

Technical Note 2

Project Name:	Glossop Fire Station
Document No:	LM21003-DYSE-XX-ZZ-TN-C-0002
Revision:	P01
Date:	15/08/2022
Distributed to:	High Peak Borough Council / Design Team
Originated by:	P Graveney MICE
Client:	Derbyshire Fire & Rescue Service
Content:	Report To Discharge Drainage Related Planning Conditions

1 Overview

In 2021 a planning application was submitted to High Peak Borough Council for the proposed demolition of the existing Fire Station and Outbuildings and construction of a new Fire Station, Smoke House and Tower with associated outbuildings and external works at Glossop Fire Station, Whitfield Park, Glossop, Derbyshire, SK13 8LG.

A Drainage Strategy Report prepared by Dyse (Ref LM21003-DYSE-XX-ZZ-RP-C-0001) was submitted with the application.

Planning approval, ref HPK/2021/0663 was granted in May 2022 which included two planning conditions relating to the drainage of the development.

This technical note has been prepared to remove these conditions; Numbers 4 and 5 and the supporting notes.

2 Original Drainage Strategy

DYSE were commissioned to prepare a drainage strategy report for the planning application. The proposed surface water drainage strategy, which was reviewed and accepted by the LPA and UU, was to discharge rainfall generated runoff to the existing on-site private surface water drainage network that ultimately outfalls to Long Clough Brook to the south of the site.

Discharge from the site was to be restricted to greenfield rates, with a minimum flow rate of 5l/s incorporated. Attenuation in the form of an off-line geocellular attenuation tank, providing a total storage volume of circa 132m³ was proposed. No green SuDS were included in the scheme.

The proposed point of connection and restricted discharge rate of 5l/s were also accepted by United Utilities.

3 Surface Water Drainage Strategy

3.1 Existing Runoff Rates

The development boundary currently encompasses the hard paved areas of the existing fire station. As such the site is considered to be brownfield for drainage purposes.

The table below summarises the existing brownfield runoff rates generated by the development for a range of storm return periods.

Gross Area (ha)	Existing Brownfield Runoff Rates (l/s)			Restricted Discharge (l/s)
	Q ₁ (30mm/hr)	Q ₃₀ (65mm/hr)	Q ₁₀₀ (95mm/hr)	
0.263	21.90	47.50	69.40	5.00

Although the existing brownfield rates are high, it is intended to restrict development runoff to 5l/s for all events. This is considered the lowest figure to prevent blockage and is a significant reduction in the predevelopment discharge rates.

3.3 Existing Geology

A phase 1 and 2 geo-environmental desk study and intrusive investigation has been undertaken.

Ground characterisation

Made ground was found across the site with a maximum depth of 1.7m BGL. Underlying this, gravelly sandy clay strata was encountered across the site.

Water table

Ground water was encountered in several of the borehole samples undertaken as part of the intrusive ground investigations. Ground water varied between 1.45m BGL to 4.5m BGL.

Percolation tests

Two percolation tests were undertaken. A minor drop in water level was recorded in one of the percolation test holes, thus indicating that the ground is not suitable for discharging surface water by infiltration.

3.4 Hydrological Assessment

No hydrological features are present on site. The Long Clough Brook is present approximately 150m to the west of the site.

Taking the above into consideration this option is not deemed a viable solution.

3.5 Existing Drainage Network

Surface water

A gravity surface water network exists on the site. This drains surface water from roads, hardstanding and buildings to a 300mm diameter surface water sewer running south along the western boundary of the site.

The discharge point of the existing surface water sewer is at the northwest corner of the site.

Foul water

A gravity foul water network exists on the site. This drains foul water from the building to a 150mm diameter foul water sewer running north along the western edge of the existing building.

A foul water sewer also runs west across the rear yard servicing the adjacent houses to the east of the site. This sewer connects into the main run of sewer running north.

The discharge of the existing foul water network is to the north of the site and into Charlesworth Road.

3.6 Sustainable Drainage Systems (SuDS) Hierarchal Approach

Current policy and best practice encourage the use of Sustainable Drainage Systems (SuDS) and in particular, infiltration systems. As noted in earlier sections, permeability testing has been undertaken and confirms that infiltration is not a viable solution.

Other non-infiltration techniques such as the use of swales and detention basins have been discounted due to space constraints within the relatively small masterplan boundary.

