase 1 connection to the public sewer. The plots north of the access road have a foul and surface water outfall with new combined connection to the public sewer.

2.2 Foul Drainage

The foul network is split into 2 main runs. A run north of the access road which serves 19 plots and another run south of the access road that serves 11 plots. The northern run outfalls to the public sewer. The southern run outfalls to the private drainage network via 2 stub connections.

The Final Construction Drainage Drawings are enclosed in Appendix C.

2.3 Surface Water Drainage

Any new development site drainage should be designed in accordance with current best practice to provide adequate capacity not to flood for the critical 1 in 30-year storm event and flood water generated for up to the critical 1 in 100-year plus climate change storm event shall be constrained within the areas on site so not to cause damage to buildings, essential services or adjoining developments and services.

Based on the nature of the development, a lifespan in excess of 60 years is anticipated. Therefore, the potential climate change allowance for 2061-2125 ranges between 30% for the central allowance and 45% for the upper end allowance. As such, an allowance of 45% for climate change on peak rainfall intensity has been included in calculations.

Assessment was completed at preliminary design stage to confirm the most viable method of discharge was to the public combined water sewer within the former Dulverton Street at a restricted rate of 5.6l/s 222based on a 50% reduction of existing flows from site to the public sewer. This has been agreed under the Phase 1 Strategy Planning Application 125990/2020.

The surface water network has been designed to accommodate the 1 in 100-year storm rainfall event plus 45% for climate change. As the flows are being attenuated by on site features, there will be a period of time after storm events where the network is still partially or fully surcharged and is draining down. Where this surcharging is still present after 48hrs appropriate action should be taken.

The proposed network on site requires attenuation to provide capacity to accommodate the volumes generated whilst maintaining the maximum flow restriction. An attenuation tank, located in the north of the site, provides approximately 48m^3 attenuation volume.

The Final Construction Drainage Drawings are enclosed in Appendix C.

The surface water drainage calculations enclosed in *Appendix D.*

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2.4 Approvals

Connection to the public combined sewer has been agreed with United Utilities Water under a S106 Part 1 agreement, reference no. 07231371.

The permission to work on the public combined sewer was approved under S106 Part 2 Agreement reference no. 07581959.

The S106 Approval Notices are enclosed in Appendix A.

Agreed flows for all phases is shown in figure 1 below:



Figure 1: Phased Development Surface Water Flows

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3 Verification

3.1 Introduction

The verification section has been developed with reference to the drainage design details and philosophy provided in section 2 of this report. Manchester City Council requirements are to verify the installation of the Drainage and SuDS to confirm by Photographic record that this has been installed.

The following elements have been recorded:

- Attenuation Tank
- Flow Control Device
  - Hydrobrake
  - Orifice Plate
- Permeable Paving

3.2 Final Construction Drawings

The contractor has confirmed the drainage has been installed as per Curtins last release of drawings.

This has been reflected on the following Final Construction drawings enclosed in Appendix C:

- 074031-CUR-00-XX-D-C-92610_C04 DRAINAGE LAYOUT PHASE 2
- 074031-CUR-00-XX-D-C-92620_C02 Drainage Notes
- 074031-CUR-00-XX-D-C-92630_C04 Manhole Schedule
- 074031-CUR-00-XX-D-C-92640_C02 Drainage Details

3.3 CCTV Survey

A CCTV Survey has not been completed on the constructed drainage network.

It has been advised that a CCTV survey is undertaken prior to handover to ensure the drainage network is in good condition with no defects.

The network has been jetted, cleared and air tested by the contractor.

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3.4 Photographic Information

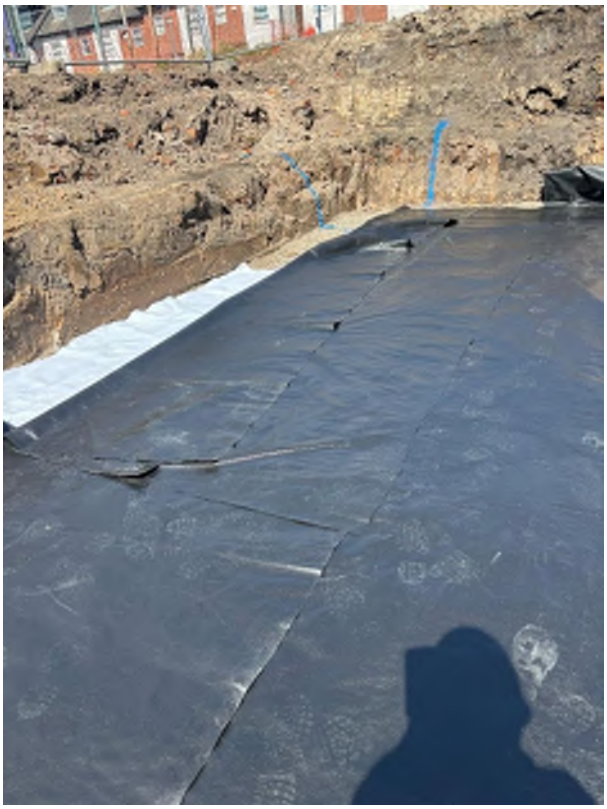
Attenuation Tank Photographs:

Tank size: 10 x 6.5 x 0.8m

Tank product: Polystorm PAM1A & PSM4 Units

The manufacturers product information is enclosed in Appendix B.



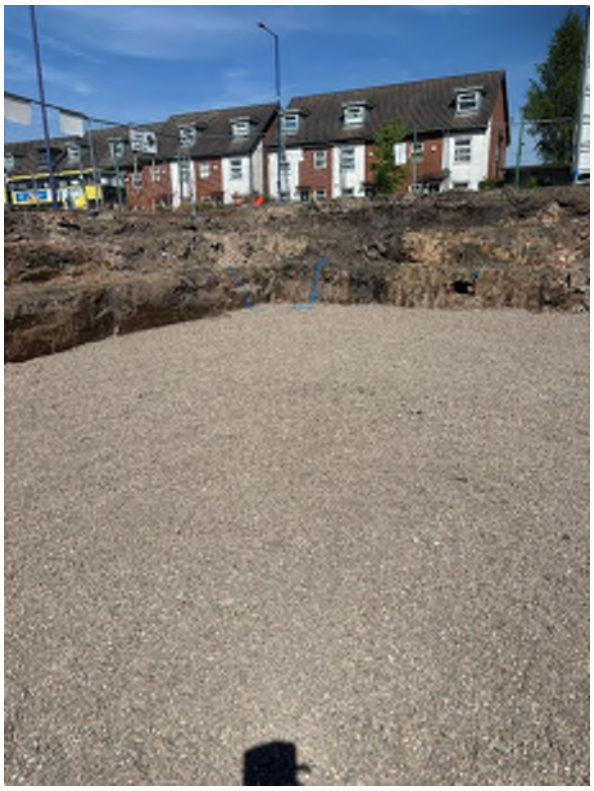


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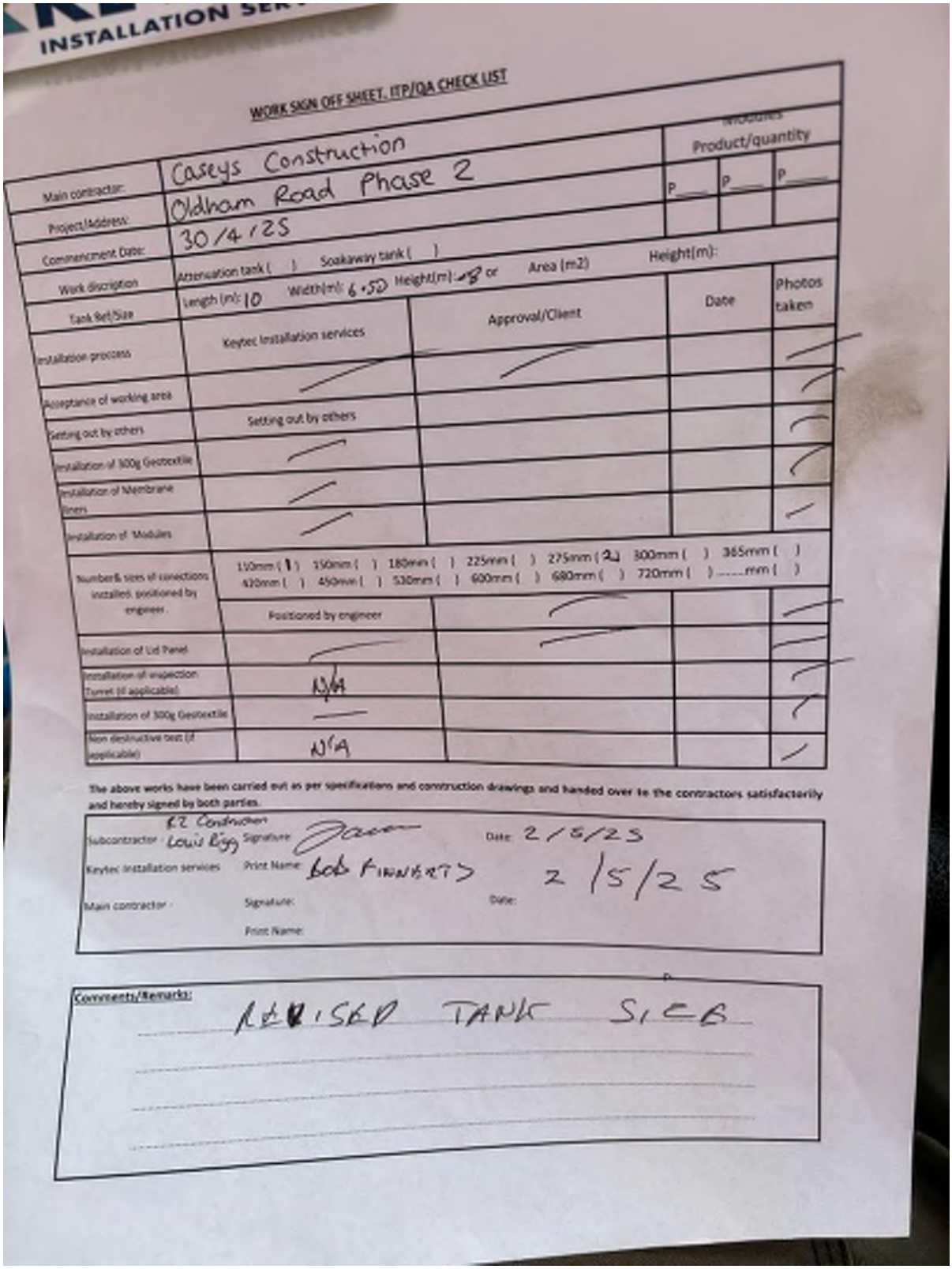








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INSTALLATION SER

WORK SIGN OFF SHEET, ITP/QA CHECK LIST

Main contractor:	Caseys Construction		Modules Product/quantity		
Project/Address:	Oldham Road Phase 2		P	P	P
Commencement Date:	30/4/25				
Work description	Attenuation tank ( ) Soakaway tank ( )				
Tank Ref/Size	Length (m): 10 Width(m): 6.50 Height(m): 2.8 or Area (m2) Height(m):				
Installation process	Keytec Installation services	Approval/Client	Date	Photos taken	
Acceptance of working area	✓	✓		✓	
Setting out by others	Setting out by others			✓	
Installation of 300g Geotextile	✓			✓	
Installation of Membrane liners	✓			✓	
Installation of Modules	✓			✓	
Number& sizes of conections installed, positioned by engineer	110mm (1) 150mm ( ) 180mm ( ) 225mm ( ) 275mm (2) 300mm ( ) 365mm ( ) 420mm ( ) 450mm ( ) 530mm ( ) 600mm ( ) 680mm ( ) 720mm ( ) .....mm ( )				
	Positioned by engineer	✓		✓	
Installation of Lid Panel	✓	✓		✓	
Installation of inspection Tunnel (if applicable)	N/A			✓	
Installation of 300g Geotextile	—			✓	
Non destructive test (if applicable)	N/A			✓	

The above works have been carried out as per specifications and construction drawings and handed over to the contractors satisfactorily and hereby signed by both parties.

Subcontractor: RZ Construction Lewis Rigg	Signature:	Date: 2/5/25	
Keytec Installation services	Print Name: Bob FINNERTY		2/5/25
Main contractor:	Signature:	Date:	
	Print Name:		

Comments/Remarks: REVISED TANK SIZE

Refer to Curtins drawing 074031-CUR-00-XX-D-C-92610 for attenuation tank location and further information.

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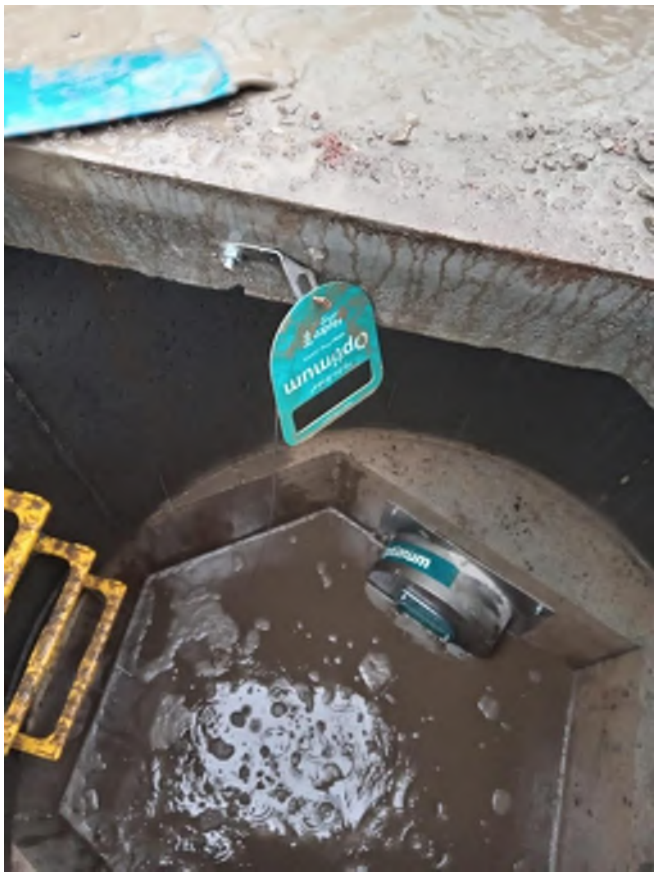
Flow Control Device - S13 (Hydrobrake) Photographs

The flow control is a Hydro-International CTL-SHE-0118-5600-0500-5600.

The manufacturers product information is enclosed in Appendix B.







Refer to Curtins drawing 074031-CUR-00-XX-D-C-92610 for Hydrobrake location and further information.

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Flow Control Device - S13 (Orifice Plate) Photographs



Refer to Curtins drawing 074031-CUR-00-XX-D-C-92610 for Orifice Plate location and further information.

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Permeable Paving Photographs





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Refer to Curtins drawing 074031-CUR-00-XX-D-C-92610 for permeable paving location and further information.

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4 General Maintenance

4.1 Components

This section is intended to give an overview of the operation and maintenance for the drainage features included with the drainage strategy and in relation to typical details. Where proprietary products are specified, the manufacturer's instructions and recommendations should be followed in priority to this document unless specifically noted otherwise due to project constraints.

The recommended operations and frequencies are typical only and should be more frequent initially to ensure that there are no unforeseen issues with the operation and then adjusted to suit the site requirements.

The following components have been included within the drainage design for the proposed development:

- Inspection, Manhole and Catchpit Chambers
- Pipes
- Attenuation Tank
- Flow Control Device
  - Hydrobrake
  - Orifice plate
- Permeable Paving
- Drainage Channels

The locations of the above drainage components are indicated on Curtins Drainage Drawing:

- 074031-CUR-00-XX-D-C-92610-Drainage Layout Phase 2

A suitable maintenance strategy should be adopted to ensure the drainage network is cleaned regularly and the routine maintenance and cleansing regime should be documented.

It is assumed that the maintenance of the private drainage network will be the responsibility of an on-site facilities management team. Confirmation is yet to be received that someone has been appointed to maintain the private drainage network.

The surface water network has been designed to accommodate the 1 in 100 year storm rainfall event plus an allowance for 45% climate change particular to the requirements of the site. 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 draining down. Where this surcharging is still present after 48hrs appropriate action should be taken as noted below.

It is recommended that the drainage system is inspected as a minimum twice a year, with the system also being inspected after any major storm event.

Significant sediment deposition is likely in areas used for storage, so a post clean-up operation may be required including the removal of litter, vegetation, sewerage debris and larger objects.

Long-term management practices include monthly sweeping of external paved areas. The sweeping program will remove sand and contaminants directly from paved surfaces before they become mobilised during storm events and transported to the drainage system.

During the winter months, drainage features such as gullies and channels should be cleared of ice, snow, debris or litter.

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Sediment/material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols; especially where run-off is taken from potentially contaminated areas such as the filter drains and the upstream/downstream chambers.

4.2 Inspection, Manhole and Catchpit Chambers

Access points have been located at the head of each run, at a change in direction and at a change of pipe size in accordance with Building Regulations Part H.

The appropriate barriers and signage should be installed during any opening of manholes to warn site users/pedestrians.

When accessing chambers, the latest Health and Safety legislation should be adhered to.

The appropriate health and safety equipment must be used when accessing manholes. Confined space certificates must be held by any personnel entering a manhole and the appropriate permits should be obtained from the Facilities Maintenance Manager prior to any access.

Sediment\material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols; especially where run-off is taken from potentially contaminated areas.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required)	Initial inspection should be provided as post construction CCTV survey.	N/A
	Inspect for evidence of poor operation via water level in chambers. If required take remedial action.	3-monthly, 48 hours after large storms.
Occasional maintenance	Check and remove large vegetation growth near pipe runs.	6 monthly
Remedial actions	Rod through poorly performing runs as initial remediation.	As required.
	If continued poor performance jet and CCTV survey poorly performing runs.	As required.
	Seek advice as to remediation techniques suitable for the type of performance issue and location.	As required If above does not improve performance.

4.3 Pipes

Pipes are proprietary products, and the materials can vary across the site and as such where used the manufacture's recommendations should be followed. Regardless of the product used the pipes are fully compliant with the Curtins drainage specification.

Pipes are intended to be the main conveyance across the development and where oversized they form the attenuation volume required by the limitation of the discharge rate. They are intended to be dry except for during rainfall events. These have been designed to be self-cleansing where possible for smaller diameter pipes. For larger diameter pipes the risk is reduced due to the overall pipe size.

Access for maintenance is provided through access chambers and manholes.

