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# Drainage Strategy Report and Flood Risk Assessment

THOMAS GRAHAM, EGREMONT

16080

**MAY 23** 

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#### **INTRODUCTION**

A L Daines & Partners (ALD) have been instructed to undertake a Surface and Foul Water Drainage Strategy and Flood Risk Assessment, in accordance with the National Planning Policy Framework (NPPF) [1], for the proposed 2.67ha commercial development accessed via Vale View, Egremont.

The purpose of this report is to provide a strategy to manage surface and foul water flows from the site, in support of the planning application, while fulfilling the requirements of the Local Planning Authority (LPA) and the Lead Local Flood Authority (LLFA).

### PLANNING POLICY

NPPF footnote 55 states that "a site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use."

Paragraph 169 reads "Major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate. The systems used should:

a) take account of advice from the lead local flood authority.
b) have appropriate proposed minimum operational standards.
c) have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development; and
d) where possible, provide multifunctional benefits."

A major development, as per The Town and Country Planning Order 2015, is partly, but not wholly, categorised as development involving the provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more and a development carried out on a site having an area of 1 hectare or more.

The Cumbria Minerals and Local Waste Plan – Strategic Flood Risk Assessment (June 2018) references the same criteria for local planning policy.

The site is therefore classified as a major development under the above criteria due to the proposals having a site area greater than 1ha and a floor area over 1000m<sup>2</sup>.

#### PLANNING POLICY IN SITE CONTEXT

The site covers 2.67ha of greenfield site, and according to the most recent Environment Agency (EA) flood risk maps, lies entirely within Flood Zone 1.

The NPPF site categorisation Table 2 places a commercial development of this nature within the 'less vulnerable' category. Developments in the 'less vulnerable' category are acceptable within Flood Zone 1 and therefore the site-specific Flood Risk Assessment (FRA) need only be brief, see page 6.

### SITE PLAN

The proposed development is located on an existing area of greenfield land to the east of Urban Fitness and to the west of the A595 at Egremont, Cumbria as shown on red line bordered plan in *Figure 1*.



Figure 1: Aerial photo of site - Google Maps

### **DEVELOPMENT DESCRIPTION**

The proposed development will see one new access created off the Vale View, Egremont, leading to an industrial park to be built on the existing 2.67ha greenfield site. The existing ground is generally open grassed landscape which is currently grazed by livestock.

The proposed development hardstanding areas are split as follows:

- Total hardstanding area = 1.367ha
- Permeable Paving / greenspace = 1.303ha

The land generally runs in a westerly direction, with the high point located at the East of the site at 62.53m AOD and the low point at 46m AOD at the southwestern aspect of the site. The land is currently used for agricultural grazing purposes as open pasture with an existing field access onto the highway of Vale View.

### PERMEABILITY AND SOIL PROFILE

British Geological Survey (BGS) and Land Information Systems (LandIS) mapping services have been used determine the following land make-up:

- Bedrock: St Bees Sandstone
- Superficial drift: Till, Devensian Diamicton
- Soil: Soilscape 6 Freely draining slightly acid loamy soils (as demonstrated within Appendix A, this result is inaccurate following a series of percolation testing undertaken on site)

#### **CURRENT FOUL AND SURFACE WATER DRAINAGE PROVISION**

#### Existing watercourses

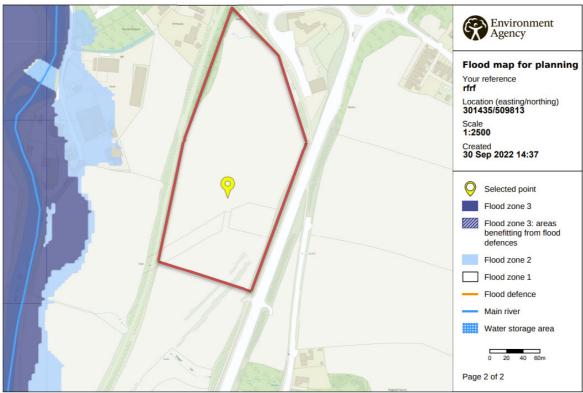
The ordinary watercourse Beggar Gill flows along the northern boundary of the site prior to entering the river Ehen approximately 250m downstream. The current land use drains surface water into Beggar Gill. The development is proposing to discharge surface water into Beggar Gill as the preferred method of surface water disposal. The discharge rate for the surface water is to be at a maximum equal to the greenfield runoff rate for the development site.

#### Combined surface and foul water

There is an existing combined foul and surface water sewer adjacent to the northern boundary of the site within the carriageway of Vale View. The foul water from the development site is proposed to be pumped into the existing foul sewer. Find attached within *Appendix C* the United Utilities maps illustrating the locations of the sewer network in the vicinity of the development site.

#### FLOOD RISK ASSESSMENT (FRA)

As described earlier in the report, the current Environment Agency Flood Map for Planning shows the site to be located wholly within Flood Zone 1 as is illustrated within *Figure 2* below and is classified as less vulnerable.



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Figure 2: Flood map for planning

A full FRA is therefore not required, although the Environment Agency long term flood risk maps are included below to further inform this report.



Figure 3: EA long term flooding from surface water

The long-term flood risk from surface water is very low (0.1%) with no areas of the site showing any form of heightened flood risk.



Figure 4: EA long term flood risk from river or sea

The long-term flood risk from rivers or sea is very low (0.1%) with no areas of the site showing any form of heightened flood risk. Therefore, the risk to the new development is seen to be negligible.

### SURFACE WATER DRAINAGE STRATEGY

The aim of the strategy is to provide a design which will avoid, reduce, and delay the discharge of surface water flows into public sewers and watercourses. This will aid in the protection of watercourses but will also ensure that no knock-on effects are seen beyond the site and that the risk of localised flooding and pollution within the site are reduced as far as possible.

To satisfy these criteria, surface water flows shall be subject to assessment via the hierarchy of drainage in accordance with the LASOO Non-Statutory Technical Standards for Sustainable Drainage: Practice Guidance. The hierarchy is as follows:

#### Hierarchy options:

- 1. Drain into the ground (infiltration).
- 2. To a surface water body.
- 3. To a surface water sewer, highway drain or another drainage system.
- 4. To a combined sewer.

The drainage strategy for the site is to be developed using the second level on the above hierarchy for the following reasons:

#### Drain into the ground (infiltration)

Four trial holes in accordance with the BRE 365 method were undertaken on site to test for infiltration. The results, as detailed within Appendix A of this report, have shown that the site is not suitable for infiltration as the method of surface water disposal. As such it is not proposed to discharge surface water via a soakaway.

#### Surface Water Body – highest viable drainage option route.

The ordinary water course Beggar Gill flows to the north of the development site. Due to the impermeability of the soil, as stated above, discharge into this system is proposed at a maximum of the greenfield run off rate (11.9/s) with attenuation provided on site to accommodate a 1 in 100 year plus 50% to account for climate change storm event. This is in line with the requirements of the Cumbria Development Design Guide.

#### Surface water sewer, highway drain or another drainage system

N/A

#### To a combined sewer

Foul water only is to be pumped into the existing combined sewer on Vale View, Egremont.

### SURFACE WATER PROPOSED DESIGN

The greenfield run off calculations, via the ICP SuDS Mean Annual Flood method, for the site have been split into 4 distinct areas to provide their own flow controls and treatment systems. The areas are shown on drawing 21-C-16080-011 in *Appendix B*. The runoff rates are summarised below:

Area	QBar (l/s)
Area 1	5.1
Area 2	1.5
Area 3	3.6
Area 4	1.7
Total	11.9

In accordance with the earlier mentioned hierarchy of drainage options, the system has been designed to utilise permeable paving where possible and attenuation tanks to store surface water prior to discharge into Beggar Gill. Please find attached in *Appendix B* the greenfield runoff rate calculations. As per the LASOO guidance, the peak runoff rate from the development for the 1 in 1yr rainfall event and the 1 in 100yr rainfall event should not exceed the peak greenfield runoff for the same event. The design is also required to prevent flooding to any part of the site for storms up to and including the 1:30yr rainfall event, while any exceedance for the 6 hour 1:100yr event should be controlled within the site and should not flood any properties or service areas.

#### Consideration of SuDS components

A range of SuDS components are available and have been considered for use. Their applicability to the site has been addressed below:

- Rainwater harvesting suitable for use on the site, however due to the use of the site there is no guarantee the systems have sufficient capacity for use during extreme events, therefore they have been discounted for site flow calculations.
- Soakaways discounted due to poor infiltration demonstrated on site.
- Permeable paving suitable for use on site parking areas. Poor infiltration rates will limit volumes able to be distributed so these shall not be used to take flows from additional hardstanding areas.
- Swales Due to the extent of the hardstanding areas within the site there is not sufficient land available to allow safe construction and maintenance of swales. In addition, due to the steep topography of the site this feature has been discounted.
- Detention basins Considered unsuitable due to large land uptake required and the steep nature of the site slopes and gradients discounted.
- Ponds/wetlands Considered unsuitable due to large land uptake required and the steep nature of the site slopes and gradients discounted.
- Underground closed storage crate/tank systems Considered viable for use however should not be used in preference to open SuDS systems where these are available. Viable

#### Climate change

Environment Agency guidance issued in 2022 estimates that peak rainfall intensity will increase due to climate change over the next 100 years. There is therefore an allowance of 50% attributed to the 30yr and 100yr storm event calculations in line with the Upper End estimate of rainfall increases for small and urban catchments.

#### Percentage impermeability (PIMP)

All impermeable area is modelled as 100% PIMP. This will allow for sufficient capacity for all hardstanding areas to be positively drained.

#### Volumetric Runoff Coefficient (Cv)

Industry standard Cv values vary for summer and winter and account for water volumes which do not enter the drainage system i.e., that is lost through infiltration, depression storage, evaporation, initial wetting etc. Standard values are 0.75 for summer and 0.84 for winter.

In this instance, only hardstanding areas are modelled and therefore the standard values have been uplifted to 0.85 and 0.95 respectively for both summer and winter storms. This results in conservative design with no infiltration allowance.

#### Surface water quality

The SuDS Manual provides best industry practice for assessing the pollutant potential of developments and providing mitigation methods to increase run off water quality using SuDS components.

The simple index approach has been utilised to assess the pollutant hazard indices and proposed treatment components. Note, this has been carried out in conjunction with the above SuDS component suitability assessment for the site and as such many features have already been discounted.

Table 26.2 from The SuDS Manual below outlines the pollution hazard indices for different land uses.

Pollution hazard indices for different land use classifications				
Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro- carbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non- residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
ommercial yard and delivery areas, on-residential car parking with equent change (eg hospitals, retail), all ads except low traffic roads and trunk ads/motorways <sup>1</sup>	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage ards, lorry parks, highly frequented orry approaches to industrial estates, vaste sites), sites where chemicals and uels (other than domestic fuel oil) are o be delivered, handled, stored, used or manufactured; industrial sites; trunk oads and motorways <sup>1</sup>	High	0.8²	0.8²	0.9²

#### Figure 5 SuDS Manual Table 26.2 Pollution hazard indices

This development is to be classed as a 'Medium' risk land use due to the presence of commercial yards with delivery areas and non-residential car parking. Due to the site layout and differing levels of pollution hazard, it is proposed to treat each area separately and therefore keep each SuDS 'train' separate. This ensures that flows are treated relative to their pollution indices and that flows are treated prior to the proposed attenuation areas; therefore, preventing any pollution build up.

This level of risk demands the following level of pollution control:

Land use	Suspended solids	Metal	Hydrocarbons
Other roofs	0.3	0.2	0.05
Parking/access road	0.7	0.6	0.7
Commercial Yard	0.7	0.6	0.7
Areas			

As per section 26.7.1 each SuDS component should be included in the total mitigation with a reduction of 50% for every additional component after the first. The highest risk element comes from the commercial yard areas and access roads, which are to be constructed using concrete / tarmac surfacing. As the loadings present will not allow for permeable surfacing, it is proposed to treat the runoff via a proprietary separator prior to entry into the below ground storage. As can be seen below, this mitigation provides sufficient treatment for these elements.

Land use	Suspended solids	Metal	Hydrocarbons
Commercial Yard Area / parking and access roads	0.7	0.6	0.7
Kingspan AquaTreat Separator	0.85	0.64	0.99

The shop and storage roof areas are categorised with a lower level of risk and therefore shall be routed through an ACO V Septor to ensure efficient removal of pollutants.

Land use	Suspended solids	Metal	Hydrocarbons
Other Roofs	0.3	0.2	0.05
ACO V-Septor	0.5	0.5	0.4

The above table shows that an ACO V-Septor would provide sufficient pollutant removal for the other roof area categories on the development site. The introduction of further treatment would be deemed inappropriate for a development of this scale.

The manufacturers specification sheets for the proprietary treatment systems stated above are located within *Appendix E*.

#### Surface water drainage proposals

Based on the above assessments, it is proposed that drainage system will convey flows from the commercial development via gravity, to Beggar Gill. The system will accept all storm events up to 1:100yr + 50% allowance for climate change.

Max site outflow: 11.9l/s (QBar)

Storage provision: Underground geocellular crate system

Treatment systems: Various proprietary systems as described above.

### MAINTENANCE

All components shall be maintained in accordance with the relative requirements shown in the SuDS Manual. These intervals should be deemed as a minimum frequency and reference should also be made to the manufacturers guidance to ensure all components are maintained correctly.

Table 21.3 from the SuDS Manual for attenuation tanks has been included below for reference.

21.3	Maintenance schedule	Required action	Typical frequency	
		Inspect and Identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually	
		Remove debris from the catchment surface (where it may cause risks to performance)	Monthly	
	fr s	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annualiy	
		Remove sediment from pre-treatment structures and/ or Internal forebays	Annually, or as required	
	Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required	
	Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually	
		Survey Inside of tank for sediment build-up and remove if necessary	Every 5 years or as required	

Figure 7 SuDS Manual table 21.3 Attenuation storage maintenance

### FOUL WATER DRAINAGE STRATEGY

All foul water from the development site will be pumped via a new rising main towards the combined sewer network within Vale View, to the north of the development site.

### **MANAGEMENT**

All separate surface and foul water drainage systems within the site are proposed to remain private and be maintained by the site owner.

### **APPENDIX A – INFILTRATION TESTING**

The infiltration tests were undertaken on Wednesday 5 October 2022. The weather conditions consisted of persistent showers in the morning with dry, brighter weather conditions in the afternoon.