Based on the existing drainage configuration, plus an assessment of the local site conditions, the SuDS hierarchal approach for discharge of surface water at the development site is considered in detail below:

Method	Suitability	Suitability for Development
Infiltration to Ground	No	A review of the Phase 2 Site Investigation has indicated that the cohesive ground would preclude the use of infiltration as a viable option.
Connection to Watercourse	No	There is no watercourse within close proximity
Connection to Surface Water Sewer	Yes	Outfall at restricted rate to the surface water public sewer via an existing connection.
Connection to Combined Water Sewer	No	Higher options available.

3.7 Surface Water Drainage Strategy

The general principal of the surface water drainage strategy is to collect the runoff from the roof of the new fire station building and direct it to a number of RWPs that will drop down to a new surface water network. This network will flow generally in a north westerly direction. Runoff from the new parking and rear training area will be collected by drainage channels and gullies, and pass through an appropriately sized petrol separator. The outflows will then be restricted to a peak flow of 5l/s by the inclusion of a Vortex flow control device located in the last manhole, before discharging into the UU surface water public sewer via the existing connection. Due to this reduction in flow rates, an offline geocellular attenuation tank will be located beneath the front parking area.

The proposed private drainage layout for the new development site will be designed in accordance with BS EN 752: 2008 and Building Regulations part H guidance, i.e. to show no flooding to the 30-year storm return period criterion.

A climate change factor of **40%** is deemed appropriate for this development, based on a design life of 50 years.

Events exceeding this up to and including the 100 year plus climate change allowance have been assessed. Flooding from these events is classed as exceedance flooding and will be directed away from the building, where it will be stored in the lower lying rear training yard area and drain back into the surface water network as the levels recede. A hydraulic model has been simulated and confirms that there is a small volume of 18m³ of exceedance flooding for the extreme 100 year + 40% CC storm event will occur. This will be retained in the lower lying training yard area and not impact the proposed development building. The drainage layout can be found in Appendix A with the hydraulic calculations in Appendix B.

3.8 Foul Flows

Foul flows generated by the new development will discharge via a number of internal SVP's to a new below ground drainage network that passes around the building connects to the existing foul public sewer via an existing manhole at the northwest corner of the site.

3.9 Maintenance

The proposed drainage system for the development adopts a series of traditional drainage techniques to control the rate of surface water discharge. It is important that these are maintained to ensure that all elements operate effectively for their lifetime.

Maintenance is a necessary and important consideration of drainage design. If systems are properly monitored and maintained, any deterioration in performance can often be managed out.

Effective maintenance will help to ensure that the drainage system continues to function as intended and keep hydraulic capacity and pollutant removal efficiency of the systems at design levels.

All management and maintenance of the drainage will be with the building owner or their appointed maintenance contractor. This will involve general maintenance of the drainage network in accordance with best practice. All drainage will remain private and not be adopted by the local sewerage authority. The table below provides the maintenance and management requirements for the drainage features proposed within the development.

Drainage Feature		Action Required	Typical Frequency
Gully's & Channels	Occasional Maintenance	Inspect cover and frame for any defects, repair and replace as necessary.	Quarterly
		Inspect channels for the build-up of silt and debris. Removal of silt and debris by means of vacuum suction and or jetting/ rodding.	
		Inspect sumps and outgoing pipework for the build-up of silt and debris. Removal of silt and debris by means of vacuum suction and or jetting/ rodding.	
Manholes/ Catchpits	Occasional Maintenance	- Inspect chamber cover and frame for any defects, repair and replace as necessary. - Inspect chamber interior and incoming/ outgoing pipes for the build-up of silt and debris. Removal of silt and debris by means of vacuum suction and or jetting/ rodding. - Ensure manhole access steps/ ladders are secured and inspect for corrosion.	Quarterly
Geocellular Attenuation	Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required take remedial actions	Monthly for 3 months then annually.
		Remove debris from the catchment surface i.e. hardstanding areas	Monthly
		Remove sediment from inlet manhole	Annually or as required
	Occasional Maintenance	Repair/ rehabilitate inlets, outlet, overflows and vents	As required
		Inspect/ check all inlets, outlets, vents and overflows to ensure they	Annually

4 Drainage Related Planning Condition and Responses

4.1 Planning Conditions

The detailed planning conditions are listed below in *italics* with the DYSE response in Section 4.2 below.