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Regular inspection and maintenance is important to identify areas which may have been obstructed/clogged and may not be drainage correctly thus exposing the development to a greater level of flood risk.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Initial Inspection should be provided as post construction CCTV survey.	N/A
Regular maintenance\ inspection	Inspect for evidence of poor operation via water level in chambers. If required, take remedial action.	3-monthly, 48 hours after large storms.
	Check and remove large vegetation growth near pipe runs.	Monthly or as required
Remedial Action	Rod through poorly performing runs as initial remediation.	As required.
	If continued poor performance jet and CCTV survey poorly performing runs.	As required.
	Seek advice as to remediation techniques suitable for the type of performance issue and location.	As required If above does not improve performance.
Regular maintenance\ inspection	Brushing and Vacuuming	Three times/year at end of winter, mid-summer, after autumn leaf fall, or as required based on site specific observations of clogging or manufacturers' recommendations.
Occasional maintenance	Stabilise and mow contributing and adjacent areas.	As required and as per landscape architect's specification.
	Removal of weeds	As required.
Remedial Action	Remediate any landscaping which, through vegetation	As required.

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	maintenance or soil slip, has been raised to within 50 mm of the level of the paving.	
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users.	As required.
	Rehabilitation of surface and upper sub-structure. This could include replacement of the jointing and bedding material. The upper geotextiles layer may also need replacing if clogged and Terram 1000 has a life span of 25 years.	As required (if infiltration performance is reduced as a result of significant clogging).

4.4 Attenuation Tanks

The attenuation tanks are geocellular units and are intended for storage of surface water run-off from the site up to and including the 1 in 100 year event to reduce the rate of run-off into the downstream network and to minimise flood risk.

The geocellular units are proprietary products and therefore manufacturer's recommendations should also be taken into consideration.

Access for maintenance has been provided by catchpit manhole chambers upstream and downstream of the tank. Vents are also provided to the upstream manholes.

Manufacturers information is enclosed in Appendix B.

Maintenance Schedule	**Required Action**	**Frequency**
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Inspect inlets, outlets and overflows for blockages, and clear if required. If faults persist jetting and CCTV survey may be required.	Monthly and after large storms.
Regular maintenance\ inspection	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly.
	Debris removal from catchment surface (where may cause risks to performance).	Monthly

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	Remove sediment from pre-treatment structures.	Annually (or as required after heavy rainfall events)
Remedial Actions	Repair/rehabilitation of inlets, outlets and overflows.	As required.

4.5 Flow Control Device

The flow control units are intended for flood control and flow restriction.

The flow controls are specified as Hydro-brake or similar approved and are proprietary products; therefore, manufacturer's recommendations should also be taken into consideration.

Access for maintenance has been provided by locating within manhole chambers.

Maintenance Schedule	**Required Action**	**Frequency**
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Inspect inlets for blockages, and clear if required. If faults persist jetting and CCTV survey may be required.	Monthly and after large storms.
Regular maintenance\ inspection	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly.
	Debris removal from catchment surface (where may cause risks to performance).	Monthly
	Remove sediment from pre-treatment structures and flow control chambers.	Annually (or as required after heavy rainfall events)
Remedial Actions	Repair/rehabilitation of inlets.	As required.

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4.1 Permeable Paving

The paving should be inspected regularly for clogging, litter, weeds and water ponding, preferably during and after heavy rainfall to check effective operation. Permeable pavements need to be regularly cleaned of silt and other sediments to preserve their infiltration capacity. The SuDS Manual indicates that sweeping once per year is sufficient for most sites, however the sweeping frequency should be adjusted to suit site specific conditions and should also be informed by annual inspection reports.

The below table outlines the proposed operation and maintenance regime for permeable pavements. This is adapted from The SuDS Manual (C753).

Maintenance Schedule	Required Action	Frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall or reduced frequency as required, based on site- specific observations of clogging - pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediments
Occasional maintenance	Stabilise and mow contributing and advancement areas	As required
	Removal of weeds or management using glyphosphate applied directly into the weeds by an applicator rather than spraying	As required –once per year on less frequently used pavements
Remedial actions	Remediate any landscaping which through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required

4.2 Drainage Channels and Gullies

Channels and gullies should be inspected and cleaned in accordance with the manufacturer's details. Channel units can be cleaned through the use of a high-pressure hose; this can be fed into the channel system through access units strategically placed along the channel run. The throat section of channel units should be kept clear at all times to ensure uninterrupted flow of surface water into the drainage channel and any debris within the throat should be removed.

Locking bolts should be replaced and sufficiently tightened, taking care that the bolt heads do not stand above the top surface of the cover or grate. If covers are allowed to move within their frame, this may cause damage to the frame or seating.

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Sediment\material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols; especially where run-off is taken from potentially contaminated areas such as the car park channels.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Initial Inspection including channel outlet boxes.	Half yearly and after large storms.
Regular maintenance\ inspection	Litter and debris removal	Monthly or as required.
	Check and remove large vegetation growth near channel runs.	Monthly or as required
	Inspect for evidence of poor operation and/or weed growth. If required take remedial action. Inspect silt accumulation rates and establish appropriate brushing frequencies. Silt can also be caused by adjacent landscaping areas which should be reprofiled to provide a flat area or berm adjacent to the paving.	3-monthly, 48 hours after large storms.
Remedial Action	Inspect access/outlet boxes and rod through poorly performing channels and outlets as initial remediation.	uired.

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Appendix A

United Utilities Section 106 Approvals

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S106 Part 1 'Application to connect to a public sewer' Approval Notice

United Utilities
Water for the North West

United Utilities Reference Number:	**07231371**
Applicant details	
Applicant name	[redacted]
Applicant address *(including postcode)*	Curtins Merchant Exchange 17-19 Whitworth St West Manchester M3 5WG
Applicant email	[redacted]
Site details: The site / property which is proposed for connection to the public sewer	
Site address *(including postcode)*	Oldham Road Newton Heath Manchester, M40 1HA

APPROVED

Your application for connection to the public sewer has been approved, to be made via a new connection:

To a private drain	☐	You may appoint your contractor and advise your appointed building control body (who should inspect the work). United Utilities should be advised when this work is complete.
Direct to the public sewer	☒	**Further action required.** You may now appoint an appropriately qualified contractor. Your appointed contractor is responsible for obtaining authorisation to work on a public sewer. (The S106 Part 2 application form **'Request for permission to work on a public sewer'** is available on our website; Sewer connections - United Utilities).

Mode of connection approved	**Connection into existing manhole**					
Sewer connection type	Foul	☐	Surface water	☐	Combined	☒

This approval is valid for 12 months from the date below.
This approval does not grant access to third party land, permission should be sought if required between applicant and landowner.
If the new connection renders access unsafe or is otherwise detrimental to the manhole or sewer, a new/upgraded manhole will be requested.

Comments

Approval granted for a 300mm combined connection to the 300mm combined sewer to the West of the site via a new manhole
With a flow control restricted to 5.6l/s

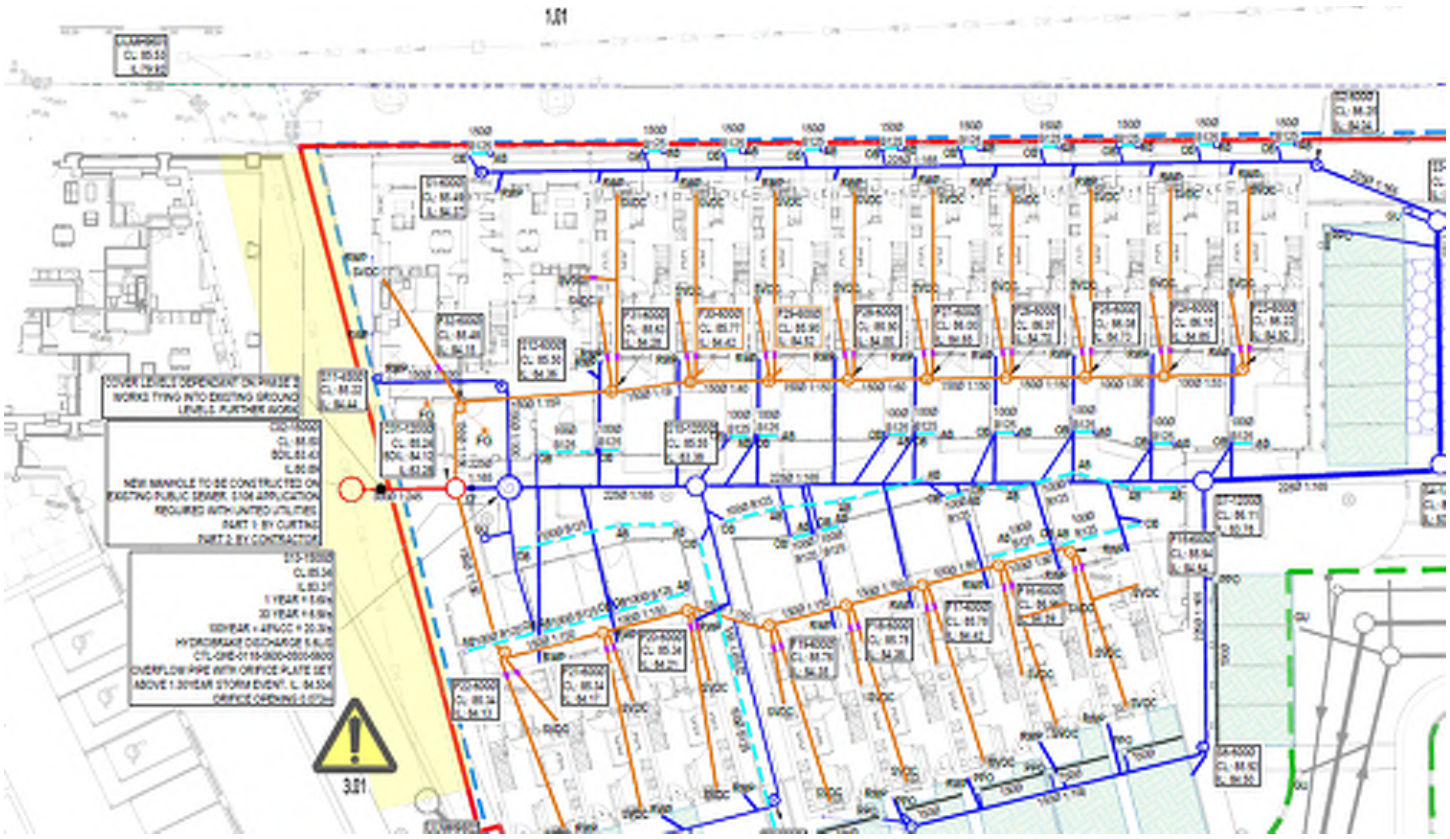
The new manhole must be constructed in line with Water UK Sewerage Sector Guidance Appendix C with the appropriate openings, ring size, benching/pipe configuration, channels and landing. Please ensure a plan of your proposals is submitted with your contractor's Part 2 application.

For low-lying sites, (where the ground level of the site or the level of a basement is below the ground level at the point where the drainage connects to the public sewer), care should be taken to ensure that the property is not at increased risk of flooding. If these circumstances exist it could affect the detailed design of your site and result in the need to incorporate appropriate mitigating measures in your drainage scheme.

Please note, if you are proposing to connect to an existing, unchartered drain or sewer then it is the developer's responsibility to confirm that it communicates with the Public Sewer

Connections may be made to private lateral drains or to existing neighbouring drain. A part 1 approval does not give permission to access third party land. The applicant must seek permission from the relevant landowner.

Please note, if you have not already done so, we would still expect you to get your drainage conditions discharged from the Local Planning Authority as any decision they make may supersede this approval.



Developer Services Inspector	**Lynne Berry**
Contact number	[redacted]
Date	**21/05/2025**

S106 Part 2 'Request for permission to work on a public sewer (MEDIUM / HIGH RISK)'

United Utilities
Water for the North West

United Utilities Reference Number:			***07581959***
Contractor details			
Contractor/company name	R2 Construction Ltd		
Contractor email address	[redacted]		
Works Supervisor	Colin Nolan		
Principal Contractor details (if applicable):			
Company name	P Casey and CO Ltd		
Name of contact for project	Jon Sharp		
Email address	[redacted]		
Date of proposed works	16/06/2025	Type of connection approved	Junction
Site details: The site / property which is proposed for connection to the public sewer			
Site address *(including postcode)*	Dulverton Street Manchester M40 2JB		

APPROVED

Your application for permission to work on the public sewer has been approved.
THIS PERMIT SHOULD BE AVAILABLE ON SITE FOR INSPECTION

This notice constitutes your permit make a connection to the public sewer network as detailed on your application, **'Request for permission to work on a public sewer'**. You are now authorised to make the connection to the public sewer based on the agreed method and on the date given.

Please provide 5 days' notice to the Development Support Technician named below to arrange an inspection of the works.

The excavation should not be backfilled until the United Utilities appointed person has inspected the works.
United Utilities reserve the right to request a connection to the public sewer be laid open for inspection.
United Utilities will also be entitled to recover all costs associated for any excavation, remedial works and repeat visits if these requirements are not met.

You must log on and off the sewer network at the beginning and end of each shift when working on the public sewer by calling

01925 235858

and quoting the United Utilities reference number at the top of this decision notice.

Any gas alarms, residual risks or sewer incidents should also be reported on this number.

Comments

Approval granted for a *300*mm *combined* connection via ***a preformed 'Y' type junction*** on the *combined* sewer located within *Dulverton Street as per drawings submitted.*

*The preformed junction should be a 'Y' type laid in the direction of flow.

Developer Services Inspector	Marcus Jones
Contact number	[redacted]
Date	09/06/2025

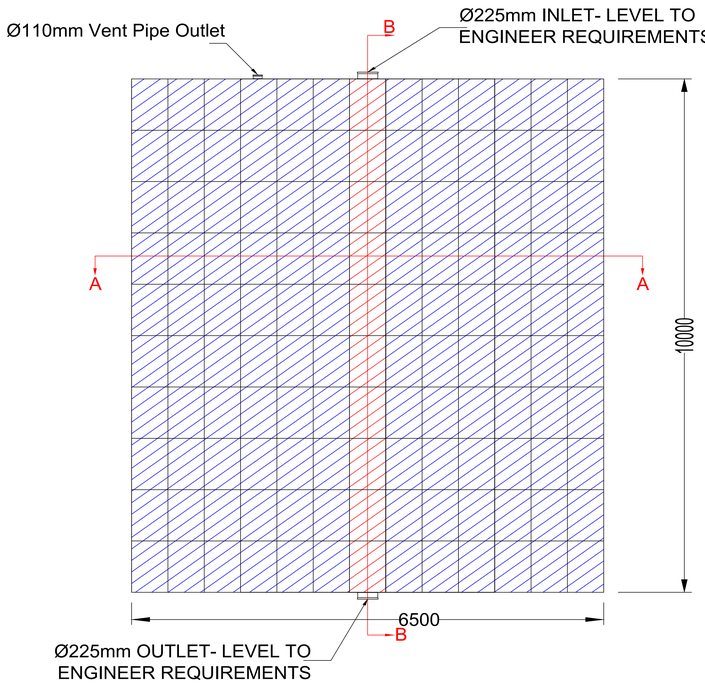
Appendix B

Attenuation Tank Manufacturers Information

Channel Drain Manufacturers Information

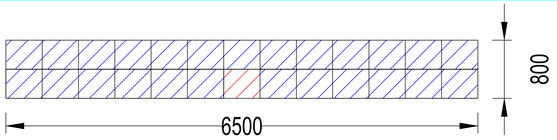
Hydrobrake Flow Control Device Manufacturers Information

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PLAN

SCALE 1:30



SECTION A-A

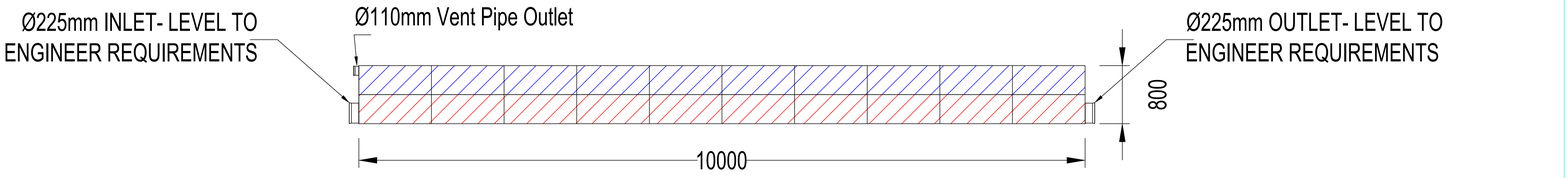
SCALE 1:30

PROPOSED POLYSTORM STRUCTURE	
Plan Area	65m²
Tank Volume	52m³
Storage	49.40m³
Polystorm-R Units	250 (PSM1A)
Polystorm-Inspect Units	10 (PSM4)

LEGEND:

Polystorm-R Units (PSM1A)

Polystorm-Inspect Units (PSM4)

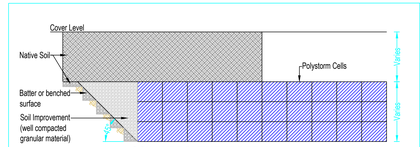


SECTION B-B

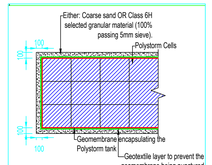
SCALE 1:30

NOTE:

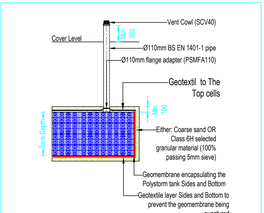
- Fall Arrest Grill to be provided by the developer / contractor (please refer to Consultant's drawings.
- The final position of the access cover should be confirmed by the Consultant and detailed on their drawing.
-Lifting Eyes are to be pointed type - to be provided by the Developer / Contractor (please refer to Consultant's drawings).
- All Polystorm tanks to be installed with a 1:500 fall, please note tank would still drain even if left flat due to our cells 3D flow.



SOIL IMPROVEMENT DETAIL
Scale (1:40)

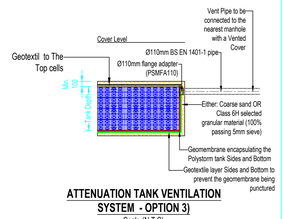


TYPICAL POLYSTORM ATTENUATION INSTALLATION DETAIL
Scale (1:40)

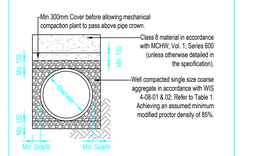


ATTENUATION TANK VENTILATION SYSTEM - OPTION 1)
Scale (N.T.S)

ATTENUATION TANK VENTILATION SYSTEM - OPTION 2)
Scale (N.T.S)



ATTENUATION TANK VENTILATION SYSTEM - OPTION 3)
Scale (N.T.S)



TYPICAL SINGLE PIPE INSTALLATION
Scale (1:40)

Table 1 -Pipe Bed & Surround Coarse Aggregate Material Grading

Product	Pipe Size [mm]	Minimum Sidefill [mm]	Material Grading [BS EN 13242, Clause 4.3.2]
Ridgistorm-XL	Ø750 - Ø900	150	4/10, 6/14, 10/20 or 20/40
	Ø1050 - Ø1200	425	
	Ø1500 - Ø3000	500	

NOTES
1. Coarse aggregate materials shall be in accordance with the relevent provisions of BS EN 13242, as detailed within WIS 4-08-02 amendment (Nov 2008), Tables A4 & 5.
2. Alternative pipe bed & surround material specifications shall not be used without prior written approval from the overseeing engineer.
3. For loading specific installation details, where concrete protection may be required, please request RST_SD_001 & 002.

