## 14. Water Resources & Flood Risk



## Appendix 14.1

## FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY REPORT



# Hydrock

## Fort Halstead

Flood Risk Assessment & Drainage Strategy

For Merseyside Pension Fund

 Date:
 19 September 2019

 Doc ref:
 10730-HYD-XX-XX-RP-D-5001



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Hydrock Flood Risk Assessment & Drainage Strategy Report | Merseyside Pension Fund | Fort Halstead | 10730-HYD-XX-XX-RP-D-5001 | 19 September 2019



## CONTENTS

1.	INTRODUCTION	1
2.	SITE INFORMATION	2
2.1	Location and Setting	2
2.2	Topography	2
2.3	Proposed Development	2
3.	ASSESSMENT OF FLOOD RISK	3
3.1	Flood Zone Mapping	3
3.2	Fluvial and Tidal Flooding	3
3.3	Surface Water Flooding	3
3.4	Groundwater Flooding	4
3.5	Infrastructure Failure Flooding	4
4.	NPPF REQUIREMENTS	5
4.1	Sequential Test	5
4.2	Exception Test	5
5.	DRAINAGE STRATEGY	6
5.1	Existing Surface Water Drainage	6
5.2	Proposed Surface Water Drainage Strategy	6
5.3	Sustainable Drainage Systems	7
5.4	Maintenance	8
5.5	Proposed Foul Water Drainage Strategy	8
6.	CONCLUSIONS	10

#### Figures

Figure 1. Flood Map for Planning	3
Figure 2. EA Flood Risk from Surface Water Mapping	4
Figure 3. Proposed Foul Sewer Network Schematic	9

#### Tables

Table 1. Catchment Areas and Storage Volumes	7
Table 2. SUDS Operation and Maintenance Activity	8

#### Appendices

Appendix A - Site Details Appendix B - Drainage Strategy



#### 1. INTRODUCTION

This report has been prepared by Hydrock on behalf of Merseyside Pension Fund in support of a Planning Application to be submitted to Sevenoaks District Council (SDC) for the proposed redevelopment of Fort Halstead.

This Flood Risk Assessment report has been prepared to address the requirements of the National Planning Policy Framework (NPPF), through;

- Assessing whether the site is likely to be affected by flooding.
- Assessing whether the proposed development is appropriate in the suggested location.
- Presenting any flood risk mitigation measures necessary to ensure that the proposed development and occupants will be safe, whilst ensuring flood risk is not increased elsewhere.
- Presenting sustainable methods of surface water management.

The report considers the requirements for undertaking a Flood Risk Assessment and Drainage Strategy as detailed in the NPPF.



#### 2. SITE INFORMATION

#### 2.1 Location and Setting

The site extends to 74.49ha and is located to the immediate east of the village of Knockholt Pound. The A224 and the M25 pass just to the east of the site's eastern boundary in a north-south orientation. The site is bounded by woodland to the north and east, and farmland (of arable use) to the south and west. The site itself is predominantly developed and previously occupied by the Defence Science and Technology Laboratory (DSTL). Some demolition of decommissioned buildings has already taken place. The nearest postcode to the site is TN14 7BS, and grid reference TQ497594.

A site location plan is included in Appendix A.

#### 2.2 Topography

The site is situated on locally high ground (on the crest of the North Downs) and has a high point at 219m AOD towards the site's southwestern limit. Levels on the site fall gently to the west, east and north from this highpoint, and more steeply to the southeast. The south-eastern limit of the site forms the scarp face of the North Downs.

A Topographical Survey of the site is included in Appendix A.

#### 2.3 Proposed Development

The scheme is to be a hybrid Planning Application comprising:

In detail:

- Demolition of existing buildings.
- Change of use and works to buildings Q13 and Q14 (including landscaping and public realm).
- Primary and secondary accesses.

Outline approval is also to be sought for:

- Development of business areas (use classes B1a/b/c).
- Works within the 'X' enclave relating to energetic testing operations, including fencing, access, car parking.
- Development of up to 750 residential dwellings.
- Development of a mixed-use village centre (use classes A1/A3/A4/A5/B1a/D1/D2).
- Development of a one form entry primary school.
- Change of use of Fort Area and bunkers to Historic Interpretation Centre (use class D1) with workshop space.
- Roads, pedestrian and cycle routes, public transport infrastructure, car parking, utilities infrastructure and drainage.
- Landscaping, landforming and ecological mitigation works.

A proposed land use parameter plan is included in Appendix A.

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#### 3. ASSESSMENT OF FLOOD RISK

#### 3.1 Flood Zone Mapping

The entirety of the site is shown to be within Flood Zone 1, i.e. land having a less than 1 in 1,000 annual probability of fluvial or tidal flooding. The Environment Agency's (EA's) Flood Zone mapping for the area is shown in Figure 1.



Figure 1. Flood Map for Planning (Flood Zones 2 and 3 shown as turquoise and blue respectively)

#### 3.2 Fluvial and Tidal Flooding

The nearest watercourses to the site are the River Darent and the Twitton Brook which are approximately 1.5km and 1.1km due east of the site respectively. The floodplains to both these watercourses are at a level of around 57m AOD, some 120m lower than the lowest point of the site. At this location these watercourses are not tidal.

The site is therefore concluded to be at negligible risk of fluvial and tidal flooding.

#### 3.3 Surface Water Flooding

The EA's Flood Risk from Surface Water mapping shows the majority of the site to be at 'very low' risk of surface water flooding, as shown in Figure 2 below.

The location of the site on the top of the North Downs scarp means that there is no catchment draining in to the site from higher ground. Couple this with the relatively permeable bedrock and expected low groundwater, any overland flows are likely to be negligible and associated only with the developed areas of the site where existing drainage is absent.

There are a number of localised areas within the site that are shown to be at potentially increased risk of surface water flooding. However, these areas are considered to be associated with existing impermeable hardstanding which is likely to be positively drained.

Sevenoaks District Council's Strategic Flood Risk Assessment (SFRA) does not record any previous surface water flooding incidents within the vicinity of the site.





The site is therefore concluded to be at low risk of surface water 'ponding' / flooding.

Figure 2. EA Flood Risk from Surface Water Mapping

#### 3.4 Groundwater Flooding

British Geological Survey mapping shows the site to be underlain by Lewes Nodular, Seaford and Newhaven Chalk Formations, which are classified as Principal Aquifers, underlain by superficial deposits of Clay-with-Flints. Underlying bedrock is considered permeable, but the superficial deposits not, which is therefore likely to act as an aquiclude and prevent groundwater from the aquifer from rising to the surface.

Kent County Council's Preliminary Flood Risk Assessment (PFRA) and the SFRA indicates that the site is located in a 'negligible' groundwater flood risk area. Furthermore, groundwater has not been encountered at the application site during previous Site Investigations. Mapping contained within Kent County Council's Surface Water Management Plan (SWMP) shows that no groundwater flooding has occurred at or in the vicinity of the application site, with the closest recorded incident being approximately 4.6km to the southeast of the application site where ground levels are much lower.

As such, the site is concluded to be at low risk of groundwater flooding.

#### 3.5 Infrastructure Failure Flooding

Similar to the assessment of surface water flooding, given the location of the site at the high point of the local area, there are no potential sources of artificial flood risk upstream of the site (such as canals, reservoirs and/or sewers). The only potential source of infrastructure failure flood risk posed to the site is therefore that posed by existing on-site sewers if they became surcharged and any resulting overland flows. However, such a scenario has not previously been recorded at the site, and as such is considered a 'residual' risk. Regardless, any overland flows would be directed away from the site to the surrounding lower-lying ground.

As such the site is concluded to be at low risk of infrastructure failure flooding and/or flooding from artificial sources.



#### 4. NPPF REQUIREMENTS

#### 4.1 Sequential Test

This assessment has demonstrated that the site is on land designated as Flood Zone 1 by the EA's Flood Zone Mapping, and at low risk of flooding from all other potential sources.

The NPPF Flood Risk Vulnerability and Flood Zone Compatibility matrix (Table 3) indicates that all forms of development are appropriate in Flood Zone 1 and accordingly the proposed development is concluded to meet the requirements of the Sequential Test.

#### 4.2 Exception Test

Whilst an Exception Test is not explicitly required under the NPPF, due to the site being demonstrated to pass the Sequential Test, the following section details any measures necessary to mitigate any 'residual' flood risks, to ensure that the proposed development and occupants will be safe and that flood risk will not be increased elsewhere, akin to the requirements of the second section of the Exception Test.

#### 4.2.1 Resistance and Resilience Measures

In order to afford the site additional protection from any potential 'residual' flood risks, it is recommended that finished floor levels be set a minimum 'standard' 150mm above adjacent infrastructure thoroughfare levels. This aims to ensure any design exceedance flows, should they occur, will be directed away for all new development.

A comprehensive Surface Water Drainage Strategy will be constructed as part of the proposed development (the details of which are provided in the following section). This is designed to intercept and manage rainfall. Furthermore, the proposed highway and building layout has been designed to create a preferential overland flow route through the site, to allow any overland flows (should the proposed drainage system fail or surcharge) to pass through the site, away from existing or proposed buildings, and continue away from the site, as per the existing situation (although it is noted that the proposed drainage system will be designed to intercept and therefore mitigate the risk of such overland flows being directed off-site).

#### 4.2.2 Safe Access and Egress

Access to the site will be via the existing surrounding highway network which is indicated to be at low risk of flooding, based on the EA's Flood Zone and Flood Risk from Surface Water mapping.

As such, a safe / dry access and egress is considered to be possible to and from the site.

#### 4.2.3 Flood Risk within Catchment

The proposed development is not considered to increase flood risk within the catchment through a loss of floodplain storage (as the site has been demonstrated as being outside a functioning floodplain).



#### 5. DRAINAGE STRATEGY

#### 5.1 Existing Surface Water Drainage

The site is currently largely developed (there are approximately 300 buildings present on the site along with associated infrastructure) and therefore there is an existing drainage system in place.

Existing records show surface water run-off from the site either infiltrates into the subsoil via shallow soakaways or is discharged into the surrounding woodland via private drainage systems. Whilst this method of surface water management offers sustainable benefits in terms of its ability to recharge the natural groundwater system, support biodiversity and facilitate improvements to water quality through filtration, it is not considered a sufficient robust solution to serve the proposed development and would be expected to be unacceptable to the Lead Local Flood Authority.

There are no surface water features present within the site, with the nearest watercourses being the River Darent and Twitton Brook (tributary of the River Darent) located approximately 1.5km and 1.1km to the east of the site, respectively. The site is located on a chalk escarpment ridge and is thereby significantly elevated above any surrounding surface water features.

#### 5.2 Proposed Surface Water Drainage Strategy

The site is underlain by a layer of clay estimated to be between circa 0m and 12m in thickness. Upper, middle and lower chalk formations, classified as Principal Aquifers, are located beneath the clay.

The presence of clay on the site is not conducive to the use of shallow infiltration techniques. The next preferable option is to discharge to the nearest watercourse or surface water sewer. According to Thames Water sewer records there are no existing public surface water sewers within the site boundary and the nearest watercourse the Twitton Brook is approximately 1.1km away. As such, neither of these options are considered viable.

The presence of the upper chalk formations below the clay presents the possibility for the use of deep borehole soakaways. In a previous Flood Risk Assessment by Watermans (Planning Ref: 15/00628/OUT), falling head tests were carried out within three boreholes at depths of 10.5m below ground level (bgl) and 20.5m bgl in order to determine the potential for infiltration within the upper chalk layer. An average infiltration rate of  $2.157 \times 10^{-4}$  m/s (0.776m/hr) was obtained from the three boreholes based on the falling head tests at 20.5m bgl.

As such, a strategy for the disposal of surface water has been developed based on the infiltration rate achieved from these falling head tests. To minimise the number of borehole soakaways required, the flow rate to the boreholes shall be restricted to 5.0l/s via a hydro-brake flow control device. Flow in excess of this discharge rate will be attenuated within a combination of surface basins and below ground storage tanks.

The proposed catchments for each of the borehole and attention systems is based on the natural topography of the site and availability of open space that avoids any impact on the existing trees and the ancient woodland that bounds the site. Drawing 10730-HYD-XX-XX-DR-C-2201 in Appendix B shows the proposed borehole and attenuation locations.

The table below shows attenuation volumes and the number of boreholes required for each catchment. The Micro Drainage calculations for each catchment are provided in Appendix B.



Storage Location	Catchment Area (ha)	Residential Imp. Area (ha)	Employment Imp. Area (ha)	Mixed Imp. Area (ha)	Total Impermeable Area (ha)	Attenuation Volume (m <sup>3</sup> )	Borehole No.
А	2.02	1.036	-	-	1.036	1124	1
В	2.50	0.5	1.50	-	2.0	1699	4
С	1.24	0.62	-	-	0.62	500	2
D	1.226	-	0.984	-	0.984	950	2
E	0.97	-	0.93	-	0.93	800	2
F	1.521	0.612	0.451	-	1.063	1144	2
G	1.515	0.744		0.292	1.036	951	2
Н	1.08	0.648	-	-	0.648	521	2
J	2.438	1.466	-	-	1.466	1399	3
К	0.707	0.422	-	-	0.422	301	2
L	1.461	0.956	-	-	0.956	891	2
Μ	2.593	1.556	-	-	1.556	1603	3

Table 1. Catchment Areas and Storage Volumes

Residential catchment areas are based on a 50% to 60% impermeability rate depending on density and employment, and mixed-use areas are based on a 90% impermeability rate. The rates used for each catchment area are shown on the Drainage Strategy drawing in Appendix B.

#### 5.3 Sustainable Drainage Systems

The sustainable credentials of the Drainage Strategy can be assessed in accordance with the guidance contained within the SUDS Manual (Ciria C753) which refers to four pillars of SUDS design.

#### 5.3.1 Quantity

The proposal to utilise borehole soakaways ensures that the volume of run-off from the site can be reduced for rainfall events up to and including the 1 in 100 year + 40% storm event.

#### 5.3.2 Quality

Surface water attenuation for the borehole soakaways will be via open storage areas. These could be constructed to allow for sedimentation before flows enter the infiltration component. The site is not located within a Source Protection Zone (SPZ) and therefore surface water run-off from the proposed development would be discharged to ground with minimal risk of contamination.

Permeable paving could also be used to reduce the levels of suspended solids, metals and hydrocarbons from residential driveways.

Areas of the proposed development that are identified as mixed-use or commercial may require additional treatment. This will be provided by the use of swales which will also provide a conveyance function.

#### 5.3.3 Amenity

The value of basins will be enhanced with wetland planting footpaths and surrounding wildflower mixes to enhance their amenity contribution.



#### 5.3.4 Biodiversity

Vegetated detention basins and swales will include a variety of structurally diverse planting that will help make a positive contribution to urban biodiversity by providing habitat and food for invertebrates and birds.

#### 5.4 Maintenance

The primary means of conveying surface water from domestic surfaces will be via a network of below ground sewers and manholes. The network will be designed to comply with Thames Water standards so it can be offered for adoption under a Section 104 Agreement. With the advent of Sewers for Adoption 8th Edition (SfA8) the attenuation features may also be adopted by Thames Water. However, in the instance where the site is developed prior to the release of SfA8 the attenuation features and boreholes will be maintained by a private management company.

A typical maintenance regime for attenuation tank, swales, basins and permeable paving is outlined in the SUDS Manual, and summarised in Table 2 below.