Condition 4

No development shall commence until a detailed design and associated management and maintenance plan of surface water drainage for the site, in accordance with OEC Consulting Engineers LTD dated 28/10/2021, Flood Risk Assessment REV 1.0, DYSE Structural Engineers dated 26/10/2021, Below Ground Drainage Strategy REV P02 and DEFRA's Non-statutory technical standards for sustainable drainage systems (March 2015), has been submitted to and approved in writing by the Local Planning Authority. Development shall be carried out in accordance with approved details.

Condition 5

No development shall commence until a detailed assessment which demonstrated that the proposed destination for surface water accords with the drainage hierarchy has been submitted to and approved in writing by the Local Planning Authority. The development shall be carried out in accordance with the approved details.

4.2 Response

Condition 4

A detailed drainage GA drawing and supporting hydraulic calculations have been prepared to support this application that aligns with the original FRA and below ground drainage strategy. Full details can be found in Appendix A and B.

A separate Drainage Management and Maintenance plan has been prepared and should be read in parallel with this document.

Condition 5

As discussed in Section 3, a detailed SuDS hierarchical assessment has been undertaken to determine the post development drainage strategy. Full details can be found in Appendix A and B.

Appendix A - DYSE Drainage Layout



1:200

IC Schedule					
Mark	CL	IL	Depth (mm)	Diameter (mm)	Cover Type
FW01	+175.850 m	+175.250 m	600 mm	450 mm	B125
FW02	+175.850 m	+175.000 m	850 mm	450 mm	B125
FW03	+175.660 m	+174.850 m	810 mm	450 mm	D400
FW04	+175.870 m	+174.820 m	1050 mm	450 mm	D400
FW05	+175.850 m	+174.700 m	1150 mm	450 mm	D400
FW06	+175.870 m	+174.820 m	1050 mm	450 mm	B125
FW07	+175.870 m	+174.770 m	1100 mm	450 mm	B125
FW08	+175.720 m	+174.150 m	1570 mm	1200 mm	B125
SW01	+176.190 m	+174.840 m	1350 mm	1200 mm	D400
SW02	+175.850 m	+174.500 m	1350 mm	450 mm	B125
SW03	+175.680 m	+174.255 m	1425 mm	1200 mm	D400
SW04	+175.800 m	+174.800 m	1000 mm	450 mm	B125
SW05	+175.700 m	+174.085 m	1615 mm	1200 mm	D400
SW06	+175.700 m	+174.085 m	870 mm	450 mm	B125
SW07	+175.720 m	+174.420 m	1300 mm	450 mm	D400
SW08	+175.850 m	+174.550 m	1300 mm	450 mm	D400
SW09	+175.600 m	+173.570 m	2030 mm	1500 mm CP	D400
SW10	+175.720 m	+174.780 m	940 mm	450 mm	D400
SW11	+175.680 m	+174.600 m	1080 mm	450 mm	D400
SW12	+175.780 m	+174.500 m	1280 mm	450 mm	D400

Above ground storage

1. Southern main yard area to retain 8m³ on the surface adjacent the drainage channel for the extreme 100yr + 40% CC peak storm event.
- Attenuation**
1. The proposed attenuation tank has been designed to accommodate a 1in100 year + 40% storm event.
 2. Chamber to be owned and maintained by Derbyshire Fire & Rescue Service

SuDS Maintenance Requirements

Monthly

1. Litter management: pick up all litter in landscaped areas.
2. Grass maintenance: mow all grass verges and paths.
3. Inlets and outlets: Inspect and remove silt and leaves from gullies and channels.
4. Hard surfaces: sweep regularly.

Yearly

1. Gutters: clear out gutters of leaves and debris.

Occasional

1. Inspection chambers: Annual inspection remove silt and check free flow.
2. Carrier drain runs: Annual inspection to check free flowing. Rod as required and remove silt.
3. Attenuation: Annual inspection to check silt. Clean and remove silt as required in accordance with manufacturers recommendations.