NOTES - PE STUB PIPE ADAPTERS

	PIPE ADAPTOR
Ø160mm SDR26 PE - Ø150mm Polysewer	PS689
Ø250mm SDR26 PE - Ø225mm Polysewer	PS1089
Ø315mm SDR41 PE - Ø300mm Polysewer	PS1289
Ø450mm SDR17 PE - Ø400mm Ridgisewer	see note below*
Ø500mm SDR17 PE - Ø450mm Ridgisewer	see note below*
Ø560mm SDR17 PE - Ø500mm Ridgisewer	see note below*
Ø630mm SDR33 PE - Ø600mm Ridgisewer	see note below*

* - For this transition, Flexseals are required, please refer to their website.

LIFTING POINTS - UNSUITABLE FOR LIFT

1. Fabricated chamber supplied to site without direct means of lifting incorporated. The lift supervisor must assess and plan the lift, in the circumstances of the lift, and provide slings and / or other controls as deemed necessary to ensure a safe lift.

POLYSTORM NOTES

1. This drawing needs to be read in conjunction with all relevant Architects, Engineers and specialist drawings.
2. Stormwater Attenuation / Infiltration system shall be Polypipe Civil's Polystorm pre-formed geocellular system, with minimum 94% volumetric void. Units shall be installed using recommended jointing clips to maintain rigidity and minimise deflection.
3. Multi-layered Polystorm tank configurations shall be fixed with proprietary shear connectors between each vertical layer to maintain rigidity and minimise lateral displacement.
4. Drawings should be read in conjunction with the supportings structural calculations, which are illustrative and should be validated by a suitably qualified Engineer, or similar.
5. For Field conditions, backfill should be placed and compacted in layers no greater than 300mm and for trafficked areas, backfill should be placed and compacted in layers no greater than 150mm.
6. The installer shall ensure that all expected temporary construction transient loads have been considered as part of the structural design and a minimum of 300mm backfill should be placed prior to initial compaction.
7. Polystorm Tanks should be installed in accordance with Polypipe Civils recommendations (refer to technical guidance for further information).

COVER SLAB THICKNESS

1. Where cover slabs are applicable, the slab thickness (shown in red) has been assumed and therefore needs to be confirmed by others.

STANDARD TOLERANCES

ALL DIMENSIONS IN MILLIMETRES, UNLESS OTHERWISE STATED.

Benching Slope	1:10 to 1:30 (1:9° - 5.7°)
Angles	+/- 1.5°
All Dimensions	+50mm / -30mm

STANDARD SPIGOTS IN ACCORDANCE WITH SPEC. ES23.

Team Leader inspection points identified by: ① ② ③

JOINTING KEY

Socket / Spigot	IEW	RS	Ring seal joint
		IEW	Internal extrusion welding joint
		EF	Electro-fusion joint

GENERAL NOTES

1. This drawing details Polypipe Civils proposed offering, reflecting our interpretation of the information provided.
2. Polypipe bespoke Ridgistorm-XL chambers are complete pre-formed units.
3. Polypipe products to be installed in accordance with Polypipe Civils recommendations (refer to Polypipe technical guidance for further information), giving due consideration to the requirements of the organisation who will take ultimate ownership of the installation.
4. Site conditions may require specific installation requirements. The installer should verify that the proposed installation method is acceptable, giving due consideration to the requirements of the relevant approving and adopting authorities, before construction activities commence.
5. Advice on any system requirements specific to the proposed Ridgistorm XL system should be sought from Polypipe Civils.
6. All PE stub connections will require adaptors (to be supplied by Contractor / Developer).

DRAWING NOTES

1. Drawings should not be scaled, refer to figured dimensions only.
2. All dimensions in millimetres, unless otherwise stated.
3. All dimensions are nominal and may vary within manufacturing or construction tolerances.
4. All site temporary and enabling works by others.
5. This drawing is intended for guidance only. Confirmation of the information contained within this document should be sought from the consulting engineers before final design or construction activities commence.

R1 30-04-2025 I TANK SIZE CHANGED TO SIT WITH SITE REQUIREMENT

KEYTEC INSTALLATION SERVICES
ROYLE HOUSE
COWM TOP BUSINESS PARK
COWM TOP LANE
OL11 2PU
TEL: 0808 141 5800
EMAIL: TECHNICAL@KEYTEC.CO.UK

PROJECT

OLDHAM ROAD - NEWTON HEATH

ATTENUATION TANK

TITLE

DETAILS OF ATTENUATION/STORAGE TANK DETAILS USING POLYSTORM PAM1A & PSM4 UNITS

Scale	Drawn	Checked
AS SHOWN	FA	KZ

Date	Drawing No.	Revision
07/04/2025	PSM - 2.0	R1

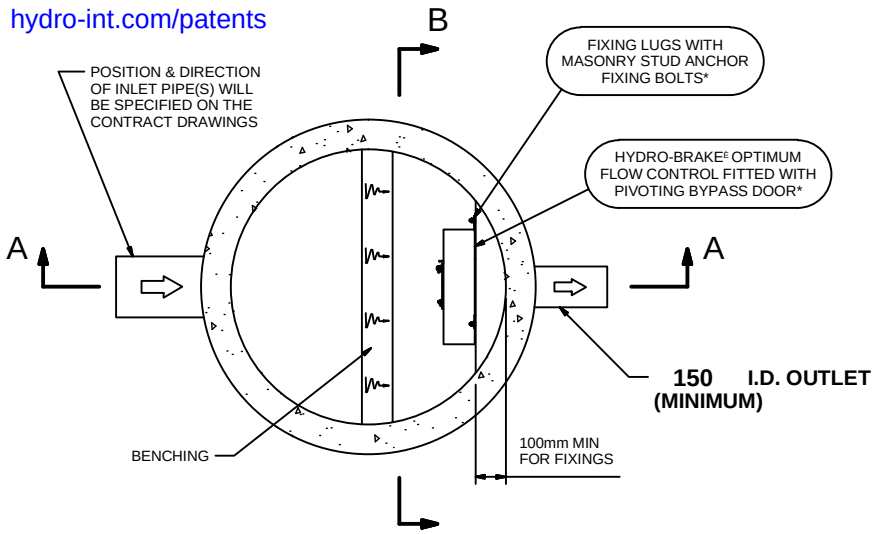
Technical Specification

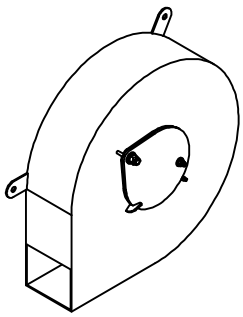
Control Point	Head (m)	Flow (l/s)
Primary Design	0.500	5.600
Flush-Flo™	0.186	5.598
Kick-Flo®	0.375	4.906
Mean Flow		4.597

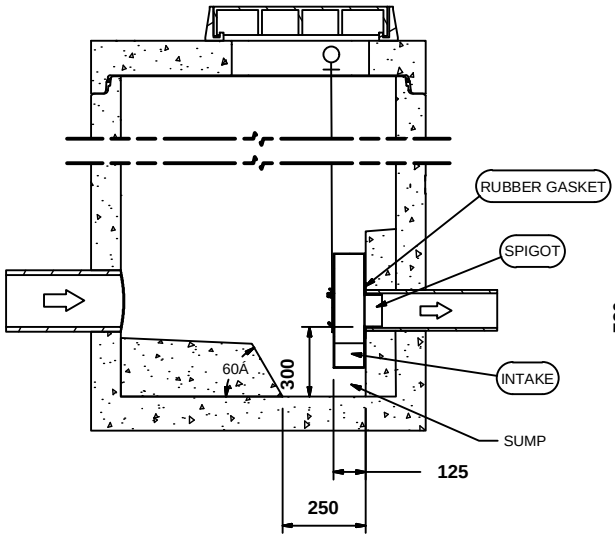
Hydro-Brake® Optimum Flow Control including:

- 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
- Indicative Weight: 10 kg

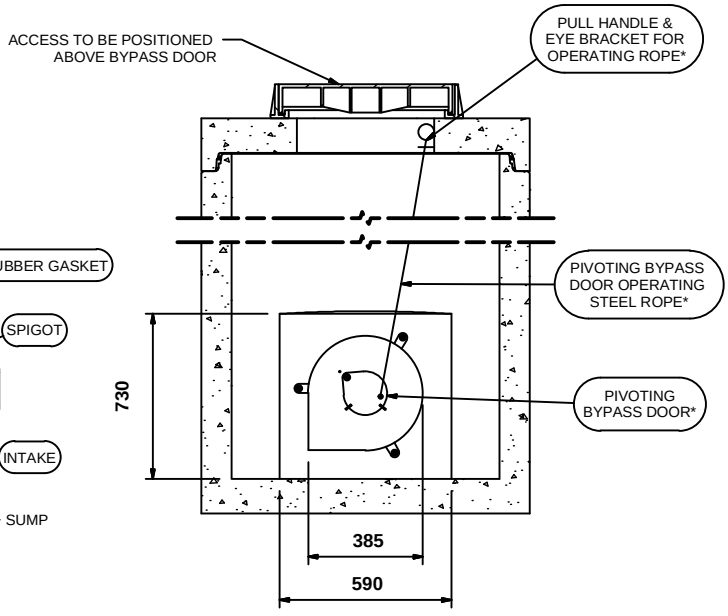
hydro-int.com/patents







SECTION A-A



SECTION B-B

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-0118-5600-0500-5600 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	15/01/2024 15:52
SITE	Newton Heath Phase 2
DESIGNER	Charlie Smith
REF	S13

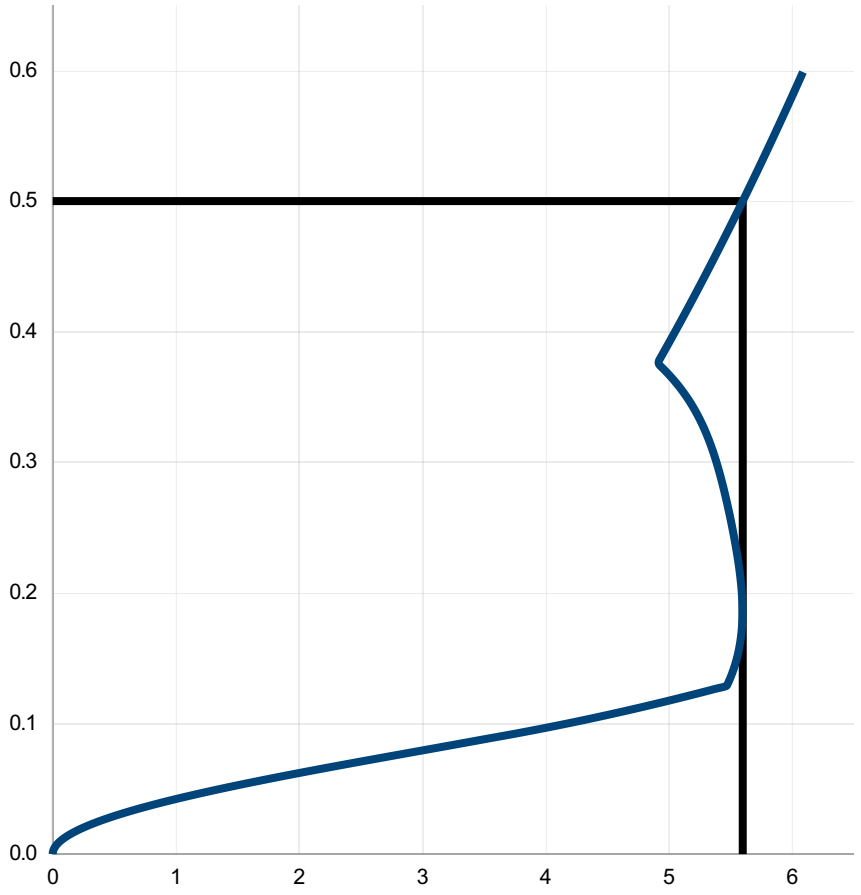
SHE-0118-5600-0500-5600
Hydro-Brake® Optimum

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Hydro International Ltd • Unit 2, Rivermead Court • Kenn Business Park • Windmill Road • Kenn • Clevedon • BS21 6FT • Tel: 01275 878371 • www.hydro-int.com • Email: Enquiries@hydro-int.com

charlie.smith@curtins.com

Technical Specification		
Control Point	Head (m)	Flow (l/s)
Primary Design	0.500	5.600
Flush-Flo™	0.186	5.598
Kick-Flo®	0.375	4.906
Mean Flow		4.597

hydro-int.com/patents



Head (m)	Flow (l/s)
0.000	0.000
0.017	0.181
0.034	0.687
0.052	1.450
0.069	2.389
0.086	3.401
0.103	4.351
0.121	5.136
0.138	5.512
0.155	5.566
0.172	5.592
0.190	5.597
0.207	5.586
0.224	5.563
0.241	5.532
0.259	5.496
0.276	5.455
0.293	5.408
0.310	5.351
0.328	5.278
0.345	5.181
0.362	5.048
0.379	4.929
0.397	5.031
0.414	5.130
0.431	5.228
0.448	5.324
0.466	5.417
0.483	5.509
0.500	5.600

DESIGN ADVICE

The head/flow characteristics of this SHE-0118-5600-0500-5600 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	15/01/2024 15:52
Site	Newton Heath Phase 2
DESIGNER	Charlie Smith
Ref	S13

SHE-0118-5600-0500-5600

Hydro-Brake® Optimum

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Appendix C

Final Construction Drawings:

- 074031-CUR-00-XX-D-C-92610_C04 DRAINAGE LAYOUT PHASE 2
- 074031-CUR-00-XX-D-C-92620_C02 Drainage Notes
- 074031-CUR-00-XX-D-C-92630_C04 Manhole Schedule
- 074031-CUR-00-XX-D-C-92640_C02 Drainage Details

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"RESIDUAL HAZARD REGISTER (RELATES TO CIVIL/STRUCTURAL MATTERS ONLY)
MUST BE READ IN CONJUNCTION WITH CURTINS RESIDUAL HAZARD REGISTER 074031-CUR-00-XX-HA-Z-00002.
HAZARDS THAT SHOULD BE OBVIOUS TO A COMPETENT CONTRACTOR HAVE NOT BEEN INDICATED ON THIS DRAWING. SHOULD ANY ADDITIONAL HAZARDS BE IDENTIFIED, THE CONTRACTOR SHOULD NOTIFY ALL RELEVANT PROJECT TEAM MEMBERS."

HAZARD REGISTER

Hazard Ref.	Item (Feature, Element or Activity)	Potential Hazard Identified	Action (Information to Assist Control)
1.00 Enabling / Highwayworks			
1.01	Working adjacent/within Live Highway	Risk to construction workers and equipment.	Construction Management Plan to assess edge protection, access routes and appropriate activities within proximity to live highway interface.
3.00 Existing Buried & Overhead Services			
3.01	Existing Live Services	Reduce	Carry out additional surveys and investigations to locate and protect the services in co-ordination with Services Engineer/Statutory Undertakers.
4.00 Demolition of Existing Structures / Site Clearance			
4.01	Contaminated Land	Risk to construction workers via inhalation or ingest. Risk to controlled waters.	Contractor to review specific site investigation report and determine what measures are required for removing spoil from site.
4.02	Ground Gas	Risk to construction workers via inhalation.	Contractor to review specific site investigation report and determine what measures are required for working within any confined spaces within excavations.
4.03	Existing Needles	Injury Risk to Construction Workers	Contractor to ensure appropriate PPE and personnel are used to appropriately manage and discard of existing needles.
5.00 Excavations and Foundations			
5.01	Deep excavations >3m deep	Excavation Stability	Sequencing of works to be considered and appropriate retention and protection

GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
2. DESIGN BASED ON TOPOGRAPHICAL SURVEY AND CCTV SURVEY INFORMATION AVAILABLE AT THE TIME OF DESIGN.
3. DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
4. ALL DIMENSIONS ARE IN METRES AND LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS OTHERWISE NOTED.
5. FOR GENERAL NOTES REFER TO DRAWING 074031-CUR-00-XX-D-C-92620

DRAWING BASED ON:

TOPOGRAPHICAL SURVEY
- BY: SEP, SEP111190L, DATED NOVEMBER 2019.
- BY: LAYER SURVEYS LTD 1631 DATED APRIL 2023

CCTV SURVEY
- CCTV SURVEY BY: LAYER SURVEYS, LAY0243, DATED NOVEMBER 2019.

UU RECORDS
- UUPS-ORD-122012, DATED 06.09.19.

SITE LAYOUTS
- ARCHITECT SITE LAYOUT: T8170G0020T2 RECEIVED 24.04.02

COVER LEVELS DEPENDANT ON PHASE 2 WORKS TYING INTO EXISTING GROUND LEVELS. FURTHER WORK.

C02-1500Ø CL: 85.50 BDIL:83.24 IL:80.89
NEW MANHOLE TO BE CONSTRUCTED ON EXISTING PUBLIC SEWER. S106 APPLICATION REQUIRED WITH UNITED UTILITIES.
PART 1: BY CURTINS
PART 1 AWAITING APPROVAL
REF:07231371
PART 2: BY CONTRACTOR

S13-1500Ø CL:85.34 IL:83.37
1 YEAR = 5.6l/s
30 YEAR = 7.3l/s
100YEAR + 45%CC = 20.3l/s
HYDROBRAKE DISCHARGE 5.6L/S
CTL-SHE-0118-5600-0500-5600
OVERFLOW PIPE WITH ORIFICE PLATE SET ABOVE 1:30YEAR STORM EVENT. IL: 84.534
ORIFICE OPENING 0.073m

FOR S278/38 REFER TO CURTINS DRAWING 074031-CUR-00-XX-DR-C-95001

CELLULAR STORAGE TANK
MAX GROUND LEVEL:86.40
MIN GROUND LEVEL:86.31
POROSITY: 95%
HEIGHT: 0.8m
AREA: 63m²
VOLUME:48m³

AREA DEVELOPED AS PART OF PHASE 1 WORKS.