Infiltration Test 1

Trial Hole 1000mm x 1700mm x 1000mm

Time	Time Elapsed (min)	Water Depth (mm)
Abandoned due to ingress of water before test could take place		

Infiltration Test 2

Trial Hole 1000mm x 1700mm x 1000mm

Time	Time Elapsed (min)	Water Depth (mm)
11:16	0	1000
11:21	5	950
11:42	26	950
12:02	46	950
12:32	76	950
13:02	106	950
13:32	136	950

Test abandoned at 14:00 due to a lack of infiltration.

#### Infiltration Test 3

Trial Hole 1000mm x 1700mm x 1000mm

Time	Time Elapsed (min)	Water Depth (mm)
Abandoned due to ingress of water before test could take place		

Infiltration Test 4

Trial Hole 1000mm x 1700mm x 1000mm

Time	Time Elapsed (min)	Water Depth (mm)
11:19	0	1000
11:25	6	1000
11:40	21	940
12:05	46	940
12:35	76	940
13:05	106	940
13:30	136	940

Test abandoned at 14:00 due to a lack of infiltration.



*Figure A1: Photograph of infiltration testing undertaken on site (Trial Hole 4)* 

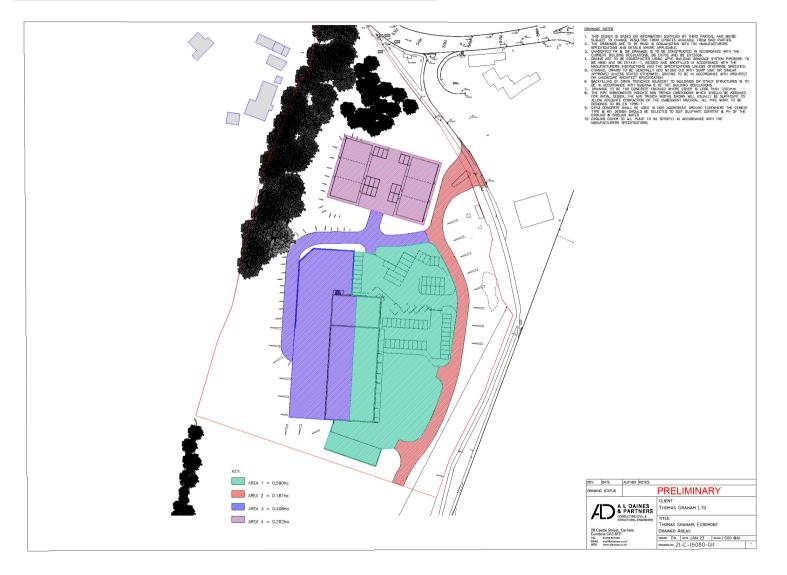


Figure A2: Photograph of a trial hole dug on site (Trial Hole 2)



*Figure A3: Photograph of a trial hole dug on site (Trial Hole 1)* 

#### **APPENDIX B – GREENFIELD RUNOFF CALCULATIONS**



May 2023 Rev A

### **Overall Site**

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#### APPENDIX C – UNITED UTILITIES SEWER RECORDS



How to contact us:

United Utilities Water Limited Property Searches Haweswater House Lingley Mere Business Park Great Sankey Warrington WA5 SLP

A L Daines & Partners LLP

28 Castle Street, Carlisie, CA3 8TP

FAO:

Telephone: 0370 7510101

E-mail: propertysearches@uupic.co.uk

Your Ref: t graham, egremont Our Ref: UUPS-ORD-261426 Date: 23/03/2021

#### Dear Sirs

#### Location: t graham egremont

I acknowledge with thanks your request dated 18/03/2021 for information on the location of our services.

Please find enclosed plans showing the approximate position of United Utilities' apparatus known to be in the vicinity of this site.

The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

If you are planning works anywhere in the North West, please read United Utilities' access statement before you start work to check how it will affect our network. <u>http://www.unitedutilities.com/work-near-asset.aspx</u>.

I trust the above meets with your requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please contact us.

Yours Faithfully,

allalis

Earen No?comack Property/Jearches/Manager

UUWaterLtd/041/03-15

United Utilities Water Limited Registered in England & Wales No. 2300078 Registered Office Haweswater House, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP



#### TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUWL apparatus) of United Utilities Water Limited "(UUWL)".

#### TERMS AND CONDITIONS:

- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others
  and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this
- agreement or not) that is not set out in this agreement or the documents referred to in it. This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
- The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
- The position and depth of UUWL apparatulus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made
- subsequent to issue and prior to any works being carried out.

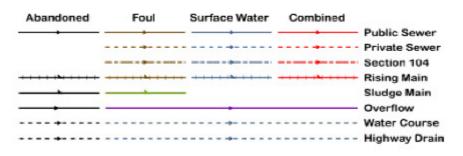
  This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of
- determining the suitability of a point of connection to the sewerage or other distribution systems.
   No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from
- those shown on the Map and any information supplied with it.
   If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
   This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.

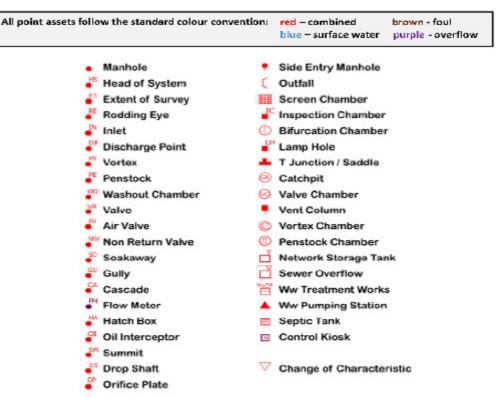
UUWaterLtd/041/03-15

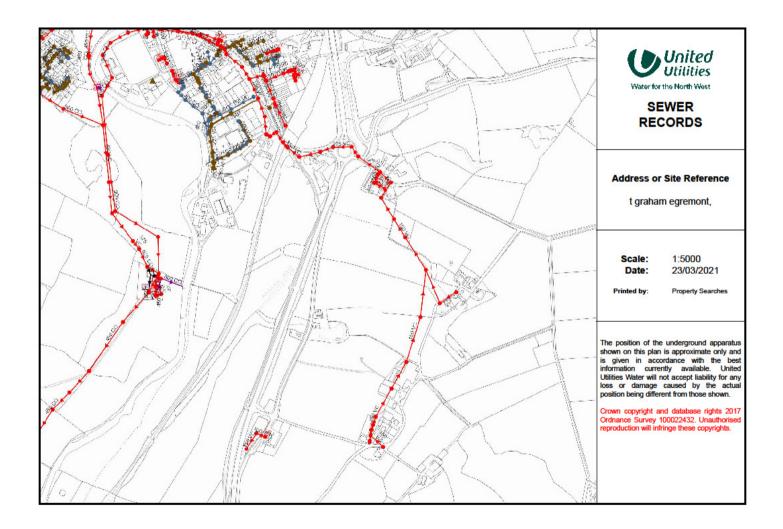
Jnited Utilities Water Limited Registered in England & Wales No. 2300078 Registered Office Haweswater House, Lingley Mere Business Park, Jingley Green Avenue, Great Sankey, Warrington, WA5 3LP



### Wastewater Symbology



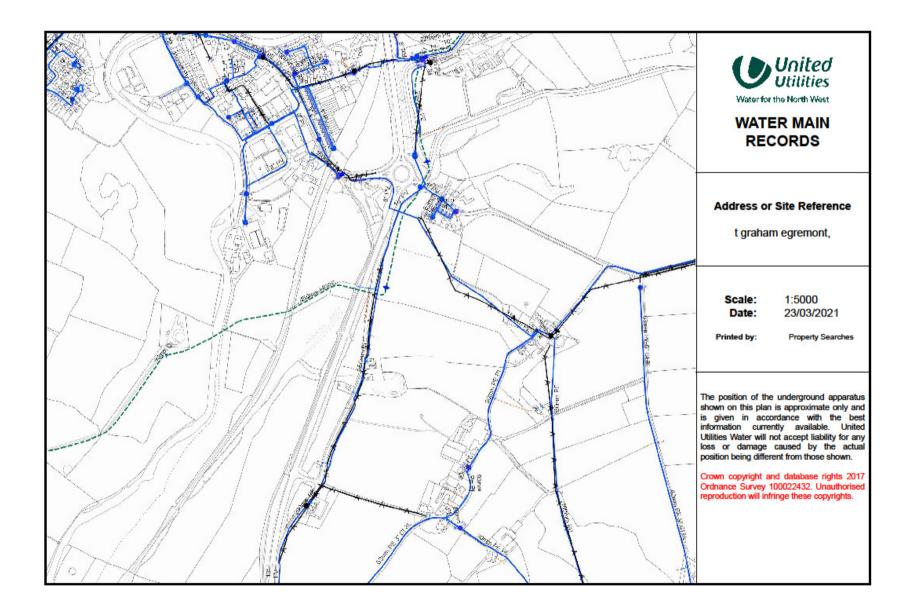






### **Clean Water Symbology**





#### **APPENDIX D – MICRO DRAINAGE CALCULATIONS**

A L Daines & Partners		Page 1
28 Castle Street		<b></b>
Carlisle		
CA3 8TP		Micro
Date 02/05/2023 09:28	Designed by petera	Drainage
File MD CALCS SM.MDX	Checked by	
Micro Drainage	Network 2020.1.3	
Free Flowing	Outfall Details for Storm	
ortfall ortfall o	. Level I. Level Min D,L W	
	(m) (m) I. Level Min D,L W (m) (m) I. Level (mm) (mm)	
-	(m)	
2 OOF OUTFALL	49.000 48.025 0.000 0 0	
5.005 OOFALL	43.000 48.025 0.000 0 0	
Simulatio	on Criteria for Storm	
Volumetric Runoff Coeff (	0.750 Additional Flow - % of Total Fl	ow 0.000
Areal Reduction Factor 1 Hot Start (mins)	1.000 MADD Factor * 10m <sup>3</sup> /ha Stora 0 Inlet Coefficie	ge 2.000
Hot Start Level (mm)	0 Inlet Coefficie 0 Flow per Person per Day (1/per/da	y) 0.000
Manhole Headloss Coeff (Global)	0.500 Run Time (min	is) 60
Foul Sewage per hectare (1/s) (	0.000 Output Interval (min	s) 1
Number of Input Hydrogr	aphs 0 Number of Storage Structures 4	
Number of Online Cont	rols 4 Number of Time/Area Diagrams 0	
Number of Offline Cont	rols 0 Number of Real Time Controls 0	
Synthet	ic Painfall Details	
synchec	ic Rainfall Details	
Rainfall Model	FSR Profile Type Sum	
Return Period (years)	100 Cv (Summer) 0.1	750
Region Engla M5-60 (mm)	nd and Wales Cv (Winter) 0.1 22.000 Storm Duration (mins)	
M5-60 (mm) Ratio R	0.196	
A1 Q2	32-2020 Innovyze	
W1 30		