Drainage notes

- This drawing is subject to change depending on further development of the site layout, detailed design development and coordination with the Architect.
- It is the contractor's responsibility to confirm presence and location of services prior to commencing works.
- The proposed building outlines shown on this drawing are for information only. Refer to Architects drawings for precise setting out information and details including locations of all popups and gullies.
- Cover levels shown on this drawing are approximate and shall be adjusted to suit finished pavement levels on site by Contractor. Covers shall be orientated to suit pavement finishes where appropriate.
- All existing drainage shall be assumed to be 'live' and shall be maintained at all times during the works.
- Existing drainage shall be reconnected to the new drainage system unless proven to be redundant for abandonment. All existing drainage to be fully removed.
- Upon completion all new drainage installation together with any existing drainage retained shall be jetted and CCTV surveyed upon completion.
- Contractor to ensure that the drainage system is fully operational, free of excess debris/silt and all identified faults rectified.

Outline specification

1. All drainage to comply with BS EN 16933-2:2017
2. Drain and sewer systems outside buildings together with parts H1, 2 and 3 of the current Building Regulations.
3. All rain water gullies to be access gullies with integral back inlet for rodding installed to manufacturer's recommendations.
4. All underslab drainage shall be clear of foundations unless shown otherwise with long radius bends kept to a minimum and used where shown when unavoidable.
5. At least one soil pipe at the head of each foul run shall be vented to the atmosphere.
6. Proposed pipework with <1.2m depth to soffit in roads to <0.9m in pedestrian/landscaped areas require a concrete surround.
7. Where new drainage is situated within 5 metres of new or existing trees the pipework shall be encased in Z Class concrete surround to reduce the risk of root ingress.
8. Concrete encasement of the pipework shall be required where the vertical clearance between two pipes crossing is less than 300mm.
9. All external carrier drains to be vitreous clay pipework. Jointing shall be either UPVC pushfit couplings or by sealing rubber 'O' rings in polyester moldings.
10. All carrier drains which are located within 2000mm of external walls or pass under buildings are to be encased in min. 150mm concrete of full width of trench.
11. Manhole covers to be seated in rebated steel frames and sealed with grease on 100mm thick concrete frame base with 600mm minimum openings.

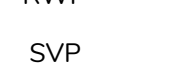
! Residual Risks !

These drawings should be read in conjunction with the designer's risk assessment (DRA) which communicates significant residual design risks that have been identified and suggests mitigating actions.

General Notes

1. Do not scale off these drawings. Work to stated dimensions only.
2. All dimensions are in millimetres unless noted otherwise.
3. These drawings should be read in conjunction with all other relevant drawings, specifications, schedules and other information including all other consultants drawings.
4. The contractor is responsible for the temporary stability of all structure including ground during the works and is to undertake the necessary temporary
5. All works are subject to all necessary approvals.
6. Setting out information to be co-ordinated by lead designer.

Drainage Legend

- | | |
|---|-----------------------------------|
|  | Existing combined water sewer |
|  | Existing foul water sewer |
|  | Existing foul water drainage |
|  | Existing surface water drainage |
|  | Proposed foul water (private) |
|  | Existing drainage to be abandoned |
|  | Proposed surface water (private) |
|  | Proposed drainage channel |
|  | Proposed mini PPIC (Depth 600mm) |
|  | Proposed 450ø PPIC |
|  | Proposed PCC Manhole |
| RWP | Roddable rain water gully |
| SVP | Soil and vent pipe |
| SS | Substack |
| RE | Rodding eye |
| RG | Road gully |
| YG | Yard gully |
| TD | Threshold drain at doorways |
|  | Geocellular attenuation |
|  | site boundary |

P02	15/06/22	Issued for Tender	PG	MS	JDY	JD
P01	10/06/22	First Issue	PG	MS	JDY	JD
Rev	Date	Description	Drw	Chk	Rev'd	App'd

status

TENDER

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Derbyshire Fire & Rescue Service

projec

Glossop Fire Station

Drawing

Drainage GA

Drawing Number:	Revision:
LM21033-DYSE-XX-ZZ-DR-C-1002	P02

DYSE
STRUCTURAL ENGINEERS

Appendix B - Hydraulic Calculations

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	Glossop Fire Station Surface Water Network	
Date 15/08/2022 File Glossop FS - SW Network...	Designed by paulg Checked by	
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Glossop Fire Station
Surface Water Network



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Date 15/08/2022
File Glossop FS - SW Network...
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Checked by