AREA INSTALLED AS PART OF ACCESS ROAD WORKS AS PER CURTINS DRAWING: 074031-CUR-00-XX-D-C-92950

AREA INSTALLED AS PART OF ADVANCED CONSTRUCTION PHASE AS PER CURTINS DRAWING 074031-CUR-00-XX-DR-C-92900

DRAINAGE COLLECTION POINTS HAVE BEEN POSITIONED BASED ON INDICATIVE CONTOUR PLAN ISSUED FOR TENDER PURPOSES AND ANY CHANGES TO LEVELS SHOULD BE CONFIRMED

EXISTING HIGHWAY MANHOLES CONSTRUCTED AS PART OF PHASE 1 SITE 1 COVER LEVELS TO BE RAISED/LOWERED TO SUIT THE LATEST GROUND LEVELS FOR THE SITE WHERE REQUIRED.

ALL FOUL DRAINS ARE 100Ø UNLESS NOTED OTHERWISE. (MIN 1:40 - NO WC'S, MIN 1:80 - WC CONNECTIONS).
ALL FOUL CONNECTION REST BEND IL's SET AT 250mm BELOW BASE OF SLAB.
ALL SURFACE WATER DRAINS ARE 150Ø UNLESS NOTED OTHERWISE. (MIN 1:100)

NO EXTERNAL AREAS ARE TO DRAIN DIRECTLY ON TO THE ADOPTED HIGHWAY. INTERCEPTING DRAINAGE IS SHOWN REQUIRED TO PREVENT THIS.

ALL DRAINAGE WITHIN TRAFFICKED AREAS TO HAVE A LOADING CLASS OF D400 OR GREATER.

CONSTRUCTION RECORD - FINAL CONSTRUCTION

THE INFORMATION IS BASED ON CONFIRMATION FROM THE CONTRACTOR OF THE INSTALLED WORKS. THERE MAY BE VARIATIONS ON SITE WHICH ARE NOT REFLECTED ON THIS DRAWING AND HAS NOT BEEN VERIFIED BY CURTINS.

KEY:

- INDICATIVE HIGHWAY BOUNDARY. TAKEN FROM MCC HIGHWAY RECORDS.
- PHASE 2 BOUNDARY. TAKEN FROM ARCHITECT DRAWING T8170W0400I1
- PHASE 2 AREA INSTALLED AS PART OF THE PHASE 2 ACCESS ROAD SEE CURTINS DRAWING 074031-CUR-00-XX-D-C-92950
- PHASE 2 AREA INSTALLED AS PART OF THE ADVANCED CONSTRUCTION WORKS SEE CURTINS DRAWING 074031-CUR-00-XX-D-C-92900
- ALL BOUNDARIES ARE OFFSET FOR CLARITY AND THEREFORE INDICATIVE.
- EXISTING PRIVATE SURFACE WATER SEWER/DRAIN (SW)
- EXISTING COMBINED PUBLIC SEWER (CW)
- PROPOSED PRIVATE COMBINED DRAIN
- PROPOSED PRIVATE FOUL DRAIN
- PROPOSED PRIVATE SURFACE DRAIN
- PROPOSED DRAINAGE TO PASS THROUGH FOUNDATION
- PROPOSED ATTENUATION SYSTEM (TYPE TO BE CONFIRMED)
- PROPOSED PERMEABLE PAVING
- PROPOSED FLOW CONTROL CHAMBER
- PROPOSED PRIVATE FOUL MANHOLE OR PPIC (F1)
- PROPOSED PRIVATE SURFACE MANHOLE OR PPIC (S1)
- PROPOSED COMBINED MANHOLE OR PPIC (C1)
- SURFACE WATER POPUP & CONNECTION (RWP)
- FOUL WATER SOIL AND VENT DIRECT CONNECTION (SVDC)
- PROPOSED LINEAR DRAINAGE WITH ASSOCIATED ACCESS/OUTLET BOXES GATIC CASTSLOT TREADSAFE 100Ø B125 UNLESS NOTED OTHERWISE OR A SIMILAR APPROVED (AB–OB)
- FOUL GULLY (FG)
- ROAD GULLY (GU)
- PERMEABLE PAVING OUTLET (PPO)
- INTERCEPTOR TRAP (IT)
- BACKDROP
- EXISTING UU 3M SEWER EASEMENT
- PHASE 1 PERMEABLE PAVING INSTALLED
- PHASE 1 SURFACE WATER DRAINAGE INSTALLED
- PHASE 1 FOUL WATER DRAINAGE INSTALLED
- PHASE 1 COMBINED WATER DRAINAGE INSTALLED

Rev:	Description:	Date:	By:	Chkd:
C04	FINAL CONSTRUCTION ISSUE	20.02.26	JC	CS
C03	updated to SUIT CLIENTS COMMENTS RECEIVED 06.05.25	07.05.25	CS	CG
C02	UPDATED TO SUIT CLIENTS COMMENTS RECEIVED 08.04.25	30.04.25	CS	CG
C01	ISSUED FOR CONSTRUCTION	03.04.25	CS	CG
P02	SURFACE WATER TANK DETAILS UPDATED	05.08.24	CS	CG
P01	ISSUED FOR TENDER	15.01.23	CS	CG

curtins
Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG
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manchester@curtins.com
www.curtins.com
Civils & Structures • Transport Planning • Environmental • Infrastructure • Geotechnical • Conservation & Heritage • Principal Designer
Birmingham • Bristol • Cambridge • Cardiff • Douglas • Dublin • Edinburgh • Glasgow • Kendal • Leeds • Liverpool • London • Manchester • Nottingham

Status: FINAL CONSTRUCTION

Project: OLDHAM ROAD, NEWTON HEATH

Drg Title: DRAINAGE LAYOUT PHASE 2

Size:	Date:	Drawn By:	Designed By:	Checked By:
A1	10/01/24	CS	CS	CG

Scale: 1:250

Project No:	Originator:	Volume:	Level:	Type:	Role:	Category / Number:	Rev:
074031	CUR	00	XX	D	C	92610	C04

\\mafs02\Projects\074031 - 075000\074031 - Oldham Road Newton Heath\04-Production\4A-Models\Drawings\CC\4D\92610

GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.

2. ALL ADOPTABLE DRAINAGE WORKS INCLUDING WORKS TO EXISTING PUBLIC SEWERS TO BE UNDERTAKEN IN ACCORDANCE WITH "SEWERS FOR ADOPTION 7th EDITION" AND "CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY 7th EDITION" AND CONSTRUCTED TO THE RELEVANT STATUTORY UNDERTAKERS DETAILS.

3. ALL PRIVATE DRAINAGE WORKS TO BE IN ACCORDANCE WITH CURTINS DRAINAGE SPECIFICATION, "CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY 7th EDITION", BS EN 752 2017 'DRAIN AND SEWER SYSTEMS OUTSIDE BUILDINGS' AND THE BUILDING REGULATIONS APPROVED 'DOCUMENT H'.

4. DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.

5. DESIGN BASED ON TOPOGRAPHICAL SURVEY AND CCTV SURVEY INFORMATION AVAILABLE AT THE TIME OF THE DESIGN.

6. OUTFALL CONNECTIONS SUBJECT TO AGREEMENT WITH THE APPROVING AUTHORITY.

7. ALL DIMENSIONS ARE IN METRES AND LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS OTHERWISE NOTED.

8. COVER LEVELS, GULLY POSITIONS, AND BUILDINGS LOCATION ARE APPROXIMATE AND SHALL BE CONFIRMED BY ARCHITECT/ LANDSCAPE ARCHITECT. CONTRACTOR TO ALLOW FOR ADJUSTMENT TO SUIT AGREED POSITIONS AND FINISHED LEVELS, AND CONFIRM ALL COVER LEVELS ON SITE.

9. ALL INTERNAL DRAINAGE CONNECTIONS ARE PROVIDED TO THE PENETRATION POSITIONS SHOWN ON ARCHITECT AND M&E DRAWINGS. REFER TO DIMENSIONED LOCATIONS AND DIAMETERS ON ARCHITECT'S GROUND FLOOR SETTING-OUT PLANS.

10. ALL UNDERGROUND FOUL DRAINAGE SHOULD BE SUITABLY VENTED AT OR NEAR TO THE HEAD OF RUNS.

11. ALL ACCESS FITTINGS, STACKS, RWP'S AND GULLIES TO BE RODDABLE. ALL TO HAVE LOW LEVEL RODDING ACCESS PLATES UNLESS AN ALTERNATIVE MEANS OF ACCESS IS AGREED. ACCESS POINT TO BE ABOVE ANY GROUND FLOOR CONNECTED APPLIANCE SPILL LEVEL.

12. LARGE ACCESS FITTING REQUIRED ABOVE GROUND WHERE GREATER THAN 12M UP TO 22M TO A JUNCTION. SMALL ACCESS FITTING REQUIRED UP TO 12M TO A JUNCTION.

13. ALL GULLY AND CHANNEL DRAIN OUTLETS AND TERMINATION POINTS TO BE TRAPPED AND RODDABLE. INTERNAL GULLIES AND CHANNEL DRAINS TO BE SPECIFIED BY OTHERS.

14. WHERE NO WC'S ARE CONNECTED UPSTREAM, UNDERSLAB FW DRAINAGE TO BE LAID AT 1:40 MIN. AFTER THE CONNECTION OF AT LEAST 1NO WC, A MIN. FALL OF 1:80 APPLIES.

15. ALL CONNECTIONS FROM POP-UPS TO BE LAID AT A CONSTANT GRADIENT TO JUNCTION/ INSPECTION CHAMBER/ MANHOLE UNLESS NOTED OTHERWISE. ANY ISSUES RELATING TO CLASHES WITH FOUNDATIONS ARE TO BE FORWARDED TO THE ENGINEER, ALLOWING SUFFICIENT TIME FOR AN ALTERNATIVE SOLUTION TO BE PROPOSED.

16. INVERT LEVELS AT MANHOLES/ INSPECTION CHAMBERS TO BE USED TO SET OUT PIPEWORK. PIPE GRADIENTS ARE SHOWN INDICATIVELY ONLY.

17. ALL PIPE DIAMETERS GIVEN ARE NOMINAL INTERNAL PIPE DIAMETERS.

18. ALL SEWERS, UNLESS AGREED OTHERWISE STATED, SHALL BE:
- 100mm to 300mm DIA TO BE VITRIFIED CLAY.
- 375mm DIA AND GREATER TO BE CLASS 120 CONCRETE PIPES.

19. AS AN ALTERNATIVE THE CONTRACTOR MAY USE AN APPROVED UNPLASTICISED POLYVINYL CHLORIDE (PVCU) WITH APPROVAL FROM THE ENGINEER.

20. SEWER PIPES TO BE LAID IN MAXIMUM 3 METRE LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER LENGTHS.

21. THE FIRST PIPE OUT OF MANHOLES TO BE AS SHORT AS PRACTICABLE SO AS TO PROVIDE A FLEXIBLE JOINT AS CLOSE AS POSSIBLE TO THE OUTSIDE FACE OF THE CONCRETE SURROUND AND CONNECTED TO A LENGTH OF ROCKER PIPE.

22. ALL NEW CONNECTIONS INTO EXISTING MANHOLES (OR INTO EXISTING SEWERS) TO BE 'SOFFITS LEVEL' UNLESS OTHERWISE NOTED.

23. ALL ADOPTABLE DRAINAGE PIPES WILL REQUIRE A MINIMUM OF 1200mm COVER, IN ACCORDANCE WITH SEWERAGE UNDERTAKERS REQUIREMENTS. WHERE THIS IS NOT ACHIEVED, IT WILL BE NECESSARY TO AGREE THE BED AND SURROUND DETAIL.

24. ALL PRIVATE DRAINAGE PIPES WITH A COVER OF LESS THAN 600mm IN NON-TRAFFICKED AREAS AND LESS THAN 1200mm IN TRAFFICKED AREAS TO BE BEDDED AND SURROUNDED IN CONCRETE (CLASS Z). COMPRESSIBLE MATERIAL SHALL BE PROVIDED AT EVERY PIPE JOINT. WHERE COVER EXCEEDS THIS DEPTH, PIPES ARE TYPICALLY BEDDED AND SURROUNDED IN CLASS S. REFER TO PIPE EMBEDMENT DETAILS DRAWING FOR SPECIFIC TYPES.

25. WHERE DRAINAGE PIPES ARE LESS THAN 300mm BELOW THE UNDERSIDE OF THE GROUND FLOOR SLAB, CONCRETE ENCASEMENT IS REQUIRED (CLASS Z). COMPRESSIBLE JOINTS ARE TO BE PROVIDED AT EVERY PIPE JOINT WITHIN THE CONCRETE.

26. WHERE PIPES ARE MORE THAN 300mm BELOW THE UNDERSIDE OF THE SLAB, CLASS S BEDDING IS ACCEPTABLE.

27. SULPHATE RESISTANT CEMENT (C20-DC2) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED TO PROVE THAT SUCH PRECAUTIONS ARE NOT REQUIRED.

28. WHERE FOUL SEWERS RUN ABOVE SURFACE SEWERS, CONCRETE PROTECTION MAY BE REQUIRED AT CROSSOVERS TO PREVENT ANY POTENTIAL CONTAMINATION.

29. ALL CONNECTIONS PASSING THROUGH BASES OR EDGE BEAMS TO BE IN SEALED SLEEVES. ALTERNATIVELY CONNECTIONS MAY BE CAST-IN WITH FLEXIBLE JOINTS NOT GREATER THAN 150MM FROM FACE OF CONCRETE.

30. THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION MAY NEED TO BE INCREASED TO ACCOMMODATE THE CONNECTIONS AND BENDS.

31. ALL MANHOLE COVERS IN BLOCK/SLAB AND EXTERNAL PAVING AREAS TO HAVE RECESSED COVERS OF THE APPROPRIATE GRADE TO ACCEPT ARCHITECT'S PAVING PROPOSAL.

32. ALL INTERNAL COVERS TO HAVE MECHANICALLY JOINTED CORNERS AND DOUBLE SEALED WITH RECESSED TRAY TO ALLOW FOR FINISHES.

33. UNLESS NOTED OTHERWISE IN THE MANHOLE SCHEDULE, ALL MANHOLE, GULLY AND CHANNEL COVERS (IRONWORK) SHOULD BE THE FOLLOWING SPECIFICATION:
- B125 LOAD CLASS IN PEDESTRIAN AREAS
- D400 LOAD CLASS IN VEHICULAR AREAS.

35. ALL PROPRIETARY PRODUCTS TO BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS, INSTRUCTIONS AND RECOMMENDATIONS.

CONSTRUCTION RECORD - FINAL CONSTRUCTION

THE INFORMATION IS BASED ON CONFIRMATION FROM THE CONTRACTOR OF THE INSTALLED WORKS. THERE MAY BE VARIATIONS ON SITE WHICH ARE NOT REFLECTED ON THIS DRAWING AND HAS NOT BEEN VERIFIED BY CURTINS.

Rev:	Description:	Date:	By:	Chkd:
C02	FINAL CONSTRUCTION ISSUE	20/02/26	JC	CS
C01	ISSUED FOR CONSTRUCTION	03/04/25	JC	CS
P01	ISSUED FOR TENDER	19/07/24	JC	CS

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Project: OLDHAM ROAD, NEWTON HEATH

Status: FINAL CONSTRUCTION

Drg Title: DRAINAGE NOTES PHASE 2

Drawn By	JC	Checked By	CS
Designed By	CS	Date	11/01/24
Scales @ A3	N/A		

Project No - Originator - Function - Spatial - Form - Discipline - Number: 074031 - CUR - XX - XX - D - C - 92620

Revision: C02

\\ma-fs-1\Projects\074001 - 075000\074031 - Oldham Road Newton Heath\Phase 2 & 3\Q4-Production\4A-Models-Drawings\C\CAD\92\

Manhole schedule - Surface Water

MH REF	CL (mAOD)	IL (mAOD)	DEPTH TO SOFFIT (mAOD)	DS PIPE DIA (mm)	MH DIA (mm)	MH TYPE	CATCHPIT	CATCHPIT DEPTH (mm)	COVER SIZE (mm)	COVER CLASS	COVER TYPE	RECESSED	BACK DROP	Back drop IL (m)	RESTRICTED ACCESS	COMMENTS	EASTING	NORTHING
S1	85.49	84.37	0.89	225	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	Y	N	N/A	N	UNRESTRICTED;	387953.19	400670.32
S2	86.25	84.04	1.98	225	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	N	N/A	Y	RESTRICTED ACCESS 350mm DIA MAX;	388002.52	400680.34
S3	86.34	83.91	2.21	225	1200	TYPE B	Y	300	600X600	D400	SINGLE SEALED	N	N	N/A	N	UNRESTRICTED;	388010.34	400678.42
S4	86.32	83.84	2.25	225	1200	TYPE B	Y	300	600X600	D400	SINGLE SEALED	N	N	N/A	N	UNRESTRICTED;	388013.31	400664.08
S5	85.70	84.65	0.90	150	600	PPIC	N	N/A	600X600	D400	SINGLE SEALED	N	N	N/A	N	UNRESTRICTED;	387986.15	400636.57
S6	85.92	84.50	1.20	225	600	PPIC	N	N/A	600X600	D400	SINGLE SEALED	Y	N	N/A	Y	RESTRICTED ACCESS 350mm DIA MAX;	388002.50	400644.64
S7	86.11	83.78	2.11	225	1200	TYPE B	N	N/A	600X600	D400	SINGLE SEALED	Y	N	N/A	N	UNRESTRICTED;	387999.46	400660.37
S8	85.32	84.27	0.90	150	600	PPIC	N	N/A	600X600	D400	SINGLE SEALED	N	N	N/A	N	UNRESTRICTED;	387968.42	400631.77
S9	85.36	84.03	1.11	225	600	PPIC	N	N/A	600X600	D400	SINGLE SEALED	Y	N	N/A	Y	RESTRICTED ACCESS 350mm DIA MAX;	387977.71	400636.54
S10	85.55	83.38	1.95	225	1200	TYPE B	N	N/A	600X600	D400	SINGLE SEALED	Y	N	N/A	N	UNRESTRICTED;	387969.49	400654.24
S11	85.22	84.44	0.63	150	450	PPIC	N	N/A	450X450	D400	SINGLE SEALED	Y	N	N/A	N	UNRESTRICTED;	387949.37	400656.91
S12	85.50	84.36	0.99	150	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	Y	N	N/A	N	UNRESTRICTED;	387956.88	400657.88
S13	85.34	83.37	1.75	225	1500	TYPE B	N	N/A	600X600	D400	SINGLE SEALED	Y	N	N/A	N	FLOW CONTROL CHAMBER MAX DISCHARGE RATE 20.3l/s CTL-SHE-0118-5600-0500-5600	387958.46	400651.98
S14	85.74	84.68	0.91	150	450	PPIC	N	N/A	450X450	B125	SINGLE SEALED	N	N	N/A	N	UNRESTRICTED;	388004.17	400615.39
S15	85.46	84.51	0.80	150	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	N	N/A	N	UNRESTRICTED;	387988.51	400608.87
S16	85.51	84.41	0.88	225	600	PPIC	N	N/A	600X600	D400	SINGLE SEALED	N	N	N/A	N	UNRESTRICTED;	387984.16	400617.97
S17	86.07	85.16	0.76	150	450	PPIC	N	N/A	450X450	B125	SINGLE SEALED	N	N	N/A	N	UNRESTRICTED;	388015.93	400621.04
S18	86.08	84.83	1.03	225	600	PPIC	N	N/A	600X600	D400	SINGLE SEALED	N	N	N/A	Y	RESTRICTED ACCESS 350mm DIA MAX;	388011.21	400630.73
S19	86.57	85.33	1.09	150	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	N	N/A	Y	RESTRICTED ACCESS 350mm DIA MAX;	388024.77	400637.35
S20	86.82	85.13	1.54	150	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	N	N/A	Y	RESTRICTED ACCESS 350mm DIA MAX;	388044.35	400641.43
S21	86.83	84.92	1.69	225	600	PPIC	N	N/A	600X600	D400	SINGLE SEALED	N	N	N/A	Y	RESTRICTED ACCESS 350mm DIA MAX;	388041.80	400654.72