Operation and Maintenance Activity		Attenuation Basins	Swales	Attenuation Storage Tanks	Tanked Permeable Paving
	Inspection	$\checkmark$	$\checkmark$	$\checkmark$	
	Litter and debris removal	$\checkmark$	$\checkmark$	$\checkmark$	
Regular	Sediment removal	$\checkmark$	$\checkmark$	$\checkmark$	
Maintenance	Grass cutting	$\checkmark$	$\checkmark$		
	Inspect inlets/outlets	$\checkmark$	$\checkmark$		
	Brushing and vacuuming				$\checkmark$
	Sediment management	$\checkmark$	$\checkmark$		
	Weed removal	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
Occasional	Tree root control/removal	$\checkmark$	$\checkmark$		
Maintenance	Repair inlets, outlets and vents			$\checkmark$	
	Stabilise and mow contributing and adjacent areas				$\checkmark$
	Repair erosion by re-turfing	$\checkmark$	$\checkmark$	$\checkmark$	
Remedial	Relevel uneven surfaces	$\checkmark$		$\checkmark$	$\checkmark$
Maintenance	Survey inside of tank for sediment			$\checkmark$	
Wantenance	Remediate any landscaping or broken blocks				$\checkmark$

Table 2. SUDS Operation and Maintenance Activity

#### 5.5 Proposed Foul Water Drainage Strategy

The existing foul sewer network discharges to a Thames Water foul sewer in Polhill Road (A224) via a single point of discharge in the northeastern corner of the site (see Figure 3). It is proposed to continue to utilise this connection. An existing pumping station and rising main located in the south of the site will need to be maintained to serve the existing retained buildings and scheduled ancient monument.

Due to the site topography it will be necessary for parts of the proposed development to be served by a pumped system that utilises the same point of discharge as the existing system. An initial assessment indicates that two new pumping stations will be required. One in the west and one in the northern most point.



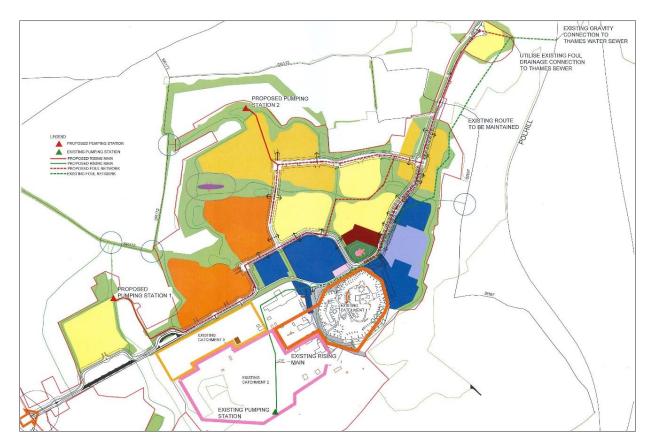


Figure 3. Proposed Foul Sewer Network Schematic

The proposed foul sewer network will be offered for adoption to Thames Water under a Section 104 Legal Agreement.



#### 6. CONCLUSIONS

This report has considered the flood risk posed to the proposal site from a variety of sources of flooding.

The entirety of the site is confirmed to be within Flood Zone 1, and at low risk of flooding from all other sources.

The Application is concluded to meet the requirements of the Sequential and Exception Tests.

Finished floor levels will be set a minimum 150mm above adjacent infrastructure thoroughfare levels, and the proposed highway and building layout will be designed to accommodate any design exceedance overland flows through the site. Such measures are intended to afford the site additional protection from potential 'residual' flood risks.

Safe access and egress has also been demonstrated to and from the site, as well as the fact that the proposed scheme will not result in a loss of floodplain storage or redirect any surface water overland flows onto adjacent land / properties.

A Surface Water Drainage Strategy has been presented which advocates the use of Sustainable Drainage Systems (SUDS).

The use of borehole soakaways linked to attenuation basins will reduce the volume of surface water run-off to accommodate the 1 in 100 year + 40% storm event. A network of sewers and manholes leading to the attenuation basins will be designed to contain a 1 in 30 year storm event.

Foul drainage will be pumped to the public network on Polhill Road.

This report therefore demonstrates that the proposed development:

- Is suitable in the location proposed.
- Will be adequately flood resistant and resilient.
- Will not place additional persons at risk of flooding, and will offer a safe means of access and egress.
- Will not increase flood risk elsewhere as a result of the proposed development through the loss of floodplain storage or impedance of flood flows.
- Will put in place measures to ensure surface water is appropriately managed.

As such, the Application is concluded to meet the flood risk requirements of the NPPF.

Hydrock Consultants Limited



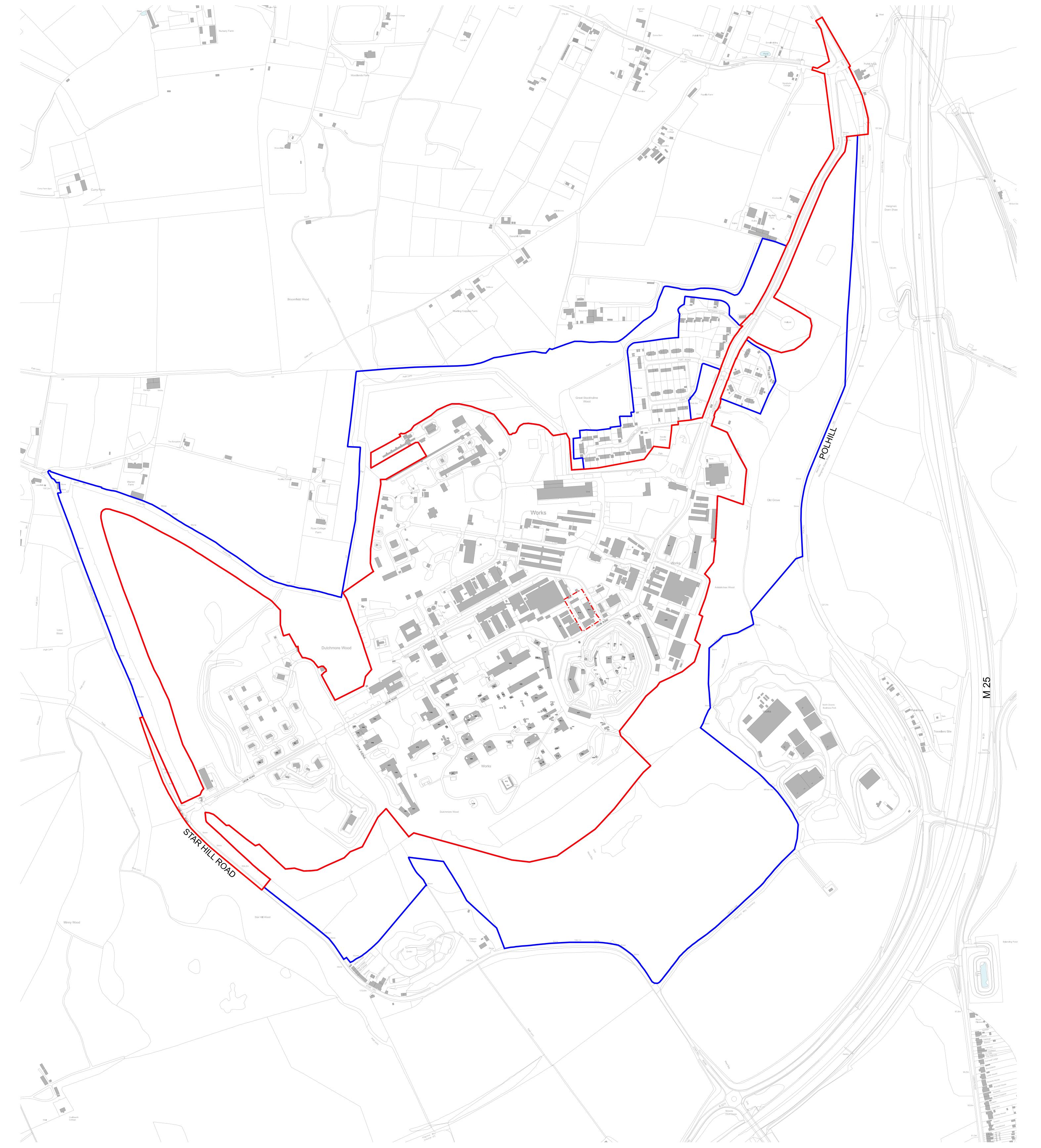
## Appendix A - Site Details

Reference	Title
00666I_S01	Site Location Plan
10323 Master	Topographical Survey
00556I_PP01	Land Use and Green Infrastructure Plan

Notes: Do not scale from this drawing. All contractors must visit the site and be responsible for taking and checking Dimensions.

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DZL ECC P1 23.08.19 Submitted for Planning Rev Date Description Drawn Chkd Drawing Status FOR PLANNING

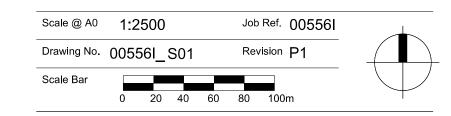






Project Fort Halstead

Drawing Title Site Location Plan



— Outline Planning Application boundary

Key

- Applicant's land ownership boundary
- Detailed Planning Application boundary

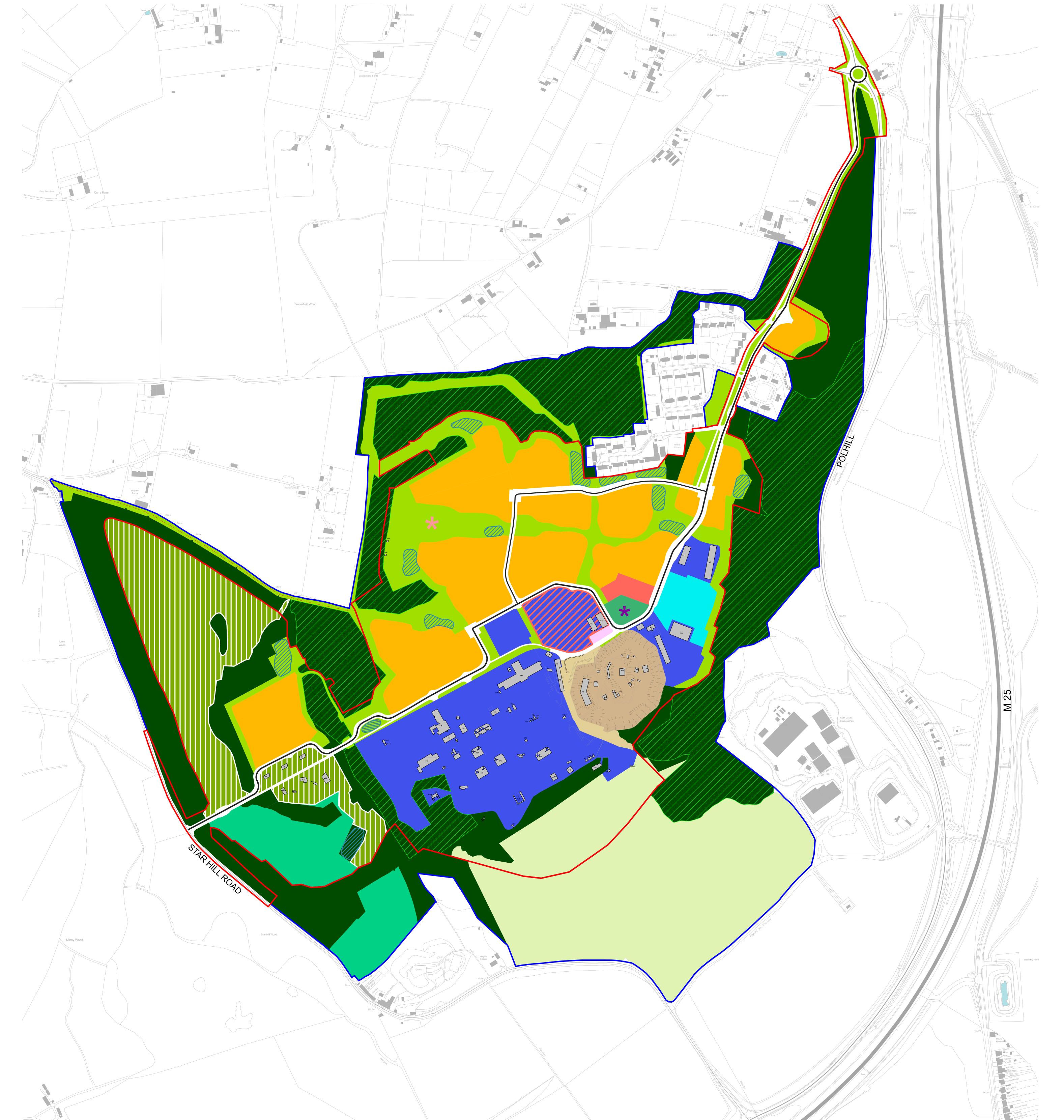


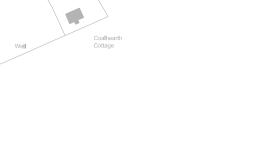
#### Notes:

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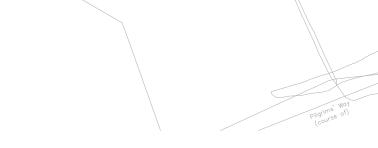
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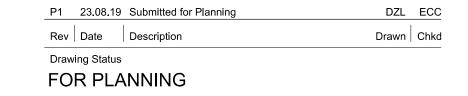












## KEY

- Application boundary
- Applicant's land ownership boundary
- Existing buildings for retention
- ----- Proposed vehicular routes
- Scheduled monument (The Fort)
  Residential
  Mixed Use
  Employment
  Employment / Mixed Use
  Primary school
  Village Square
- Hardstanding

Village Green

Public Open Space (incl. woodland buffer, SuDs, Children's play area)

Community Recreation Area

Existing Woodland

Existing Ancient Woodland

Ecologically Enhanced Grassland / Mitigation Zone

Existing Chalk Grassland

Indicative Neighbourhood Equipped Area for Play (NEAP)

- Indicative Local Equipped Area for Play (LEAP)
- Indicative location for SuDS ponds

## Notes:

All land uses can deviate +/-3m within the application boundary, subject to on-site constraints.

\*The shapes and sizes of the ponds as shown on the plan are indicative only.