A L Daines & Pa	artner	s					Page 2
28 Castle Stree		-					
Carlisle							
CA3 8TP							
	ate 02/05/2023 09:28 Designed 1						Micro
File MD CALCS			Checked				Drainage
Micro Drainage				2020.1.	3		
mero brainage			HELBOIR	202011			
		Onli	Ine Controls	s for St	orm		
Hydro-Brak	e@ Opt	imum Man)	nole: SW09,	DS/PN:	3.002, V	olume (m³	): 11.2
			Unit Reference		0107-5100-	1000-5100	
			esign Head (m)		0107-5100-	1.000	
			ign Flow (1/s)			5.1	
			Flush-Flo			alculated	
			Objective Application		se upstrea	n storage Surface	
			Sump Available			Yes	
			Diameter (mm)			107	
			vert Level (m)			53.660	
M1		-	Diameter (mm) Diameter (mm)			150 1200	
		Control	l Points	Head (m)	Flow (1/s	)	
	De	asign Point	(Calculated)	1.000	5.	1	
			Flush-Flow				
	M	an Flow or	Kick-Flo® er Head Range		) 4. · 4.		
						-	
The hydrologica	al calcu	lations ha	ve been based	on the H	ead/Discha	rge relatio	
Hydro-Brake@ Op	al calcu stimum a	lations ha	ve been based d. Should an	on the H	ead/Dischar	rge relatio	other than a
	al calcu stimum a	lations ha	ve been based d. Should an	on the H	ead/Dischar	rge relatio	other than a
Hydro-Brake® Op Hydro-Brake Opt invalidated	al calcu btimum a imum@ b	ulations ha us specifie we utilised	we been based d. Should an then these s	on the H other typ torage ro	ead/Dischar e of contro uting calco	rge relation ol device o ulations wi	other than a 111 be
Hydro-Brake@ Op Hydro-Brake Opt	al calcu btimum a imum@ b	ulations ha us specifie we utilised	we been based d. Should an then these s	on the H other typ torage ro	ead/Dischar e of contro uting calco	rge relation ol device o ulations wi	other than a 111 be
Hydro-Brake@ Op Hydro-Brake Opt invalidated Depth (m) Flow 0.100	al calcu otimum a imum@ b r (1/s) 3.6	lations ha is specifie we utilised Depth (m) 1.200	ve been based d. Should and then these s Flow (1/s) De 5.6	on the H other typ torage ro mpth (m) 1 3.000	ead/Dischar e of contro uting calco Flow (1/s) 8.5	nge relation ol device of ulations with Depth (m) 7.000	Ther than a till be Flow (1/s)
Hydro-Brake@ Op Hydro-Brake Opt invalidated Depth (m) Flow 0.100 0.200	al calcu otimum a :imum@ b r (1/s) 3.6 5.0	Depth (m) 1.200 1.400	ve been based d. Should an then these s Flow (1/s) De 5.6 6.0	on the H other typ torage ro pth (m) 1 3.000 3.500	ead/Dischar e of contro uting calco Flow (1/s) 8.5 9.2	Depth (m) 7.000 7.500	<pre>pther than a iii be Flow (l/s) 12.8 13.2</pre>
Hydro-Brake@ Op Hydro-Brake Opt invalidated Depth (m) Flow 0.100	al calcu otimum a imum@ b r (1/s) 3.6	Depth (m) 1.200 1.600	ve been based d. Should an then these s Flow (1/s) De 5.6 6.0 6.3	on the H other typ torage ro mpth (m) 1 3.000	ead/Dischar e of contro uting calco Flow (1/s) 8.5 9.2 9.8	rge relation ol device of ulations with Depth (m) 7.000 7.500 8.000	<pre>pther than a ill be  Flow (1/s)  12.8  13.2  13.6</pre>
Hydro-Brake@ Op Hydro-Brake Opt invalidated Depth (m) Flow 0.100 0.200 0.300	al calcu otimum a imum@ b (1/s) 3.6 5.0 5.1	Depth (m) 1.200 1.600 1.800	ve been based d. Should an then these s Flow (1/s) De 5.6 6.0 6.3 6.7	on the H other typ torage ro pth (m) 1 3.000 3.500 4.000	ead/Discha: e of contri- uting calco Flow (1/s) 8.5 9.2 9.8 10.3	rge relation ol device of ulations with Depth (m) 7.000 7.500 8.000	Flow (1/s) 12.8 13.2 13.6 14.0
Hydro-Brake 0 Op Hydro-Brake Opt invalidated Depth (m) Flow 0.100 0.200 0.300 0.400 0.500 0.600	al calcu otimum a imum@ b (1/s) 3.6 5.0 5.1 5.0 4.9 4.5	Depth (m) 1.200 1.400 1.600 1.800 2.200	we been based d. Should an then these si Flow (1/s) De 5.6 6.0 6.3 6.7 7.0 7.4	on the H other typ torage ro 	ead/Dischar e of contruting calco Flow (1/s) 8.5 9.2 9.8 10.3 10.9 11.4	rge relation ol device ( plations with Depth (m) 7.000 7.500 8.000 8.500	Flow (1/s) 12.8 13.2 13.6 14.0 14.4
Hydro-Brake 0 Op Hydro-Brake Opt invalidated Depth (m) Flow 0.100 0.200 0.300 0.400 0.500 0.600 0.800	al calcu timum a imum@ b 3.6 5.0 5.1 5.0 5.1 5.0 4.9 4.5 4.6	Depth (m) 1.200 1.400 1.600 1.800 2.000 2.200 2.400	we been based d. Should an then these si Flow (1/s) Da 5.6 6.0 6.3 6.7 7.0 7.4 7.7	on the H ther typ torage ro 	ead/Dischar e of contri- uting calco Flow (1/s) 8.5 9.2 9.8 10.3 10.9 11.4 11.9	rge relation of device of ulations with Depth (m) 7.000 7.500 8.000 8.000 9.000	Flow (1/s) 12.8 13.2 13.6 14.0 14.4
Hydro-Brake 0 Op Hydro-Brake Opt invalidated Depth (m) Flow 0.100 0.200 0.300 0.400 0.500 0.600	al calcu otimum a imum@ b (1/s) 3.6 5.0 5.1 5.0 4.9 4.5	Depth (m) 1.200 1.400 1.600 1.800 2.000 2.200 2.400	we been based d. Should an then these si Flow (1/s) De 5.6 6.0 6.3 6.7 7.0 7.4	on the H other typ torage ro 	ead/Dischar e of contruting calco Flow (1/s) 8.5 9.2 9.8 10.3 10.9 11.4	rge relation of device of ulations with Depth (m) 7.000 7.500 8.000 8.000 9.000	<pre>bther than a ll1 be Flow (l/s) l2.8 l3.2 l3.6 l4.0 l4.4</pre>
Hydro-Brake 0 Op Hydro-Brake Opt invalidated Depth (m) Flow 0.100 0.200 0.300 0.400 0.500 0.600 0.800 1.000	al calcu timum@ b imum@ b 3.6 5.0 5.1 5.0 4.9 4.5 4.5 5.1	lations ha is specifie w utilised Depth (m) 1.200 1.400 1.600 1.800 2.000 2.200 2.400 2.600	we been based d. Should an then these si Flow (1/s) Da 5.6 6.0 6.3 6.7 7.0 7.4 7.7	on the H bther typ torage ro 3.000 3.500 4.000 4.500 5.000 5.500 6.000 6.500	ead/Discha: e of contro uting calco Flow (1/s) 8.5 9.2 9.8 10.3 10.9 11.4 11.9 12.3	rge relation of device of ulations with <b>Depth (m)</b> 7.000 7.500 8.000 8.000 9.000 9.500	<pre>bther than a ll1 be Flow (1/s) l2.8 l3.2 l3.6 l4.0 l4.4 l4.8</pre>
Hydro-Brake 0 Op Hydro-Brake Opt invalidated Depth (m) Flow 0.100 0.200 0.300 0.400 0.500 0.600 0.800 1.000	al calcu timum@ b imum@ b 3.6 5.0 5.1 5.0 4.9 4.5 4.5 5.1	Depth (m) 1.200 1.400 1.600 1.800 2.000 2.400 2.600 1.100 1.100 1.200 1.200 1.400 1.600 1.200 1.400 1.6000 1.6000 1.6000 1.600 1.6000 1.6000 1.6000 1.600	we been based d. Should an then these si Flow (1/s) De 5.6 6.0 6.3 6.7 7.0 7.4 7.7 8.0 hole: SW05,	on the H ther typ torage ro <b>pth (m) 1</b> 3.000 3.500 4.000 4.500 5.000 5.500 6.000 6.500 DS/PN:	ead/Dischar a of contruting calco flow (1/s) 8.5 9.2 9.8 10.3 10.9 11.4 11.9 12.3 4.004, Vo	rge relation of device of ulations with <b>Depth (m)</b> 7.000 7.500 8.000 8.500 9.500 9.500	Flow (1/s) 12.8 13.2 13.6 14.0 14.4 14.8
Hydro-Brake 0 Op Hydro-Brake Opt invalidated Depth (m) Flow 0.100 0.200 0.300 0.400 0.500 0.600 0.800 1.000	al calcu timum@ b imum@ b 3.6 5.0 5.1 5.0 4.9 4.5 4.5 5.1	Depth (m) 1.200 1.400 1.600 1.600 2.000 2.200 2.400 2.600 1.100 1.100 1.8000 1.8000 1.8000 1.8000 1.8000 1.8000 1.8000 1.800	we been based d. Should an then these si Flow (1/s) De 5.6 6.0 6.3 6.7 7.0 7.4 7.7 8.0 nole: SW05, Unit Reference	on the H ther typ torage ro <b>pth (m) 1</b> 3.000 3.500 4.000 4.000 4.500 5.500 6.000 6.500 DS/PN: MD-SHE-	ead/Dischar a of contruting calco flow (1/s) 8.5 9.2 9.8 10.3 10.9 11.4 11.9 12.3 4.004, Vo	rge relation of device of ulations with Depth (m) 7.000 7.500 8.000 8.500 9.500 9.500 0.000 9.500	<pre>bther than a ll1 be Flow (1/s) l2.8 l3.2 l3.6 l4.0 l4.4 l4.8</pre>
Hydro-Brake 0 Op Hydro-Brake Opt invalidated Depth (m) Flow 0.100 0.200 0.300 0.400 0.500 0.600 0.800 1.000	al calcu timum@ b imum@ b 3.6 5.0 5.1 5.0 4.9 4.5 4.5 5.1	lations ha is specifie w utilised Depth (m) 1.200 1.400 1.600 1.800 2.000 2.400 2.400 2.400 2.600 2.400 2.600	ve been based d. Should an then these s Flow (1/s) De 5.6 6.0 6.3 6.7 7.0 7.4 7.7 8.0 nole: SW05, Unit Reference esign Head (m)	on the H bther typ torage ro 3.000 3.500 4.500 5.500 5.500 6.500 DS/PN: a MD-SHE-	ead/Dischar a of contruting calco flow (1/s) 8.5 9.2 9.8 10.3 10.9 11.4 11.9 12.3 4.004, Vo	rge relation of device of ulations with <b>Depth (m)</b> 7.000 7.500 8.000 8.500 9.500 9.500	<pre>bther than a ll1 be Flow (1/s) l2.8 l3.2 l3.6 l4.0 l4.4 l4.8</pre>
Hydro-Brake 0 Op Hydro-Brake Opt invalidated Depth (m) Flow 0.100 0.200 0.300 0.400 0.500 0.600 0.800 1.000	al calcu timum@ b imum@ b 3.6 5.0 5.1 5.0 4.9 4.5 4.5 5.1	lations ha is specifie w utilised Depth (m) 1.200 1.400 1.600 1.800 2.000 2.400 2.400 2.400 2.600 2.400 2.600	we been based d. Should an then these si Flow (1/s) De 5.6 6.0 6.3 6.7 7.0 7.4 7.7 8.0 nole: SW05, Unit Reference	on the H pther typ torage ro 	ead/Dischar a of contru- uting calco Flow (1/s) 8.5 9.2 9.8 10.3 10.9 11.4 11.9 12.3 4.004, Vo 0062-1500-1	rge relation of device ( ulations with r. 000 7. 000 8. 000 8. 500 9. 000 9. 500 0. 000 9. 500 0. 000 0. 000 0. 700	<pre>bther than a ll1 be Flow (1/s) l2.8 l3.2 l3.6 l4.0 l4.4 l4.8</pre>
Hydro-Brake 0 Op Hydro-Brake Opt invalidated Depth (m) Flow 0.100 0.200 0.300 0.400 0.500 0.600 0.800 1.000	al calcu timum@ b imum@ b 3.6 5.0 5.1 5.0 4.9 4.5 4.5 5.1	lations ha is specifie w utilised Depth (m) 1.200 1.400 1.600 1.800 2.000 2.400 2.400 2.400 2.600 2.400 2.600	ve been based d. Should an then these si Flow (1/s) De 5.6 6.0 6.3 6.7 7.0 7.4 7.7 8.0 nole: SW05, Unit Reference seign Head (m) ign Flow (1/s) Flush-Flo <sup>*</sup> Objective	on the H other typ torage ro <b>pth (m) 1</b> 3.000 3.500 4.000 4.500 5.500 6.000 6.500 DS/PN: MD-SHE-	ead/Dischar a of contru- uting calco Flow (1/s) 8.5 9.2 9.8 10.3 10.9 11.4 11.9 12.3 4.004, Vo 0062-1500-1	rge relation pepth (m) 7.000 7.500 8.000 8.500 9.500 0.000 9.500 0.100 0.700 1.5 alculated m storage	<pre>bther than a ll1 be Flow (1/s) l2.8 l3.2 l3.6 l4.0 l4.4 l4.8</pre>
Hydro-Brake 0 Op Hydro-Brake Opt invalidated Depth (m) Flow 0.100 0.200 0.300 0.400 0.500 0.600 0.800 1.000	al calcu timum@ b imum@ b 3.6 5.0 5.1 5.0 4.9 4.5 4.5 5.1	lations ha is specifie w utilised Depth (m) 1.200 1.400 1.600 1.800 2.000 2.200 2.400 2.400 2.600 .imum Mani Des	ve been based d. Should am then these s Flow (1/s) De 5.6 6.0 6.3 6.7 7.0 7.4 7.7 8.0 nole: SW05, Unit Reference asign Head (m) ign Flow (1/s) Flush-Flo <sup>0</sup> Objective Application	on the H pther typ torage ro pth (m) 1 3.000 3.500 4.500 5.500 5.500 0.500 DS/PN: MD-SHE-	ead/Dischar a of contru- uting calco flow (1/s) 8.5 9.2 9.8 10.3 10.9 11.4 11.9 12.3 4.004, Vo 0062-1500-1	rge relation 1 device ( 1 de	<pre>bther than a ll1 be Flow (1/s) l2.8 l3.2 l3.6 l4.0 l4.4 l4.8</pre>
Hydro-Brake 0 Op Hydro-Brake Opt invalidated Depth (m) Flow 0.100 0.200 0.300 0.400 0.500 0.600 0.800 1.000	al calcu timum@ b imum@ b 3.6 5.0 5.1 5.0 4.9 4.5 4.5 5.1	lations ha is specifie w utilised Depth (m) 1.200 1.400 1.600 1.800 2.000 2.200 2.400 2.400 2.600 .imum Mani Des	ve been based d. Should an then these si Flow (1/s) De 5.6 6.0 6.3 6.7 7.0 7.4 7.7 8.0 nole: SW05, Unit Reference seign Head (m) ign Flow (1/s) Flush-Flo <sup>*</sup> Objective	on the H pther typ torage ro pth (m) 1 3.000 3.500 4.500 5.000 6.500 DS/PN: MD-SHE-	ead/Dischar a of contru- uting calco flow (1/s) 8.5 9.2 9.8 10.3 10.9 11.4 11.9 12.3 4.004, Vo 0062-1500-1	rge relation pepth (m) 7.000 7.500 8.000 8.500 9.500 0.000 9.500 0.100 0.700 1.5 alculated m storage	<pre>bther than a ll1 be Flow (1/s) l2.8 l3.2 l3.6 l4.0 l4.4 l4.8</pre>
Hydro-Brake@ Op Hydro-Brake Opt invalidated Depth (m) Flow 0.100 0.200 0.300 0.400 0.500 0.600 0.800 1.000 <u>Hydro-Brak</u>	al calcu otimum@ b imum@ b 3.6 5.0 4.9 4.5 4.5 5.1 5.0 4.9 4.5 4.5 5.1	lations ha is specifie w utilised Depth (m) 1.200 1.400 1.600 1.800 2.000 2.400 2.400 2.400 2.600 :imum Mani Des	ve been based d. Should am then these s Flow (1/s) De 5.6 6.0 6.3 6.7 7.0 7.4 7.7 8.0 hole: SW05, Unit Reference asign Head (m) ign Flow (1/s) Flush-Flo Objective Application Sump Available Diameter (mm) vert Level (m)	on the H bther typ torage ro (pth (m) 1 3.000 4.000 4.500 5.000 6.500 DS/PN: MD-SHE-	ead/Dischar a of contru- uting calco flow (1/s) 8.5 9.2 9.8 10.3 10.9 11.4 11.9 12.3 4.004, Vo 0062-1500-1	rge relations with the second	Flow (1/s) 12.8 13.2 13.6 14.0 14.4 14.8
Hydro-Brake Op Hydro-Brake Opt invalidated Depth (m) Flow 0.100 0.200 0.300 0.400 0.500 0.600 0.600 0.800 1.000 <u>Hydro-Brak</u>	al calcu timum@ b imum@ b (1/s) 3.6 5.0 4.9 4.5 4.5 4.5 5.1 be@ Opt	Depth (m) 1.200 1.200 1.400 1.600 1.800 2.000 2.400 2.400 2.600 1.mum Mani Des Immuter Pipe	ve been based d. Should an then these s Flow (1/s) De 5.6 6.0 6.3 6.7 7.0 7.4 7.7 8.0 hole: SW05, Unit Reference seign Head (m) ign Flow (1/s) Flush-Flo <sup>0</sup> Objective Application Sump Available Diameter (mm) vert Level (m)	on the H pther typ torage ro pth (m) 1 3.000 3.500 4.500 5.500 5.500 DS/PN: MD-SHE-	ead/Dischar a of contru- uting calco flow (1/s) 8.5 9.2 9.8 10.3 10.9 11.4 11.9 12.3 4.004, Vo 0062-1500-1	rge relation of device of ulations with 7.000 7.500 8.000 8.500 9.000 9.500 0.000 9.500 0.000 1.5 0.700 1.5 alculated m storage Surface Surface 55.065 75	Flow (1/s) 12.8 13.2 13.6 14.0 14.4 14.8
Hydro-Brake Op Hydro-Brake Opt invalidated Depth (m) Flow 0.100 0.200 0.300 0.400 0.500 0.600 0.600 0.800 1.000 <u>Hydro-Brak</u>	al calcu timum@ b imum@ b (1/s) 3.6 5.0 4.9 4.5 4.5 4.5 5.1 be@ Opt	Depth (m) 1.200 1.200 1.400 1.600 1.800 2.000 2.400 2.400 2.600 1.mum Mani Des Immuter Pipe	ve been based d. Should am then these s Flow (1/s) De 5.6 6.0 6.3 6.7 7.0 7.4 7.7 8.0 hole: SW05, Unit Reference asign Head (m) ign Flow (1/s) Flush-Flo Objective Application Sump Available Diameter (mm) vert Level (m)	on the H pther typ torage ro pth (m) 1 3.000 3.500 4.500 5.500 5.500 DS/PN: MD-SHE-	ead/Dischar a of contru- uting calco flow (1/s) 8.5 9.2 9.8 10.3 10.9 11.4 11.9 12.3 4.004, Vo 0062-1500-1	rge relations with the second	Flow (1/s) 12.8 13.2 13.6 14.0 14.4 14.8
Hydro-Brake@ Op Hydro-Brake Opt invalidated Depth (m) Flow 0.100 0.200 0.300 0.400 0.500 0.600 0.600 0.800 1.000 <u>Hydro-Brak</u>	al calcu timum@ b imum@ b (1/s) 3.6 5.0 4.9 4.5 4.5 4.5 5.1 be@ Opt	Depth (m) 1.200 1.200 1.400 1.600 1.800 2.000 2.400 2.400 2.600 1.mum Mani Des Immuter Pipe	ve been based d. Should an then these s Flow (1/s) De 5.6 6.0 6.3 6.7 7.0 7.4 7.7 8.0 hole: SW05, Unit Reference seign Head (m) ign Flow (1/s) Flush-Flo <sup>0</sup> Objective Application Sump Available Diameter (mm) vert Level (m)	on the H pther typ torage ro pth (m) 1 3.000 3.500 4.500 5.500 5.500 DS/PN: MD-SHE-	ead/Dischar a of contru- uting calco flow (1/s) 8.5 9.2 9.8 10.3 10.9 11.4 11.9 12.3 4.004, Vo 0062-1500-1	rge relation of device of ulations with 7.000 7.500 8.000 8.500 9.000 9.500 0.000 9.500 0.000 1.5 0.700 1.5 alculated m storage Surface Surface 55.065 75	Flow (1/s) 12.8 13.2 13.6 14.0 14.4 14.8
Hydro-Brake@ Op Hydro-Brake Opt invalidated Depth (m) Flow 0.100 0.200 0.300 0.400 0.500 0.600 0.600 0.800 1.000 <u>Hydro-Brak</u>	al calcu timum@ b imum@ b (1/s) 3.6 5.0 4.9 4.5 4.5 4.5 5.1 be@ Opt	Depth (m) 1.200 1.400 1.400 1.600 2.000 2.400 2.400 2.600 1.1mum Manh Des.	ve been based d. Should an then these s Flow (1/s) De 5.6 6.0 6.3 6.7 7.0 7.4 7.7 8.0 hole: SW05, Unit Reference seign Head (m) ign Flow (1/s) Flush-Flo <sup>0</sup> Objective Application Sump Available Diameter (mm) vert Level (m)	on the H pther typ torage ro pth (m) 1 3.000 3.500 4.500 5.000 6.500 DS/PN: MD-SHE-	ead/Discha: e of contru- uting calco flow (1/s) 8.5 9.2 9.8 10.3 10.9 11.4 11.9 12.3 4.004, VC 0062-1500-1 cc se upstream	rge relation of device of ulations with 7.000 7.500 8.000 8.500 9.000 9.500 0.000 9.500 0.000 1.5 0.700 1.5 alculated m storage Surface Surface 55.065 75	Flow (1/s) 12.8 13.2 13.6 14.0 14.4 14.8