Manhole schedule - Foul Water

MH REF	CL (mAOD)	IL (mAOD)	DEPTH TO SOFFIT (mAOD)	DS PIPE DIA (mm)	MH DIA (mm)	MH TYPE	CATCHPIT	CATCHPIT DEPTH (mm)	COVER SIZE (mm)	COVER CLASS	COVER TYPE	RECESSED	BACK DROP	Back drop IL (m)	RESTRICTED ACCESS	COMMENTS	EASTING	NORTHING
F1	86.06	85.08	0.83	150	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	N	N/A	N	UNRESTRICTED;	388013.14	400617.97
F2	85.99	85.08	0.81	100	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	N	N/A	N	UNRESTRICTED;	388010.97	400618.14
F3	85.76	84.88	0.78	100	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	N	N/A	N	UNRESTRICTED;	387998.73	400612.25
F4	85.69	84.85	0.74	100	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	N	N/A	N	UNRESTRICTED;	387996.94	400611.39
F5	85.39	84.50	0.79	100	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	N	N/A	N	UNRESTRICTED;	387983.80	400603.85
F6	85.46	84.65	0.71	100	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	N	N/A	N	UNRESTRICTED;	387985.09	400605.69
F7	85.69	84.10	1.44	150	450	PPIC	N	N/A	450X450	B125	SINGLE SEALED	N	Y	84.61	Y	RESTRICTED ACCESS 350mm DIA MAX;	387993.57	400608.16
F8	85.63	84.03	1.45	150	450	PPIC	N	N/A	450X450	D400	SINGLE SEALED	N	N	N/A	Y	RESTRICTED ACCESS 350mm DIA MAX;	387988.43	400619.77
F9	86.63	84.01	2.47	150	450	PPIC	N	N/A	450X450	D400	SINGLE SEALED	N	N	N/A	Y	RESTRICTED ACCESS 350mm DIA MAX;	387989.89	400621.00
F10	86.57	85.67	0.80	100	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	Y	85.95	N	UNRESTRICTED;	388019.80	400649.82
F11	86.65	85.67	0.88	100	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	Y	85.95	N	UNRESTRICTED;	388024.11	400650.28
F12	86.83	85.52	1.21	100	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	Y	86.17	Y	RESTRICTED ACCESS 350mm DIA MAX;	388037.18	400653.78
F13	86.74	85.40	1.24	100	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	Y	86.10	Y	RESTRICTED ACCESS 350mm DIA MAX;	388032.63	400652.84
F14	86.68	85.05	1.48	150	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	Y	86.02	Y	RESTRICTED ACCESS 350mm DIA MAX;	388028.19	400651.92
F15	85.94	84.64	1.20	100	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	Y	85.16	Y	RESTRICTED ACCESS 350mm DIA MAX;	387992.40	400654.63
F16	86.96	84.59	2.37	100	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	Y	85.16	Y	RESTRICTED ACCESS 350mm DIA MAX;	387988.70	400652.55
F17	85.78	84.42	1.36	150	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	N	N/A	Y	RESTRICTED ACCESS 350mm DIA MAX;	387984.02	400650.97
F18	85.78	84.38	1.40	150	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	Y	85.06	Y	RESTRICTED ACCESS 350mm DIA MAX;	387979.73	400648.91
F19	85.78	84.35	1.43	150	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	Y	85.06	Y	RESTRICTED ACCESS 350mm DIA MAX;	387975.43	400646.84
F20	85.34	84.21	1.13	150	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	N	N/A	Y	RESTRICTED ACCESS 350mm DIA MAX;	387969.96	400646.57
F21	85.34	84.17	1.17	150	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	Y	84.62	Y	RESTRICTED ACCESS 350mm DIA MAX;	387965.67	400644.50
F22	85.34	84.13	1.21	150	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	N	N/A	Y	RESTRICTED ACCESS 350mm DIA MAX;	387960.08	400642.22
F23	86.22	84.92	1.30	100	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	Y	85.50	Y	RESTRICTED ACCESS 350mm DIA MAX;	388000.50	400667.43
F24	86.15	84.85	1.30	100	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	Y	85.35	Y	RESTRICTED ACCESS 350mm DIA MAX;	387995.91	400666.12
F25	86.08	84.73	1.35	150	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	Y	85.23	Y	RESTRICTED ACCESS 350mm DIA MAX;	387991.27	400665.16
F26	86.07	84.70	1.37	150	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	Y	85.20	Y	RESTRICTED ACCESS 350mm DIA MAX;	387986.58	400664.19
F27	86.00	84.65	1.35	150	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	Y	85.15	Y	RESTRICTED ACCESS 350mm DIA MAX;	387981.92	400663.22
F28	85.90	84.55	1.35	150	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	Y	85.05	Y	RESTRICTED ACCESS 350mm DIA MAX;	387977.26	400662.25
F29	85.90	84.52	1.38	150	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	Y	85.02	Y	RESTRICTED ACCESS 350mm DIA MAX;	387972.60	400661.29
F30	85.77	84.42	1.35	150	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	Y	84.92	Y	RESTRICTED ACCESS 350mm DIA MAX;	387967.93	400660.32
F31	85.63	84.28	1.35	150	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	Y	84.78	Y	RESTRICTED ACCESS 350mm DIA MAX;	387963.40	400658.87
F32A	85.55	84.27	1.28	150	600	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	N	N/A	Y	RESTRICTED ACCESS 350mm DIA MAX;	387961.63	400658.41
F32	85.48	84.15	1.33	150.00	600.00	PPIC	N	N/A	600X600	B125	SINGLE SEALED	N	N	N/A	Y	RESTRICTED ACCESS 350mm DIA MAX;	387954.63	400656.17

Manhole Schedule - Combined Water

MH REF	CL (mAOD)	IL (mAOD)	DEPTH TO SOFFIT (mAOD)	DS PIPE DIA (mm)	MH DIA (mm)	MH TYPE	CATCHPIT	CATCHPIT DEPTH (mm)	COVER SIZE (mm)	COVER CLASS	COVER TYPE	RECESSED	BACK DROP	Back drop IL (m)	RESTRICTED ACCESS	COMMENTS	EASTING	NORTHING
C01	85.24	83.28	1.96	300	1200	TYPE B	N	N/A	600X600	D400	SINGLE SEALED	Y	Y	84.12	N	UNRESTRICTED;	387955.295	400651.339
C02	85.50	80.89	4.61	AS EXISTING	1500	TYPE A1/2	N	N/A	600X600	D400	SINGLE SEALED	Y	Y	83.43	N	UNRESTRICTED;	387949.136	400650.077

FOR ALL MANHOLES WITHIN THE ROAD SEE CURTINS DRAWING:
074031-CUR-00-XX-D-C-92950-C01_Phase 2 Access Road Drainage Layout

Existing Manholes within Phase 2				
MH Ref	CL	New Proposed Cover level	Level Difference	Raised/Lowered
EXC01A	85.58	85.61	0.03	R
EXC01B	85.00	85.19	0.19	R

GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
2. ALL ADOPTABLE DRAINAGE WORKS INCLUDING WORKS TO EXISTING PUBLIC SEWERS TO BE UNDERTAKEN IN ACCORDANCE WITH "SEWERS FOR ADOPTION 7th EDITION" AND "CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY 7th EDITION" AND CONSTRUCTED TO THE RELEVANT STATUTORY UNDERTAKERS DETAILS.
3. ALL PRIVATE DRAINAGE WORKS TO BE IN ACCORDANCE WITH CURTINS DRAINAGE SPECIFICATION, "CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY 7th EDITION", BS EN 752 2017 'DRAIN AND SEWER SYSTEMS OUTSIDE BUILDINGS' AND THE BUILDING REGULATIONS APPROVED 'DOCUMENT H'.
4. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
5. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
6. THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION MAY NEED TO BE INCREASED TO ACCOMMODATE THE CONNECTIONS AND BENDS.
7. COVER LEVELS BASED ON LANDSCAPE GENERAL ARRANGEMENTS 3538 102A Landscape Layout.
8. COVER LEVELS, GULLY POSITIONS, AND BUILDING LOCATION ARE APPROXIMATE AND SHALL BE CONFIRMED BY ARCHITECT/LANDSCAPE ARCHITECT. CONTRACTOR TO ALLOW FOR ADJUSTMENT TO SUIT AGREED POSITIONS AND FINISHED LEVELS, AND CONFIRM ALL COVER LEVELS ON SITE.
9. THE LANDSCAPE ARCHITECT MAY REQUIRE THE ORIENTATION OF CHAMBER COVERS TO BE CO-ORDINATED WITH THE PAVING PATTERN. THIS WILL BE SUBJECT TO REVIEW WITH THE MANHOLE INTERNAL BENCHING ARRANGEMENT, LANDING AND STEP LOCATION AND IF REQUIRED, SHOULD BE ADVISED TO US AS SOON AS POSSIBLE.
10. ALL MANHOLE, GULLY AND CHANNEL (ACCESS/OUTLET) COVERS (IRONWORK) SHOULD BE THE FOLLOWING SPECIFICATION:
    - B125 LOAD CLASS IN PEDESTRIAN AREAS
    - D400 LOAD CLASS IN VEHICULAR AREAS.

    ANY AMBIGUITIES ON DRAWINGS/ACCESS AND MAINTENANCE STRATEGY SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY.
11. ALL SURFACE CHANNEL ACCESS BOXES/OUTLET BOXES IN BLOCK/SLAB AND EXTERNAL PAVING AREAS MAY REQUIRE RECESSED COVERS OF THE APPROPRIATE GRADE TO ACCEPT THE LANDSCAPE ARCHITECT'S PAVING PROPOSAL. TBC BY LANDSCAPE ARCHITECT AND SUBJECT TO AVAILABILITY FROM MANUFACTURER.
12. ALL SURFACE CHANNELS TO BE OF THE TREADSAFE TYPE, UNLESS OTHERWISE SPECIFIED.
13. ALL PROPRIETARY PRODUCTS TO BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS, INSTRUCTIONS AND RECOMMENDATIONS.

CONSTRUCTION RECORD - FINAL CONSTRUCTION

THE INFORMATION IS BASED ON CONFIRMATION FROM THE CONTRACTOR OF THE INSTALLED WORKS. THERE MAY BE VARIATIONS ON SITE WHICH ARE NOT REFLECTED ON THIS DRAWING AND HAS NOT BEEN VERIFIED BY CURTINS.

Rev:	Description:	Date:	By:	Chkd:
C04	FINAL CONSTRUCTION ISSUE	20.02.26	JC	CS
C03	UPDATED TO SUIT COMMENTS RECEIVED 06.05.25	07.05.25	CS	CG
C02	UPDATED TO SUIT CLIENTS COMMENTS RECEIVED 08.04.25	30.04.25	CS	CG
C01	ISSUED FOR CONSTRUCTION	03/04/25	JC	CS
P02	MH EXC01A AND EXC01B COVER LEVEL UPDATED	05/08/24	CS	CG
P01	ISSUED FOR TENDER	19/07/24	JC	CS

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Status: FINAL CONSTRUCTION

Project: OLDHAM ROAD, NEWTON HEATH

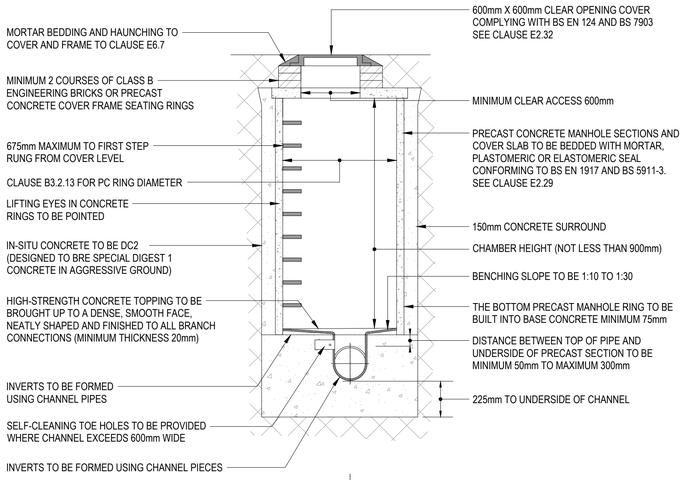
Drg Title: MANHOLE SCHEDULE PHASE 2

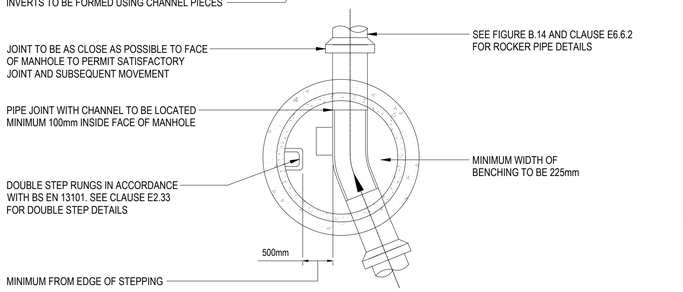
Drawn By	Designed By	Checked By
JC	CS	CS
	Date: 11/01/24	Scales @ A1: N/A

Project No - Originator - Function - Spatial - Form - Discipline - Number: 074031 - CUR - 00 - XX - D - C - 92630

Revision: C04

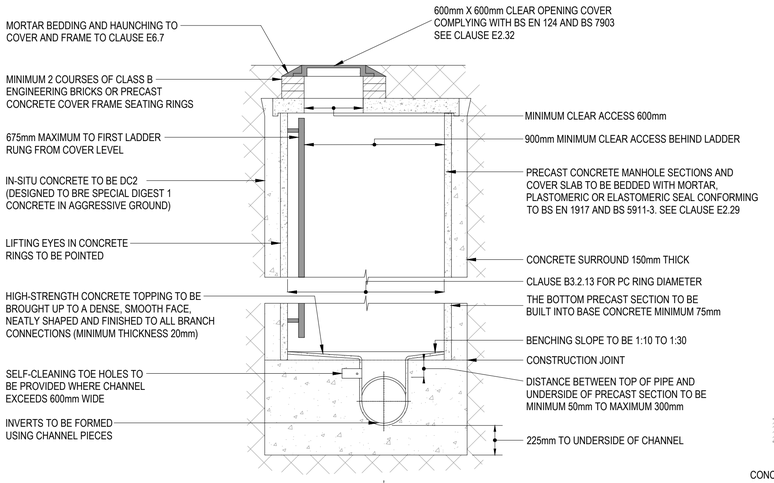
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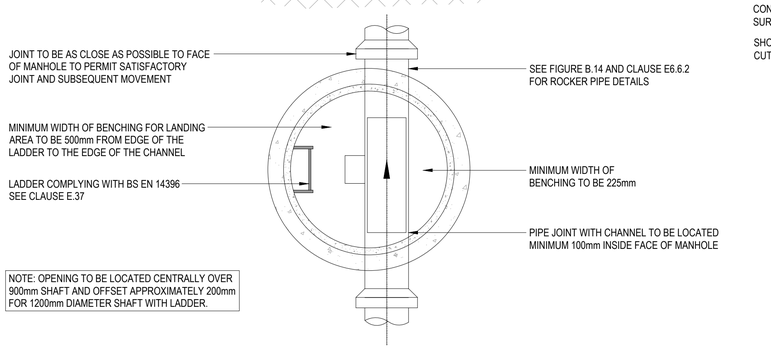




MANHOLE COVERS WITHIN TRAFFICKED PAVED AREAS TO BE D400 RECESSED COVERS.

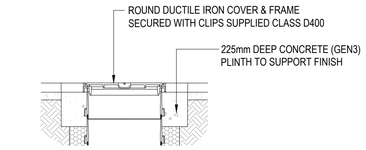
TYPICAL MANHOLE DETAIL - TYPE B
(MAXIMUM DEPTH FROM COVER TO SOFFIT OF PIPE 3.0 m)



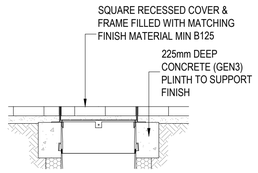


NOTE: OPENING TO BE LOCATED CENTRALLY OVER 900mm SHAFT AND OFFSET APPROXIMATELY 200mm FOR 1200mm DIAMETER SHAFT WITH LADDER.