Project Fort Halstead

Client

Drawing Title Land Use and Green Infrastructure Plan

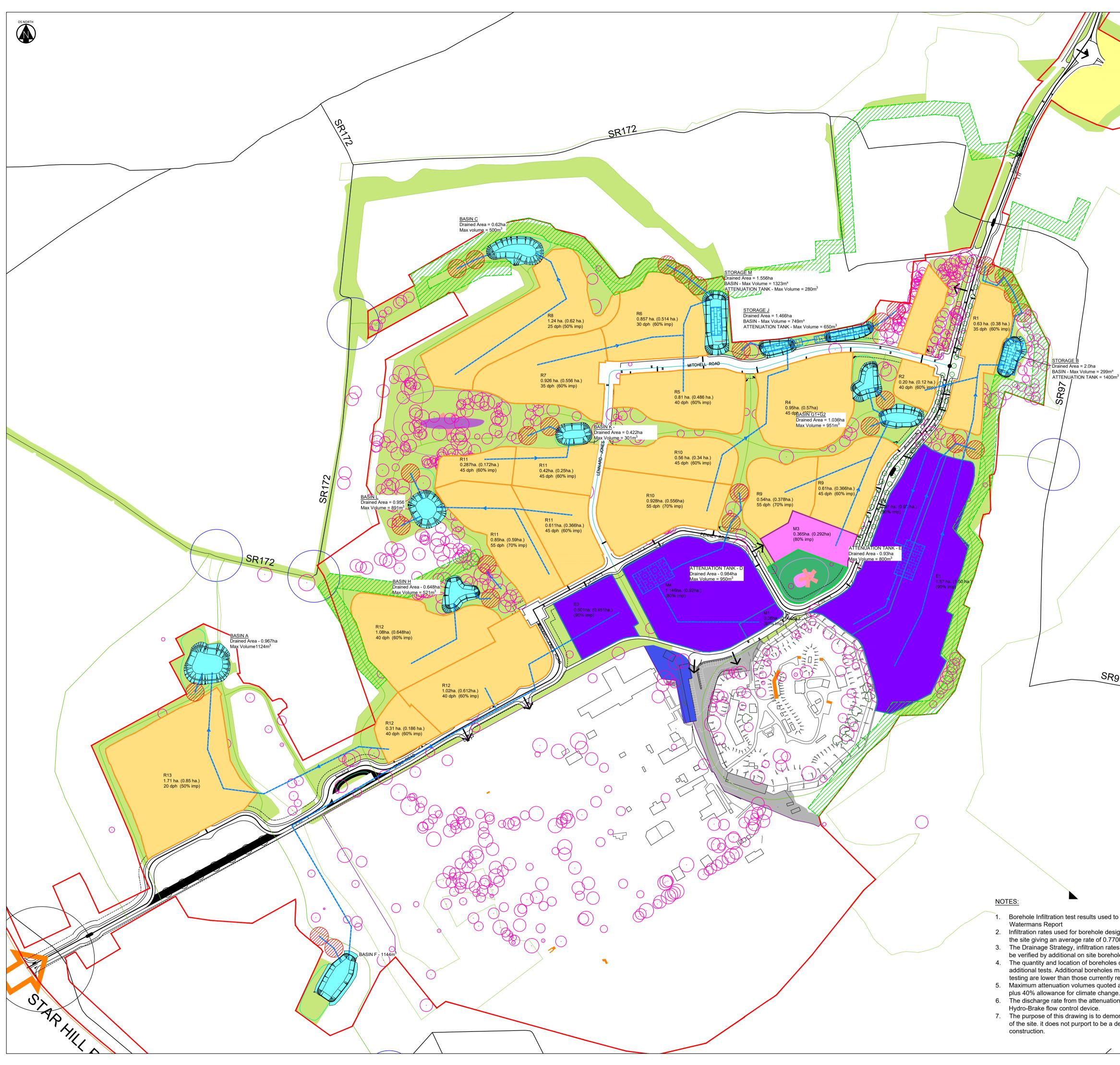
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12

## Appendix B - Drainage Strategy

Reference	Title
10730-HYD-XX-XX-DR-C-2201	Surface Water Drainage Strategy
-	Micro Drainage Calculations



	KEY PLAN Proposed soakaway borehole (with 10.0m offset to adjacent boreholes)
	Indicative primary flow route
	Proposed mixed use plot
	Proposed residential plot
	Village Green
	Proposed employment plot
	Approx 15.0m buffer zone from extent of Ancient Woodland
	Proposed attenuation pond
	Existing 'Category A' tree
	Below Ground Cellular Storage Tank
om <sup>3</sup>	
	REVISIONS
	P04 03/09/2019 Updated attenuation basin sizes and locations to SM DB DB suit updated layout.
897	P03 04/03/2019 Update to attenuation features following Architects SM DB DB comments
	P02 05/02/2019 Updated attenuation sizing. Reviewed borehole SM DB DB
	PO1         03/12/18         First Issue.         JLWI         DB         DB           Rev         Date         Description         By         Ckd         App
	Hydrock Ver COURT BARNS OVER LANE ALMONDSBURY BRISTOL BS32 4DF t: +44 (0) 1454 619533 t: +44 (0) 1454 619533
	e: bristol@hydrock.com
	CBRE
	PROJECT
	FORT HALSTEAD
to produce the drainage strategy are taken from	TITLE
sign are an average of three tests taken across 700m/hr (2.138x10 <sup>-4</sup> m/s) tes and attenuation volumes quoted will need to nole infiltration tests. es currently shown are reliant on the results of may be required if rates obtained by additional recommended in the Watermans Report d are based on the critical 1 in 100 year event	
d are based on the critical 1 in 100 year event ge. ion basis has been restricted to 5l/s via a	HYDROCK PROJECT NO.         SCALE @ A1           C-10730         1:2,000
nonstrate an intended approach to the drainage detailed design and should not be used for	STATUS DESCRIPTION STATUS STATUS S2
	DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER) 10730-HYD-XX-XX-DR-C-2201 P04

Hydrock Consultants Ltd				Page 1
·	Fort H	alstead		
	Catchm	ent A		
				Micco
Date 04/09/2019	Design	ed by SM		– Micro
File 10730-HYD-XX-XX-CA-C-Micro	_	-		Drainage
	Checke			
Innovyze	Networ	k 2018.1.1		
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Des	sign Criter	ia for Pond A	7	
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	0-4 0.745	4-8 0.291		
Total	Area Contrib	uting $(ha) = 1$ .	0.3.6	
10041				
То	tal Pipe Volu	me (m³) = 6.362		
Netwo	rk Design '	Table for Pon	<u>d A</u>	
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(m) (m) (1:X) (ha)			ECT (mm)	Design
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S1.002 10.000 0.026 384.6 0.00		0.0 0.600	o 450 Pipe/Conduit	
S1.003 5.000 0.013 384.6 0.00	0.00	0.0 0.600	o 450 Pipe/Conduit	6
S1.004 10.000 0.060 166.7 0.00	0.00	0.0 0.600	o 450 Pipe/Conduit	

#### <u>Network Results Table</u>

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)		Add Flow (1/s)		Cap (1/s)	Flow (1/s)
	(11117)	(mins)	(111)	(IIA)	FIOW (1/S)	(1/5)	(1/5)	(11/5)	(1/5)	(1/5)
S1.000	50.00	5.05	214.350	1.036	0.0	0.0	0.0	3.22	512.5	140.3
S1.001	50.00	5.06	214.100	1.036	0.0	0.0	0.0	15.30	2433.2	140.3
S1.002	50.00	5.22	211.300	1.036	0.0	0.0	0.0	1.03	163.9	140.3
S1.003	50.00	5.30	211.274	1.036	0.0	0.0	0.0	1.03	163.9	140.3
S1.004	50.00	5.41	211.261	1.036	0.0	0.0	0.0	1.57	250.0	140.3

Hydrock Consultants Ltd		Page 2
•	Fort Halstead	
	Catchment A	
•		Micro
Date 04/09/2019	Designed by SM	Drainage
File 10730-HYD-XX-XX-CA-C-Micro	Checked by	Diamage
Īnnovyze	Network 2018.1.1	

#### Simulation Criteria for Pond A

Volumetric Runoff Coeff 0.750Additional Flow - % of Total Flow 0.000Areal Reduction Factor 1.000MADD Factor \* 10m³/ha Storage 2.000Hot Start (mins)0Hot Start Level (mm)0 Flow per Person per Day (1/per/day) 0.000Manhole Headloss Coeff (Global)0.500Foul Sewage per hectare (1/s)0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0 Number of Online Controls 2 Number of Storage Structures 2 Number of Real Time Controls 0

#### Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.700	Storm Duration (mins)	30
Ratio R	0.370		

Hydrock Consultants Ltd					Pag	ge 3
•	Fort Hals	tead				
	Catchment	A				
					Ν	<i>Aicro</i>
Date 04/09/2019	Designed	by SM				
File 10730-HYD-XX-XX-CA-C-Micro	Checked b	У				)rainage
Īnnovyze	Network 2	018.1.1				
<u>Or</u> <u>Hydro-Brake® Optimum</u>	Marbala: S4 D			1.1mo (m <sup>3</sup>	) • 6 3	
<u>Hydro-Brake® Optimum</u>	Mannole: 54, Di	5/PN: 5	1.003, VO	<u>rume (mº</u>	): 6.3	
	Unit Reference	MD-SHE-	0098-5000-1			
	Design Head (m)			1.500		
I	Design Flow (l/s)			5.0		
	Flush-Flo™			lculated		
	Application	Minimi	se upstream	storage Surface		
	Sump Available			Yes		
	Diameter (mm)			98		
	Invert Level (m)			211.274		
Minimum Outlet P:	. ,			150		
	ole Diameter (mm)			1200		
Control Points Head (	m) Flow (l/s)	Contr	ol Points	Head	(m) Flow (	1/s)
Design Point (Calculated) 1.5	00 5.0		Kick-F	'lo® 0	878	3.9
Flush-Flo™ 0.4		in Flow o	over Head Ra		-	4.3
	· hered on the He					Duchen
The hydrological calculations have been Optimum as specified. Should another			-	-	-	
then these storage routing calculation.			ner than a .	iyuru-brak	ze ορετιιαμα	, pe utitised
Depth (m) Flow (1/s) Depth (m) Flow (1/	's) Depth (m) Flo	w (l/s)	Depth (m) F	low (l/s)	Depth (m)	Flow (l/s)
0.100 3.2 0.800 4	1.3 2.000	5.7	4.000	7.9	7.000	10.3
	1.1 2.200	6.0	4.500	8.4	7.500	10.7

0.100	3.2	0.000	4.5	2.000	5.7	4.000	1.9	1.000	10.5
0.200	4.4	1.000	4.1	2.200	6.0	4.500	8.4	7.500	10.7
0.300	4.8	1.200	4.5	2.400	6.2	5.000	8.8	8.000	11.0
0.400	4.9	1.400	4.8	2.600	6.5	5.500	9.2	8.500	11.3
0.500	4.9	1.600	5.1	3.000		6.000		9.000	11.6
0.600	4.8	1.800	5.4	3.500	7.4	6.500	10.0	9.500	11.9

Weir Manhole: S5, DS/PN: S1.004, Volume (m<sup>3</sup>): 0.6

Discharge Coef 0.544 Width (m) 1.000 Invert Level (m) 214.600  $\,$ 

Hydrock Consultants Ltd		Page 4
•	Fort Halstead	
	Catchment A	
		Micro
Date 04/09/2019	Designed by SM	
File 10730-HYD-XX-XX-CA-C-Micro	Checked by	Drainage
Īnnovyze	Network 2018.1.1	L
Stor	age Structures for Pond A	

#### Storage Structures for Pond A

Tank or Pond Manhole: S3, DS/PN: S1.002

Invert Level (m) 211.300

Depth (m)	Area (m²)								
0.000	664.0	1.200	1174.8	2.400	1830.4	3.600	2630.8	4.800	3576.0
0.200	739.1	1.400	1274.1	2.600	1953.8	3.800	2778.3	5.000	3747.6
0.400	818.2	1.600	1377.3	2.800	2081.2	4.000	2929.8		
0.600	901.3	1.800	1484.6	3.000	2212.5	4.200	3085.3		
0.800	988.5	2.000	1595.8	3.200	2347.9	4.400	3244.8		
1.000	1079.6	2.200	1711.1	3.400	2487.4	4.600	3408.4		

#### Deep Bore Soakaway Manhole: S5, DS/PN: S1.004

Chamber Invert Level (m) 193.261 Infiltration Coefficient Base (m/hr) 0.77000 Chamber Diameter/Length (m) 1.350 Safety Factor 2.0 Borehole Diameter (m) 0.300 Borehole Depth (m) 18.000

	Side		Side		Side		Side
Depth	Infil.	Depth	Infil.	Depth	Infil.	Depth	Infil.
(m)	Coef.	(m)	Coef.	(m)	Coef.	(m)	Coef.
	(m/hr)		(m/hr)		(m/hr)		(m/hr)
	(111/111)		(m/nr)		(m/nr)		(m/nr)

Hydrock Co	onsultants	Ltd								F	age 5
•					Fort	Halste	ad				
					Catch	ment A					
											Micro
Date 04/09	9/2019				Desig	ned by	SM				
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Īnnovyze					Netwo	rk 201	8.1.1				
<u>l year</u>	Return Per:	iod Sur	nmary	of Cr	itical	Result	s by Ma	aximum I	evel (Rar	n <u>k 1) f</u>	or Pond A
		Ho Hot St eadloss wage per Hydrogr	t Star art Le Coeff hecta aphs 0	t (mins vel (mm (Global re (l/s Numb	) 0 ) 0.500 ) 0.000	Addit M Flow pe	ional F IADD Fact r Person ontrols	tor * 10m Inlet n per Day 0 Number		ge 2.000 nt 0.800 7) 0.000	
1			1010 2			2			or near ri		1010 0
	. ·	C 11 M		Syn	thetic R			-		F 0	
	Rain	fall Moc Regi		rland ar					Summer) 0.7 Jinter) 0.8		
		1.091		<i>j_ana</i> ai	ia naroo	1100		000 00 (.		10	
	Mai	-		Analys: Ine:	arning (1 is Times: DTS Sta: DVD Sta: rtia Sta	tep 2.5 tus tus	Second	Increment	300. (Extended OF OI	) F N N	
	Dura		ofile(s (mins		, 30, 60	, 120,	180, 240	), 360, 48	Summer and 30, 600, 72		
	Return Pe: Clin	riod(s) mate Cha	· 1							0, 2880 30, 100 , 0, 40	
	S/MH Name Storm		urn Cl iod Cł	imate nange	First ( Surchar		.rst (Y) Flood	First (Z Overflow	) Overflow Act.	Water Level (m)	Surcharged Depth (m)
S1.000 S1.001 S1.002 S1.003 S1.004	S1 15 Win S2 15 Win S3 2880 Win S4 2880 Win S5 2880 Win	nter nter nter	1 1 1 1	+0% +0% 3 +0% 3	30/15 Su 30/180 Wi 30/120 Wi 30/180 Wi	nter nter				214.581 214.218 211.650 211.650 211.619	-0.332 -0.100 -0.074
		PN	US/MH Name	Flooded Volume (m³)	i Flow / Cap.	Overfl (l/s)			Level Exceeded		
		S1.000 S1.001 S1.002 S1.003 S1.004	S1 S2 S3 S4 S5	0.000 0.000 0.000 0.000	0 0.15 0 0.01 0 0.01		144.0 143.9 1.1 1.1 0.0	) OK OK OK			

Hydrock Consultants Ltd							I	Page 6
•			Fort Ha	lstead				
			Catchme	nt A				
•			Designed	-l -l - 014				Micro
Date 04/09/2019			Designe	-				Drainage
File 10730-HYD-XX-XX-CA-	C-M1Ci	ro	Checked	-				
Innovyze			Network	2018.1.1				
Hot Manhole Headlos Foul Sewage p Number of Input Hydro Number of Online Co Rainfall N R	Reduct Hot St Start Ss Coef per hec ographs ontrols Model egion 1	tion Fact tart (min Level (m ff (Globa ttare (1/ s 0 Nun s 2 Numbe <u>Sy</u> England a	Simulation for 1.000 m) 0 m) 0 1) 0.500 Fl (s) 0.000 mber of Offl er of Storage <u>nthetic Rain</u> FSR M5 and Wales	<u>Criteria</u> Additional I MADD Fac ow per Perso ine Controls e Structures <u>fall Detail</u> -60 (mm) 20 Ratio R 0	Flow - % of ctor * 10m <sup>3</sup> , Inlet Co on per Day 6 0 Number of 5 2 Number of 5 .700 Cv (Su	Total Flo /ha Storag peffiecien (l/per/day of Time/Ar of Real Ti mmer) 0.7 nter) 0.8	w 0.000 e 2.000 t 0.800 ) 0.000 rea Diag me Cont 50 40	rams O
Margin f	for Flo	Analy	Warning (mm) sis Timestep DTS Status DVD Status ertia Status	2.5 Second	Increment	300.( (Extended) OFI OI	) F N	
	s) (yea	ins) 1 ars)	.5, 30, 60, 3	120, 180, 24		1440, 216 1,	0, 960,	
		Climate Change	First (X) Surcharge	First (Y) Flood		Overflow Act.		Surcharged Depth (m)
S1.000S115 WinterS1.001S215 WinterS1.002S32880 WinterS1.003S42880 WinterS1.004S52880 Winter	30 30 30 30 30	+0%	30/15 Summ 30/180 Wint 30/120 Wint 30/180 Wint	er er			214.93 214.29 212.03 212.05 212.002	-0.259 3 0.283 3 0.329
PN	US/MH Name	Flooded Volume (m³)	Flow / Over	Pipe flow Flow /s) (l/s)		Level Exceeded		
S1.000 S1.001 S1.002 S1.003 S1.004	S2 S3 S4	0.000 0.000 0.000	0.38 0.01 0.01	353.7 1.1 1.1	SURCHARGED OK SURCHARGED SURCHARGED SURCHARGED			