Innovyze

Network 2017.1.2

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
4.000	7.000	0.590	11.9	0.013	4.00	0.0	0.600	o	100	Pipe/Conduit	
1.002	34.000	0.200	170.0	0.016	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	8.000	0.315	25.4	0.013	0.00	0.0	0.600	o	225	Pipe/Conduit	
5.000	22.000	0.220	100.0	0.026	4.00	0.0	0.600	o	100	Pipe/Conduit	
6.000	6.000	0.060	100.0	0.000	4.00	0.0	0.600	o	100	Pipe/Conduit	
7.000	4.000	0.030	133.3	0.040	4.00	0.0	0.600	o	150	Pipe/Conduit	
7.001	4.000	0.030	133.3	0.013	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	14.000	1.300	10.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
4.000	50.00	4.05	174.800	0.013	0.0	0.0	0.0	2.26	17.7	1.8
1.002	50.00	5.05	174.085	0.228	0.0	0.0	0.0	1.00	39.8	30.9
1.003	50.00	5.10	173.885	0.241	0.0	0.0	0.0	2.61	103.7	32.6
5.000	50.00	4.48	174.420	0.026	0.0	0.0	0.0	0.77	6.0	3.5
6.000	50.00	4.13	174.550	0.000	0.0	0.0	0.0	0.77	6.0	0.0
7.000	50.00	4.08	174.000	0.040	0.0	0.0	0.0	0.87	15.3	5.4
7.001	50.00	4.14	173.600	0.053	0.0	0.0	0.0	1.13	45.0	7.2
1.004	50.00	5.16	173.570	0.320	0.0	0.0	0.0	4.01	159.5	43.3

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Innovyze				Network 2017.1.2					
<u>PIPELINE SCHEDULES for Storm</u> <u>Upstream Manhole</u>									
PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., (mm)	L*W
1.000	o	150	SW01	176.190	174.840	1.200	Open Manhole		1200
2.000	o	150	SW02	175.850	174.500	1.200	Open Manhole		450
3.000	o	225	tank 1	175.700	174.500	0.975	Open Manhole		1200
1.001	o	225	SW03	175.680	174.255	1.200	Open Manhole		1200
4.000	o	100	SW04	175.800	174.800	0.900	Open Manhole		450
1.002	o	225	SW05	175.700	174.085	1.390	Open Manhole		1200
1.003	o	225	SW06	175.720	173.885	1.610	Open Manhole		1200
5.000	o	100	SW07	175.720	174.420	1.200	Open Manhole		450
6.000	o	100	SW08	175.850	174.550	1.200	Open Manhole		450
7.000	o	150	DC	174.950	174.000	0.800	Open Manhole		300
7.001	o	225	TANK	175.400	173.600	1.575	Open Manhole		300
1.004	o	225	SW09	175.600	173.570	1.805	Open Manhole		1500
<u>Downstream Manhole</u>									
PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., (mm)	L*W
1.000	19.000	37.3	SW03	175.680	174.330	1.200	Open Manhole		1200
2.000	23.000	135.3	SW03	175.680	174.330	1.200	Open Manhole		1200
3.000	5.000	166.7	SW03	175.680	174.470	0.985	Open Manhole		1200
1.001	5.000	29.4	SW05	175.700	174.085	1.390	Open Manhole		1200
4.000	7.000	11.9	SW05	175.700	174.210	1.390	Open Manhole		1200
1.002	34.000	170.0	SW06	175.720	173.885	1.610	Open Manhole		1200
1.003	8.000	25.4	SW09	175.600	173.570	1.805	Open Manhole		1500
5.000	22.000	100.0	SW09	175.600	174.200	1.300	Open Manhole		1500
6.000	6.000	100.0	SW09	175.600	174.490	1.010	Open Manhole		1500
7.000	4.000	133.3	TANK	175.400	173.970	1.280	Open Manhole		300
7.001	4.000	133.3	SW09	175.600	173.570	1.805	Open Manhole		1500
1.004	14.000	10.8	sewer	173.500	172.270	1.005	Open Manhole		0
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	Glossop Fire Station Surface Water Network	
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Online Controls for Storm

Orifice Manhole: SW05, DS/PN: 1.002, Volume (m³): 2.0

Diameter (m) 0.094 Discharge Coefficient 0.600 Invert Level (m) 174.085

Hydro-Brake® Optimum Manhole: SW09, DS/PN: 1.004, Volume (m³): 4.2

Unit Reference	MD-SHE-0101-5000-1300-5000
Design Head (m)	1.300
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	101
Invert Level (m)	173.570
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.300	5.0
Flush-Flo™	0.384	5.0
Kick-Flo®	0.798	4.0
Mean Flow over Head Range	-	4.4