TYPICAL MANHOLE DETAIL - TYPE A2
(DEPTH FROM COVER TO SOFFIT OF PIPE 3m TO 6m)

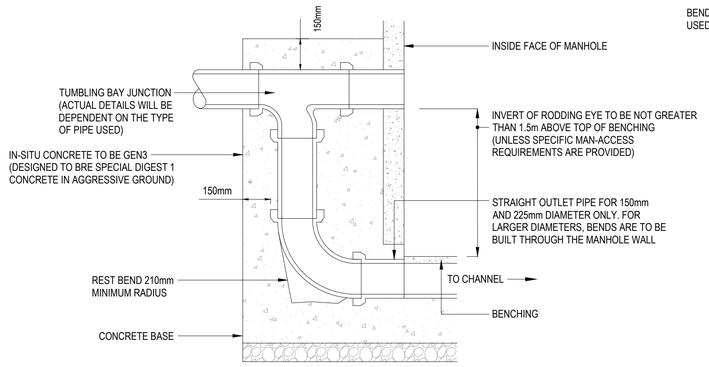


SITED IN HARD LANDSCAPED AREAS
WITH STANDARD ROUND COVER

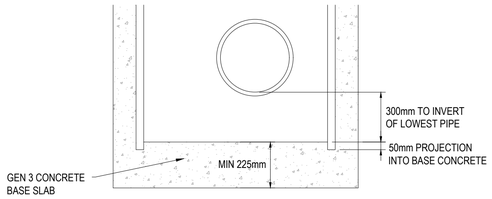


SITED IN HARD LANDSCAPED AREAS
WITH RECESSED COVER

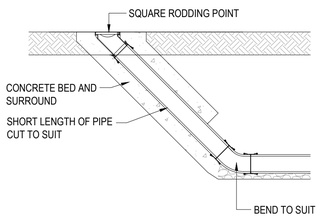
TYPICAL INSPECTION CHAMBER COVER DETAILS



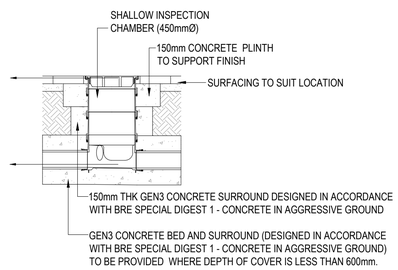
EXTERNAL VERTICAL BACKDROP



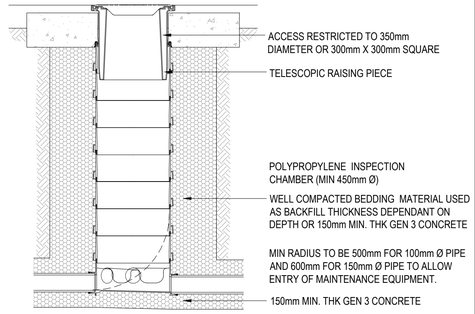
CATCH PIT DETAIL



RODDING POINT DETAIL (RE)

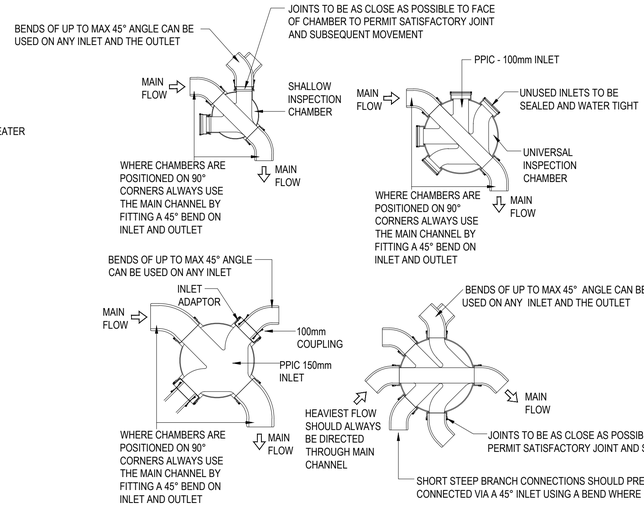


SHALLOW INSPECTION CHAMBER
MIN DEPTH 0.6m

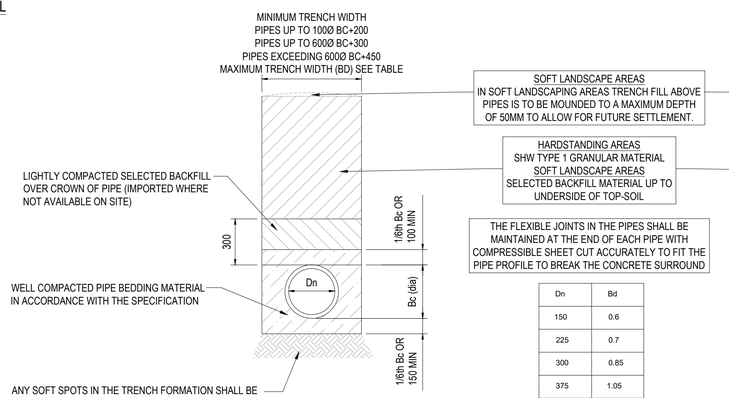


DEEP INSPECTION CHAMBER
DEPTHS BETWEEN 1.2m AND 3.0m

TYPICAL INSPECTION CHAMBER DETAILS - PPIC



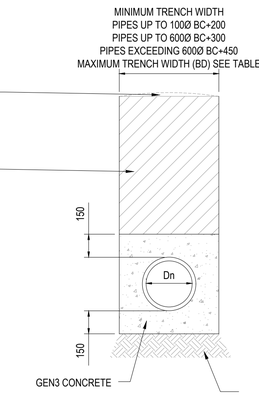
INSPECTION CHAMBER BASE DETAILS



CLASS S - 360° GRANULAR SURROUND PIPE BEDDING DETAIL

Dn	Bd
150	0.6
225	0.7
300	0.85
375	1.05
450	1.15
525	1.25
600	1.35
675	1.45
750	1.50

MAXIMUM TRENCH WIDTH



CLASS Z - CONCRETE BED AND SURROUND PIPE BEDDING DETAIL
COVER < 900mm IN VEHICULAR LOADING AND OPEN FIELD.
COVER <600mm ELSEWHERE EXCEPT UNDER BUILDINGS.

GENERAL NOTES:

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P01	ISSUED FOR TENDER	19/07/24	JC	CS

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Status:
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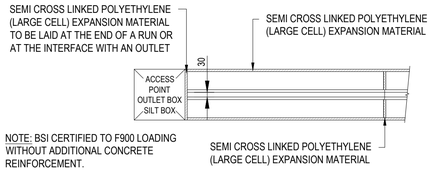
Project:
OLDHAM ROAD, NEWTON HEATH

Drg Title:
DRAINAGE DETAILS
SHEET 1 OF 4
PHASE 2

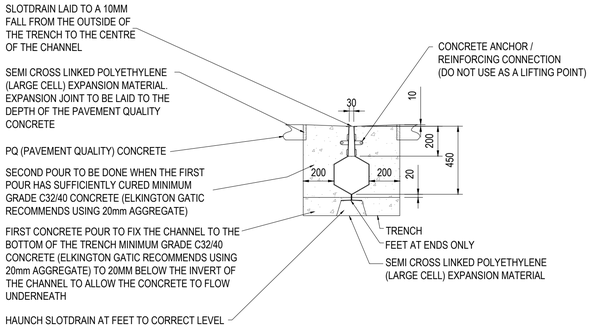
Drawn By	Designed By	Checked By
JC	CS	CS
	Date: 11/01/24	Scales @ A1: N/A

Project No - Originator - Function - Spatial - Form - Discipline - Number	Revision
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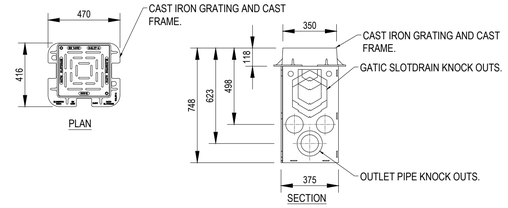
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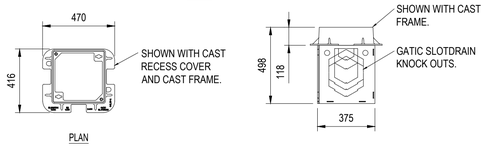
GATIC PLAN DETAIL



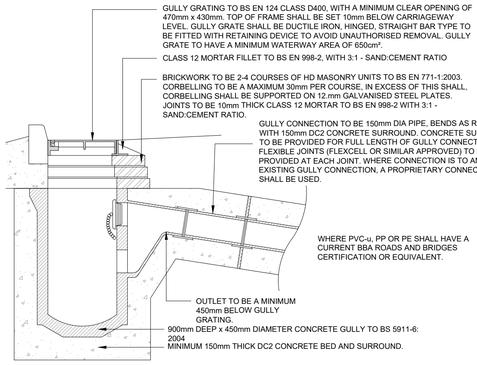
GATIC SLOTDRAIN CASTSLOT CONCRETE INSTALLATION



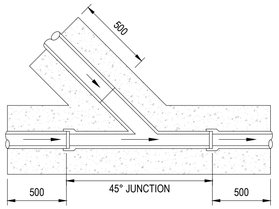
GATIC SLOTDRAIN 350mm OUTLET UNIT SECTION AND PLAN DETAILS NTS



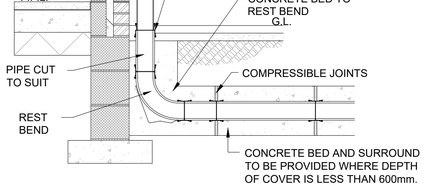
350 ACCESS BOX SECTION AND PLAN DETAILS NTS



ROAD GULLY(G) DETAIL - TYPE 1

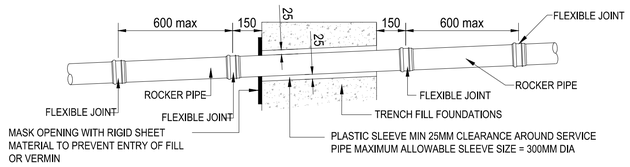


TYPICAL SADDLE CONNECTION



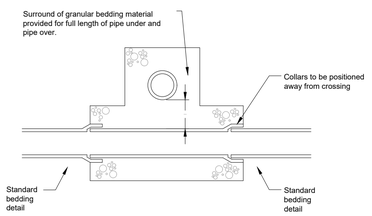
RWP CONNECTION DETAIL

(SCALE 1:20)



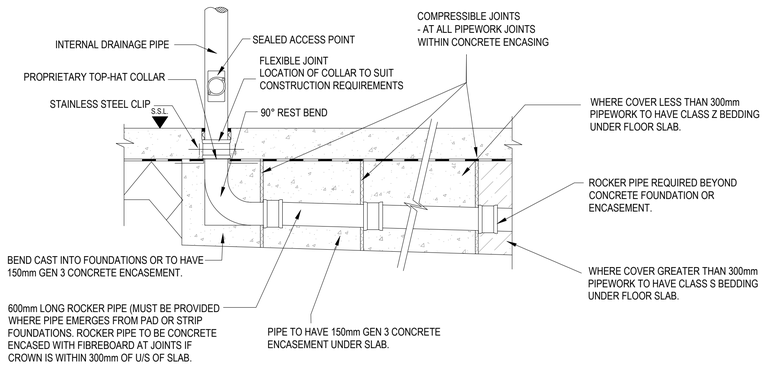
PIPE PASSING THROUGH MASS FILL CONCRETE FOUNDATION

SCALE 1:20

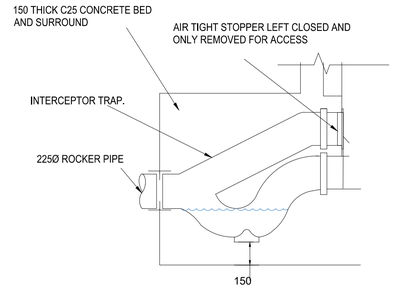


PIPE CROSSINGS DETAIL

(SCALE 1:20)



DRAINAGE UNDER BUILDINGS



INTERCEPTOR TRAP

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Status: FINAL CONSTRUCTION

Project: OLDHAM ROAD, NEWTON HEATH

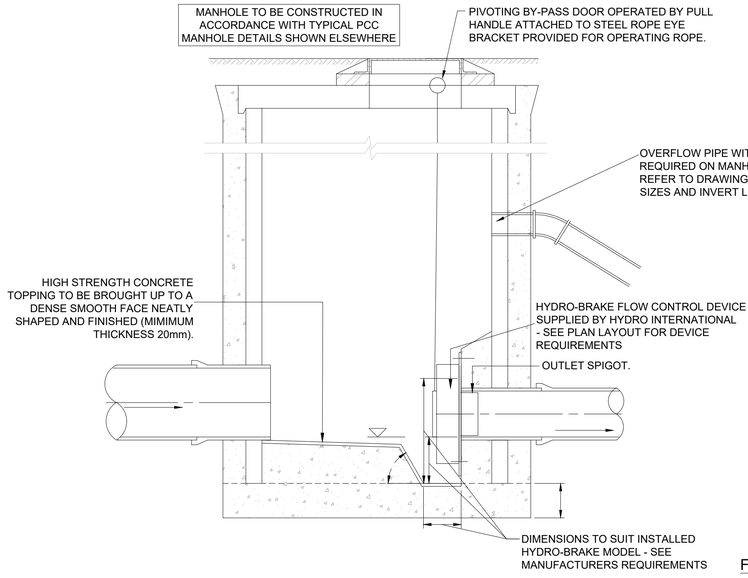
Drg Title: DRAINAGE DETAILS SHEET 2 OF 4 PHASE 2

Drawn By	Designed By	Checked By
JC	CS	CS
	Date: 11/01/24	Scales @ A1: N/A

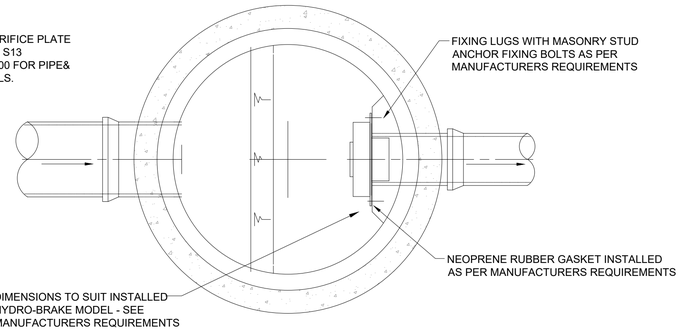
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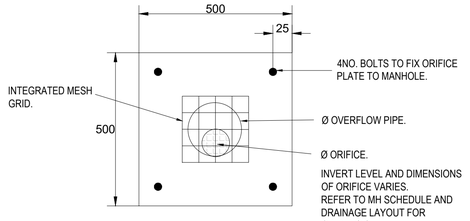
Revision: C02

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FLOW CONTROL MANHOLE (HYDRO-BRAKE)



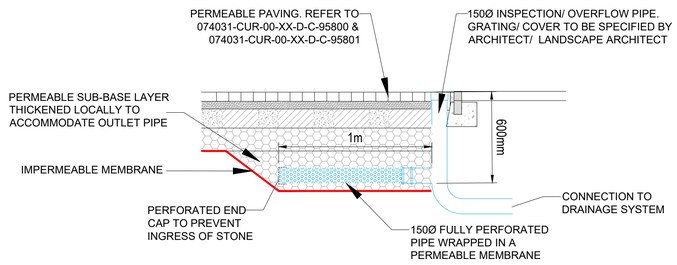


TYPICAL ORIFICE PLATE DETAIL

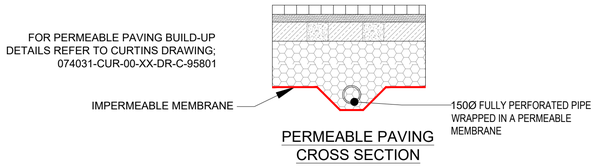
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4. REFER TO DRAINAGE LAYOUT 074031-CUR-00-XX-D-C-92610 FOR THE LOCATION OF THE ATTENUATION TANK.
5. FLOW CONTROL TO BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS, INSTRUCTIONS AND RECOMMENDATIONS.
6. WHERE ALTERNATIVE FLOW CONTROL DEVICE IS PREFERRED, IT WILL BE SUBJECT TO REDESIGN TO CONFIRM WHETHER THE SYSTEM HAS CAPACITY.
7. SURFACE WATER DRAINAGE CONNECTION SUBJECT TO S106 AGREEMENT WITH UNITED UTILITIES
8. FOR FULL DRAINAGE NOTES REFER TO DWG 074031-CUR-00-XX-D-C-92620

FOR INSPECTION PIPE LOCATIONS, REFER TO DRAINAGE LAYOUTS



PERMEABLE PAVING OUTLET



PERMEABLE PAVING CROSS SECTION

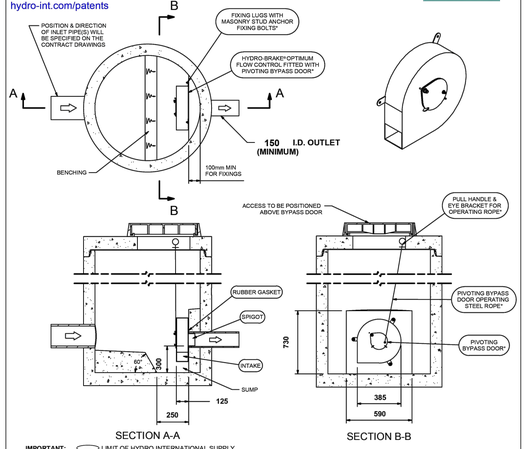
Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	0.500	5.600
Flush-Flo™	0.186	5.598
Kick-Flo®	0.375	4.906
Mean Flow		4.597

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
- Indicative Weight: 10 kg

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SECTION A-A SECTION B-B

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-0118-5600-0500-5600 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	15/01/2024 15:52
SITE	Newton Heath Phase 2
DESIGNER	Charlie Smith
REF	S13

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Hydro-Brake® Optimum

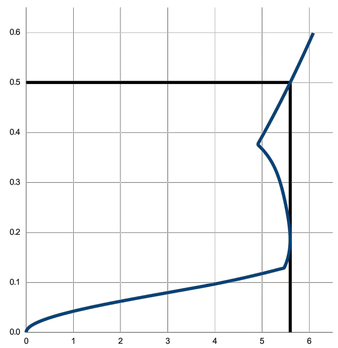
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Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	0.500	5.600
Flush-Flo™	0.186	5.598
Kick-Flo®	0.375	4.906
Mean Flow		4.597

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Head (m)	Flow (l/s)
0.000	0.000
0.017	0.181
0.034	0.687
0.052	1.450
0.069	2.389
0.086	3.401
0.103	4.351
0.121	5.136
0.138	5.512
0.155	5.566
0.172	5.592
0.190	5.597
0.207	5.586
0.224	5.563
0.241	5.532
0.259	5.496
0.276	5.455
0.293	5.408
0.310	5.351
0.328	5.278
0.345	5.181
0.362	5.048
0.379	4.929
0.397	5.031
0.414	5.130
0.431	5.228
0.448	5.324
0.466	5.417
0.483	5.509
0.500	5.600

DESIGN ADVICE !	The head/flow characteristics of this SHE-0118-5600-0500-5600 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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Ref	S13