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A L Daines & Part	ners					Page 3
28 Castle Street						
Carlisle						
CA3 8TP						Micro
Date 02/05/2023 0	9:28	Designed	i by peter	а		Drainage
File MD CALCS SM.	MDX	Checked	ру			Diamaye
Micro Drainage		Network	2020.1.3			
Hydro-Brake@	Optimum Manho	le: SW05,	DS/PN: 4.0	004, Volu	ume (m³)	: 67.1
	Control H	Points	Head (m) Fl	low (1/s)		
	Design Point (	Calculated	0.700	1.5		
	besign roine (	Flush-Flom		1.5		
		Kick-Flo0		1.2		
	Mean Flow over	Head Range	-	1.3		
				in a set		
The hydrological c Hydro-Brake@ Optim						
Hydro-Brake Optimu						
invalidated				,		
Depth (m) Flow (1)	/s) Depth (m) Fl	ow (1/s) Dep	pth (m) Flow	(1/s) De	apth (m)	Flow (1/s)
0.100	1.4 1.200	1.9	3.000	2.9	7,000	4.3
	1.5 1.400	2.1	3.500	3.1	7.500	4.5
0.300	1.5 1.600	2.2	4.000	3.3	8.000	4.6
	1.4 1.800	2.3	4.500	3.5	8.500	4.8
1	1.3 2.000	2.4	5.000	3.7	9.000	4.9
1	1.4 2.200 1.6 2.400	2.5	5.500	3.9	9.500	5.0
	1.8 2.600	2.7	6.500	4.2		
Hydro-Brake@	Optimum Manho	le: SW16,	DS/PN: 6.	004, Vol	ume (m³	): 8.1
		it Reference	MD-SHE-009	5-3600-070		
		ign Head (m)			0.700	
	Desig	n Flow (1/s) Flush-Flo <sup>m</sup>		C-1-	3.6 sulated	
			Minimise			
		Application			Surface	
	Sur	np Available			Yes	
		iameter (mm)			95	
		rt Level (m)			49.200	
1	um Outlet Pipe D: gested Manhole D:				150 1200	
aug	gesced Mainore D.	rameter (mm)			1200	
	Control H	Points	Head (m) Fl	low (1/s)		
	Design Point (	Calculated) Flush-Flo <sup>m</sup>		3.6		
		Flush-Flow Kick-Flow		3.6		
	Mean Flow over			3.1		
The hydrological c						
Hydro-Brake@ Optim						
Hydro-Brake Optimu invalidated	me be utilised th	nen these st	orage routi	ng calcula	cions wil	LI DO
111VALIGATO						
Depth (m) Flow (1)	/s) Depth (m) Fl	ow (1/s) Dep	pth (m) Flow	(1/s) De	apth (m)	Flow (l/s)
	3.0 0.300 3.6 0.400	3.5	0.500	3.1	0.800	3.8
0.200	3.6 0.400	3.4	0.000	3.4	1.000	4.2
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A L Daines & D							Page 4		
28 Castle Str	eet								
Carlisle							and the second		
CA3 8TP							Micro		
Date 02/05/20	Date 02/05/2023 09:28 Designed by petera								
File MD CALCS SM.MDX Checked by							Drainage		
Micro Drainag	Micro Drainage Network 2020.1.3								
Hydro-Bra	ake@ Opt:	Lmum Manho	ole: SW16,	DS/PN: 6.	004, Vol	lume (m³	): 8.1		
Depth (m) Flo	DW (1/s) D	epth (m) Fl	Low (1/s) D	apth (m) Flo	w (1/s) D	epth (m)	Flow (1/s)		
1.200	4.6	2,400	6.4	5.000	9.0	8.000	11.3		
1.400	5.0	2,600	6.6	5,500	9.4	8.500	11.6		
1.600	5.3	3.000	7.1	6.000	9.8	9.000	12.0		
1.800	5.6	3.500	7.6	6.500 7.000	10.2	9.500	12.3		
2,200	6.1	4,500	8.6	7.500	10.9				
Hydro-Bra	ake@ Opt:	Lmum Manho	ole: SW19,	DS/PN: 7.	001, Vol	lume (m³	): 7.5		
				MD-SHE-006	2-1200-02				
			ign Head (m			0.200			
		Desig	n Flow (1/s Flush-Flo		Cal	culated			
				e Minimise					
			Applicatio	n	-	Surface			
			mp Availabl			Yes			
			iameter (mm			62 52,500			
,	Minimum Out		rt Level (m iameter (mm			52.500			
			iameter (mm			1200			
		Control	Points	Head (m) F	LOW (1/S)				
	Des	ign Point	(Calculated)		1.2				
			Flush-Flo		1.2				
	Mon		Kick-Flot Head Range		1.1				
	794 4	in stow over	near nang		0.9				
The hydrologic	cal calcul	ations have	been based	on the Head	/Discharg	e relatio	nship for the		
Hydro-Brake@ (									
Hydro-Brake Op invalidated	ptimum@ be	utilised t	hen these s	torage routi	ng calcul	ations wi	11 be		
invalidated									
Depth (m) Flo	ow (1/s) D	epth (m) Fl	low (1/s) D	epth (m) Flo	w (l/s) D	epth (m)	Flow (l/s)		
0,100	1.2	1,200	2.7	3,000	4.2	7,000	6.4		
0.200	1.2	1,400	2.9	3.500	4.5	7.500	6.6		
0.300	1.4	1.600	3.1	4.000	4.8	8.000	6.8		
0.400	1.6	1.800	3.3	4.500	5.1	8.500	7.0		
0.500	1.8	2.000	3.4	5.000	5.4	9.000	7.2		
0.600	2.0	2.200	3.6	5.500	5.7	9.500	7.4		
0.800	2.2	2.400	3.7	6.000 6.500	5.9				
1.000	2.3	2.600	3.3	0.000	0.2				
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A L Daines 4 Partners       Page 5         28 Castle Street       Designed by petera       Designed by petera         Call Street       Checked by       Designed by petera         File MD CALCS SM.MDX       Checked by       Designed by petera         Date 02/05/2023 09:28       Designed by petera       Checked by         Micro Drainage       Network 2020.1.3       Designed by petera         Derous Car Park Manhole: SW10, DS/PN: 3.001         Infiltration Coefficiant Base (m/hr) 0.00000       Width (m) 38.0         Matwork 2020.1.3         Derous Car Park Manhole: SW10, DS/PN: 3.001         Infiltration Coefficiant Base (m/hr) 0.00000         Natwork 2020.1.3         Matwork 2020.1.3         Derous Car Park Manhole: SW10, DS/PN: 3.001         Infiltration Coefficiant Base (m/hr) 0.00000         Derout 0.30 Paperation (m/hr) 3         Invert Level (m) 33.50         Matwork 10/3 B3.70         Depth (m) Area (m²) Inf. Area (m²)         O.000         Cellular Storage Manhole: SW10, DS/PN: 3.002         Invert Level (m) 45.475 Safety Factor 2.0         Infiltration Coefficient Base (m/hr) 0.00000				
Carlisie       Designed by petra       Checked by         Micro Drainage       Network 2020.1.3         Decomposition of the petra         Micro Drainage       Network 2020.1.3         Decomposition of the petra         Micro Drainage         Decomposition of the petra         Decomposition (mathemposition of the petra         Decomposition (mathemposition (mathem	A L Daines & Partners		Page 5	
CAS BTP         Designed by petra         Checked by           Micro Drainage         Network 2020.1.3           Storage Structures for Storm           Micro Drainage         Network 2020.1.3           Designed by petra           Checked by           Micro Drainage         Network 2020.1.3           Decous Car Park Manhole: SW10, DS/PN: 3.001           Midro Designed by petra           Designed by Petra           Designed by Petra	28 Castle Street			
Date 02/05/2023 09:28         Designed by petera Checked by         Designed by checked by           Micro Drainage         Network 2020.1.3           Storage Structures for Storm           Dorous Car Park Manhole: SW10, DS/PN: 3.001           Infiltration Coefficient Base (m/hr) 0.0000         Width (m) 38.0           Mambrane Percolation (mm/hr) 1000         Length (m) 85.0           Mambrane Percolation (mm/hr) 1000         Length (m) 85.0           Metwork 2020.1.3           Mambrane Percolation (mm/hr) 1000         Length (m) 85.0           Mambrane Percolation (mm/hr) 1000         Length (m) 85.0           Metwork 2020.1.3           Mambrane Percolation (m/hr) 1000           Metwork 2020.1.3           Mambrane Percolation (m/hr) 1000           Dispecticly 36.0           Invert Lavel (m) 53.660 Safety Factor 2.0           Infiltration Coefficient Base (m/hr) 0.00000           Depth (m) Area (m <sup>2</sup> )           O.00           O.00           Network 2020.1.1           Invert Lavel (m) 53.660 Safety Factor 2.0           Invert Lavel (m) 49.475 Safety Factor 2.0           In	Carlisle			
Date 02/05/2023 09128       Designed by peters       Define 02         Micro Drainage       Network 2020.1.3         Metwork 2020.1.3         Storage Structures for Storm         Derous Car Park Manhole: SW10, DS/PN: 3.001         Midth (m) 38.0         Langth (m) 8.00         Midth (m) 38.0         Metwork 2020.1.3         Derous Car Park Manhole: SW10, DS/PN: 3.001         Midth (m) 38.0         Metwork 2020.1.3         Midth (m) 38.0         Midth (m) 400         Midth (m) 38.0         Midth (m) 38.0         Midth (m) 51.560 Safety Factor 2.0         Infiltration Coefficient Base (m/hr) 0.00000         Depth (m) Area (m²) Inf. Area (m²)         0.00         One filter f	CA3 8TP		Micco	
Micro Drainage         Network 2020.1.3           Storage Structures for Storm           Derous Car Park Manhole: SW10, DS/PN: 3.001           Infiltration Coefficient Base (m/hr) 0.00000         With (m) 38.0           Memory 2.0 Depression Storage (m) 5           Storage Manhole: SW09, DS/PN: 3.001           Infiltration Coefficient Base (m/hr) 0.00000           Memory 2.0 Depression Storage (m) 5           Storage Manhole: SW09, DS/PN: 3.002           Derosity 0.30 Exportion (m/kdy) 3           Invert Level (m) 53.660 Safety Factor 2.0           Intert Level (m) 53.660 Safety Factor 2.0           Intert Level (m) 53.660 Safety Factor 2.0           Intert Level (m) 49.475 Safety Factor 2.0<	Date 02/05/2023 09:28	Designed by petera		
Micro Drainage         Network 2020.1.3           Storage Structures for Storm           Porous Car Park Manhole: SW10, DS/PN: 3.001           Infiltration Coefficient Base (m/hr) 0.00000         Width (m) 38.0           Membrane Percolation (mm/hr)           Network 2020.1.3           Membrane Percolation (mm/hr)           Invert Level (m) 53.660 Safety Factor 2.0           Invert Level (m) 53.660 Safety Factor 2.0           Infiltration Coefficient Base (m/hr) 0.00000           Depth (m) Area (m <sup>2</sup> )           On 650.0           0.00           Sigpt (m) Area (m <sup>2</sup> )           One of 50.0           0.00           Cellular Storage Manhole: SW16, DS/PN: 6.004           Invert Level (m) 49.475 Safety Factor 2.0           Infiltration Coefficient Base (m/hr) 0.00000           Depth (m) Area (m <sup>2</sup> )	File MD CALCS SM.MDX	Checked by	Drainage	
Storage structures for store           Derose car park Manhole: SW10, DS/PN: 3.001           Infiltration Coefficient Base (m/n) 0.0000         Midth (m) 38.0           Max Percolation (m/n) 0.000         Light (m) 38.0           Max Percolation (m/n) 0.000         Stopo (m) 30.0           Max Percolation (m/n) 0.000         Dispension Storage (m) 30.0           Max Percolation (m) 0.000         Dispension Storage (m) 30.0           Max Percolation (m) 0.0000         Depression Storage (m) 30.0           Max Percolation (m) 0.0000         Perconsit 0.0000           Definitiation Coefficient Base (m/n) 0.00000         Perconsit 0.00           0.000         0.00         0.00           0.000         0.00         0.00           0.000         0.00         0.00           0.000         0.00         0.00           0.000         0.00         0.00           0.000         0.00         0.00           0.000         0.00         0.00           0.000         0.00         0.00           0.000         0.00         0.00		-		
Jonds Car Park Manhole: SW10, DS/PN: 3.001Millingtion Coefficient Base (m/h) 0.0000Ninth (m) 34.0Max Percolation (m/h) 1000Longth (m) 34.0Max Percolation (m/h) 10002.00Percent 0.13S97.2Signe (m) 3.3Statur ParcoPercent Vol (m) 3.3.000Restrance Barto (m/day) 3Inter Level (m) 3.3.605Satety ParcoPercent Vol (m) 3.3.000Percent 0.000Deluter Storage Manhole: SW09, DS/PN: 3.000Constration (m/day) 3Inter Level (m) 3.5.605Satety ParcoMillingtion Coefficient Base (m/hr) 0.00000Percent 0.03Deft (m) Area (m) Inf. Area (m) Restration Coefficient Base (m/hr) 0.00000Percent 0.03Octo 0.000.010.00.00.000.000.010.00.000.000.010.00.000.000.010.00.000.000.010.00.000.000.010.00.000.000.010.00.000.010.010.00.000.010.010.00.000.010.010.00.000.010.010.00.000.010.010.00.000.010.010.00.000.010.010.00.000.010.010.00.000.010.000.00.000.010.000.00.000.010.000.00.000.010.00		ALLOVIA DEDITIO		
Jonds Car Park Manhole: SW10, DS/PN: 3.001Millingtion Coefficient Base (m/h) 0.0000Ninth (m) 34.0Max Percolation (m/h) 1000Longth (m) 34.0Max Percolation (m/h) 10002.00Percent 0.13S97.2Signe (m) 3.3Statur ParcoPercent Vol (m) 3.3.000Newbrane Bepro1Detrict Loval (m) 3.3.000Percent (m)/ds/9Antipercent Vol (m) 4.0000Percent (m)/ds/9Antiperce	Storage	Structures for Storm		
<pre>Infiltration Coefficient Base (m/hr) 0.0000</pre>				
Infiltration Coefficient Base (m/hr) 0.0000 intervence (m)				
Infiltration Coefficient Base (m/hr) 0.0000 intervence (m) (m) (m) 85.0         Max Percolation (1/s) 87.2       Slope (1:3) 46.0         Max Percolation (1/s) 87.2       Slope (1:3) 46.0         Sterrostiy 0.30       Percostiy 0.30         Percostiy 0.30       Perpersion Storage (ms) 0.000         Invert Level (m) 53.860       Sterrostorage (ms) 400         Cellular Storage Manhole: SW09, DS/PN: 3.002         Invert Level (m) 53.660 Safety Factor 2.0         Infiltration Coefficient Base (m/hr) 0.0000         Opth (m) Ares (m²) Inf. Ares (n²)         Opth (m) Ares (m²) Inf. Ares (n²)         Opth (m) Ares (m²) Inf. Ares (m²)	Porous Car Park	Manhole: SW10, DS/PN: 3.001		
Membrane Percolation (im/h)       1000       Length (m) 85.0         Max Percolation (im/h)       897.2       Slope (1x) 46.0         Safety Factor       2.0 Depression Storage (mm)       5         Porosity       0.30       Rvaporation (mm/day)       3         Invert Level (m)       53.660       Safety Factor       2.0         Invert Level (m)       53.660       Safety Factor       2.0         Infiltration Coefficient Base (m/hr)       0.0000       Poresity 0.95       0.16         Depth (m) Area (m²)       Inf. Area (m²)       Depth (m) Area (m²)       Inf. Area (m²)         0.000       650.0       0.0       0.961       0.0       0.0         0.960       650.0       0.0       0.961       0.0       0.0         Cellular Storage Manhole:       SW16, DS/FN: 6.004       Invert Level (m) 49.475       Safety Factor 2.0         Infiltration Coefficient Base (m/hr)       0.0000       Poresity 0.95       Infiltration Coefficient Side (m/hr)       0.000         0.000       650.0       0.0       0.961       0.0       0.0         0.000       650.0       0.0       0.961       0.0       0.0         0.000       650.0       0.0       0.961       0.0       0.0				