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.4	1.200	4.8	3.000	7.4	7.000	11.0
0.200	4.7	1.400	5.2	3.500	7.9	7.500	11.4
0.300	4.9	1.600	5.5	4.000	8.5	8.000	11.8
0.400	5.0	1.800	5.8	4.500	9.0	8.500	12.1
0.500	4.9	2.000	6.1	5.000	9.4	9.000	12.5
0.600	4.8	2.200	6.4	5.500	9.8	9.500	12.8
0.800	4.0	2.400	6.7	6.000	10.3		
1.000	4.4	2.600	6.9	6.500	10.7		

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Storage Structures for Storm

Cellular Storage Manhole: tank 1, DS/PN: 3.000

Invert Level (m) 174.500 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	50.0	50.0	2.600	0.0	61.3
0.200	50.0	55.7	2.800	0.0	61.3
0.400	50.0	61.3	3.000	0.0	61.3
0.401	0.0	61.3	3.200	0.0	61.3
0.800	0.0	61.3	3.400	0.0	61.3
1.000	0.0	61.3	3.600	0.0	61.3
1.200	0.0	61.3	3.800	0.0	61.3
1.400	0.0	61.3	4.000	0.0	61.3
1.600	0.0	61.3	4.200	0.0	61.3
1.800	0.0	61.3	4.400	0.0	61.3
2.000	0.0	61.3	4.600	0.0	61.3
2.200	0.0	61.3	4.800	0.0	61.3
2.400	0.0	61.3	5.000	0.0	61.3

Cellular Storage Manhole: TANK, DS/PN: 7.001

Invert Level (m) 173.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	170.0	170.0	5.200	0.0	211.7
0.400	170.0	190.9	5.600	0.0	211.7
0.800	170.0	211.7	6.000	0.0	211.7
0.801	0.0	211.7	6.400	0.0	211.7
1.600	0.0	211.7	6.800	0.0	211.7
2.000	0.0	211.7	7.200	0.0	211.7
2.400	0.0	211.7	7.600	0.0	211.7
2.800	0.0	211.7	8.000	0.0	211.7
3.200	0.0	211.7	8.400	0.0	211.7
3.600	0.0	211.7	8.800	0.0	211.7
4.000	0.0	211.7	9.200	0.0	211.7
4.400	0.0	211.7	9.600	0.0	211.7
4.800	0.0	211.7	10.000	0.0	211.7