	Consul								P	age 7
					Fort H	alstead				
					Catchm	ent A				
										Micco
ate 04,	/09/201	.9			Design	ed by SM				Micro
ile 10	730-нүр	-XX-XX-CA	-C-Mic	ro	Checke	-				Drainac
nnovyze						k 2018.1.1				_
	-									
<u>100 y</u> e	ear Ret	<u>urn Perio</u>	<u>l Summa</u>	ary of (	<u>Critical I</u>	Results by	<u>Maximum I</u>	evel (Ra	nk 1)	for Pond
И	Jumber o	Ho nhole Headl Foul Sewage f Input Hydr	Hot St t Start oss Coef per hec rographs	cart (mir Level (m Ef (Globa ctare (l/ s 0 Nur	cor 1.000 ns) 0 m) 0 al) 0.500 F (s) 0.000 mber of Off	<u>n Criteria</u> Additional MADD Fa low per Pers line Control: ge Structure:	ctor * 10m³ Inlet C on per Day s 0 Number	/ha Storag beffiecien (l/per/day of Time/Ar	e 2.000 t 0.800 ) 0.000 ea Diagu	
	Trainib 0 1	01 0111110	,01101010			nfall Detail				
		Rainfall			FSR M	5-60 (mm) 20 Ratio R (	.700 Cv (Si	,		
		Margin	for Flc	od Risk	Warning (mm	)		300.0	)	
		- 5			-	p 2.5 Second	l Increment			
					DTS Statu			OFE		
				Tu	DVD Statu			ON		
				In	ertia Statu	S		ON	I	
			Profil	e (s)			c	Summer and	Winter	
					15 30 60					
		Duratio	·II(3) (III.		10, 00, 00,	120, 180, 24	40, 360, 480			
					10, 30, 00,	120, 180, 24	40, 360, 480		), 960,	
	Re	eturn Period	l(s) (ye	ars)	13, 30, 00,	120, 180, 2	40, 360, 480	), 600, 72 1440, 216 1, 3	), 960, ), 2880 30, 100	
	Re	eturn Period		ars)		120, 180, 24	40, 360, 480	), 600, 72 1440, 216 1, 3	), 960, ), 2880	
	Re	eturn Period	l(s) (ye	ars)				0, 600, 72 1440, 216 1, 3 0	0, 960, 0, 2880 30, 100 , 0, 40 Water	Surcharge
PN	Re US/MH Name	eturn Period	(s) (yea Change <b>Return</b>	ars)		) First (Y	) First (Z)	0, 600, 72 1440, 216 1, 3 0	0, 960, 0, 2880 30, 100 , 0, 40 Water	-
<b>PN</b> \$1.000	US/MH Name	eturn Period Climate <b>Storm</b> 15 Winter	(s) (ye. Change Return Period	ars) (%) Climate	First (X Surcharge	) First (Y 9 Flood	) First (Z)	0, 600, 72 1440, 2160 1, 3 0 Overflow	<pre>D, 960, D, 2880 30, 100 , 0, 40 Water Level (m) 215.782</pre>	Depth (m) 0.98
S1.000 S1.001	US/MH Name S1 S2	eturn Period Climate Storm 15 Winter 15 Winter	Return Period 100 100	ars) (%) Climate Change +40% +40%	First (X) Surcharge 30/15 Summ	) First (Y e Flood mer	) First (Z)	0, 600, 72 1440, 2160 1, 3 0 Overflow	<pre>D, 960, D, 2880 30, 100 , 0, 40 Water Level (m) 215.782 214.368</pre>	<b>Depth</b> (m) 0.98 -0.18
\$1.000 \$1.001 \$1.002	US/MH Name S1 S2 S3	sturn Period Climate Storm 15 Winter 15 Winter 2880 Winter	Return Period 100 100	ars) (%) Climate Change +40% +40% +40%	First (X) Surcharge 30/15 Sum 30/180 Win	) First (Y e Flood mer ter	) First (Z)	0, 600, 72 1440, 2160 1, 3 0 Overflow	<pre>D, 960, D, 2880 30, 100 , 0, 40 Water Level (m) 215.782 214.368 212.528</pre>	Depth (m) 0.98 -0.18 0.77
\$1.000 \$1.001 \$1.002 \$1.003	<b>US/MH</b> Name S1 S2 S3 S4	Storm 15 Winter 15 Winter 2880 Winter 2880 Winter	Return Period 100 100 100 100	ars) (%) Climate Change +40% +40% +40% +40%	First (X) Surcharge 30/15 Sum 30/180 Win 30/120 Win	) First (Y e Flood mer ter ter	) First (Z)	0, 600, 72 1440, 2160 1, 3 0 Overflow	<pre>D, 960, D, 2880 30, 100 , 0, 40 Water Level (m) 215.782 214.368 212.528 212.548</pre>	Depth (m) 0.98 -0.18 0.77 0.82
S1.000 S1.001 S1.002	<b>US/MH</b> Name S1 S2 S3 S4	sturn Period Climate Storm 15 Winter 15 Winter 2880 Winter	Return Period 100 100	ars) (%) Climate Change +40% +40% +40% +40%	First (X) Surcharge 30/15 Sum 30/180 Win	) First (Y e Flood mer ter ter	) First (Z)	0, 600, 72 1440, 2160 1, 3 0 Overflow	<pre>D, 960, D, 2880 30, 100 , 0, 40 Water Level (m) 215.782 214.368 212.528</pre>	Depth (m) 0.98 -0.18 0.77 0.82
\$1.000 \$1.001 \$1.002 \$1.003	<b>US/MH</b> Name S1 S2 S3 S4	Storm 15 Winter 15 Winter 2880 Winter 2880 Winter	Return Period 100 100 100 100	ars) (%) Climate Change +40% +40% +40% +40%	First (X) Surcharge 30/15 Sum 30/180 Win 30/120 Win 30/180 Win	) First (Y a Flood mer ter ter ter	) First (Z)	0, 600, 72 1440, 2160 1, 3 0 Overflow	<pre>D, 960, D, 2880 30, 100 , 0, 40 Water Level (m) 215.782 214.368 212.528 212.548</pre>	Depth (m) 0.98 -0.18 0.77 0.82
\$1.000 \$1.001 \$1.002 \$1.003	<b>US/MH</b> Name S1 S2 S3 S4	Storm 15 Winter 15 Winter 2880 Winter 2880 Winter	Return Period 100 100 100 100	ars) (%) Climate Change +40% +40% +40% +40% Flooded	First (X) Surcharge 30/15 Sum 30/180 Win 30/120 Win 30/180 Win	) First (Y e Flood mer ter ter	) First (Z)	0, 600, 72 1440, 2160 1, 3 0 Overflow	<pre>D, 960, D, 2880 30, 100 , 0, 40 Water Level (m) 215.782 214.368 212.528 212.548</pre>	Depth (m) 0.98 -0.18 0.77 0.82
\$1.000 \$1.001 \$1.002 \$1.003	<b>US/MH</b> Name S1 S2 S3 S4	Storm 15 Winter 15 Winter 2880 Winter 2880 Winter	Return Period 100 100 100 100	ars) (%) Climate Change +40% +40% +40% +40% Flooded	First (X) Surcharge 30/15 Sum 30/180 Win 30/120 Win 30/180 Win Flow / Ove	) First (Y e Flood mer ter ter ter ter	) First (Z)	0, 600, 72 1440, 2160 1, 3 0 Overflow Act.	<pre>D, 960, D, 2880 30, 100 , 0, 40 Water Level (m) 215.782 214.368 212.528 212.548</pre>	Depth (m) 0.98 -0.18 0.77 0.82
\$1.000 \$1.001 \$1.002 \$1.003	<b>US/MH</b> Name S1 S2 S3 S4	sturn Period Climate Storm 15 Winter 15 Winter 2880 Winter 2880 Winter 2880 Winter	Return Period 100 100 100 100 100 100 Name	ars) (%) Climate Change +40% +40% +40% +40% Flooded Volume (m <sup>3</sup> )	First (X) Surcharge 30/15 Sum 30/180 Win 30/180 Win 30/180 Win Flow / Ove Cap. (3	) First (Y e Flood mer ter ter ter ter Pipe orflow Flow L/s) (1/s)	) First (Z) Overflow Status	0, 600, 72 1440, 2160 1, 3 0 Overflow Act.	<pre>D, 960, D, 2880 30, 100 , 0, 40 Water Level (m) 215.782 214.368 212.528 212.548</pre>	Depth (m) 0.98 -0.18 0.77 0.82
\$1.000 \$1.001 \$1.002 \$1.003	<b>US/MH</b> Name S1 S2 S3 S4	Storm Storm 15 Winter 15 Winter 2880 Winter 2880 Winter 2880 Winter 2880 Winter 2880 Winter	Return Period 100 100 100 100 100 100 100 100 100 10	ars) (%) Climate Change +40% +40% +40% +40% Flooded Volume (m <sup>3</sup> ) 0.000	First (X) Surcharge 30/15 Sum 30/180 Win 30/180 Win 30/180 Win Flow / Ove Cap. (3 2.22	) First (Y a Flood mer ter ter ter ter brflow Flow l/s) (l/s) 626.5	) First (Z) Overflow Status FLOOD RISK	0, 600, 72 1440, 2160 1, 3 0 Overflow Act.	<pre>D, 960, D, 2880 30, 100 , 0, 40 Water Level (m) 215.782 214.368 212.528 212.548</pre>	Depth (m) 0.98 -0.18 0.77 0.82
\$1.000 \$1.001 \$1.002 \$1.003	US/MH Name S1 S2 S3 S4	sturn Period Climate Storm 15 Winter 15 Winter 2880 Winter 2880 Winter 2880 Winter	Return Period 100 100 100 100 100 100 100 100 100 10	ars) (%) Climate Change +40% +40% +40% +40% Flooded Volume (m <sup>3</sup> ) 0.000 0.000	First (X) Surcharge 30/15 Sum 30/180 Win 30/120 Win 30/180 Win Flow / Ove Cap. (3 2.22 0.66	) First (Y Flood mer ter ter ter ter ter l/s) (1/s) 626.5 624.7	) First (Z) Overflow Status	0, 600, 72 1440, 2160 1, 3 0 Overflow Act.	<pre>D, 960, D, 2880 30, 100 , 0, 40 Water Level (m) 215.782 214.368 212.528 212.548</pre>	Depth (m) 0.98 -0.18 0.77 0.82
\$1.000 \$1.001 \$1.002 \$1.003	US/MH Name S1 S2 S3 S4	Storm Storm 15 Winter 15 Winter 2880 Winter 2880 Winter 2880 Winter 2880 Winter 2880 Winter 2880 Winter	Return Period 100 100 100 100 100 100 100 100 100 10	ars) (%) Climate Change +40% +40% +40% +40% Flooded Volume (m <sup>3</sup> ) 0.000 0.000 0.000	First (X) Surcharge 30/15 Sum 30/180 Win 30/180 Win 30/180 Win Flow / Ove Cap. (3 2.22 0.66 0.01	) First (Y Flood mer ter ter ter ter ter l/s) (1/s) 626.5 624.7 1.2	) First (Z) Overflow Status FLOOD RISK OK	0, 600, 72 1440, 2160 1, 3 0 Overflow Act.	<pre>D, 960, D, 2880 30, 100 , 0, 40 Water Level (m) 215.782 214.368 212.528 212.548</pre>	Depth (m) 0.98 -0.18 0.77 0.82

ydrock Consultants Ltd			Page 1
	Fort Halstead		
	Catchment B		
			– Micro
ate 04/09/2019	Designed by SM		
ile 10730-HYD-XX-XX-CA-C-Micro	Checked by		Drainage
nnovyze	Network 2018.1.1		
	IGN by the Modified Rat	cional Method	
Des	ign Criteria for Pond B	3	
Pipe Size:	STANDARD Manhole Sizes ST	ANDARD	
FSR Rai	nfall Model - England and Wa	ales	
Return Period (ye	-	PIMP (%)	) 100
	(mm) 20.700 Add Flo	-	
		num Backdrop Height (m)	
Maximum Rainfall (mm		num Backdrop Height (m)	
Maximum Time of Concentration (m Foul Sewage (l/s		th for Optimisation (m Auto Design only (m/s	
Volumetric Runoff Co		for Optimisation (1:X)	
			,
D.			
De	signed with Level Soffits		
	-		
	signed with Level Soffits Area Diagram for Pond	B	
Time	Area Diagram for Pond	<u>B</u>	
Time	Area Diagram for Pond Time Area Time Area mins) (ha) (mins) (ha)	B	
<u>Time</u>	Area Diagram for PondTime Area mins) (ha)Time Area (mins) (ha)0-4 0.9574-8 1.043		
<u>Time</u>	Area Diagram for Pond Time Area Time Area mins) (ha) (mins) (ha)		
<u>Time</u> ( Total 2	Area Diagram for PondTime Area mins) (ha)Time Area (mins) (ha)0-4 0.9574-8 1.043	000	
<u>Time</u> ( Total 2 Tota	Area Diagram for Pond         Time Area mins) (ha)       Time Area (mins) (ha)         0-4 0.957       4-8 1.043         Area Contributing (ha) = 2.0	000	
<u>Time</u> ( Total : Tota <u>Networ</u>	Area Diagram for PondTime Area mins) (ha)Time Area (mins) (ha)0-40.9574-84-81.043Area Contributing (ha) = 2.01Pipe Volume (m³) = 45.482kDesign Table for Pond	000 2 <u>d B</u>	
<u>Time</u> ( Total : Tota <u>Networ</u>	Area Diagram for Pond         Time Area       Time Area         mins) (ha)       (mins) (ha)         0-4 0.957       4-8 1.043         Area Contributing (ha) = 2.0         1 Pipe Volume (m³) = 45.482	000 2 <u>d B</u>	
<u>Time</u> ( Total 2 Tota <u>Networ</u> « - I:	Area Diagram for Pond         Time Area mins) (ha)       Time Area (mins) (ha)         0-4       0.957       4-8       1.043         Area Contributing (ha) = 2.0       1       Pipe Volume (m³) = 45.482         k Design Table for Pond       ndicates pipe capacity < flor	000 2 <u>d B</u> ow	Auto
<u>Time</u> ( Total : Tota <u>Networ</u>	Area Diagram for Pond         Time Area mins) (ha)       Time Area (mins) (ha)         0-4       0.957       4-8       1.043         Area Contributing (ha) = 2.0       1       Pipe Volume (m³) = 45.482         k Design Table for Pond       ndicates pipe capacity < flor	000 2 <u>d B</u>	Auto Design
Time ( Total : Total : Tota Networ (m) (m) (1:X) (ha)	Area Diagram for Pond         Fime Area mins) (ha)       Time Area (mins) (ha)         0-4       0.957       4-8       1.043         Area Contributing (ha) = 2.0       1       Pipe Volume (m³) = 45.482         k Design Table for Pond       ndicates pipe capacity < flow	000 2 d <u>B</u> ow HYD DIA Section Type SECT (mm)	Design
<u>Time</u> ( Total 2 Total 2 Tota <u>Networ</u> ( <u>Networ</u> ( <u>-</u> I: <u>PN Length Fall Slope I.Area</u> ( <u>m) (m) (1:X) (ha)</u> S1.000 25.090 0.190 132.1 2.000	Area Diagram for Pond         Fime Area mins) (ha)       Time Area (mins) (ha)         0-4       0.957       4-8       1.043         Area Contributing (ha) = 2.0       4-8       1.043         Area Contributing (ha) = 45.482       4-8       1.043         K Design Table for Pond       main for Pond       1         Mathematical Control       1       1       1         Mathematical Control       0       1       1         Mathematical Control       1       1       1	000 2 <u>d B</u> ow HYD DIA Section Type SECT (mm) o 750 Pipe/Conduit	Design
<u>Time</u> ( Total 2 Total 2 Total 2 Networ ( Networ ( r) (1:X) (ha) S1.000 25.090 0.190 132.1 2.000 S1.001 42.790 0.230 186.0 0.000	Area Diagram for Pond         Fime Area mins) (ha)       Time Area (mins) (ha)         0-4       0.957       4-8       1.043         Area Contributing (ha) = 2.0       4-8       1.043         Area Contributing (ha) = 45.482       4-8       1.043         'k Design Table for Pond       maicates pipe capacity < flow	000 2 d B ow HYD DIA Section Type SECT (mm) o 750 Pipe/Conduit o 750 Pipe/Conduit	Design
<u>Time</u> ( Total 2 Total 2 Total 2 Total 2 Tota <u>Networ</u> ( <u>Networ</u> ( <u>Networ</u> ( <u>n</u> ) ( <u>1:X</u> ) ( <u>ha</u> ) S1.000 25.090 0.190 132.1 2.000 S1.001 42.790 0.230 186.0 0.000 S1.002 22.297 0.056 398.2 0.000	Area Diagram for Pond         Fime Area mins) (ha)       Time Area (mins) (ha)         0-4       0.957       4-8       1.043         Area Contributing (ha) = 2.0       4-8       1.043         Area Contributing (ha) = 45.482       4-8       1.043         'k Design Table for Pond       mainal for Pond         'k Design Table for Pond       100         'hdicates pipe capacity < flow	000 2 d B ow HYD DIA Section Type SECT (mm) o 750 Pipe/Conduit o 750 Pipe/Conduit o 600 Pipe/Conduit	Design
Time         Image: Constraint of the second state of the second stat	Area Diagram for Pond           Fime Area mins) (ha) 0-4 0.957         Time Area (mins) (ha) 4-8 1.043           Area Contributing (ha) = 2.0           1 Pipe Volume (m³) = 45.482           'k Design Table for Pond dicates pipe capacity < flow	000 2 d B ow HYD DIA Section Type SECT (mm) o 750 Pipe/Conduit o 750 Pipe/Conduit o 600 Pipe/Conduit o 600 Pipe/Conduit	Design 0 0 0 0
Time         Intervention         In	Area Diagram for Pond           Fime Area mins) (ha) 0-4 0.957         Time Area (mins) (ha) 4-8 1.043           Area Contributing (ha) = 2.0           1 Pipe Volume (m³) = 45.482           'k Design Table for Pond           mins) Flow (l/s) (mm) S           0.5.00         0.0 0.600           0.00         0.0 0.600           0.00         0.0 0.600           0.00         0.0 0.600	000 2 d B ow HYD DIA Section Type SECT (mm) o 750 Pipe/Conduit o 750 Pipe/Conduit o 600 Pipe/Conduit o 600 Pipe/Conduit o 450 Pipe/Conduit	Design 0 0 0
Time         Image: Constraint of the second state of the second stat	Area Diagram for Pond           Fime Area mins) (ha) 0-4 0.957         Time Area (mins) (ha) 4-8 1.043           Area Contributing (ha) = 2.0           1 Pipe Volume (m³) = 45.482           'k Design Table for Pond           mins) Flow (l/s) (mm) S           0.00         0.0 0.600           0.00         0.0 0.600           0.00         0.0 0.600           0.00         0.0 0.600	000 2 d B ow HYD DIA Section Type SECT (mm) o 750 Pipe/Conduit o 750 Pipe/Conduit o 600 Pipe/Conduit o 600 Pipe/Conduit	Design

#### Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (1/s)	Vel (m/s)	Cap (1/s)	Flow (1/s)
S1.000 S1.001 S1.002	50.00 50.00 50.00	5.52 5.83	193.420 193.230 193.000	2.000 2.000 2.000	0.0 0.0 0.0	0.0	0.0 0.0 0.0	2.05	1075.2 905.0 343.3	270.8
S1.003 S1.004 S1.005 S1.006 S1.007	50.00 49.72 49.12 48.54 47.97	6.12 6.29 6.45	192.944 192.931 192.871 192.845 192.819	2.000 2.000 2.000 2.000 2.000	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	1.57 1.03 1.03	246.0« 250.0« 163.9« 163.9« 163.9«	270.8 270.8 270.8

Hydrock Consultants Ltd		Page 2
	Fort Halstead	
	Catchment B	
•		Micro
Date 04/09/2019	Designed by SM	Drainage
File 10730-HYD-XX-XX-CA-C-Micro	Checked by	Diginarie
Īnnovyze	Network 2018.1.1	

#### Simulation Criteria for Pond B

Volumetric Runoff Coeff 0.750Additional Flow - % of Total Flow 0.000Areal Reduction Factor 1.000MADD Factor \* 10m³/ha Storage 2.000Hot Start (mins)0Hot Start Level (mm)0 Flow per Person per Day (1/per/day) 0.000Manhole Headloss Coeff (Global)0.500Foul Sewage per hectare (1/s)0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0 Number of Online Controls 2 Number of Storage Structures 5 Number of Real Time Controls 0

#### Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.700	Storm Duration (mins)	30
Ratio R	0.370		

Hydrock Consultants Ltd							Pac	ge 3
•		Fort H	alstead					
		Catchm	ent B					
							N	<i>licro</i>
Date 04/09/2019		Design	ed by SM					
File 10730-HYD-XX-XX-CA-C-Mi	.cro	Checke	d by					)rainage
Īnnovyze		Networ	k 2018.1.	1				
			ols for Po					
<u>Hydro-Brake® Opt</u>	<u>cimum Man</u>	hole: S4,	DS/PN: S	<u>51.003, v</u>	<u>olume (</u>	<u>m³): 3</u>	<u>84.9</u>	
	τ	Jnit Refere	ence MD-SHE-	-0094-5000	-1800-500	0 0		
		esign Head			1.80			
	Dest	ign Flow (l			-	.0		
		Flush-F			Calculate			
		Applicat	tive Minim:	ise upstre	am storag Surfa	-		
	(	Sump Availa				es		
		Diameter (				94		
	In	vert Level			192.94	44		
Minimum O	utlet Pipe	Diameter (	(mm)		15	50		
Suggest	ed Manhole	Diameter (	(mm)		120	0 0		
Control Points	Head (m)	Flow (l/s)	Cont	rol Points	He	ad (m)	Flow (	1/s)
Design Point (Calculated)	1.800	5.0		Kick	-Flo®	0.838		3.5
Flush-Flo™		4.4	Mean Flow	over Head	Range	-		4.1
The hydrological calculations h	awa baan b	acad on the	- Hood /Discl	hargo rola	tionchin	for the	- Uudro	-Proko@
Optimum as specified. Should a				-	-		-	
then these storage routing calc				chier chian	a 117 ar 0 1	stance of	o o ± munio	20 00111000
Depth (m) Flow (1/s) Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l	/s) Dep	oth (m)	Flow (l/s)
0.100 3.0 0.800	3.7	2.000	5.2	4.000		7.3	7.000	9.5
0.200 4.0 1.000	3.8	2.200	5.5	4.500		7.7	7.500	9.8

0.100	5.0	0.000		2.000		4.000	1.5	1.000	2.5
0.200	4.0	1.000	3.8	2.200	5.5	4.500	7.7	7.500	9.8
0.300	4.3	1.200	4.1	2.400	5.7	5.000	8.1		10.1
0.400			4.4		5.9	5.500	8.4	8.500	10.4
0.500	4.4	1.600	4.7	3.000	6.3	6.000	8.8	9.000	10.7
0.600	4.3	1.800	5.0	3.500	6.8	6.500	9.1	9.500	11.0

Weir Manhole: S195.7, DS/PN: S1.007, Volume (m<sup>3</sup>): 1.4

Discharge Coef 0.544 Width (m) 1.000 Invert Level (m) 195.600  $\,$ 

Hydrock Con	sultants	Ltd									Page 4
•					Fort H	lalste	ad				
•					Catchn	nent B					
•											Micro
Date 04/09/					Desigr	-	SM				Drainage
File 10730-	HYD-XX-XX	<u>-CA-C-</u>	Micro		Checke		0 1 1				
Innovyze					Networ	<u> </u>	8.1.1				
			St	torage	e Struct	ures	for Por	<u>nd B</u>			
			<u>Tank or</u>	<u>r Pond</u>	l Manhol	.e: S3	, DS/PI	<u>v: s1.0</u>	002		
				Inv	ert Leve	l (m) 1	193.000				
Depth (m)	Area (m²)	Depth (	m) Area	. (m²)   I	)epth (m)	Area	(m²) Dej	pth (m)	Area (m²)	Depth (m	) Area (m²)
0.000				500.0	2.400		00.0	3.600	330.9		
0.200 0.400				500.0	2.600 2.800		00.0	3.800 4.000			0 657.1
0.400			800		3.000		25.0	4.000			
0.800		2.0	000	500.0	3.200	) 2	58.0	4.400			
1.000	500.0	2.2	00	500.0	3.400	) 2	93.3	4.600	552.6		
		<u>Dee</u>	<u>p Bore</u>	Soaka	way Mar	hole:	<u>s5, D</u>	<u> 3/PN: S</u>	<u>1.004</u>		
	Chamber	r Invert	Level	(m) 173	.186 Inf	iltrat	ion Coef	ficient	Base (m/h:	r) 0.7700	0
	Chamber Di				.500				afety Facto		
		ehole Di		. ,	.300						
	B	Borehole	Depth	(m) 18	.000						
			Side		Side		Side		Side		
		-		-	Infil.	-		-	Infil.		
		(m)	Coef. (m/hr)	(m)	Coef. (m/hr)	(m)	Coef. (m/hr)	(m)	Coef. (m/hr)		
		0.000	0.77000	8.000	0.77000	8.001	0.00000	18.000	0.00000		
		Dee	<u>p Bore</u>	Soaka	way Mar	<u>hole:</u>	<u>s6, D</u>	<u>3/PN: S</u>	51.005		
	Chamber	r Invert	Level	(m) 178	.976 Inf	iltrat	ion Coef	ficient	Base (m/h:	r) 0.7700	0
	Chamber Di	Lameter/	Length	(m) 1	.350			Sa	afety Facto	or 2.	0
		ehole Di Borehole		( )	.300 .000						
	E	sorenoie	Depth	(111) 10	.000						
			Side		Side		Side		Side		
		Depth (m)	Infil. Coef.	Depth (m)	Infil. Coef.	Depth (m)	Infil. Coef.	Depth (m)	Infil. Coef.		
		(111)	(m/hr)	(,	(m/hr)	()	(m/hr)	()	(m/hr)		
		0.000	0.77000	8.000	0.77000	8.001	0.00000	18.000			
				I	way Mar	1		I			
			-		_						_
	Chamber Chamber Di				.100 Inf .350	iltrat	lon Coef		Base (m/h: afety Facto		
		ehole Di	2	. ,	.300			50	arecy racto	51 2.	0
		Borehole			.000						
			Side		Side		Side		Side		
		Depth	Infil.	Depth	Infil.	Depth	Infil.	Depth	Infil.		
		(m)	Coef.	(m)	Coef.	(m)	Coef.	(m)	Coef.		
			(m/hr)		(m/hr)		(m/hr)		(m/hr)		
		0.000	0.77000	8.000	0.77000	8.001	0.00000	18.000	0.00000		
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	CA-C-M	1010				0 1 1				J
nnovyze				Networ	K ZUI	5.1.1				
nnovyze Chamber Chamber Dia Boreh Bo:	Deep B Invert 1 meter/L ole Diar rehole 1 Depth (m)	ore Sc Level ( ength ( meter ( Depth ( Side Infil. Coef. (m/hr)	m) 179 m) 1 m) 0 m) 18 Depth (m)	Networ y Manho .074 Inf .350 .300 .000 Side Infil. Coef. (m/hr)	bepth (m)	on Coeff	icient Sa Depth (m)	S1.007 Base (m/hr) fety Factor Side Infil. Coef. (m/hr) 0.00000		