Max Percolation (1/s)       897.2       Slopé (1:X) 46.0         Safety Factor       2.0 Depression Storage (nm) 5       3         Porestiv       0.30       Evaporation (mm/day) 3         Invert Level (n)       53.620       Membrane Depth (nm) 400         Cellular Storage Manhole: SW09, DS/PN: 3.002         Invert Level (m)       53.660         Invert Level (m)       53.660         Note: Cellular Storage Manhole: SW09, DS/PN: 3.002         Depth (m) Area (m <sup>2</sup> )         Invert Level (m)       53.660         One (m)       0.961       0.0         One (m)       1.0       0.0         One (m)       Area (m <sup>2</sup> )       Inf. Area (m <sup>2</sup> )         One (m)       Area (m <sup>2</sup> )       Inf. Area (m <sup>2</sup> )         One (m)       0.0       0.0         One (m)       0.0       0.0         One (m)       0.0       0.0 <td cols<="" td=""><td>Infiltration Coefficient Base</td><td>(m/hr) 0.00000 Width (m)</td><td>38.0</td></td>	<td>Infiltration Coefficient Base</td> <td>(m/hr) 0.00000 Width (m)</td> <td>38.0</td>	Infiltration Coefficient Base	(m/hr) 0.00000 Width (m)	38.0
Safety Factor       2.0 Depression Storings (mm) 43         Invert Level (m) 53.820       Numbrane Depth (mm) 400         Cellular Storage Manhole: SW09, DS/PN: 3.002         Invert Level (m) 53.660 Safety Factor 2.0         Intert Level (m) 53.660 Safety Factor 2.0         Intert Level (m) 53.660 Safety Factor 2.0         Intert Level (m) Area (m <sup>2</sup> ) Inf. Area (m <sup>2</sup> )         0.000         Safety Factor 2.0         Intert Level (m) 49.475 Safety Factor 2.0         On the set of th				
Invert Level (m) 53.820 Membrane Depth (mm) 400 <u>Cellular Storage Manhole: SW09, DS/PN: 3.002</u> Invert Level (m) 53.660 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 <b>Depth (m) Area (m<sup>2</sup>) Inf. Area (m<sup>2</sup>)</b> 0.000 650.0 0.0 0.960 650.0 0.0 <u>Cellular Storage Manhole: SW16, DS/PN: 6.004</u> Invert Level (m) 49.475 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 <b>Depth (m) Area (m<sup>2</sup>) Inf. Area (m<sup>2</sup>)</b> 0.000 650.0 0.0 <u>Cellular Storage Manhole: SW16, DS/PN: 6.004</u> <u>Invert Level (m) 49.475 Safety Factor 2.0</u> Infiltration Coefficient Base (m/hr) 0.00000 <b>Depth (m) Area (m<sup>2</sup>) Inf. Area (m<sup>2</sup>)</b> 0.960 650.0 0.0 <u>Cellular Storage Manhole: SW19, DS/PN: 7.001</u> <u>Invert Level (m) 52.500 Safety Factor 2.0</u> Infiltration Coefficient Side (m/hr) 0.00000 <b>Depth (m) Area (m<sup>2</sup>) Inf. Area (m<sup>2</sup>)</b> <u>Divert Level (m) 52.500 Safety Factor 2.0</u> Infiltration Coefficient Side (m/hr) 0.00000 <b>Depth (m) Area (m<sup>2</sup>) Inf. Area (m<sup>2</sup>)</b> <u>Divert Level (m) 52.500 Safety Factor 2.0</u> Infiltration Coefficient Side (m/hr) 0.00000 <b>Depth (m) Area (m<sup>2</sup>) Inf. Area (m<sup>2</sup>)</b> <u>Divert Level (m) Area (m<sup>2</sup>) Inf. Area (m<sup>2</sup>)</u> <u>Divert (m) Area (m<sup>2</sup>) Inf. Area (m<sup>2</sup>) <u>Divert (m) Area (m<sup>2</sup>) Inf. Area (m<sup>2</sup>)</u></u>				
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Invert Level (m)       53.660       Safety Factor       2.0         Infiltration Coefficient Base (m/hr)       0.0000       Porenity       0.95         Depth (m)       Area (m²)       Inf. Area (m²)       Depth (m)       Area (m²)       Inf. Area (m²)         0.000       650.0       0.0       0.961       0.0       0.0         0.960       650.0       0.0       0.961       0.0       0.0         Cellular Storage Manhole: SW16, DS/PN: 6.004         Invert Level (m)       49.475       Safety Factor       2.0         Infiltration Coefficient Base (m/hr)       0.00000       Poresity       0.95         Infiltration Coefficient Base (m/hr)       0.00000       Poresity       0.95         Infiltration Coefficient Base (m/hr)       0.00000       0.0       0.0         Open (m) Area (m²)       Inf. Area (m²)       Depth (m) Area (m²)       0.0       0.0         Open (m) Area (m²)       Infiltration Coefficient Base (m/hr)       0.961       0.0       0.0         Open (m) S2.500       Safety Factor       2.0         Infiltration Coefficient Base (m/hr)       0.9000       Poresity       0.3         Infiltration Coeff	Invert Lev	vel (m) 53.820 Membrane Depth (mm)	400	
Invert Level (m)       53.660       Safety Factor       2.0         Infiltration Coefficient Base (m/hr)       0.0000       Porenity       0.95         Depth (m)       Area (m²)       Inf. Area (m²)       Depth (m)       Area (m²)       Inf. Area (m²)         0.000       650.0       0.0       0.961       0.0       0.0         0.960       650.0       0.0       0.961       0.0       0.0         Cellular Storage Manhole: SW16, DS/PN: 6.004         Invert Level (m)       49.475       Safety Factor       2.0         Infiltration Coefficient Base (m/hr)       0.00000       Poresity       0.95         Infiltration Coefficient Base (m/hr)       0.00000       Poresity       0.95         Infiltration Coefficient Base (m/hr)       0.00000       0.0       0.0         Open (m) Area (m²)       Inf. Area (m²)       Depth (m) Area (m²)       0.0       0.0         Open (m) Area (m²)       Infiltration Coefficient Base (m/hr)       0.961       0.0       0.0         Open (m) S2.500       Safety Factor       2.0         Infiltration Coefficient Base (m/hr)       0.9000       Poresity       0.3         Infiltration Coeff				
Infiltration Coefficient Base (m/hr) 0.0000 Persity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) 0.000 550.0 0.0 Cellular Storage Manhole: SW16, DS/FN: 6.004 Invert Lavel (m) 49.475 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) 0.000 550.0 0.0 Cellular Storage Manhole: SW16, DS/FN: 6.004 Invert Lavel (m) 49.475 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) 0.000 550.0 0.0 Cellular Storage Manhole: SW19, DS/FN: 7.001 Invert Lavel (m) 52.500 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) 0.000 550.0 0.0 Cellular Storage Manhole: SW19, DS/FN: 7.001 Invert Lavel (m) 52.500 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) 0.000 350.0 0.0 0.960 350.0 0.0 0.961 0.0 0.0 Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) 0.000 350.0 0.0 0.961 0.0 0.0 Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) 0.960 350.0 0.0 Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) 0.960 350.0 0.0 Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) 0.961 0.0 0.0 Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) 0.960 350.0 0.0 Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) 0.960 350.0 0.0 Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) Depth (m) Ares (m <sup>2</sup> ) Inf. Ares (m <sup>2</sup> ) Depth (m) Ares (m <sup>2</sup>	Cellular Storage	Manhole: SW09, DS/PN: 3.002		
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Infiltration Coefficient Side (m/hr) 0.0000         Depth (m) Area (m²) Inf. Area (m²)       Depth (m) Area (m²) Inf. Area (m²)         0.000       650.0       0.0         0.960       650.0       0.0         Cellular Storage Manhole: SW16, DS/PN: 6.004         Invert Lavel (m) 49.475 Safety Factor 2.0         Infiltration Coefficient Base (m/hr) 0.00000         Depth (m) Area (m²) Inf. Area (m²)         0.961       0.0         0.961       0.0         Opth (m) Area (m²) Inf. Area (m²)         Infiltration Coefficient Base (m/hr) 0.00000         Depth (m) Area (m²) Inf. Area (m²)         0.961       0.0         0.961       0.0         Opth (m) Area (m²) Inf. Area (m²)         Infiltration Coefficient Base (m/hr) 0.00000         Depth (m) Area (m²) Inf. Area (m²)         Opth (m) Area (m²) Inf. Area (m²)         Opth (m) Area (m²) Inf. Area (m²)         O.000       0.951         O.000				
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0.000       650.0       0.0       0.961       0.0       0.0         Cellular Storage Manhole: SW16, DS/PN: 6.004         Invert Level (m) 49.475 Safety Factor 2.0         Infiltration Coefficient Base (m/hr) 0.00000         Depth (m) Area (m <sup>2</sup> ) Inf. Area (m <sup>2</sup> )         Depth (m) Area (m <sup>2</sup> ) Inf. Area (m <sup>2</sup> )         0.000       650.0       0.0         0.960       650.0       0.0         Osepth (m) Area (m <sup>2</sup> ) Inf. Area (m <sup>2</sup> )         0.961       0.0         Osepth (m) Area (m <sup>2</sup> ) Inf. Area (m <sup>2</sup> )         Osepth (m) Area (m <sup>2</sup> ) Inf. Area (m <sup>2</sup> )         Osepth (m) Area (m <sup>2</sup> ) Inf. Area (m <sup>2</sup> )         Invert Level (m) 52.500 Safety Factor 2.0         Infiltration Coefficient Base (m/hr) 0.00000         Depth (m) Area (m <sup>2</sup> ) Inf. Area (m <sup>2</sup> )         Infiltration Coefficient Base (m/hr) 0.00000         Depth (m) Area (m <sup>2</sup> ) Inf. Area (m <sup>2</sup> )         0.000         0.000         Osepth (m) Area (m <sup>2</sup> ) Inf. Area (m <sup>2</sup> )         0.000         0.000         Osepth (m) Area (m <sup>2</sup> ) Inf. Area (m <sup>2</sup> )         0.00	Infiltration Coefficient	Side (m/hr) 0.00000		
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Cellular Storage Manhole:         SW16, DS/PN: 6.004           Invert Level (m)         49.475 Safety Factor 2.0           Infiltration Coefficient Base (m/hr)         0.0000           Depth (m) Area (m²)         Inf. Area (m²)           0.000         650.0         0.0           0.960         650.0         0.0           0.960         650.0         0.0           Cellular Storage Manhole:         SW19, DS/PN: 7.001           Invert Level (m)         52.500 Safety Factor 2.0           Infiltration Coefficient Base (m/hr)         0.00000           Porosity 0.95         Infiltration Coefficient Side (m/hr)           Infiltration Coefficient Side (m/hr)         0.00000           Porosity 0.95         Infiltration Coefficient Side (m/hr)         0.00000           Depth (m) Area (m²) Inf. Area (m²)         Pepth (m) Area (m²) Inf. Area (m²)         0.961         0.0           0.000         350.0         0.0         0.961         0.0         0.0	0.000 650.0	0.0 0.961 0.0	0.0	
Invert Level (m)       49.475       Safety Factor 2.0         Infiltration Coefficient Base (m/hr)       0.00000       Porosity 0.95         Infiltration Coefficient Side (m/hr)       0.00000       Porosity 0.95         Depth (m) Area (m²)       Inf. Area (m²)       Depth (m) Area (m²)       Inf. Area (m²)         0.000       650.0       0.0       0.961       0.0       0.0         0.960       650.0       0.0       0.961       0.0       0.0         Cellular Storage Manhole: SW19, DS/PN: 7.001         Invert Level (m) 52.500 Safety Factor 2.0         Infiltration Coefficient Base (m/hr)       0.0000       Porosity 0.95         Infiltration Coefficient Side (m/hr)       0.0000       Porosity 0.95         Depth (m) Area (m²) Inf. Area (m²)         0.000       350.0       0.0       0.961       0.0       0.0         0.000       350.0       0.0       0.961       0.0       0.0         0.960       350.0       0.0       0.961       0.0       0.0	0.960 650.0	0.0		
Invert Level (m)       49.475       Safety Factor 2.0         Infiltration Coefficient Base (m/hr)       0.00000       Porosity 0.95         Infiltration Coefficient Side (m/hr)       0.00000       Porosity 0.95         Depth (m) Area (m²)       Inf. Area (m²)       Depth (m) Area (m²)       Inf. Area (m²)         0.000       650.0       0.0       0.961       0.0       0.0         0.960       650.0       0.0       0.961       0.0       0.0         Cellular Storage Manhole: SW19, DS/PN: 7.001         Invert Level (m) 52.500 Safety Factor 2.0         Infiltration Coefficient Base (m/hr)       0.0000       Porosity 0.95         Infiltration Coefficient Side (m/hr)       0.0000       Porosity 0.95         Depth (m) Area (m²) Inf. Area (m²)         0.000       350.0       0.0       0.961       0.0       0.0         0.000       350.0       0.0       0.961       0.0       0.0         0.960       350.0       0.0       0.961       0.0       0.0				
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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)						
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PN	US/ME Name	Depth (m)	(m <sup>3</sup> )			Time (mins)	(1/s)	Status	Level Exceeded
				-		(,			
	SW11	-0.328					23.6	OR	
	SW10 SW09		0.000			12	39.5	OF	
	SW01	-0.245				224	3.3		
4.001	SW02	-1.133	0.000	0.00			1.9	OB	
	SW03		0.000				2.1	OR	
	SW04 SW07		0.000				2.4	OR	
	SW06		0.000				1.6	OF	
	SW05		0.000				1.5	SURCHARGED	
	SW08		0.000				6.2	OB	
	SW12 SW13		0.000				16.4	OF	
1	SW14		0.000				44.6	OF	
	SW15		0.000				11.5	OB	
	SW16		0.000			168		SURCHARGED	
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		AI			(mins)	000 A			<pre>% of Total 10m*/ha Sto</pre>		
				rt Leve	-	0			et Coeffie	-	
3	fanhole	Hea	dloss 0	Coeff (G	lobal) 0	.500 Flo	w per P	erson per	Day (1/per,	(day) 0.0	00
		N							Structures		
									a Diagrams a Controls		
			- and the second second	v. v. i.i.	and contra	and a la	uniter of	- towned a time	concrois		
		1	targin f	or Floo	d Risk W	arning (	mm) 300	.0 DVD	Status OF	F	
					Analys	is Times	tep Fi	ne Inertia	Status OF	F	
						DTS Sta	tus	ON			
				Profile	2 (5)				Summer and	Winter	
			Duratio			30, 60,	120, 18		60, 480, 60		
	Re	turn	Period	(s) (yea	ars)					0, 100	
			Climate	Change	(*)				0,	50, 50	
	WARNIN	G: H	alf Dra	in Time	has not	been cal	lculated	d as the st	ructure is	too full	
	US/MH			Boturn	Climato	First	(10)	First (V)	First (Z)	Overflow	Water
PN	Name		torm		Change				Overflow		(m)
					and and		65				
			Winter								54.261
			Winter			100/30 30/60					54.224
			Winter			30/60	WINCEL				54.221
			Winter								55.871
			Winter								55.871
4.003	SW04	480	Winter	30	+50%						55.871
			Winter	30	+50%	30/30					55.872
			Winter			30/15					55.872
			Winter			1/15	Summer				55.871
			Winter								53.528 53.065
			Winter		+50%						52.174
			Winter		+50%						49.867
			Winter			100/180	Winter				49.866
			Winter				Summer				49.866
			Winter								48.645
			Winter				Minte				53.149
			Winter			100/240	winter				52.929
3.005	0410	120	witter.	30	1001						40.214
					@1.0.0	0.0000	Terrer				
					@198	2-2020	TUHOAA	ze			