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Hydro-Brake® Optimum

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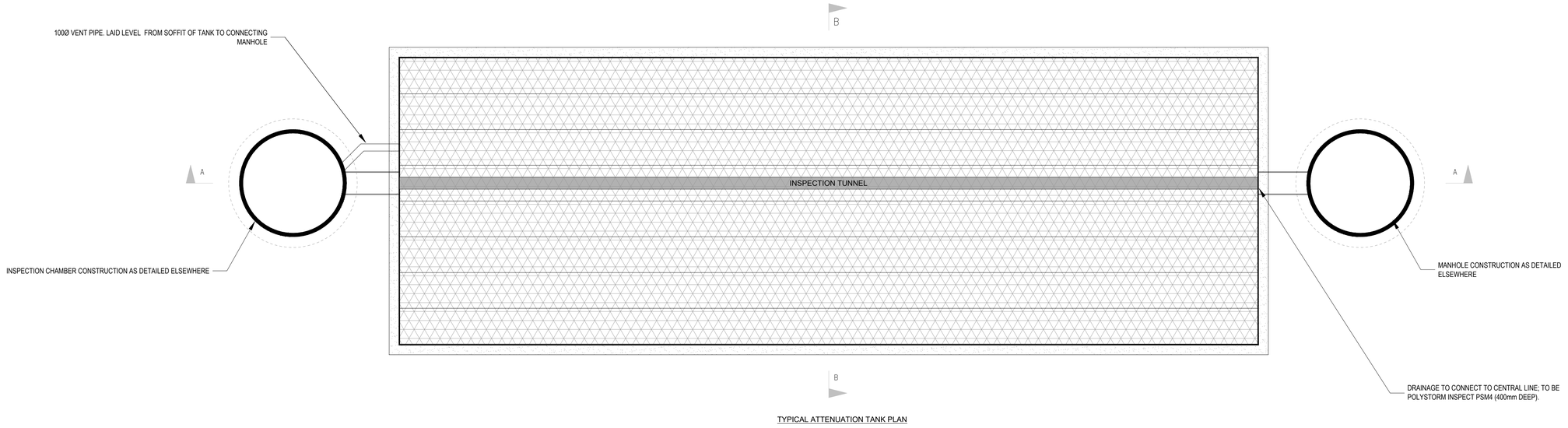
Project:
OLDHAM ROAD, NEWTON HEATH

Drg Title:
DRAINAGE DETAILS
SHEET 3 OF 4
PHASE 2

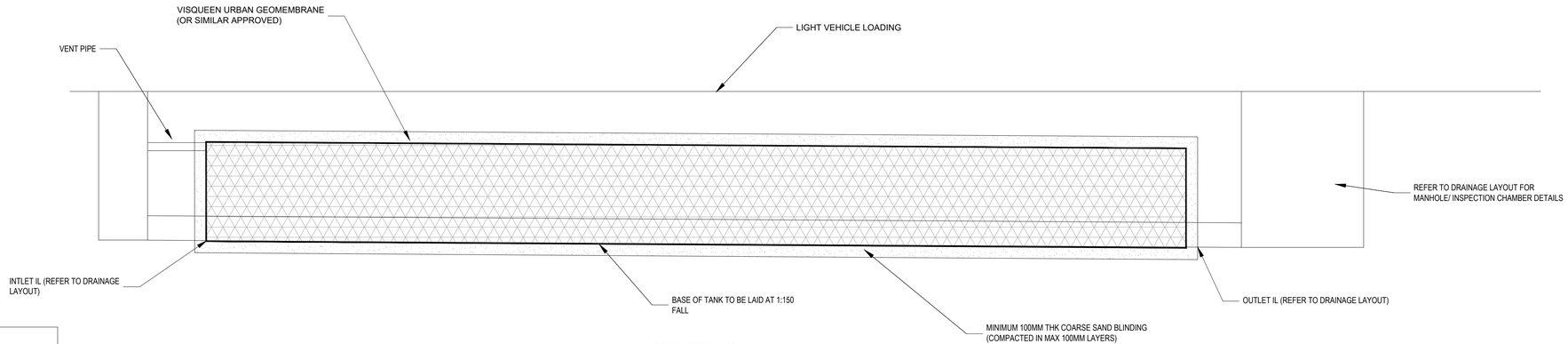
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JC	CS	CS
	Date: 11/01/24	Scales @ A1: N/A

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074031 - CUR - 00 - XX - D - C - 92642	C02

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TYPICAL ATTENUATION TANK PLAN



LONG SECTION A-A

CURRENT DESIGN ASSUMPTIONS

DESIGN BASED POLYSTORM RC (PSM1A) 1m (L), 0.50m (W), 0.40m (H).
TBC BY POLYPIPE

TANK IS LOCATED IN AN AREA SUBJECT TO LIGHT VEHICLE LOADING ONLY. DETAILED STRUCTURAL CALCULATIONS REQUIRED TO PROVE TANK HAS SUFFICIENT STRENGTH.

THE MANUFACTURER WILL NEED TO CONFIRM THAT THE TANK HAS SUFFICIENT STRENGTH FOR THIS LOCATION IN ACCORDANCE WITH CIRIA C680.

GROUND LEVEL IS APPROX 86.32 - 86.34 ,
TOP OF TANK VARIES
INLET LEVEL: 83.90
OUTLET LEVEL: 83.85
MIN COVER: 1.62m
MAX COVER: 1.64m
*FINAL COVER LEVELS TBC BY LANDSCAPE ARCHITECT

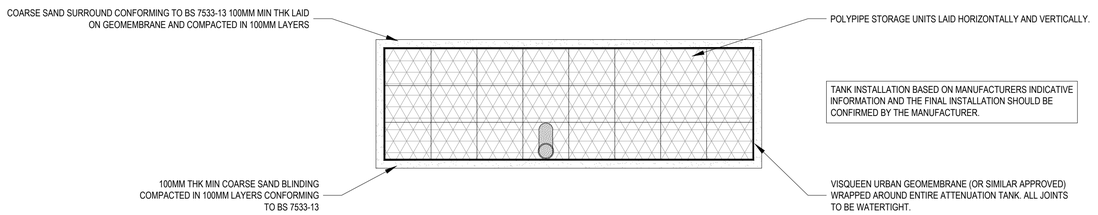
DIMENSIONS OF TOTAL UNIT ARE AS SHOWN.
PLAN AREA OF TANK IS 63m²
TOTAL DEPTH OF TANK IS 0.8m.
ATTENUATION VOLUME, BASED ON 95% VOID RATIO IS 48m³

IMPERMEABLE MEMBRANE, BED AND SURROUND TO BE CONFIRMED WITH THE MANUFACTURER.

GROUNDWATER IS ASSUMED TO BE BELOW TANK BASE. THEREFORE IT IS ASSUMED THAT THERE ARE NO FLOTATION ISSUES. HOWEVER, THIS IS TO BE CONFIRMED AT DETAILED DESIGN.

AS PER SITE INVESTIGATION 079193-CUR-XX-XX-T-GE-00003, GROUNDWATER LEVELS WERE RECORDED BELOW TANK BASE. THEREFORE IT IS ASSUMED THAT THERE ARE NO FLOTATION ISSUES. HOWEVER, THIS IS TO BE CONFIRMED AT DETAILED DESIGN.

REFER TO DRAINAGE LAYOUT: "074031-CUR-00-XX-D-C-92610" FOR TANK & INLET/OUTLET LOCATIONS.



CROSS SECTION B-B

GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
2. DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEER,S ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
4. REFER TO DRAINAGE LAYOUT 074031- CUR-00-XX-D-C-92610 DRAINAGE LAYOUT PHASE 2 FOR THE LOCATION OF THE ATTENUATION TANK.
5. ATTENUATION TANK TO BE INSTALLED STRICTLY IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS.
6. WHERE AN ALTERNATIVE ATTENUATION TANK DEVICE IS PREFERRED, IT WILL BE SUBJECT TO REDESIGN TO CONFIRM WHETHER THE SYSTEM HAS CAPACITY.
7. THE DESIGN OF THE TANK SHOULD BE PROVIDED BY THE MANUFACTURER OR SUPPLIER TO ENSURE THE TANK IS SUFFICIENT FOR THE SITE SPECIFIC CRITERIA.
8. THE TANK DESIGN SHOULD INCORPORATE:
   - CRATES SUBJECT TO REGULAR HEAVY VEHICLE LOADING,
   - SUITABLE MAINTENANCE ACCESS; AND
   - VENTING TO PREVENT TRAPPED AIR POCKETS.
9. THE STRENGTH OF THE TANK SHOULD COMPLY WITH CIRIA C680 STRUCTURAL DESIGN OF MODULAR GEOCELLULAR DRAINAGE TANKS.
10. ACCESS FOR MAINTENANCE SHOULD BE IN ACCORDANCE WITH CIRIA GUIDANCE.
11. VENTING TO THE TANK SHOULD BE CONFIRMED BY THE TANK MANUFACTURER. VENTING SHOULD BE LOCATED WITHIN LANDSCAPED AREAS, OR ROUTED BACK TO THE NEAREST MANHOLE ABOVE THE DESIGN WATER LEVEL.
12. CONSTRUCTION AND INSTALLATION OF THE TANK SHOULD BE STRICTLY IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION REQUIREMENTS.
13. THE CURRENT DESIGN OF THE TANK IS BASED ON USE OF PSM1A MODULES, TO ALLOW AN ASSUMPTION OF UNIT SIZES WITHIN THE OVERALL DESIGN. HOWEVER, WHERE AN ALTERNATIVE SYSTEM IS PROPOSED, THE DIMENSIONS OF THE UNITS WILL NEED TO BE CHECKED WITHIN THE DESIGN AND MAY RESULT IN A REDESIGN.
14. THE CONTRACTOR SHALL PROHIBIT THE MOVEMENT OF CONSTRUCTION PLANT ACROSS THE STORAGE TANK AND WHERE NECESSARY PROVIDE ADDITIONAL SUPPORT AND PROTECTION TO THE STRUCTURE. PARTICULARLY POST CONSTRUCTION. TEMPORARY FENCING CAN BE USED TO PROHIBIT TRADE STOCKS, PILLING MATERIALS, HEAVY PLANTS ETC.
15. SURFACE WATER DRAINAGE CONNECTION SUBJECT TO S106 AGREEMENT WITH UNITED UTILITIES. UU REF: 07231371
16. FOR FULL DRAINAGE NOTES REFER TO DWG 074031-CUR-00-XX-D-C-92620

CONSTRUCTION RECORD - FINAL CONSTRUCTION

THE INFORMATION IS BASED ON CONFIRMATION FROM THE CONTRACTOR OF THE INSTALLED WORKS. THERE MAY BE VARIATIONS ON SITE WHICH ARE NOT REFLECTED ON THIS DRAWING AND HAS NOT BEEN VERIFIED BY CURTINS.

Rev:	Description:	Date:	By:	Chkd:
C02	FINAL CONSTRUCTION ISSUE	20/02/26	JC	CS
C01	ISSUED FOR CONSTRUCTION	03/04/25	JC	CS
P01	ISSUED FOR TENDER	19/07/24	JC	CS

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Status: FINAL CONSTRUCTION

Project: OLDHAM ROAD, NEWTON HEATH

Drg Title: DRAINAGE DETAILS SHEET 4 OF 4 PHASE 2

Drawn By	Designed By	Checked By
JC	CS	CS
	Date: 11/01/24	Scales @ A1: N/A

Project No - Originator - Function - Spatial - Form - Discipline - Number	Revision
074031 - CUR - 00 - XX - D - C - 92643	C02

\\ma-fs-1\Projects\074001 - 075000\074031 - Oldham Road Newton Heath\Phase 2 & 3\04-Production\4A-Models-Drawings\C\CAD\92(

Appendix D

Surface Water Network Drainage Calculations

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Design Settings

Rainfall Methodology	FSR	CV	0.750	Minimum Backdrop Height (m)	0.200
Return Period (years)	100	Time of Entry (mins)	5.00	Preferred Cover Depth (m)	1.200
Additional Flow (%)	0	Maximum Time of Concentration (mins)	30.00	Include Intermediate Ground	✓
FSR Region	England and Wales	Maximum Rainfall (mm/hr)	50.0	Enforce best practice design rules	✓
M5-60 (mm)	20.000	Minimum Velocity (m/s)	1.00		
Ratio-R	0.400	Connection Type	Level Soffits		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.038	5.00	85.490	600	387953.190	400670.320	1.120
S2			86.250	600	388002.520	400680.340	2.210
S3	0.030	5.00	86.340	1200	388010.340	400678.420	2.430
S4	0.003	5.00	86.320	1200	388013.310	400664.080	2.480
S5	0.025	5.00	85.700	600	387986.150	400636.570	1.050
S6	0.020	5.00	85.920	600	388002.500	400644.640	1.420
S7	0.050	5.00	86.110	1200	387999.460	400660.370	2.330
S8	0.020	5.00	85.320	600	387968.420	400631.770	1.050
S9	0.003	5.00	85.360	600	387977.710	400636.540	1.330
S10	0.023	5.00	85.550	1350	387969.490	400654.240	2.170
S11	0.004	5.00	85.220	600	387949.370	400656.910	0.780
S12	0.004	5.00	85.500	600	387956.880	400657.880	1.140
S13	0.005	5.00	85.340	1800	387958.460	400651.980	1.970
C01			85.240	1200	387955.290	400651.340	1.960
C02			85.500	1500	387949.140	400650.080	2.270
S14		5.00	85.740	450	388004.170	400615.390	0.730
S15			85.460	450	387988.510	400608.870	0.950
S16			85.510	450	387984.160	400617.970	1.100
EXS01			86.130	1500	387985.081	400623.137	2.250
S17		5.00	86.070	450	388015.930	400621.040	0.910
S18			86.080	450	388011.210	400630.730	1.250
EXS02A			86.430	1200	388008.276	400634.201	2.720
S19		5.00	86.570	600	388024.770	400637.353	1.240
S20			86.820	600	388044.353	400641.430	1.690
S21			86.830	600	388041.797	400654.717	1.910
EXS02C			86.610	1200	388040.308	400657.912	1.711

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	S2	50.337	0.600	84.370	84.040	0.330	152.5	225	5.79	50.0
1.001	S2	S3	8.052	0.600	84.040	83.910	0.130	61.9	225	5.88	50.0
1.002	S3	S4	14.644	0.600	83.910	83.840	0.070	209.2	225	6.15	50.0
1.003	S4	S7	14.338	0.600	83.840	83.780	0.060	239.0	225	6.43	50.0
2.000	S5	S6	18.233	0.600	84.650	84.500	0.150	121.6	150	5.33	50.0
2.001	S6	S7	16.021	0.600	84.500	83.780	0.720	22.3	225	5.43	50.0
1.004	S7	S10	30.590	0.600	83.780	83.380	0.400	76.5	225	6.77	50.0
3.000	S8	S9	10.443	0.600	84.270	84.030	0.240	43.5	150	5.11	50.0
3.001	S9	S10	19.516	0.600	84.030	83.380	0.650	30.0	225	5.25	50.0
1.005	S10	S13	11.259	0.600	83.380	83.370	0.010	1125.9	225	7.26	50.0
4.000	S11	S12	7.572	0.600	84.440	84.360	0.080	94.7	150	5.12	50.0
4.001	S12	S13	6.108	0.600	84.360	84.299	0.061	100.0	150	5.22	50.0
1.006	S13	C01	3.234	0.600	83.370	83.280	0.090	35.9	225	7.29	50.0
1.007	C01	C02	6.278	0.600	83.280	83.230	0.050	125.6	300	7.36	50.0
6.000	S14	S15	16.963	0.600	85.010	84.510	0.500	33.9	150	5.16	50.0
6.001	S15	S16	10.086	0.600	84.510	84.410	0.100	100.9	150	5.33	50.0
6.002	S16	EXS01	5.248	0.600	84.410	83.880	0.530	9.9	225	5.35	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	1.056	42.0	5.1	0.895	1.985	0.038	0.0
1.001	1.664	66.2	5.1	1.985	2.205	0.038	0.0
1.002	0.900	35.8	9.2	2.205	2.255	0.068	0.0
1.003	0.841	33.4	9.6	2.255	2.105	0.071	0.0
2.000	0.910	16.1	3.4	0.900	1.270	0.025	0.0
2.001	2.785	110.8	6.1	1.195	2.105	0.045	0.0
1.004	1.497	59.5	22.5	2.105	1.945	0.166	0.0
3.000	1.529	27.0	2.7	0.900	1.180	0.020	0.0
3.001	2.396	95.3	3.1	1.105	1.945	0.023	0.0
1.005	0.381	15.2	28.7	1.945	1.745	0.212	0.0
4.000	1.033	18.3	0.5	0.630	0.990	0.004	0.0
4.001	1.005	17.8	1.1	0.990	0.891	0.008	0.0
1.006	2.189	87.0	30.5	1.745	1.735	0.225	0.0
1.007	1.402	99.1	30.5	1.660	1.970	0.225	0.0
6.000	1.734	30.6	0.0	0.580	0.800	0.000	0.0
6.001	1.000	17.7	0.0	0.800	0.950	0.000	0.0
6.002	4.182	166.3	0.0	0.875	2.025	0.000	0.0

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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)
7.000	S17	S18	10.778	0.600	85.160	84.905	0.255	42.3	150	5.12	50.0
7.001	S18	EXS02A	4.545	0.600	84.830	83.710	1.120	4.1	225	5.13	50.0
5.000	S19	S20	20.003	0.600	85.330	85.130	0.200	100.0	150	5.33	50.0
5.001	S20	S21	13.531	0.600	85.130	84.995	0.135	100.0	150	5.56	50.0
5.002	S21	EXS02C	3.525	0.600	84.920	84.899	0.021	165.0	225	5.61	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
7.000	1.552	27.4	0.0	0.760	1.025	0.000	0.0
7.001	6.540	260.0	0.0	1.025	2.495	0.000	0.0
5.000	1.005	17.8	0.0	1.090	1.540	0.000	0.0
5.001	1.005	17.8	0.0	1.540	1.685	0.000	0.0
5.002	1.015	40.4	0.0	1.685	1.486	0.000	0.0

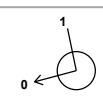
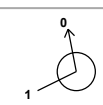
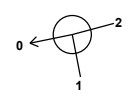
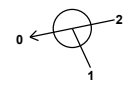
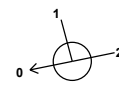
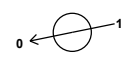
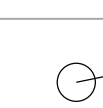
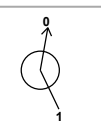
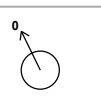
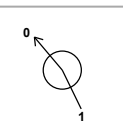
Pipeline Schedule