udwaal. Cana	ultopto I	+ d							Dama 6
ydrock Cons	ultants I			Fort Halst	]			E	Page 6
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ate 04/09/2				Designed k					Drainage
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nnovyze				Network 20	018.1.1				
<u>1 year Re</u> Number	A Manhole He Foul Sew of Input : wer of Onli: Rainf	eal Reduct Hot Start dloss Coef ge per heo ydrographs e Controls all Model Region	tion Fact tart (min Level (m f (Globa ttare (1/ s 0 Num s 2 Numbe <u>Svr</u> England a rod Risk V	1) 0.500 Flow s) 0.000 ber of Offline r of Storage S <u>hthetic Rainfal</u> FSR M5-60 and Wales Ra Warning (mm)	<u>iteria</u> itional F MADD Fac per Perso Controls tructures <u>l Details</u> (mm) 20. atio R 0.	<pre>2low - % of tor * 10m³/ Inlet Co n per Day 0 Number of 5 Number of 2 .700 Cv (Su .369 Cv (Wi</pre>	Total Flc /ha Storag beffiecien (l/per/day of Time/Ar of Real Ti mmer) 0.7	ow 0.000 ge 2.000 it 0.800 () 0.000 cea Diag ime Cont 50 40	rams O
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<b>PN Nam</b> S1.000 S1.001	Return Per Clim MH me Storn	cion(s) (m iod(s) (ye ate Change Return Period cer 1 cer 1	Ine e(s) ins) 1 ars) (%) Climate Change +0% +0%	DTS Status DVD Status ertia Status 5, 30, 60, 120, First (X) F Surcharge	, 180, 24 First (Υ)	5 0, 360, 480 <b>First (Z)</b>	OF] OI OI OI OI OI OVERTIOW	N N O, 960, 50, 2880 30, 100 0, 0, 40 Water Level (m)	Depth (m) -0.413 -0.303
PN         Nam           \$1.000         \$1.001           \$1.002         \$1.003	Return Per Clim MH S1 15 Win S2 960 Win S3 960 Win S4 960 Win	Return Period cer 1 cer 1 cer 1 cer 1 cer 1	Ine e(s) ins) 1 ars) (%) Climate Change +0% +0% +0% +0% +0%	DTS Status DVD Status ertia Status 5, 30, 60, 120, First (X) F Surcharge 30/60 Winter 1/360 Winter 1/240 Winter	, 180, 24 First (Υ)	5 0, 360, 480 <b>First (Z)</b>	OF] OI OI OI OI OI OVERTIOW	N N N N N N N N N N N N N N N N N N N	Depth (m) -0.413 -0.303 0.077 0.156
PN         Nam           \$1.000         \$1.001           \$1.002         \$1.003           \$1.004         \$1.004	Return Per Clim MH S1 15 Win S2 960 Win S3 960 Win S4 960 Win S5 960 Win	Return Period cer 1 cer 1 cer 1 cer 1 cer 1 cer 1 cer 1 cer 1 cer 1	Ine e(s) ins) 1 ars) (%) Climate Change +0% +0% +0% +0% +0% +0%	DTS Status DVD Status ertia Status 5, 30, 60, 120, First (X) F Surcharge 30/60 Winter 1/360 Winter 1/240 Winter 1/240 Winter	, 180, 24 First (Υ)	5 0, 360, 480 <b>First (Z)</b>	OF] OI OI OI OI OI OVERTIOW	N N N N N N N N N N N N N N N N N N N	Depth (m) -0.413 -0.303 0.077 0.156 0.132
PN         Nam           \$1.000         \$1.001           \$1.002         \$1.003           \$1.004         \$1.005	Return Per Clim MH S1 15 Win S2 960 Win S3 960 Win S4 960 Win S5 960 Win S6 960 Win	Return Period cer 1 cer 1	Ine e(s) ins) 1 ars) (%) Climate Change +0% +0% +0% +0% +0% +0% +0%	DTS Status DVD Status ertia Status 5, 30, 60, 120, First (X) F Surcharge 30/60 Winter 1/360 Winter 1/240 Winter 1/240 Winter 1/180 Winter	, 180, 24 First (Υ)	5 0, 360, 480 <b>First (Z)</b>	OF] OI OI Summer and 0, 600, 72 1440, 216 1, 0 <b>Overflow</b> Act.	N N V N N N N N N N N N N N N N N N N N	Depth (m) -0.413 -0.303 0.077 0.156 0.132 0.192
PN         Nam           \$1.000         \$1.001           \$1.002         \$1.003           \$1.004         \$1.005	Return Per Clim MH S1 15 Win S2 960 Win S3 960 Win S4 960 Win S5 960 Win S5 960 Win S5 960 Win S7 960 Win	Return Period cer 1 cer 1	Ine e(s) ins) 1 ars) (%) Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0%	DTS Status DVD Status ertia Status 5, 30, 60, 120, First (X) F Surcharge 30/60 Winter 1/360 Winter 1/240 Winter 1/240 Winter	, 180, 24 First (Υ)	5 0, 360, 480 <b>First (Z)</b>	OF] OI OI Summer and 0, 600, 72 1440, 216 1, 0 <b>Overflow</b> Act.	N N N N N N N N N N N N N N N N N N N	Depth (m) -0.413 -0.303 0.077 0.156 0.132 0.192 0.218
PN         Nam           \$1.000         \$1.001           \$1.002         \$1.003           \$1.004         \$1.005           \$1.006         \$1.006	Return Per Clim MH S1 15 Win S2 960 Win S3 960 Win S4 960 Win S5 960 Win S5 960 Win S5 960 Win S7 960 Win	Return Period cer 1 cer 1	Ine e(s) ins) 1 ars) (%) Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0%	DTS Status DVD Status ertia Status 5, 30, 60, 120, First (X) F Surcharge 30/60 Winter 1/360 Winter 1/240 Winter 1/240 Winter 1/180 Winter 1/120 Winter	, 180, 24 First (Υ)	5 0, 360, 480 <b>First (Z)</b>	OF] OI OI Summer and 0, 600, 72 1440, 216 1, 0 <b>Overflow</b> Act.	N N V N N N N N N N N N N N N N N N N N	Depth (m) -0.413 -0.303 0.077 0.156 0.132 0.192 0.218
PN         Nam           \$1.000         \$1.001           \$1.002         \$1.003           \$1.004         \$1.005           \$1.006         \$1.006	Return Per Clim MH S1 15 Win S2 960 Win S3 960 Win S4 960 Win S5 960 Win S5 960 Win S5 960 Win S7 960 Win	Return Period cer 1 cer 1	Ine e(s) ins) 1 ars) (%) Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0% +0%	DTS Status DVD Status ertia Status 5, 30, 60, 120, First (X) F Surcharge 30/60 Winter 1/360 Winter 1/240 Winter 1/240 Winter 1/180 Winter 1/120 Winter 1/120 Winter	, 180, 24 First (Y) Flood	5 0, 360, 480 <b>First (Z)</b>	OF] OI OI Summer and 0, 600, 72 1440, 216 1, 0 <b>Overflow</b> Act.	N N V N N N N N N N N N N N N N N N N N	Depth (m) -0.413 -0.303 0.077 0.156 0.132 0.192 0.218
PN         Nam           \$1.000         \$1.001           \$1.002         \$1.003           \$1.004         \$1.005           \$1.006         \$1.006	Return Per Clim MH S1 15 Win S2 960 Win S3 960 Win S4 960 Win S5 960 Win S5 960 Win S5 960 Win S7 960 Win	Return Period cer 1 cer 1	Ine e(s) ins) 1 ars) (%) Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0%	DTS Status DVD Status ertia Status 5, 30, 60, 120, First (X) F Surcharge 30/60 Winter 1/360 Winter 1/240 Winter 1/240 Winter 1/180 Winter 1/120 Winter 1/120 Winter	, 180, 24 First (Y) Flood Pipe	5 0, 360, 480 <b>First (Z)</b>	OF] OI OI Summer and 0, 600, 72 1440, 216 1, 0 <b>Overflow</b> Act.	N N V N N N N N N N N N N N N N N N N N	Depth (m) -0.413 -0.303 0.077 0.156 0.132 0.192 0.218
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	Re	eturn Period(	s) (yea	rs)					-	30, 100	
		Climate	Change	(%)					0	, 0, 40	
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	US/MH		Return	Climate	First	t (X)		First (Z)	Overflow	Level	Depth
PN	Name	Storm	Period	Change	Surch	harge	Flood	Overflow	Act.	(m)	(m)
s1.000	S1	1440 Winter	30	+0응	30/60	Winter				194.731	0.561
S1.001		1440 Winter	30		30/60					194.730	
S1.002		1440 Winter	30		1/360					194.730	
S1.003 S1.004		1440 Winter 1440 Winter	30 30		1/240 1/240					194.754 194.743	
s1.004		1440 Winter	30		1/180					195.188	
S1.006		1440 Winter	30		1/120					195.624	
S1.007	S195.7	1440 Winter	30	+0%	1/120	Winter				195.651	2.382
				Flooded			Pipe				
			US/MH		Flow /	Overfl	ow Flow		Level		
		PN	Name	(m³)	Cap.	(1/s)	(1/s)	Status	Exceeded		
		S1.000	S1	0.000	0.05		35 1	SURCHARGED			
		S1.000	S1 S2	0.000	0.05			SURCHARGED			
		S1.002	S3	0.000	0.04			SURCHARGED			
		S1.003	S4	0.000	0.03			SURCHARGED			
		S1.004 S1.005	S5 S6	0.000	0.14			SURCHARGED SURCHARGED			
		S1.005	50 S7	0.000	0.18			SURCHARGED			
			S195.7	0.000	0.01			SURCHARGED			
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nnovyze					Network 2	018.1.1				
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	Re	Duratio: turn Period	Profile n(s) (mi	Ine (s) ns) 1: rs)	DTS Status DVD Status ertia Status		s 0, 360, 480	OFF ON ON Summer and 0, 600, 72 1440, 216 1, 1	F Winter 0, 960, 0, 2880 30, 100 , 0, 40	Surcharged
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PN		Duratio: turn Period	Profile n(s) (mi (s) (yea Change <b>Return</b>	Ine (s) ns) 1! rs) (%)	DTS Status DVD Status ertia Status 5, 30, 60, 120	, 180, 24	s 0, 360, 480	OFF ON ON Summer and 0, 600, 72 1440, 216 1, 0	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water	-
<b>PN</b> 51.000	US/MH Name	Duratio: turn Period Climate	Profile n(s) (mi (s) (yea Change <b>Return</b> <b>Period</b>	Ine (s) ns) 1: rs) (%) Climate Change	DTS Status DVD Status ertia Status 5, 30, 60, 120 First (X)	, 180, 24 First (Y)	S 0, 360, 480 First (Z)	OFF ON ON Summer and 0, 600, 72 1440, 216 1, . 0 Overflow	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level	Depth (m)
S1.000 S1.001	US/MH Name S1 S2	Duratio turn Period Climate <b>Storm</b> 2160 Winter 2160 Winter	Profile n(s) (mi (s) (yea Change <b>Return</b> <b>Period</b> 100 100	Ine (s) ns) 1: rs) (%) Climate Change +40%	DTS Status DVD Status ertia Status 5, 30, 60, 120 First (X) Surcharge	, 180, 24 First (Y)	S 0, 360, 480 First (Z)	OFF ON ON Summer and 0, 600, 72 1440, 216 1, . 0 Overflow	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m)	Depth (m) 3 2.533 2 2.722
S1.000 S1.001 S1.002	US/MH Name S1 S2 S3	Duration Oturn Period Climate Storm 2160 Winter 2160 Winter 2160 Winter	Profile n(s) (mi (s) (yea Change Return Period 100 100 100	(s) ns) 1: rs) (%) Climate Change +40% +40% +40%	DTS Status DVD Status ertia Status 5, 30, 60, 120 First (X) Surcharge 30/60 Winter 30/60 Winter 1/360 Winter	, 180, 24 First (Y)	S 0, 360, 480 First (Z)	OFF ON ON Summer and 0, 600, 72 1440, 216 1, . 0 Overflow	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 196.703 196.703 196.703	Depth (m) 3 2.533 2 2.722 3 3.103
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S1.000 S1.001 S1.002 S1.003 S1.004	<b>US/MH</b> Name S1 S2 S3 S4 S5	Duration Oturn Period Climate Storm 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2160 Winter	Profile n(s) (mi (s) (yea Change Return Period 100 100 100 100	(s) ns) 1: rs) (%) Climate Change +40% +40% +40% +40% +40%	DTS Status DVD Status ertia Status 5, 30, 60, 120 First (X) Surcharge 30/60 Winter 1/360 Winter 1/240 Winter 1/240 Winter	, 180, 24 First (Y)	S 0, 360, 480 First (Z)	OFF ON ON Summer and 0, 600, 72 1440, 216 1, . 0 Overflow	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 196.703 196.703 196.703 196.724	Depth (m) 3 2.533 2 2.722 3 3.103 4 3.180 5 1.455
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S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	US/MH Name S1 S2 S3 S4 S5 S6 S7	Duration Oturn Period Climate Storm 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2180 Winter	Profile n(s) (mi (s) (yea Change <b>Return</b> <b>Period</b> 100 100 100 100 100 100	Ine (s) ns) 1: rs) (%) Climate Change +40% +40% +40% +40% +40% +40% +40%	DTS Status DVD Status ertia Status 5, 30, 60, 120 First (X) Surcharge 30/60 Winter 1/360 Winter 1/240 Winter 1/240 Winter 1/180 Winter 1/120 Winter	, 180, 24 First (Y)	S 0, 360, 480 First (Z)	OFF ON ON Summer and 0, 600, 72 1440, 216 1, . 0 Overflow	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 196.703 196.703 196.703 196.703 196.724 194.836 195.609 195.731	Depth (m) 3 2.533 2 2.722 3 3.103 4 3.180 5 1.455 9 2.288 2.436
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S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	US/MH Name S1 S2 S3 S4 S5 S6 S7	Duration Oturn Period Climate Storm 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2180 Winter	Profile n(s) (mi (s) (yea Change <b>Return</b> <b>Period</b> 100 100 100 100 100 100	Ine (s) ns) 1: rs) (%) Climate Change +40% +40% +40% +40% +40% +40% +40%	DTS Status DVD Status ertia Status 5, 30, 60, 120 First (X) Surcharge 30/60 Winter 1/360 Winter 1/240 Winter 1/240 Winter 1/180 Winter 1/120 Winter	, 180, 24 First (Y)	S 0, 360, 480 First (Z)	OFF ON ON Summer and 0, 600, 72 1440, 216 1, . 0 Overflow	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 196.703 196.703 196.703 196.703 196.724 194.836 195.609 195.731	Depth (m) 3 2.533 2 2.722 3 3.103 4 3.180 5 1.455 9 2.288 2.436
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	US/MH Name S1 S2 S3 S4 S5 S6 S7	Duration Oturn Period Climate Storm 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2180 Winter	Profile n(s) (mi (s) (yea Change <b>Return</b> <b>Period</b> 100 100 100 100 100 100	Ine (s) ns) 1: rs) (%) Climate Change +40% +40% +40% +40% +40% +40% +40% +40%	DTS Status DVD Status ertia Status 5, 30, 60, 120 First (X) Surcharge 30/60 Winter 1/360 Winter 1/240 Winter 1/240 Winter 1/180 Winter 1/120 Winter	, 180, 24 First (Y) Flood Pipe	S 0, 360, 480 First (Z)	OFF ON ON Summer and 0, 600, 72 1440, 216 1, . 0 Overflow	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 196.703 196.703 196.703 196.703 196.724 194.836 195.609 195.731	Depth (m) 3 2.533 2 2.722 3 3.103 4 3.180 5 1.455 9 2.288 2.436
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	US/MH Name S1 S2 S3 S4 S5 S6 S7	Duration Oturn Period Climate Storm 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2180 Winter	Profile n(s) (mi (s) (yea Change <b>Return</b> <b>Period</b> 100 100 100 100 100 100	Ine (s) ns) 1: rs) (%) Climate Change +40% +40% +40% +40% +40% +40% +40% +40%	DTS Status DVD Status ertia Status 5, 30, 60, 120 First (X) Surcharge 30/60 Winter 1/360 Winter 1/240 Winter 1/240 Winter 1/180 Winter 1/120 Winter	, 180, 24 First (Y) Flood Pipe ow Flow	S 0, 360, 480 First (Z)	OFF ON ON Summer and 0, 600, 72 1440, 216 1, 0 Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 196.703 196.703 196.703 196.703 196.724 194.836 195.609 195.731	Depth (m) 3 2.533 2 2.722 3 3.103 4 3.180 5 1.455 9 2.288 2.436
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	US/MH Name S1 S2 S3 S4 S5 S6 S7	Duration Oturn Period Climate Storm 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2160 Winter	Profile n(s) (mi (s) (yea Change Return Period 100 100 100 100 100 100 100 100 100	Ine (s) ns) 1: rs) (%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Volume (m <sup>3</sup> )	DTS Status DVD Status ertia Status 5, 30, 60, 120 First (X) Surcharge 30/60 Winter 1/360 Winter 1/240 Winter 1/240 Winter 1/120 Winter 1/120 Winter 1/120 Winter 1/120 Winter	, 180, 24 First (Y) Flood Pipe ow Flow ) (1/s)	S 0, 360, 480 First (Z) Overflow Status	OFF ON ON Summer and 0, 600, 72 1440, 216 1, 0 Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 196.703 196.703 196.703 196.703 196.724 194.836 195.609 195.731	Depth (m) 3 2.533 2 2.722 3 3.103 4 3.180 5 1.455 9 2.288 2.436
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	US/MH Name S1 S2 S3 S4 S5 S6 S7	Duration Oturn Period Climate Storm 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2160 Winter	Profile n(s) (mi (s) (yea Change <b>Return</b> <b>Period</b> 100 100 100 100 100 100 100 100 100 10	Ine (s) ns) 1: rs) (%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Volume (m <sup>3</sup> ) 0.000	DTS Status DVD Status ertia Status 5, 30, 60, 120 First (X) Surcharge 30/60 Winter 1/360 Winter 1/240 Winter 1/240 Winter 1/120 Winter 1/120 Winter 1/120 Winter 1/120 Winter 1/120 Winter	<pre>, 180, 24 First (Y) Flood Pipe ow Flow ) (1/s) 43.2</pre>	S 0, 360, 480 First (Z) Overflow Status SURCHARGED	OFF ON ON Summer and 0, 600, 72 1440, 216 1, 0 Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 196.703 196.703 196.703 196.703 196.724 194.836 195.609 195.731	Depth (m) 3 2.533 2 2.722 3 3.103 4 3.180 5 1.455 9 2.288 2.436
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	US/MH Name S1 S2 S3 S4 S5 S6 S7	Duration Sturn Period Climate Storm 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2160 Winter 2160 Winter	Profile n(s) (mi (s) (yea Change <b>Return</b> <b>Period</b> 100 100 100 100 100 100 100 100 100 10	Ine (s) ns) 1: rs) (%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Volume (m <sup>3</sup> ) 0.000 0.000	DTS Status DVD Status ertia Status 5, 30, 60, 120 First (X) Surcharge 30/60 Winter 1/360 Winter 1/240 Winter 1/240 Winter 1/120 Winter 1/120 Winter 1/120 Winter 1/120 Winter 1/120 Winter	<pre>, 180, 24 First (Y) Flood Pipe ow Flow ) (1/s) 43.2 42.9</pre>	S 0, 360, 480 First (Z) Overflow Status SURCHARGED SURCHARGED	OFF ON ON Summer and 0, 600, 72 1440, 216 1, 0 Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 196.703 196.703 196.703 196.703 196.724 194.836 195.609 195.731	Depth (m) 3 2.533 2 2.722 3 3.103 4 3.180 5 1.455 9 2.288 2.436
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	US/MH Name S1 S2 S3 S4 S5 S6 S7	Duration Oturn Period Climate Storm 2160 Winter 2160 Winter	Profile n(s) (mi (s) (yea Change <b>Return</b> <b>Period</b> 100 100 100 100 100 100 100 100 100 10	Ine (s) ns) 1: rs) (%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Volume (m <sup>3</sup> ) 0.000 0.000 0.000	DTS Status DVD Status ertia Status 5, 30, 60, 120 First (X) Surcharge 30/60 Winter 30/60 Winter 1/360 Winter 1/240 Winter 1/240 Winter 1/120 Winter 1/120 Winter 1/120 Winter 1/120 Winter 1/120 Winter	<pre>, 180, 24 First (Y) Flood Pipe ow Flow ) (1/s) 43.2 42.9 13.3</pre>	S 0, 360, 480 First (Z) Overflow Surcharged SURCHARGED SURCHARGED	OFF ON ON Summer and 0, 600, 72 1440, 216 1, 0 Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 196.703 196.703 196.703 196.703 196.724 194.836 195.609 195.731	Depth (m) 3 2.533 2 2.722 3 3.103 4 3.180 5 1.455 9 2.288 2.436
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	US/MH Name S1 S2 S3 S4 S5 S6 S7	Duration Duration Climate Storm 2160 Winter 2160 Winter	Profile n(s) (mi (s) (yea Change <b>Return</b> <b>Period</b> 100 100 100 100 100 100 100 100 100 10	Ine (s) ns) 1: rs) (%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000	DTS Status DVD Status ertia Status 5, 30, 60, 120 First (X) Surcharge 30/60 Winter 1/360 Winter 1/240 Winter 1/240 Winter 1/120 Winter 1/120 Winter 1/120 Winter 1/120 Winter 1/120 Winter 1/120 Winter	<pre>, 180, 24 First (Y) Flood Pipe ow Flow ) (1/s) 43.2 42.9 13.3 5.6</pre>	S 0, 360, 480 First (Z) Overflow Surcharged SURCHARGED SURCHARGED SURCHARGED	OFF ON ON Summer and 0, 600, 72 1440, 216 1, 0 Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 196.703 196.703 196.703 196.703 196.724 194.836 195.609 195.731	Depth (m) 3 2.533 2 2.722 3 3.103 4 3.180 5 1.455 9 2.288 2.436
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	US/MH Name S1 S2 S3 S4 S5 S6 S7	Duration Sturn Period Climate Storm 2160 Winter 2160 Winter	Profile n(s) (mi (s) (yea Change <b>Return</b> <b>Period</b> 100 100 100 100 100 100 100 100 100 10	Ine (s) ns) 1: rs) (%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000 0.000	DTS Status DVD Status ertia Status 5, 30, 60, 120 First (X) Surcharge 30/60 Winter 1/360 Winter 1/240 Winter 1/240 Winter 1/120 Winter 1/120 Winter 1/120 Winter 1/120 Winter 1/120 Winter 1/120 Winter 1/120 Winter	<pre>, 180, 24 First (Y) Flood Pipe ow Flow ) (1/s) 43.2 42.9 13.3 5.6 24.7</pre>	S 0, 360, 480 First (Z) Overflow Surcharged SURCHARGED SURCHARGED SURCHARGED SURCHARGED	OFF ON ON Summer and 0, 600, 72 1440, 216 1, 0 Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 196.703 196.703 196.703 196.703 196.724 194.836 195.609 195.731	Depth (m) 3 2.533 2 2.722 3 3.103 4 3.180 5 1.455 9 2.288 2.436
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	US/MH Name S1 S2 S3 S4 S5 S6 S7	Duration Duration Climate Storm 2160 Winter 2160 Winter	Profile n(s) (mi (s) (yea Change <b>Return</b> <b>Period</b> 100 100 100 100 100 100 100 100 100 10	Ine (s) ns) 1: rs) (%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000	DTS Status DVD Status ertia Status 5, 30, 60, 120 First (X) Surcharge 30/60 Winter 1/360 Winter 1/240 Winter 1/240 Winter 1/120 Winter 1/120 Winter 1/120 Winter 1/120 Winter 1/120 Winter 1/120 Winter	<pre>, 180, 24 First (Y) Flood Pipe ow Flow ) (1/s) 43.2 42.9 13.3 5.6 24.7 18.8</pre>	S 0, 360, 480 First (Z) Overflow Surcharged SURCHARGED SURCHARGED SURCHARGED	OFF ON ON Summer and 0, 600, 72 1440, 216 1, 0 Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 196.703 196.703 196.703 196.703 196.724 194.836 195.609 195.731	Depth (m) 3 2.533 2 2.722 3 3.103 4 3.180 5 1.455 9 2.288 2.436