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					-	by petera			Drainage			
The mb childs shrinba												
Micro D	icro Drainage Network 2020.1.3											
20 110 27	Botu	rn Dortod	C		ritioni	Bogulte b	Max		1 (Ropk 1)			
50 year	Recu	in Period	Summar		or Storn		Y Max.	IIIUII Leve	1 (Rank 1)			
				-	or acorn	<u>.</u>						
		Surcharged	Flooded			Half Drain	Pipe					
	US/ME	-		-	Overflow		Flow		Level			
PN	Name	(m)	(m <sup>3</sup> )	Cap.	(1/s)	(mins)	(1/s)	Status	Exceeded			
3,000	SW11	-0.189	0.000	0.56			85.8	OK				
3.001	SW10	-0.046	0.000	0.19		408	30.1					
	SW09		0.000					SURCHARGED				
	SW01		0.000				12.2					
	SW02 SW03		0.000				3.8	OK				
	SW04						2.1	OK				
5.000	SW07	0.347	0.000	0.06				SURCHARGED				
	SW06		0.000					SURCHARGED				
	SW05 SW08		0.000				6.5	SURCHARGED				
	SW12		0.000				60.0	OK				
1	SW13		0.000				123.0	OK	:			
	SW14						25.8	OK				
	SW15 SW16		0.000			680	25.5	OK				
	SW17		0.000			000	9.7					
	SW20		0.000	0.24			90.1	OK	:			
	SW19		0.000				1.7					
3.005	SW18	-0.136	0.000	0.33			11.3	OK				
				<b>b1982</b> -	2020 Inr	ovyze						
						-						