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Date 15/08/2022 File Glossop FS - SW Network...		Designed by paulg Checked by						
Innovyze		Network 2017.1.2						
<u>1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for Storm</u>								
Simulation Criteria								
Areal Reduction Factor		1.000	Additional Flow - % of Total Flow		0.000			
Hot Start (mins)		0	MADD Factor * 10m³/ha Storage		2.000			
Hot Start Level (mm)		0	Inlet Coefficient		0.800			
Manhole Headloss Coeff (Global)		0.500	Flow per Person per Day (l/per/day)		0.000			
Foul Sewage per hectare (l/s)		0.000						
Number of Input Hydrographs		0	Number of Storage Structures		2			
Number of Online Controls		2	Number of Time/Area Diagrams		0			
Number of Offline Controls		0	Number of Real Time Controls		0			
Synthetic Rainfall Details								
Rainfall Model		FSR	Ratio R		0.312			
Region England and Wales Cv (Summer)		0.750						
M5-60 (mm)		18.800	Cv (Winter)		0.840			
Margin for Flood Risk Warning (mm)		300.0						
Analysis Timestep		2.5	Second Increment (Extended)					
DTS Status		OFF						
DVD Status		ON						
Inertia Status		ON						
Profile(s)		Summer and Winter						
Duration(s) (mins)		15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440						
Return Period(s) (years)		1, 30, 100						
Climate Change (%)		0, 0, 40						
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	SW01	15 Summer	1	+0%	30/15 Summer			
2.000	SW02	15 Winter	1	+0%	1/15 Summer	100/15 Winter		
3.000	tank 1	15 Winter	1	+0%	30/15 Summer			
1.001	SW03	15 Winter	1	+0%	1/15 Summer	100/15 Summer		
4.000	SW04	15 Winter	1	+0%	100/15 Summer	100/15 Winter		
1.002	SW05	15 Winter	1	+0%	1/15 Summer	100/15 Summer		
1.003	SW06	15 Winter	1	+0%	100/60 Summer			
5.000	SW07	15 Winter	1	+0%	30/15 Summer			
6.000	SW08	120 Winter	1	+0%	100/180 Winter			
7.000	DC	15 Summer	1	+0%	30/15 Summer			
7.001	TANK	120 Winter	1	+0%	30/30 Winter			
1.004	SW09	30 Summer	1	+0%	1/15 Summer			
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		Glossop Fire Station Surface Water Network		Page 8					
Date 15/08/2022 File Glossop FS - SW Network...		Designed by paulg Checked by							
Innovyze		Network 2017.1.2							
<u>1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for Storm</u>									
PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW01	174.892	-0.098	0.000	0.26		7.2	OK	
2.000	SW02	174.728	0.078	0.000	0.26		3.8	SURCHARGED	1
3.000	tank 1	174.538	-0.187	0.000	0.06		1.8	OK	
1.001	SW03	174.711	0.231	0.000	0.20		11.7	SURCHARGED	10
4.000	SW04	174.821	-0.079	0.000	0.10		1.7	OK	1
1.002	SW05	174.702	0.392	0.000	0.37		13.8	SURCHARGED	1
1.003	SW06	173.951	-0.159	0.000	0.19		14.9	OK	
5.000	SW07	174.474	-0.046	0.000	0.57		3.3	OK	
6.000	SW08	174.550	-0.100	0.000	0.00		0.0	OK	
7.000	DC	174.073	-0.077	0.000	0.48		5.2	OK	
7.001	TANK	173.715	-0.110	0.000	0.13		3.8	OK	
1.004	SW09	173.836	0.041	0.000	0.04		4.9	SURCHARGED	
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		Glossop Fire Station Surface Water Network		Page 9				
Date 15/08/2022 File Glossop FS - SW Network...		Designed by paulg Checked by						
Innovyze		Network 2017.1.2						
<u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for Storm</u>								
Simulation Criteria								
Areal Reduction Factor		1.000		Additional Flow - % of Total Flow 0.000				
Hot Start (mins)		0		MADD Factor * 10m³/ha Storage 2.000				
Hot Start Level (mm)		0		Inlet Coefficient 0.800				
Manhole Headloss Coeff (Global)		0.500		Flow per Person per Day (l/per/day) 0.000				
Foul Sewage per hectare (l/s)		0.000						
Number of Input Hydrographs		0		Number of Storage Structures 2				
Number of Online Controls		2		Number of Time/Area Diagrams 0				
Number of Offline Controls		0		Number of Real Time Controls 0				
Synthetic Rainfall Details								
Rainfall Model		FSR		Ratio R 0.312				
Region England and Wales Cv (Summer)		0.750						
M5-60 (mm)		18.800 Cv (Winter)		0.840				
Margin for Flood Risk Warning (mm)				300.0				
Analysis Timestep		2.5 Second Increment (Extended)						
DTS Status				OFF				
DVD Status				ON				
Inertia Status				ON				
Profile(s)				Summer and Winter				
Duration(s) (mins)		15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440						
Return Period(s) (years)				1, 30, 100				
Climate Change (%)				0, 0, 40				
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow Overflow	Overflow Act.
1.000	SW01	15 Summer	30	+0%	30/15 Summer			
2.000	SW02	15 Summer	30	+0%	1/15 Summer	100/15 Winter		
3.000	tank 1	30 Winter	30	+0%	30/15 Summer			
1.001	SW03	30 Winter	30	+0%	1/15 Summer	100/15 Summer		
4.000	SW04	15 Summer	30	+0%	100/15 Summer	100/15 Winter		
1.002	SW05	30 Winter	30	+0%	1/15 Summer	100/15 Summer		
1.003	SW06	180 Winter	30	+0%	100/60 Summer			
5.000	SW07	15 Winter	30	+0%	30/15 Summer			
6.000	SW08	120 Winter	30	+0%	100/180 Winter			
7.000	DC	15 Summer	30	+0%	30/15 Summer			
7.001	TANK	180 Winter	30	+0%	30/30 Winter			
1.004	SW09	180 Winter	30	+0%	1/15 Summer			
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