lydrock Consultants Ltd	Page 1	
	Fort Halstead	
	Catchment C	
	Micco	<u></u>
Date 04/09/2019	Designed by SM	
ile 10730-HYD-XX-XX-CA-C-Micro	Checked by	IQC
nnovyze	Network 2018.1.1	
STORM SEWER DES	SIGN by the Modified Rational Method	
Des	sign Criteria for Pond C	
Pipe Size	es STANDARD Manhole Sizes STANDARD	
	infall Model - England and Wales	
Return Period (ye		
	(mm) 20.700 Add Flow / Climate Change (%) 0 tio R 0.370 Minimum Backdrop Height (m) 0.200	
Maximum Rainfall (mm		
Maximum Time of Concentration (m		
Foul Sewage (1/s	s/ha) 0.000 Min Vel for Auto Design only (m/s) 1.00	
Volumetric Runoff Co	Coeff. 0.750 Min Slope for Optimisation (1:X) 500	
	Designed with Level Soffits e Area Diagram for Pond C	
	Time Area Time Area	
(	(mins) (ha) (mins) (ha)	
	0-4 0.386 4-8 0.234	
Total	Area Contributing (ha) = $0.620$	
	Area Contributing (ha) = $0.620$ tal Pipe Volume (m <sup>3</sup> ) = $16.434$	
	-	
Tota	-	
Tota <u>Networ</u> PN Length Fall Slope I.Are	ea T.E. Base k HYD DIA Section Type Auto	
Tota <u>Netwo</u>	ea T.E. Base k HYD DIA Section Type Auto	
Tota <u>Networ</u> PN Length Fall Slope I.Are (m) (m) (1:X) (ha)	<pre>tal Pipe Volume (m<sup>3</sup>) = 16.434 ork Design Table for Pond C ea T.E. Base k HYD DIA Section Type Auto ) (mins) Flow (1/s) (mm) SECT (mm) Design</pre>	
Tota <u>Networ</u> PN Length Fall Slope I.Are	<pre>cal Pipe Volume (m<sup>3</sup>) = 16.434 ork Design Table for Pond C ea T.E. Base k HYD DIA Section Type Auto (mins) Flow (1/s) (mm) SECT (mm) Design 20 5.00 0.0 0.600 o 750 Pipe/Conduit</pre>	
Tota <u>Networ</u> PN Length Fall Slope I.Are (m) (m) (1:X) (ha) S1.000 10.000 0.050 200.0 0.62	cal Pipe Volume (m³) = 16.434         ork Design Table for Pond C         ca T.E. Base k HYD DIA Section Type Auto         (mins) Flow (l/s) (mm) SECT (mm) Design         20       5.00       0.0 0.600 o       750 Pipe/Conduit         20       0.00       0.00 0.600 o       600 Pipe/Conduit	
Tota <u>Networ</u> PN Length Fall Slope I.Area (m) (m) (1:X) (ha) S1.000 10.000 0.050 200.0 0.62 S1.001 5.000 0.373 13.4 0.00	cal Pipe Volume (m³) = 16.434         ork Design Table for Pond C         ca T.E. Base k HYD DIA Section Type Auto (mins) Flow (1/s) (mm) SECT (mm) Design         20 5.00       0.0 0.600 o 750 Pipe/Conduit         20 0 0.00       0.0 0.600 o 600 Pipe/Conduit         20 0 0.00       0.0 0.600 o 600 Pipe/Conduit	
Tota <u>Networ</u> PN Length Fall Slope I.Area (m) (m) (1:X) (ha) S1.000 10.000 0.050 200.0 0.62 S1.001 5.000 0.373 13.4 0.00 S1.002 10.000 0.026 384.6 0.00	cal Pipe Volume (m³) = 16.434         ork Design Table for Pond C         ca T.E. Base k HYD DIA Section Type Auto (mins) Flow (1/s) (mm) SECT (mm) Design         20 5.00       0.0 0.600 o 750 Pipe/Conduit         20 0.00       0.0 0.600 o 600 Pipe/Conduit	
Netword           PN         Length (m)         Fall         Slope         I.Area           (m)         (m)         (1:X)         (ha)           \$1.000         10.000         0.050         200.0         0.62           \$1.001         5.000         0.373         13.4         0.00           \$1.002         10.000         0.026         384.6         0.00           \$1.003         5.000         0.013         384.6         0.00	cal Pipe Volume (m³) = 16.434         ork Design Table for Pond C         ca T.E. Base k HYD DIA Section Type Auto (mins) Flow (1/s) (mm) SECT (mm) Design         20 5.00       0.0 0.600 o 750 Pipe/Conduit         20 0.00       0.0 0.600 o 600 Pipe/Conduit	
PN         Length (m)         Fall (m)         Slope (1:X)         I.Area (ha)           \$1.000         10.000         0.050         200.0         0.62           \$1.001         5.000         0.373         13.4         0.00           \$1.002         10.000         0.026         384.6         0.00           \$1.003         5.000         0.013         384.6         0.00           \$1.004         10.000         0.060         166.7         0.00	cal Pipe Volume (m³) = 16.434         ork Design Table for Pond C         ca T.E. Base k HYD DIA Section Type Auto (mins) Flow (1/s) (mm) SECT (mm) Design         20 5.00       0.0 0.600 o         20 5.00       0.0 0.600 o         20 0.00       0.0 0.600 o	

### Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (1/s)	Add Flow (l/s)	Vel (m/s)	Cap (1/s)	Flow (l/s)
S1.000	50.00	5.08	197.723	0.620	0.0	0.0	0.0	1.98	872.6	84.0
S1.001	50.00	5.10	197.673	0.620	0.0	0.0	0.0	6.67	1887.1	84.0
S1.002	50.00	5.23	197.225	0.620	0.0	0.0	0.0	1.24	349.4	84.0
S1.003	50.00	5.30	197.199	0.620	0.0	0.0	0.0	1.24	349.4	84.0
S1.004	50.00	5.41	197.186	0.620	0.0	0.0	0.0	1.57	250.0	84.0
S1.005	50.00	5.57	197.126	0.620	0.0	0.0	0.0	1.03	163.9	84.0
S1.006	50.00	5.73	197.100	0.620	0.0	0.0	0.0	1.03	163.9	84.0
S1.007	50.00	5.89	197.074	0.620	0.0	0.0	0.0	1.03	163.9	84.0

Hydrock Consultants Ltd		Page 2
	Fort Halstead	
	Catchment C	
		Micro
Date 04/09/2019	Designed by SM	Drainage
File 10730-HYD-XX-XX-CA-C-Micro	Checked by	Diamage
Īnnovyze	Network 2018.1.1	

# Simulation Criteria for Pond C

Volumetric Runoff Coeff 0.750Additional Flow - % of Total Flow 0.000Areal Reduction Factor 1.000MADD Factor \* 10m³/ha Storage 2.000Hot Start (mins)0Hot Start Level (mm)0 Flow per Person per Day (1/per/day) 0.000Manhole Headloss Coeff (Global)0.500Foul Sewage per hectare (1/s)0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0 Number of Online Controls 2 Number of Storage Structures 3 Number of Real Time Controls 0

#### Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.700	Storm Duration (mins)	30
Ratio R	0.370		

Hydrock Consultant	s Ltd									Pag	je 3	
•			Fort H	alstead								
•			Catchm	ent C								
										Ν	/icro	
Date 04/09/2019			Design	ed by SM								
File 10730-HYD-XX-	XX-CA-C-Mic	ro	Checke	d by							Inain	aye
Īnnovyze			Networ	k 2018.1.	1							
Hudro-	Brake® Opti			DS /DN . S		Ve	lumo	(m <sup>3</sup> )	. 1-	1 0		
<u>Hydro-</u>	Brake® Opti	Lmum Man	<u>noie: 54</u> ,		1.003,	<u></u> VO	<u>une</u>	e (III )	): 1.	1.8		
				ence MD-SHE-	-0103-5	000-						
			esign Head				1	.200				
		Des	ign Flow (1			~		5.0				
			Flush-H	clom cive Minim:			alcul					
			Applicat		lse ups	trea		face				
			Sump Availa				Sur	Yes				
			Diameter					103				
		In	vert Level	(m)			197	.199				
	Minimum Out	tlet Pipe	Diameter	(mm)				150				
	Suggested	d Manhole	Diameter	(mm)				1200				
Control	Points	Head (m)	Flow (l/s)	Cont	rol Poi	nts		Head	(m) 1	Flow (	1/s)	
Design Point (	(Calculated)	1.200	5.0		K	lick-	Flo®	0.	745		4.0	
	Flush-Flo™	0.354	5.0	Mean Flow	over He	ad F	Range		-		4.4	
The hydrological cal	lculations ha	ve been b	ased on the	e Head/Discl	harge re	elat	ionsh	ip foi	r the	Hvdro	-Brak	e®
Optimum as specified					-			-		-		
then these storage 1	routing calcu	lations w	ill be inva	alidated								
Depth (m) Flow (l/s)	Depth (m) Fl	Low (l/s)	Depth (m)	Flow (l/s)	Depth	(m)	Flow	(l/s)	Dept	:h (m)	Flow	(1/s)
0.100 3.4	0.800	4.1	2.000	6.3	4.	000		8.8		7.000		11.5
0.200 4.7	1.000	4.6	2.200	6.6	4.	500		9.3		7.500		11.8