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	50.337	152.5	225	1 STANDARD	85.490	84.370	0.895	86.250	84.040	1.985
1.001	8.052	61.9	225	1 STANDARD	86.250	84.040	1.985	86.340	83.910	2.205
1.002	14.644	209.2	225	1 STANDARD	86.340	83.910	2.205	86.320	83.840	2.255
1.003	14.338	239.0	225	1 STANDARD	86.320	83.840	2.255	86.110	83.780	2.105
2.000	18.233	121.6	150	1 STANDARD	85.700	84.650	0.900	85.920	84.500	1.270
2.001	16.021	22.3	225	1 STANDARD	85.920	84.500	1.195	86.110	83.780	2.105
1.004	30.590	76.5	225	1 STANDARD	86.110	83.780	2.105	85.550	83.380	1.945
3.000	10.443	43.5	150	1 STANDARD	85.320	84.270	0.900	85.360	84.030	1.180
3.001	19.516	30.0	225	1 STANDARD	85.360	84.030	1.105	85.550	83.380	1.945
1.005	11.259	1125.9	225	1 STANDARD	85.550	83.380	1.945	85.340	83.370	1.745
4.000	7.572	94.7	150	1 STANDARD	85.220	84.440	0.630	85.500	84.360	0.990
4.001	6.108	100.0	150	1 STANDARD	85.500	84.360	0.990	85.340	84.299	0.891
1.006	3.234	35.9	225	1 STANDARD	85.340	83.370	1.745	85.240	83.280	1.735
1.007	6.278	125.6	300	1 STANDARD	85.240	83.280	1.660	85.500	83.230	1.970
6.000	16.963	33.9	150	1 STANDARD	85.740	85.010	0.580	85.460	84.510	0.800
6.001	10.086	100.9	150	1 STANDARD	85.460	84.510	0.800	85.510	84.410	0.950
6.002	5.248	9.9	225	1 STANDARD	85.510	84.410	0.875	86.130	83.880	2.025
7.000	10.778	42.3	150	1 STANDARD	86.070	85.160	0.760	86.080	84.905	1.025
7.001	4.545	4.1	225	1 STANDARD	86.080	84.830	1.025	86.430	83.710	2.495
5.000	20.003	100.0	150	1 STANDARD	86.570	85.330	1.090	86.820	85.130	1.540
5.001	13.531	100.0	150	1 STANDARD	86.820	85.130	1.540	86.830	84.995	1.685
5.002	3.525	165.0	225	1 STANDARD	86.830	84.920	1.685	86.610	84.899	1.486

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	600	Manhole	1 STANDARD	S2	600	Manhole	1 STANDARD
1.001	S2	600	Manhole	1 STANDARD	S3	1200	Manhole	1 STANDARD
1.002	S3	1200	Manhole	1 STANDARD	S4	1200	Manhole	1 STANDARD
1.003	S4	1200	Manhole	1 STANDARD	S7	1200	Manhole	1 STANDARD
2.000	S5	600	Manhole	1 STANDARD	S6	600	Manhole	1 STANDARD
2.001	S6	600	Manhole	1 STANDARD	S7	1200	Manhole	1 STANDARD
1.004	S7	1200	Manhole	1 STANDARD	S10	1350	Manhole	1 STANDARD
3.000	S8	600	Manhole	1 STANDARD	S9	600	Manhole	1 STANDARD
3.001	S9	600	Manhole	1 STANDARD	S10	1350	Manhole	1 STANDARD
1.005	S10	1350	Manhole	1 STANDARD	S13	1800	Manhole	1 STANDARD
4.000	S11	600	Manhole	1 STANDARD	S12	600	Manhole	1 STANDARD
4.001	S12	600	Manhole	1 STANDARD	S13	1800	Manhole	1 STANDARD
1.006	S13	1800	Manhole	1 STANDARD	C01	1200	Manhole	1 STANDARD
1.007	C01	1200	Manhole	1 STANDARD	C02	1500	Manhole	1 STANDARD
6.000	S14	450	Manhole	1 STANDARD	S15	450	Manhole	1 STANDARD
6.001	S15	450	Manhole	1 STANDARD	S16	450	Manhole	1 STANDARD
6.002	S16	450	Manhole	1 STANDARD	EXS01	1500	Manhole	1 STANDARD
7.000	S17	450	Manhole	1 STANDARD	S18	450	Manhole	1 STANDARD
7.001	S18	450	Manhole	1 STANDARD	EXS02A	1200	Manhole	1 STANDARD
5.000	S19	600	Manhole	1 STANDARD	S20	600	Manhole	1 STANDARD
5.001	S20	600	Manhole	1 STANDARD	S21	600	Manhole	1 STANDARD
5.002	S21	600	Manhole	1 STANDARD	EXS02C	1200	Manhole	1 STANDARD

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S1	387953.190	400670.320	85.490	1.120	600				
						0	1.000	84.370	225
S2	388002.520	400680.340	86.250	2.210	600	1	1.000	84.040	225
									
						0	1.001	84.040	225
S3	388010.340	400678.420	86.340	2.430	1200	1	1.001	83.910	225
									
						0	1.002	83.910	225
S4	388013.310	400664.080	86.320	2.480	1200	 1	1.002	83.840	225
						0	1.003	83.840	225
S5	387986.150	400636.570	85.700	1.050	600				
						0	2.000	84.650	150
S6	388002.500	400644.640	85.920	1.420	600	 1	2.000	84.500	150
						0	2.001	84.500	225
S7	387999.460	400660.370	86.110	2.330	1200	1	2.001	83.780	225
						2	1.003	83.780	225
									
						0	1.004	83.780	225
S8	387968.420	400631.770	85.320	1.050	600				
						0	3.000	84.270	150
S9	387977.710	400636.540	85.360	1.330	600	1	3.000	84.030	150
									
						0	3.001	84.030	225
S10	387969.490	400654.240	85.550	2.170	1350	1	3.001	83.380	225
						2	1.004	83.380	225
									
						0	1.005	83.380	225
S11	387949.370	400656.910	85.220	0.780	600				
						0	4.000	84.440	150
S12	387956.880	400657.880	85.500	1.140	600	1	4.000	84.360	150
									
						0	4.001	84.360	150
S13	387958.460	400651.980	85.340	1.970	1800	 1	4.001	84.299	150
						2	1.005	83.370	225
						0	1.006	83.370	225
C01	387955.290	400651.340	85.240	1.960	1200	1	1.006	83.280	225
									
						0	1.007	83.280	300
C02	387949.140	400650.080	85.500	2.270	1500	1	1.007	83.230	300
									
S14	388004.170	400615.390	85.740	0.730	450				
						0	6.000	85.010	150
S15	387988.510	400608.870	85.460	0.950	450	 1	6.000	84.510	150
						0	6.001	84.510	150
S16	387984.160	400617.970	85.510	1.100	450	1	6.001	84.410	150
									
						0	6.002	84.410	225
EXS01	387985.081	400623.137	86.130	2.250	1500	1	6.002	83.880	225
									
S17	388015.930	400621.040	86.070	0.910	450				
						0	7.000	85.160	150
S18	388011.210	400630.730	86.080	1.250	450	 1	7.000	84.905	150
						0	7.001	84.830	225

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
EXS02A	388008.276	400634.201	86.430	2.720	1200	1	7.001	83.710	225
S19	388024.770	400637.353	86.570	1.240	600	0	5.000	85.330	150
S20	388044.353	400641.430	86.820	1.690	600	1	5.000	85.130	150
						0	5.001	85.130	150
S21	388041.797	400654.717	86.830	1.910	600	1	5.001	84.995	150
						0	5.002	84.920	225
EXS02C	388040.308	400657.912	86.610	1.711	1200	1	5.002	84.899	225

Simulation Settings

Rainfall Methodology	FSR	Summer CV	0.750	Additional Storage (m³/ha)	20.0
Rainfall Events	Singular	Winter CV	0.840	Starting Level (m)	
FSR Region	England and Wales	Analysis Speed	Normal	Check Discharge Rate(s)	x
M5-60 (mm)	20.000	Skip Steady State	x	Check Discharge Volume	x
Ratio-R	0.400	Drain Down Time (mins)	240		

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

Node S13 Online Hydro-Brake® Control

Flap Valve	x	Design Flow (l/s)	5.6	Min Outlet Diameter (m)	0.150
Replaces Downstream Link	✓	Objective	(HE) Minimise upstream storage	Min Node Diameter (mm)	1200
Invert Level (m)	83.370	Sump Available	✓		
Design Depth (m)	0.500	Product Number	CTL-SHE-0118-5600-0500-5600		

Node S13 Online Orifice Control

Flap Valve	x	Invert Level (m)	84.534	Design Flow (l/s)	14.9	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Depth (m)	1.750	Diameter (m)	0.073		

Node S4 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	83.840
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	67

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	63.0	0.0	0.800	63.0	0.0	0.801	0.0	0.0

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Results for 1 year Critical Storm Duration. Lowest mass balance: 99.77%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	84.426	0.056	5.4	0.0538	0.0000	OK
15 minute winter	S2	11	84.083	0.043	5.2	0.0121	0.0000	OK
15 minute winter	S3	10	83.994	0.084	9.2	0.1161	0.0000	OK
30 minute winter	S4	27	83.933	0.093	12.7	5.6432	0.0000	OK
15 minute winter	S5	10	84.700	0.050	3.5	0.0378	0.0000	OK
15 minute winter	S6	10	84.536	0.036	6.2	0.0203	0.0000	OK
30 minute winter	S7	26	83.932	0.152	12.5	0.2375	0.0000	OK
15 minute winter	S8	10	84.304	0.034	2.8	0.0228	0.0000	OK
15 minute winter	S9	10	84.058	0.028	3.2	0.0092	0.0000	OK
30 minute winter	S10	26	83.932	0.552	17.1	0.9064	0.0000	SURCHARGED
15 minute winter	S11	10	84.458	0.018	0.6	0.0070	0.0000	OK
15 minute winter	S12	10	84.386	0.026	1.2	0.0092	0.0000	OK
30 minute winter	S13	26	83.930	0.560	10.3	1.4535	0.0000	SURCHARGED
30 minute winter	C01	26	83.333	0.053	5.9	0.0596	0.0000	OK
30 minute winter	C02	21	83.279	0.049	5.9	0.0000	0.0000	OK
15 minute summer	S14	1	85.010	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S15	1	84.510	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S16	1	84.410	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EXS01	1	83.880	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S17	1	85.160	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S18	1	84.830	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EXS02A	1	83.710	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S19	1	85.330	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S20	1	85.130	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S21	1	84.920	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EXS02C	1	84.899	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	1.000	S2	5.2	0.822	0.124	0.3216	
15 minute winter	S2	1.001	S3	5.2	0.584	0.079	0.0748	
15 minute winter	S3	1.002	S4	9.4	1.227	0.263	0.1296	
30 minute winter	S4	1.003	S7	-6.3	0.491	-0.189	0.3135	
15 minute winter	S5	2.000	S6	3.4	0.828	0.214	0.0762	
15 minute winter	S6	2.001	S7	6.2	0.843	0.056	0.2433	
30 minute winter	S7	1.004	S10	12.1	0.460	0.203	1.0456	
15 minute winter	S8	3.000	S9	2.8	1.051	0.103	0.0277	
15 minute winter	S9	3.001	S10	3.2	0.211	0.033	0.4158	
30 minute winter	S10	1.005	S13	9.0	0.344	0.594	0.4478	
15 minute winter	S11	4.000	S12	0.6	0.351	0.031	0.0123	
15 minute winter	S12	4.001	S13	1.1	0.548	0.062	0.0122	
30 minute winter	S13	Hydro-Brake®	C01	5.9				
30 minute winter	S13	Orifice	C01	0.0				
30 minute winter	C01	1.007	C02	5.9	0.746	0.060	0.0497	18.8
15 minute summer	S14	6.000	S15	0.0	0.000	0.000	0.0000	
15 minute summer	S15	6.001	S16	0.0	0.000	0.000	0.0000	
15 minute summer	S16	6.002	EXS01	0.0	0.000	0.000	0.0000	0.0
15 minute summer	S17	7.000	S18	0.0	0.000	0.000	0.0000	
15 minute summer	S18	7.001	EXS02A	0.0	0.000	0.000	0.0000	0.0
15 minute summer	S19	5.000	S20	0.0	0.000	0.000	0.0000	
15 minute summer	S20	5.001	S21	0.0	0.000	0.000	0.0000	
15 minute summer	S21	5.002	EXS02C	0.0	0.000	0.000	0.0000	0.0

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.86%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	84.460	0.090	13.1	0.0860	0.0000	OK
60 minute winter	S2	53	84.266	0.226	6.7	0.0640	0.0000	SURCHARGED
60 minute winter	S3	53	84.266	0.356	12.0	0.4908	0.0000	SURCHARGED
60 minute winter	S4	53	84.266	0.426	28.1	25.9791	0.0000	SURCHARGED
15 minute winter	S5	10	84.732	0.082	8.6	0.0626	0.0000	OK
15 minute winter	S6	10	84.556	0.056	15.4	0.0318	0.0000	OK
60 minute winter	S7	52	84.265	0.485	18.5	0.7571	0.0000	SURCHARGED
15 minute summer	S8	10	84.324	0.054	6.6	0.0360	0.0000	OK
60 minute winter	S9	52	84.262	0.232	4.1	0.0760	0.0000	SURCHARGED
60 minute winter	S10	52	84.262	0.882	16.0	1.4486	0.0000	SURCHARGED
15 minute winter	S11	10	84.468	0.028	1.4	0.0107	0.0000	OK
15 minute winter	S12	10	84.402	0.042	2.8	0.0148	0.0000	OK
60 minute winter	S13	52	84.259	0.889	9.6	2.3065	0.0000	SURCHARGED
60 minute winter	C01	52	83.339	0.059	7.3	0.0666	0.0000	OK
60 minute winter	C02	52	83.285	0.055	7.3	0.0000	0.0000	OK
15 minute summer	S14	1	85.010	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S15	1	84.510	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S16	1	84.410	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EXS01	1	83.880	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S17	1	85.160	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S18	1	84.830	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EXS02A	1	83.710	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S19	1	85.330	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S20	1	85.130	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S21	1	84.920	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EXS02C	1	84.899	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	1.000	S2	12.8	1.056	0.306	0.6699	
60 minute winter	S2	1.001	S3	6.7	0.619	0.101	0.3202	
60 minute winter	S3	1.002	S4	10.8	0.876	0.303	0.5824	
60 minute winter	S4	1.003	S7	-17.4	-0.512	-0.520	0.5702	
15 minute winter	S5	2.000	S6	8.5	1.066	0.528	0.1455	
15 minute winter	S6	2.001	S7	15.3	1.034	0.138	0.3807	
60 minute winter	S7	1.004	S10	11.4	0.477	0.192	1.2166	
15 minute summer	S8	3.000	S9	6.6	1.316	0.244	0.0910	
60 minute winter	S9	3.001	S10	4.0	0.209	0.042	0.7762	
60 minute winter	S10	1.005	S13	8.3	0.364	0.549	0.4478	
15 minute winter	S11	4.000	S12	1.4	0.444	0.075	0.0237	
15 minute winter	S12	4.001	S13	2.7	0.703	0.153	0.0236	
60 minute winter	S13	Hydro-Brake®	C01	7.3				
60 minute winter	S13	Orifice	C01	0.0				
60 minute winter	C01	1.007	C02	7.3	0.791	0.074	0.0581	57.8
15 minute summer	S14	6.000	S15	0.0	0.000	0.000	0.0000	
15 minute summer	S15	6.001	S16	0.0	0.000	0.000	0.0000	
15 minute summer	S16	6.002	EXS01	0.0	0.000	0.000	0.0000	0.0
15 minute summer	S17	7.000	S18	0.0	0.000	0.000	0.0000	
15 minute summer	S18	7.001	EXS02A	0.0	0.000	0.000	0.0000	0.0
15 minute summer	S19	5.000	S20	0.0	0.000	0.000	0.0000	
15 minute summer	S20	5.001	S21	0.0	0.000	0.000	0.0000	
15 minute summer	S21	5.002	EXS02C	0.0	0.000	0.000	0.0000	0.0

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Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.87%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	S1	48	85.224	0.854	12.8	0.8210	0.0000	FLOOD RISK
60 minute winter	S2	48	85.223	1.183	12.8	0.3347	0.0000	SURCHARGED
60 minute winter	S3	48	85.222	1.312	19.8	1.8082	0.0000	SURCHARGED
60 minute winter	S4	48	85.220	1.380	53.8	49.5038	0.0000	SURCHARGED
60 minute winter	S5	48	85.221	0.571	8.4	0.4333	0.0000	SURCHARGED
60 minute winter	S6	48	85.218	0.718	15.1	0.4051	0.0000	SURCHARGED
60 minute winter	S7	48	85.217	1.437	36.8	2.2423	0.0000	SURCHARGED
60 minute winter	S8	48	85.193	0.923	6.7	0.6125	0.0000	FLOOD RISK
60 minute winter	S9	48	85.192	1.162	7.4	0.3810	0.0000	FLOOD RISK
60 minute winter	S10	48	85.191	1.811	23.9	2.9759	0.0000	SURCHARGED
60 minute winter	S11	48	85.172	0.732	2.2	0.2818	0.0000	FLOOD RISK
60 minute winter	S12	48	85.172	0.812	4.0	0.2867	0.0000	SURCHARGED
60 minute winter	S13	48	85.172	1.802	22.1	4.6767	0.0000	FLOOD RISK
60 minute winter	C01	48	83.378	0.098	18.8	0.1106	0.0000	OK
60 minute winter	C02	48	83.318	0.088	18.8	0.0000	0.0000	OK
15 minute summer	S14	1	85.010	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S15	1	84.510	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S16	1	84.410	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EXS01	1	83.880	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S17	1	85.160	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S18	1	84.830	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EXS02A	1	83.710	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S19	1	85.330	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S20	1	85.130	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S21	1	84.920	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EXS02C	1	84.899	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	S1	1.000	S2	12.8	0.973	0.305	2.0020	
60 minute winter	S2	1.001	S3	9.7	0.622	0.147	0.3202	
60 minute winter	S3	1.002	S4	18.6	1.015	0.520	0.5824	
60 minute winter	S4	1.003	S7	-34.6	-0.871	-1.036	0.5702	
60 minute winter	S5	2.000	S6	8.4	1.066	0.522	0.3210	
60 minute winter	S6	2.001	S7	15.1	0.664	0.136	0.6372	
60 minute winter	S7	1.004	S10	19.4	0.552	0.325	1.2166	
60 minute winter	S8	3.000	S9	6.4	1.182	0.235	0.1838	
60 minute winter	S9	3.001	S10	6.5	0.220	0.069	0.7762	
60 minute winter	S10	1.005	S13	21.1	0.532	1.395	0.4478	
60 minute winter	S11	4.000	S12	-1.4	0.455	-0.079	0.1333	
60 minute winter	S12	4.001	S13	-3.2	0.688	-0.181	0.1075	
60 minute winter	S13	Hydro-Brake®	C01	10.2				
60 minute winter	S13	Orifice	C01	8.6				
60 minute winter	C01	1.007	C02	18.8	1.017	0.190	0.1162	110.4
15 minute summer	S14	6.000	S15	0.0	0.000	0.000	0.0000	
15 minute summer	S15	6.001	S16	0.0	0.000	0.000	0.0000	
15 minute summer	S16	6.002	EXS01	0.0	0.000	0.000	0.0000	0.0
15 minute summer	S17	7.000	S18	0.0	0.000	0.000	0.0000	
15 minute summer	S18	7.001	EXS02A	0.0	0.000	0.000	0.0000	0.0
15 minute summer	S19	5.000	S20	0.0	0.000	0.000	0.0000	
15 minute summer	S20	5.001	S21	0.0	0.000	0.000	0.0000	
15 minute summer	S21	5.002	EXS02C	0.0	0.000	0.000	0.0000	0.0

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