US/MH         Return Climate Prind         First (X)         First (Y)         First (Z)         Overflow         Level Act.           3.000         SW11         720 Winter         100         +50%         Surcharge         Flood         Overflow         Act.         (m)           3.001         SW10         720 Winter         100         +50%         100/30 Summer         54.37           3.002         SW09         720 Winter         100         +50%         30/60 Winter         54.37           4.001         SW02         600 Winter         100         +50%         30/60 Winter         56.04           4.002         SW03         600 Winter         100         +50%         56.04         56.04           4.002         SW04         600 Winter         100         +50%         30/30 Summer         56.04           4.003         SW04         600 Winter         100         +50%         30/30 Summer         56.04           5.001         SW06         600 Winter         100         +50%         30/30 Summer         56.05           5.001         SW06         600 Winter         100         +50%         30/15 Summer         56.05           6.000         SW117         100		ninon	6 T	artno							Dage	10
Carlisle CA3 STP Date 02/05/2023 09:28 File MD CALCS SM.MDX Checked by Micro Drainage Network 2020.1.3  100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm  Simulation Critoria Volumetric Runoff Coaff 0.750 Fool Sewage per hectare (1/s) 0.000 Areal Reduction Factor 1.000 Additional First - % of Total First (1/s) 0.000 Hot Start (mins) 0 Hot Start (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720 Hot Start Starts ON Hot Start Start (X) Frofile(S) US/ME Return Climate First (X) First (Y) First (E) Overflow Act. 0 Hot Start Inter 100 +50% 10/30 Summer Hot Start Inter 100 +50% 10/	20 Ud.				. 8						Page	10
CA3 STP         Date 02/05/2023 09:28         Designed by petera Checked by         Difference           Micro Drainage         Network 2020.1.3         Designed by maximum Level (Rank 1) for Storm         Intervent Critical Results by Maximum Level (Rank 1) for Storm           Simulation Critoria           Network 2020.1.3           Seture Critoria           Number of Input Hydrographe 0 Mubber of Storage Structures 4           Number of Critical Naming (ma) 300.0         DVD Status OFF           Nation For Lood Risk Maring (ma) 300.0         DVD Status OFF           Nation For Lood Risk Maring (ma) 300.0         DVD Status OFF           Daration(s) (mari 15, 30, 60, 120,			acre	eL								
Date 02/05/2023 09:28 File MD CALCS SM.MDX Micro Drainage Network 2020.1.3 100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm Simulation Critoria Volumetric Runoff Coeff 0.750 Simulation Critoria Volumetric Runoff Coeff 0.750 Foul Sewage per hectare (1/s) 0.000 Hot Start (mins) 0 MADD Factor 100% Additional Fire - v of Total Firew 0.000 Hot Start (mins) 0 Mathole Readies Coeff (Global) 0.500 Flow per Person per Day (1/per/day) 0.000 Number of Input Hydrographs 0 Number of Coff 0.750 Number of Coff 0.750 Number of Coff 0.500 Flow per Person per Day (1/per/day) 0.000 Number of Coff 0.500 Flow per Person per Day (1/per/day) 0.000 Number of Coff 0.500 Flow per Person per Day (1/per/day) 0.000 Number of Coff Coff 0.500 Flow per Person per Day (1/per/day) 0.000 Number of Coff Coff 0.100, 150, 240, 360, 480, 600, 720 Daration(3) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720 Climate Change (%) NUMERINE: Half Drain Time has not been Calculated as the structure is too full.  NAMUNINE: Half Drain Time has not been Calculated as the structure is too full.  Note of Store Stor												اسر 📹
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Micro Drainage         Network 2020.1.3           100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm           Simulation Criteria           Volumetric Runoff Coeff 0.750         Foul Sewage per hectare (1/s) 0.000 Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000 Hot Start (mms) 0           Manhole Headloss Coeff (clobal) 0.500 Flow per Person per Day (//per/day) 0.000           Manhole Goeff (clobal) 0.500 Flow per Person per Day (//per/day) 0.000           Number of Input Hydrographs 0 Number of Storage Structures 4 Number of Offline Controls 4 Number of Time/Area Diagrams 0 Number of Offline Controls 0 Number of Real Time Controls 0           Number of Offline Controls 0 Number of Real Time Controls 0 Number of Offline Controls 0, 120, 180, 240, 360, 480, 600, 720 Dirstatus ON           Profile(s)         Summer and Winter Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720 Return Period(s) (years)           1, 30, 100 Climate Change (%)         0, 50, 50           900 SW11 720 Winter 100 +504 100 250 Winter 100 +504 100 250 Winter 100 +504 100 30/60 Winter 100 +504 100 30/60 Winter 100 +504 100 30/60 Winter 100 +504 100 300 4 600 Winter 100 +504 100 300 600 Winter 100 +504 100 300 600 Winter 100 +504 100 300 800 600 Winter 100 +504 100 300 600 Winter 100 +504 100 300 800 600 Winter 100 +504 100 300 800 60							-		etera		Dra	inarie
100 year Return Period Summary of Critical Results by Maximum Level (Rank           1) for Storm           Simulation Criteria           Volumetric Runoff Conff 0.750         Foul Sewage per hectare (1/s) 0.000           Areal Reduction Factor 1.000         Additional Flow - V of Total Flow 0.000           MADD Factor 1.100*/hol Storage 2.000           Both Start Level (mm)         MADD Factor 1.100*/hol Storage 2.000           Manhole Headloss Coeff (Global) 0.500 Flow per Ferson per Day (1/per/day) 0.000           Number of Input Hydrographs 0 Number of Storage Structures 4           Number of Offline Controls 0 Number of Real Time Controls 0           Margin for Flood Risk Warning (mm) 300.0         DV Status OFF           Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720           Number of Storage Field Change (s)         Nature           VS/ME         Return Climate First (X) First (Y) First (Z) Overflow Act.         (material Status OFF           Number of Storage Structure is too full.           VS/ME         Return Climate First (X) First (Y) First (Z) Overflow Act.         (material Colspan="2")           Numage Store Retried Change         Storage F	File	MD CA	LCS	SM.MD)	C C		Checked 1	БУ				moge
1) for Storm           Simulation Criteria           Simulation Criteria           Volumetric Runoff Coeff 0.750         Foul Sewage per hectare (1/s) 0.000           Areal Reduction Factor 1.000 / Additional Flow - V of Total Flow 0.000         Bot Start (sins) 0         MADD Factor 1.100*/has Storage 2.000           Hot Start (sins) 0         MADD Factor 1.100*/has Storage 2.000           Manbole Headloss Coeff (Global) 0.500 Flow per Ferson per Day (1/per/day) 0.000           Number of Online Controls 4 Number of Storage Structures 4           Number of Online Controls 0 Number of Storage Structures 4           Number of Online Controls 0 Number of Storage Structures 4           Number of Online Controls 0 Number of Storage Structures 4           Number of Online Controls 0 Number of Storage Structures 4           Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720           Raturn Period(s) (years)         0, 50, 50           WARNINC: Half Drain Time has not been calculated as the structure is too full.           Storm Period Change First (X) First (Y) First (E) Overflow Lower           Storm Period Change Surcharge Flood Overflow Lower           Storm Period Change Surcharge Flo	Micro	Micro Drainage Network 2020.1.3										
Volumetric Runoff Costf 0.750       Foul Swaps per hectare (1/s) 0.000         Areal Reduction Factor 1.000       Additional Flow - k of Total Flow 0.000         Hot Start (mins)       0         Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (1/per/day) 0.000         Number of Input Hydrographs 0 Number of Storage Structures 4         Number of Online Controls 4 Number of Time/Area Diagrams 0         Number of Offline Controls 0 Number of Real Time Controls 0         Margin for Flood Risk Warning (mm) 300.0       DVD Status OFF         DIS Status       ON         Profile(s)       Summer and Winter         Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720         Return Period(s) (years)       1, 30, 100         Climate Change (%)       0, 50, 50         WARNING: Helf Drain Time has not been calculated as the structure is too full.         US/ME       Return Climate         FN       Name         Storm Period Change       Storage         Store       Period Change         Store       Store         Store       Store         Store       Store         Store       Store         Store       Store         Store       Store         Store       Store <t< td=""><td><u>100</u></td><td>year</td><td>Ret</td><td>urn Pe</td><td>riod S</td><td></td><td></td><td></td><td>esults b</td><td>y Maximum</td><td>1 Level</td><td>(Rank</td></t<>	<u>100</u>	year	Ret	urn Pe	riod S				esults b	y Maximum	1 Level	(Rank
US/MH         Return Climate         First (X)         First (Y)         First (Z)         Overflow         Level           Name         Storm         Period         Change         Surcharge         Flood         Overflow         Act.         (m)           3.000         SW11         720 Winter         100         +50%         100/30 Summer         54.37           3.001         SW01         720 Winter         100         +50%         30/60 Winter         54.37           4.000         SW01         600 Winter         100         +50%         30/60 Winter         54.37           4.001         SW02         600 Winter         100         +50%         30/60 Winter         54.37           4.001         SW02         600 Winter         100         +50%         30/60 Winter         56.04           4.002         SW03         600 Winter         100         +50%         30/30 Summer         56.04           5.001         SW06         600 Winter         100         +50%         30/30 Summer         56.04           5.001         SW05         600 Winter         100         +50%         30/15 Summer         56.04           6.001         SW12         15 Winter         100		Re	Ar b Hea N b b	eal Red Hot Hot Sta dloss C umber o Number o Number o dargin f Duratio Period Climate	Auction 1 Start Int Leve Scoff (G f Input of Offic for Floo Profile n(s) (m) (s) (ye: Change	Coeff 0 Factor 1 (mins) 1 (mm) lobal) 0 Hydrogra ine Contr ine Contr ine Contr d Risk W Analys a(s) ins) 15, ars) (%)	.750 .000 Add 0 .500 Flow y cols 4 Numb cols 0 Numb cols 3 Numb cols 3 Numb cols 4 Numb cols 4 Numb cols 4 Numb cols 4 Numb cols 4 Numb	Foul itions MADD per Pe ser of ser of ser of 0 300. p Fin s C	Sewage pe al Flow - Factor * Inl arson per : Storage S Time/Area Real Time 0 DVD e Inertia N	<pre>% of Total l0m*/ha St et Coeffic Day (1/per, structures b Controls Status OF Status OF Status OF Status OF (0, 480, 60 1, 3</pre>	Flow 0. orage 2. cient 0. (day) 0. 4 0 0 F F Winter 10, 720 10, 100	000 000 800
3.000       SW11       720       Winter       100       +50%       564.37%         3.001       SW10       720       Winter       100       +50%       30/60       Winter       54.37%         3.002       SW09       720       Winter       100       +50%       30/60       Winter       54.37%         4.000       SW01       600       Winter       100       +50%       30/60       Winter       56.04%         4.001       SW02       600       Winter       100       +50%       56.04%       56.04%         4.002       SW04       600       Winter       100       +50%       56.04%       56.04%         5.001       SW06       600       Winter       100       +50%       30/30       Summer       56.05%         5.001       SW06       600       Winter       100       +50%       30/15       Summer       56.05%         6.001       SW05       600       Winter       100       +50%       30/15       Summer       56.05%         6.001       SW05       600       Winter       100       +50%       53.05%       53.05%         6.001       SW12       15       Winter		maction and	G: H	alf Dra	in line	has not	been calcu	lated	as the st	ructure is	too ful	1.
3.001       SW10       720 Winter       100       +50%       30/60 Winter       54.37         3.002       SW01       600 Winter       100       +50%       30/60 Winter       54.37         4.000       SW01       600 Winter       100       +50%       56.04         4.001       SW02       600 Winter       100       +50%       56.04         4.002       SW03       600 Winter       100       +50%       56.044         4.003       SW04       600 Winter       100       +50%       56.044         5.001       SW07       600 Winter       100       +50%       30/15 Summer       56.054         5.001       SW06       600 Winter       100       +50%       30/15 Summer       56.043         5.001       SW06       600 Winter       100       +50%       30/15 Summer       56.043         3.003       SW08       60 Winter       100       +50%       1/15 Summer       56.043         6.001       SW12       15 Winter       100       +50%       53.083       53.083         6.001       SW12       15 Winter       100       +50%       50.014       50.014         6.002       SW14       720 Wi		US/MH			Return	Climate	First ()	X)	First (Y)	First (Z)	Overflo	Water F Level
3.002       SW09       720 Winter       100       +50%       30/60 Winter       56.04         4.001       SW02 600 Winter       100       +50%       56.04         4.002       SW03 600 Winter       100       +50%       56.04         4.003       SW04 600 Winter       100       +50%       56.04         4.003       SW04 600 Winter       100       +50%       56.04         5.001       SW06 600 Winter       100       +50%       30/30 Summer       56.05         5.001       SW06 600 Winter       100       +50%       30/15 Summer       56.05         5.001       SW06 600 Winter       100       +50%       30/15 Summer       56.05         6.001       SW114 7       100       +50%       1/15 Summer       56.05         6.001       SW12 15 Winter       100       +50%       53.05       53.05         6.001       SW13 15 Winter       100       +50%       50.01       50.01         6.002       SW14 720 Winter       100       +50%       10/180 Winter       50.01         6.003       SW15 720 Winter       100       +50%       1/15 Summer       50.01         6.003       SW16 720 Winter       100 <td< td=""><td></td><td>US/MH</td><td></td><td></td><td>Return</td><td>Climate</td><td>First ()</td><td>X)</td><td>First (Y)</td><td>First (Z)</td><td>Overflo</td><td>Water F Level</td></td<>		US/MH			Return	Climate	First ()	X)	First (Y)	First (Z)	Overflo	Water F Level
4.000       SW01 600 Winter       100       +50%       56.043         4.001       SW02 600 Winter       100       +50%       56.043         4.002       SW03 600 Winter       100       +50%       56.043         4.003       SW04 600 Winter       100       +50%       56.043         5.000       SW07 600 Winter       100       +50%       30/30 Summer       56.053         5.001       SW06 600 Winter       100       +50%       30/15 Summer       56.054         4.004       SW05 600 Winter       100       +50%       1/15 Summer       56.054         3.003       SW08 60 Winter       100       +50%       1/15 Summer       56.054         3.003       SW08 60 Winter       100       +50%       53.523       53.523         6.001       SW12       15 Winter       100       +50%       53.063         6.001       SW13       15 Winter       100       +50%       50.011         6.002       SW14 720 Winter       100       +50%       10/180 Winter       50.011         3.004       SW17 720 Winter       100       +50%       1/15 Summer       50.011         3.004       SW17 720 Winter       100       +50%	<b>PN</b> 3.000	US/MH Name SW11	<b>8</b> 720	torm Winter	Return Period 100	Climate Change +50%	First () Surchar	X) ge	First (Y)	First (Z)	Overflo	Water K Level (m) 54.379
4.001       SW02 600 Winter       100       +50%       56.043         4.002       SW03 600 Winter       100       +50%       56.043         5.000       SW04 600 Winter       100       +50%       56.043         5.000       SW06 600 Winter       100       +50%       30/30 Summer       56.053         5.001       SW06 600 Winter       100       +50%       30/15 Summer       56.054         4.004       SW05 600 Winter       100       +50%       30/15 Summer       56.054         3.003       SW08 60 Winter       100       +50%       1/15 Summer       56.044         3.003       SW08 60 Winter       100       +50%       53.053       53.523         6.001       SW12 15 Winter       100       +50%       53.053       50.014         6.001       SW13 15 Winter       100       +50%       50.012       50.012         6.003       SW16 720 Winter       100       +50%       1/15 Summer       50.012         3.004       SW17 720 Winter       100       +50%       1/15 Summer       50.012         3.004       SW19 720 Winter       100       +50%       1/25 Summer       53.053         3.005       SW18 720 Winter	PN 3.000 3.001	US/MH Name SW11 SW10	<b>9</b> 720 720	<b>torm</b> Winter Winter	Return Period 100 100	Climate Change +50% +50%	First () Surchar	x) ge	First (Y)	First (Z)	Overflo	Water K Level (m) 54.379 54.379
4.002       SW03 600 Winter       100       +50%       56.043         4.003       SW04 600 Winter       100       +50%       30/30 Summer       56.043         5.001       SW07 600 Winter       100       +50%       30/15 Summer       56.054         5.001       SW06 600 Winter       100       +50%       30/15 Summer       56.054         4.004       SW05 600 Winter       100       +50%       1/15 Summer       56.043         3.003       SW08 60 Winter       100       +50%       1/15 Summer       56.043         3.003       SW08 60 Winter       100       +50%       1/15 Summer       56.043         6.001       SW12 15 Winter       100       +50%       53.523       53.053         6.001       SW12 15 Winter       100       +50%       53.053       50.014         6.002       SW14 720 Winter       100       +50%       10/180 Winter       50.013         6.004       SW16 720 Winter       100       +50%       1/15 Summer       50.013         3.004       SW16 720 Winter       100       +50%       1/15 Summer       50.013         3.004       SW17 720 Winter       100       +50%       1/15 Summer       53.053	PN 3.000 3.001 3.002	US/MH Name SW11 SW10 SW09	<b>8</b> 720 720 720	Winter Winter Winter Winter	Return Period 100 100 100	Climate Change +50% +50% +50%	First () Surchar	x) ge	First (Y)	First (Z)	Overflo	Water V Lovel (m) 54.379 54.379 54.379
5.001       SW06 600 Winter       100       +50%       30/15 Summer       56.054         4.004       SW05 600 Winter       100       +50%       1/15 Summer       56.064         3.003       SW08 60 Winter       100       +50%       53.523       53.523         6.001       SW12       15 Winter       100       +50%       53.083         6.001       SW13       15 Winter       100       +50%       50.011         6.002       SW14       720 Winter       100       +50%       50.011         6.003       SW15       720 Winter       100       +50%       50.011         6.004       SW16       720 Winter       100       +50%       1/15 Summer       50.011         3.004       SW17       720 Winter       100       +50%       48.647         7.000       SW20       15 Winter       100       +50%       53.177         7.001       SW19       720 Winter       100       +50%       53.053         3.005       SW18       720 Winter       100       +50%       48.217	PN 3.000 3.001 3.002 4.000	US/MH Name SW11 SW10 SW09 SW01	9 720 720 720 600	Winter Winter Winter Winter Winter	Return Period 100 100 100 100	Climate Change +50% +50% +50%	First () Surchar	x) ge	First (Y)	First (Z)	Overflo	Water K Level (m) 54.379 54.379
5.001       SW06 600 Winter       100       +50%       30/15 Summer       56.054         4.004       SW05 600 Winter       100       +50%       1/15 Summer       56.064         3.003       SW08 60 Winter       100       +50%       53.523       53.523         6.001       SW12       15 Winter       100       +50%       53.083         6.001       SW13       15 Winter       100       +50%       50.011         6.002       SW14       720 Winter       100       +50%       50.011         6.003       SW15       720 Winter       100       +50%       50.011         6.004       SW16       720 Winter       100       +50%       1/15 Summer       50.011         3.004       SW17       720 Winter       100       +50%       48.647         7.000       SW20       15 Winter       100       +50%       53.177         7.001       SW19       720 Winter       100       +50%       53.053         3.005       SW18       720 Winter       100       +50%       48.217	PN 3.000 3.001 3.002 4.000 4.001 4.002	US/MH Name SW11 SW10 SW09 SW01 SW02 SW02 SW03	9 720 720 600 600 600	Winter Winter Winter Winter Winter Winter	Return Period 100 100 100 100 100	Climate Change +50% +50% +50% +50%	First () Surchar 100/30 Su 30/60 W1	X) ge immer inter	First (Y)	First (Z)	Overflo	Water Water (m) 54.379 54.379 54.377 56.049
4.004       SW05 600 Winter       100       +50%       1/15 Summer       56.043         3.003       SW08 60 Winter       100       +50%       53.524         6.000       SW12 15 Winter       100       +50%       53.524         6.001       SW12 15 Winter       100       +50%       53.083         6.001       SW13 15 Winter       100       +50%       50.014         6.002       SW14 720 Winter       100       +50%       50.012         6.003       SW15 720 Winter       100       +50%       1/15 Summer       50.012         6.004       SW16 720 Winter       100       +50%       1/15 Summer       50.012         3.004       SW16 720 Winter       100       +50%       1/15 Summer       50.012         3.004       SW17 720 Winter       100       +50%       1/15 Summer       53.172         7.000       SW20       15 Winter       100       +50%       53.052         3.005       SW18 720 Winter       100       +50%       48.217	PN 3.000 3.001 3.002 4.000 4.001 4.002	US/MH Name SW11 SW10 SW09 SW01 SW02 SW02 SW03	9 720 720 600 600 600	Winter Winter Winter Winter Winter Winter	Return Period 100 100 100 100 100	Climate Change +50% +50% +50% +50%	First () Surchar 100/30 Su 30/60 W1	X) ge immer inter	First (Y)	First (Z)	Overflo	Water w Level (m) 54.379 54.377 56.049 56.049 56.049 56.049
3.003       SW08       60 Winter       100       +50%       53.524         6.000       SW12       15 Winter       100       +50%       53.085         6.001       SW13       15 Winter       100       +50%       50.016         6.002       SW14       720 Winter       100       +50%       50.012         6.003       SW15       720 Winter       100       +50%       50.012         6.004       SW16       720 Winter       100       +50%       1/15 Summer       50.012         6.004       SW16       720 Winter       100       +50%       1/15 Summer       50.012         3.004       SW17       720 Winter       100       +50%       100/240 Winter       53.172         7.001       SW19       720 Winter       100       +50%       100/240 Winter       53.052         3.005       SW18       720 Winter       100       +50%       48.217	PN 3.000 3.001 3.002 4.000 4.000 4.002 4.003 5.000	05/MH Name SW11 SW10 SW09 SW01 SW02 SW03 SW04 SW04 SW07	720 720 720 600 600 600 600 600	Vinter Winter Winter Winter Winter Winter Winter Winter	Return Period 100 100 100 100 100 100 100	Climate Change +50% +50% +50% +50% +50%	First () Surchar 100/30 Su 30/60 W1 30/30 Su	x) ge immer inter	First (Y)	First (Z)	Overflo	Water Water (m) 54.379 54.379 54.377 56.049 56.049 56.049 56.049 56.049 56.049
6.000       SW12       15 Winter       100       +50%       53.089         6.001       SW13       15 Winter       100       +50%       52.200         6.002       SW14       720 Winter       100       +50%       50.011         6.003       SW15       720 Winter       100       +50%       100/180 Winter       50.011         6.004       SW16       720 Winter       100       +50%       1/15 Summer       50.012         3.004       SW17       720 Winter       100       +50%       48.647         7.000       SW20       15 Winter       100       +50%       53.177         7.001       SW19       720 Winter       100       +50%       53.053         3.005       SW18       720 Winter       100       +50%       48.217	PN 3.000 3.001 3.002 4.000 4.001 4.002 4.003 5.000	US/MH Name SW11 SW10 SW09 SW01 SW02 SW03 SW03 SW03 SW04 SW07 SW06	720 720 720 600 600 600 600 600 600	Winter Winter Winter Winter Winter Winter Winter Winter	Return Feriod 100 100 100 100 100 100 100	Climate Change +50% +50% +50% +50% +50% +50% +50%	First () Surchar 100/30 Su 30/60 W1 30/30 Su 30/30 Su 30/15 Su	x) ge immer immer immer	First (Y)	First (Z)	Overflo	Water W Lovel (m) 54.379 54.379 54.377 56.049 56.049 56.049 56.049 56.050 56.050
6.001       SW13       15 Winter       100       +50%       52.20         6.002       SW14       720 Winter       100       +50%       50.01         6.003       SW15       720 Winter       100       +50%       100/180 Winter       50.01         6.004       SW15       720 Winter       100       +50%       1/15 Summer       50.01         3.004       SW17       720 Winter       100       +50%       1/15 Summer       53.17         7.000       SW20       15 Winter       100       +50%       100/240 Winter       53.053         3.005       SW18       720 Winter       100       +50%       48.21	PN 3.000 3.001 3.002 4.000 4.001 4.002 4.003 5.000 5.001 4.004	US/MH Name SW11 SW10 SW09 SW01 SW02 SW03 SW04 SW07 SW06 SW05	720 720 720 600 600 600 600 600 600 600	Winter Winter Winter Winter Winter Winter Winter Winter Winter	Return Period 100 100 100 100 100 100 100 100	Climate Change +50% +50% +50% +50% +50% +50% +50% +50%	First () Surchar 100/30 Su 30/60 W1 30/30 Su 30/30 Su 30/15 Su	x) ge immer immer immer	First (Y)	First (Z)	Overflo	Water Water (m) 54.379 54.379 54.377 56.049 56.049 56.049 56.049 56.049 56.049
6.003       SW15       720 Winter       100       +50%       100/180 Winter       50.012         6.004       SW16       720 Winter       100       +50%       1/15 Summer       50.012         3.004       SW17       720 Winter       100       +50%       48.642         7.000       SW20       15 Winter       100       +50%       53.175         7.001       SW19       720 Winter       100       +50%       53.055         3.005       SW18       720 Winter       100       +50%       48.217	PN 3.000 3.001 3.002 4.000 4.001 4.002 4.003 5.000 5.001 4.004 3.003	05/MH Name SW11 SW10 SW09 SW01 SW02 SW03 SW04 SW03 SW04 SW05 SW05 SW08	720 720 720 600 600 600 600 600 600 600 600	Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter	Return Period 100 100 100 100 100 100 100 100 100	Climate Change +50% +50% +50% +50% +50% +50% +50% +50%	First () Surchar 100/30 Su 30/60 W1 30/30 Su 30/30 Su 30/15 Su	x) ge immer immer immer	First (Y)	First (Z)	Overflo	Water (m) 54.379 54.379 54.377 56.049 56.049 56.049 56.050 56.050 56.049
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3.004         SW17         720 Winter         100         +50%         48.64           7.000         SW20         15 Winter         100         +50%         53.17           7.001         SW19         720 Winter         100         +50%         53.05           3.005         SW18         720 Winter         100         +50%         48.21	PN 3.000 3.001 3.002 4.000 4.001 4.003 5.000 5.000 5.000 4.004 3.003 6.000 6.001	US/ME Name SW11 SW09 SW01 SW02 SW03 SW04 SW05 SW06 SW05 SW06 SW05 SW08 SW12 SW12 SW14	8 720 720 600 600 600 600 600 600 600 15 15 720	Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter	Return Feriod 100 100 100 100 100 100 100 100 100 10	Climate Change +50% +50% +50% +50% +50% +50% +50% +50%	First () Surchar 100/30 Su 30/60 Wi 30/30 Su 30/15 Su 1/15 Su	X) ge Inter Inter Inner Inner	First (Y)	First (Z)	Overflo	Water (m) 54.379 54.379 56.049 56.049 56.049 56.049 56.050 56.050 56.049 53.528 53.528 53.089 52.207 50.014
7.000         SW20         15 Winter         100         +50%         53.17           7.001         SW19         720 Winter         100         +50%         100/240 Winter         53.05           3.005         SW18         720 Winter         100         +50%         48.21	<b>FN</b> 3.000 3.002 4.000 4.001 4.002 4.003 5.000 5.001 4.003 6.000 6.001 6.002 6.003	US/ME Name SW11 SW10 SW09 SW02 SW02 SW02 SW02 SW03 SW04 SW07 SW04 SW05 SW08 SW05 SW08 SW12 SW12 SW13 SW14 SW15	2720 720 720 600 600 600 600 600 600 600 15 15 720 720	torm Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter	Return Feriod 100 100 100 100 100 100 100 100 100 10	Climate Change +50% +50% +50% +50% +50% +50% +50% +50%	First () Surchar 100/30 Su 30/60 Wi 30/30 Su 30/15 Su 1/15 Su 100/180 Wi	X) ge immer immer immer	First (Y)	First (Z)	Overflo	Water Loval (m) 54.379 54.377 56.049 56.049 56.049 56.050 56.050 56.050 56.050 56.059 53.528 53.089 52.207 50.014 50.013
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28 Cast	le Sti	reet										
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				1)	for Sto	<b>E 10</b>						
		Surcharged	Flooded			Half Drain	Pipe					
	US/ME	-			Overflow		Flow		Level			
PN	Name	(m)	(m <sup>3</sup> )	Cap.	(1/s)	(mins)	(1/s)	Status	Exceeded			
3 000	SW11	-0.071	0 000	0.09			14.3	OK				
	SW10		0.000			624		SURCHARGED				
	SW09	0.417	0.000	0.07				SURCHARGED				
	SW01						2.2					
	SW 02 SW 03						4.1	OK				
	SW04		0.000	0.00			1.9	OK				
	SW07	0.525	0.000	0.07			2.1	SURCHARGED	)			
	SW06		0.000					SURCHARGED				
	SW05 SW08		0.000	0.04			1.7	SURCHARGED				
	SW12	-0.136					77.4	OK				
	SW13						158.8	OK	:			
	SW14						28.5	OK				
	SW15 SW16		0.000					SURCHARGED				
	SW17	-0.103	0 000	0.57			10.0					
	SW20		0.000	0.31			116.3					
	SW19	0.103	0.000	0.00				SURCHARGED				
3.005	SW18	-0.133	0.000	0.35			11.9	OK				
			(	<b>D1982</b> -	2020 Inn	ovyze						

#### <u>APPENDIX E – TREATMENT SYSTEMS</u>



A L Daines and Partners LLP 21-C-16080

Water Management Solutions

## Margester AquaTreat Surface Water Treatment Separator Range

#### **Technical Specifications**

Model	Treatment device capacity [1]	Treatment flow rate [I/s]	Connectable surface [m <sup>2</sup> ]	Particulate storage capacity [1]	Hydrocarbons storage capacity [1]
SWT010	2450	10	1000	1000	100
SWT015	3600	15	1470	1500	150
SWT020	7300	20	2000	2000	200
SWT030	9150	30	3735	3000	300
SWT040	11000	40	4500	4000	400
SWT050	13400	50	5470	5000	500
SWT065	17250	65	7040	6500	650
SWT080	24800	80	10125	8000	800
SWT100	27100	100	11065	10000	1000
SWT125	32950	125	13450	12500	1250
SWT150	40650	150	16600	15000	1500
SWT175	47380	175	19340	17500	1750
SWT200	52650	200	21500	20000	2000
SWT210	56200	210	14105	21000	2100
SWT225	60100	225	15013	22500	2250
SWT240	63950	240	15909	24000	2400
SWT255	67850	255	16817	25500	2550
SWT270	71700	270	17724	27000	2700
SWT285	75550	285	18620	28500	2850

Hydrocarbon retention	99.7%
Particulate retention efficiency	85.5%
Zinc retention efficiency**	64%
Copper retention efficiency**	64%

British Water CoP testing results available on request.

For more information on any of our products: T: +44 (0)1296 633 209 E: elliott.evans@kingspan.co.uk or visit kingspan.co.uk/klargester

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4359-gb-02/2022-v1

#### ACO Data Sheet



the future of drainage

# ACO V-Septor – Hydrodynamic Separator

#### The ACO V-Septor is an advanced

hydrodynamic separator that removes sediment bound contaminants. Its design enables removal of pollutants by means of settlement and the capture of floatables.

The ACO V-Septor is available in a range of sizes to accommodate small to large sites and can be custom made for demanding installations.

The ACO V-Septor retains solid pollution and oil. It also forms part of the SuDS management train as it removes over 50% of fine Total Suspended Solids as well as sediment bound metals and hydrocarbons.

#### Benefits

- Removes solid pollution from plastic rubbish to fine silt
- Forms part of the SuDS management train
- Delivered fitted in a HDPE chamber with lifting eyes, and straps supplied for ease of installation
- Easily accessible for maintenance



(	0.5	0.5	0.4	
Liquid hydrocarbons	Sediment bound hydrocarbons		2012-0113	
0.8	0.5			

Details available on request

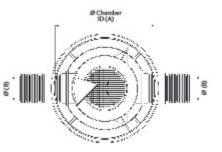


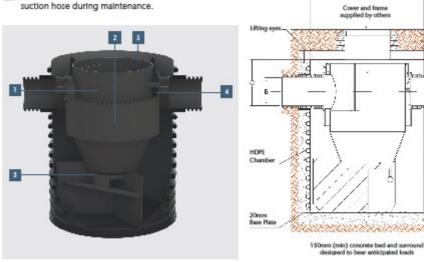


Product name	Product code	Gumber diameter (A)	Fipe connections (B)	Tap to invert (Q	Sediment storage capacity	Gil / debris storage capacity	Typical treatment flow rate (fire)	Typical treatment flow rate (coarse)	Typical non remobilisation flow rate (coarse)
		nn a	nn	nn	m <sup>3</sup>	1	l/s	1/1	l/a
ACO V-Septor -	Hydrodynami	c Separator	Range						
V-Septor 750	40995	750	150	375	0.4	49	11	14	37
V-Septor 1000	41000	1050	225	483	0.6	335	20	25	67
V-Septor 1200	41003	1200	300	550	0.86	397	29	37	98
V-Septor 1500	41005	1500	375	608	1.2	785	45	57	151
V-Septor 2000	41009	2100	500	700	2.2	1130	80	102	269
V-Septor 2500	41013	2400	600	850	3.5	2010	125	159	421

#### How it works

- The deflection plate directs the incoming stormwater to create a vertical vortex.
- Suspended solids settle down in the sludge chamber. Light liquids and debris are captured at the surface.
- Radial flow baffies create isolated zones to retain sediments in the sludge chamber and prevent remobilisation of sediments during peak flow events.
- Cleaned water flows up the outer chamber and over the balancing weir and then passes through the outlet to discharge to the water environment.
- S Captured solids and debris can easily be removed by suction hose during maintenance.





ACO Water Management Contacts: Sales: uk-swc@aco.co.uk Technical: technical@aco.co.uk Tel: 01462 816666 www.aco.co.uk

ACO. creating the future of drainage



Concrete capping slab supplied by others

Min

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Chamber height 2000mm

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