0.200	4.7	1.000	4.6	2.200	6.6	4.500	9.3	7.500	11.8
0.300	5.0	1.200	5.0	2.400		5.000		8.000	12.2
0.400	5.0	1.400	5.4	2.600	7.2	5.500	10.2	8.500	12.6
0.500	4.9	1.600	5.7	3.000	7.7	6.000	10.7		12.9
0.600	4.7	1.800	6.0	3.500	8.3	6.500	11.1	9.500	13.3
	1		1				1		

	nsultants	Ltd									Page 4
					Fort H	lalstea	ad				
					Catchm	nent C					
ate 04/09/	2019				Design	ed by	SM				Micro
ile 10730-		-CA-C-	Micro		Checke	-	011				Drainage
nnovyze					Networ	k 2018	8.1.1				
			C+	orago	Struct	11700	For Por	ad C			
			<u>30</u>	Ulaye	SLIUCL	ures i	<u>.01 POI</u>				
							,				
		-	<u>Tank or</u>	Pond	Manhol	e: S3,	DS/PI	N: S1.0	02		
				Inve	ert Level	l (m) 1	97.300				
Depth (m)	Area (m²)	Depth (	m) Area	(m²) D	epth (m)	Area	(m²)   Dej	pth (m)	Area (m²)	Depth (m	ı) Area (m²)
0.000	380.0	1.2	00 9	07.7	2.400	16	61.6	3.600	2641.7	4.80	3848.0
0.200			00 10 00 11	17.7	2.600	18 19	09.3	3.800 4.000		5.00	4071.1
	530.8 615.6			256.4		212		4.000 4.200			
0.800	706.7	2.0		85.2	3.200		39.9	4.400			
1.000	804.1	2.2	00 15	20.3	3.400	24	52.7	4.600	3631.3		
		Dee	p Bore	Soaka	way Man	hole:	S5, D3	S/PN: S	1.004		
	Ch amh a m	Torrowt	Terrel (	m) 172	106 Tmf	iltti		ficiant	Daga (m/h		0
	Chamber Chamber Di					iltrati	on Coer		Base (m/h) fety Facto		
			ameter (								
	В	orehole	Depth (	m) 18	.000						
			Side		Side		Side	1	Side		
		-		-	Infil.	-		-	Infil.		
		(m)	Coef. (m/hr)	(m)	Coef. (m/hr)	(m)	Coef. (m/hr)	(m)	Coef. (m/hr)		
		0 000				0 001		10 000			
		0.000	0.77000	8.000	0.77000	8.001	0.00000	18.000	0.00000		
		Dee	p Bore	Soaka	<u>way Man</u>	hole:	S6, D5	S/PN: S	1.005		
	Chamber	Invert	Level (	m) 178	.976 Inf	iltrati	on Coef	ficient	Base (m/hı	c) 0.7700	0
	Chamber Di		5 1	,	.350			Sa	fety Facto	or 2.	0
			ameter ( Depth (		.300 .000						
			-	,				1			
			Side		Side	Depth	Side	Depth	Side		
		Depth	Infil.	Depth	Infil.		INTIL.		INTIL.		
		Depth (m)	Infil. Coef.	Depth (m)	Infil. Coef.	(m)	Coef.	(m)	Infil. Coef.		
		-		-				_			
		(m)	Coef. (m/hr)	- (m)	Coef. (m/hr)	(m)	Coef. (m/hr)	_	Coef. (m/hr)		

lydrock Consultants Ltd		Page 5
	Fort Halstead	
	Catchment C	
		Micco
Date 04/09/2019	Designed by SM	Micro
ile 10730-HYD-XX-XX-CA-C-Micro		Drainage
	Network 2018.1.1	
nnovyze	Network 2010.1.1	
Areal Reducti Hot Star Hot Start L	<u>Simulation Criteria</u> on Factor 1.000 Additional Flow - % of Total ct (mins) 0 MADD Factor * 10m <sup>3</sup> /ha St evel (mm) 0 Inlet Coeffie (Global) 0.500 Flow per Person per Day (1/per are (1/s) 0.000	Flow 0.000 orage 2.000 cient 0.800
Number of Input Hydrographs	) Number of Offline Controls 0 Number of Tim 2 Number of Storage Structures 3 Number of Rea	5
	Synthetic Rainfall Details	
Rainfall Model Region Er	FSR M5-60 (mm) 20.700 Cv (Summer) gland and Wales Ratio R 0.369 Cv (Winter)	
Margin for Flood	l Risk Warning (mm) 3 Analysis Timestep 2.5 Second Increment (Exter DTS Status DVD Status Inertia Status	OFF ON
	Inertia Status	ON
Profile( Duration(s) (min	s) Summer s) 15, 30, 60, 120, 180, 240, 360, 480, 600	and Winter , 720, 960,
	s) Summer s) 15, 30, 60, 120, 180, 240, 360, 480, 600 1440, s)	and Winter
Duration(s) (min Return Period(s) (year Climate Change (	s) Summer s) 15, 30, 60, 120, 180, 240, 360, 480, 600 1440, %) imate First (X) First (Y) First (Z) Overf	and Winter , 720, 960, 2160, 2880 1, 30, 100 0, 0, 40 Water Surcharged low Level Depth
Duration(s) (min Return Period(s) (year Climate Change ( US/MH Return CI PN Name Storm Period C	s) Summer s) 15, 30, 60, 120, 180, 240, 360, 480, 600 1440, %) imate First (X) First (Y) First (Z) Overf mange Surcharge Flood Overflow Act	and Winter , 720, 960, 2160, 2880 1, 30, 100 0, 0, 40 Water Surcharged low Level Depth (m) (m)
Duration(s) (min Return Period(s) (year Climate Change ( US/MH Return CJ PN Name Storm Period C S1.000 S1 15 Winter 1	s) Summer s) 15, 30, 60, 120, 180, 240, 360, 480, 600 1440, %) imate First (X) First (Y) First (Z) Overf	and Winter , 720, 960, 2160, 2880 1, 30, 100 0, 0, 40 Water Surcharged low Level Depth . (m) (m) 197.933 -0.540
Duration(s) (min Return Period(s) (year Climate Change ( US/MH Return CJ PN Name Storm Period C S1.000 S1 15 Winter 1	s) Summer s) 15, 30, 60, 120, 180, 240, 360, 480, 600 1440, s) %) imate First (X) First (Y) First (Z) Overf mange Surcharge Flood Overflow Act +0%	and Winter , 720, 960, 2160, 2880 1, 30, 100 0, 0, 40 Water Surcharged low Level Depth (m) (m)
Duration(s) (min Return Period(s) (year Climate Change ( US/MH Return CI PN Name Storm Period C S1.000 S1 15 Winter 1 S1.001 S2 15 Winter 1	s) Summer s) 15, 30, 60, 120, 180, 240, 360, 480, 600 1440, s) %) imate First (X) First (Y) First (Z) Overf hange Surcharge Flood Overflow Act +0% +0%	and Winter , 720, 960, 2160, 2880 1, 30, 100 0, 0, 40 Water Surcharged low Level Depth . (m) (m) 197.933 -0.540 197.824 -0.449
Duration(s) (min Return Period(s) (year Climate Change ( US/MH Return CI PN Name Storm Period C S1.000 S1 15 Winter 1 S1.001 S2 15 Winter 1 S1.002 S3 600 Winter 1 S1.003 S4 600 Winter 1 S1.004 S5 600 Winter 1	s) Summer s) 15, 30, 60, 120, 180, 240, 360, 480, 600 1440, s) %) imate First (X) First (Y) First (Z) Overf hange Surcharge Flood Overflow Act +0% +0% +0% 100/60 Winter +0% 100/60 Summer +0% 30/180 Winter	and Winter , 720, 960, 2160, 2880 1, 30, 100 0, 0, 40 Water Surcharged low Level Depth . (m) (m) 197.933 -0.540 197.824 -0.449 197.487 -0.338 197.487 -0.312 197.426 -0.210
Duration(s) (min Return Period(s) (year Climate Change ( US/MH Return CI PN Name Storm Period C S1.000 S1 15 Winter 1 S1.001 S2 15 Winter 1 S1.002 S3 600 Winter 1 S1.003 S4 600 Winter 1 S1.004 S5 600 Winter 1 S1.005 S6 600 Winter 1	s) Summer s) 15, 30, 60, 120, 180, 240, 360, 480, 600 1440, s) %) imate First (X) First (Y) First (Z) Overf hange Surcharge Flood Overflow Act +0% +0% +0% 100/60 Winter +0% 30/180 Winter +0% 30/120 Winter	and Winter , 720, 960, 2160, 2880 1, 30, 100 0, 0, 40 Water Surcharged low Level Depth . (m) (m) 197.933 -0.540 197.824 -0.449 197.487 -0.338 197.487 -0.312 197.426 -0.210 197.426 -0.150
Duration(s)         (min           Return Period(s)         (year           Climate Change (           US/MH         Return Cl           PN         Name         Storm         Period         Cl           \$1.000         \$1         15         Winter         1           \$1.001         \$2         15         Winter         1           \$1.002         \$3         600         Winter         1           \$1.003         \$4         600         Winter         1           \$1.004         \$5         600         Winter         1           \$1.005         \$6         600         Winter         1           \$1.006         \$7         600         Winter         1	s) Summer s) 15, 30, 60, 120, 180, 240, 360, 480, 600 1440, s) %) imate First (X) First (Y) First (Z) Overf hange Surcharge Flood Overflow Act +0% +0% +0% 100/60 Winter +0% 100/60 Summer +0% 30/180 Winter +0% 30/120 Summer	and Winter , 720, 960, 2160, 2880 1, 30, 100 0, 0, 40 Water Surcharged low Level Depth . (m) (m) 197.933 -0.540 197.824 -0.449 197.487 -0.338 197.487 -0.312 197.426 -0.210 197.426 -0.150 197.426 -0.124
Duration(s) (min Return Period(s) (year Climate Change ( US/MH Return CJ PN Name Storm Period C S1.000 S1 15 Winter 1 S1.001 S2 15 Winter 1 S1.002 S3 600 Winter 1 S1.003 S4 600 Winter 1 S1.004 S5 600 Winter 1 S1.005 S6 600 Winter 1	s) Summer s) 15, 30, 60, 120, 180, 240, 360, 480, 600 1440, s) %) imate First (X) First (Y) First (Z) Overf hange Surcharge Flood Overflow Act +0% +0% +0% 100/60 Winter +0% 30/180 Winter +0% 30/120 Winter	and Winter , 720, 960, 2160, 2880 1, 30, 100 0, 0, 40 Water Surcharged low Level Depth . (m) (m) 197.933 -0.540 197.824 -0.449 197.487 -0.338 197.487 -0.312 197.426 -0.210 197.426 -0.150
Duration(s)         (min           Return Period(s)         (year           Climate Change (           US/MH         Return Cl           PN         Name         Storm         Period         Cl           \$1.000         \$1         15         Winter         1           \$1.001         \$2         15         Winter         1           \$1.002         \$3         600         Winter         1           \$1.003         \$4         600         Winter         1           \$1.004         \$5         600         Winter         1           \$1.005         \$6         600         Winter         1           \$1.006         \$7         600         Winter         1	<pre>s) Summer s) 15, 30, 60, 120, 180, 240, 360, 480, 600</pre>	and Winter , 720, 960, 2160, 2880 1, 30, 100 0, 0, 40 Water Surcharged low Level Depth . (m) (m) 197.933 -0.540 197.824 -0.449 197.487 -0.338 197.487 -0.312 197.426 -0.210 197.426 -0.150 197.426 -0.124
Duration(s)         (min           Return Period(s)         (year           Climate Change (           US/MH         Return CI           PN         Name         Storm         Period         CI           \$1.000         \$1         15         Winter         1           \$1.001         \$2         15         Winter         1           \$1.002         \$3         600         Winter         1           \$1.003         \$4         600         Winter         1           \$1.004         \$5         600         Winter         1           \$1.005         \$6         600         Winter         1           \$1.006         \$7         600         Winter         1           \$1.007         \$8         600         Winter         1	<pre>s) Summer s) 15, 30, 60, 120, 180, 240, 360, 480, 600</pre>	and Winter , 720, 960, 2160, 2880 1, 30, 100 0, 0, 40 Water Surcharged low Level Depth . (m) (m) 197.933 -0.540 197.824 -0.449 197.487 -0.338 197.487 -0.312 197.426 -0.210 197.426 -0.150 197.426 -0.124
Duration(s) (min Return Period(s) (year Climate Change ( US/MH Return CI PN Name Storm Period CI S1.000 S1 15 Winter 1 S1.001 S2 15 Winter 1 S1.002 S3 600 Winter 1 S1.003 S4 600 Winter 1 S1.004 S5 600 Winter 1 S1.005 S6 600 Winter 1 S1.006 S7 600 Winter 1 S1.007 S8 600 Winter 1	<pre>s) Summer s) 15, 30, 60, 120, 180, 240, 360, 480, 600</pre>	and Winter , 720, 960, 2160, 2880 1, 30, 100 0, 0, 40 Water Surcharged low Level Depth . (m) (m) 197.933 -0.540 197.824 -0.449 197.487 -0.338 197.487 -0.312 197.426 -0.210 197.426 -0.120 197.426 -0.124 197.426 -0.098
Duration(s)         (min           Return Period(s)         (year           Climate Change (           US/MH         Return CI           PN         Name         Storm         Period         CI           \$1.000         \$1         15         Winter         1           \$1.001         \$2         15         Winter         1           \$1.002         \$3         600         Winter         1           \$1.003         \$4         600         Winter         1           \$1.004         \$5         600         Winter         1           \$1.005         \$6         600         Winter         1           \$1.006         \$7         600         Winter         1           \$1.007         \$8         600         Winter         1	<pre>s) Summer s) 15, 30, 60, 120, 180, 240, 360, 480, 600</pre>	and Winter , 720, 960, 2160, 2880 1, 30, 100 0, 0, 40 Water Surcharged low Level Depth . (m) (m) 197.933 -0.540 197.824 -0.449 197.487 -0.338 197.487 -0.312 197.426 -0.210 197.426 -0.120 197.426 -0.124 197.426 -0.098
Duration(s) (min Return Period(s) (year Climate Change ( US/MH Return CI PN Name Storm Period CI S1.000 S1 15 Winter 1 S1.001 S2 15 Winter 1 S1.002 S3 600 Winter 1 S1.003 S4 600 Winter 1 S1.004 S5 600 Winter 1 S1.005 S6 600 Winter 1 S1.006 S7 600 Winter 1 S1.007 S8 600 Winter 1	<pre>s) Summer s) 15, 30, 60, 120, 180, 240, 360, 480, 600</pre>	and Winter , 720, 960, 2160, 2880 1, 30, 100 0, 0, 40 Water Surcharged low Level Depth . (m) (m) 197.933 -0.540 197.824 -0.449 197.487 -0.338 197.487 -0.312 197.426 -0.210 197.426 -0.150 197.426 -0.124 197.426 -0.098
Duration(s) (min Return Period(s) (year Climate Change ( US/MH Return CJ PN Name Storm Period C S1.000 S1 15 Winter 1 S1.001 S2 15 Winter 1 S1.002 S3 600 Winter 1 S1.003 S4 600 Winter 1 S1.004 S5 600 Winter 1 S1.005 S6 600 Winter 1 S1.005 S6 600 Winter 1 S1.007 S8 600 Winter 1 S1.000 S1 5 S1.000 S1 5	s) Summer s) 15, 30, 60, 120, 180, 240, 360, 480, 600 1440, s) %) imate First (X) First (Y) First (Z) Overf hange Surcharge Flood Overflow Act +0% +0% +0% 100/60 Winter +0% 100/60 Summer +0% 30/180 Winter +0% 30/120 Summer +0% 30/120 Summer +0% 30/60 Winter Flooded Pipe Volume Flow / Overflow Flow Level (m <sup>3</sup> ) Cap. (1/s) (1/s) Status Exceede 0.000 0.17 86.0 OK 0.000 0.14 86.5 OK	and Winter , 720, 960, 2160, 2880 1, 30, 100 0, 0, 40 Water Surcharged low Level Depth . (m) (m) 197.933 -0.540 197.824 -0.449 197.487 -0.338 197.487 -0.312 197.426 -0.210 197.426 -0.150 197.426 -0.124 197.426 -0.098
Duration(s) (min Return Period(s) (year Climate Change ( US/MH Return CI PN Name Storm Period C S1.000 S1 15 Winter 1 S1.001 S2 15 Winter 1 S1.002 S3 600 Winter 1 S1.003 S4 600 Winter 1 S1.004 S5 600 Winter 1 S1.005 S6 600 Winter 1 S1.005 S6 600 Winter 1 S1.006 S7 600 Winter 1 S1.007 S8 600 Winter 1 S1.007 S8 600 Winter 1 S1.007 S8 600 Winter 3 S1.007 S8 600 Winter 3 S1.000 S1 S1.000 S1 S1 S1.000 S1 S1 S1 S1.000 S1 S1 S1 S1 S1 S1 S1 S1 S1 S1	s) Summer s) 15, 30, 60, 120, 180, 240, 360, 480, 600 1440, s) %) imate First (X) First (Y) First (Z) Overf hange Surcharge Flood Overflow Act +0% +0% +0% 100/60 Winter +0% 100/60 Summer +0% 30/180 Winter +0% 30/120 Summer +0% 30/120 Summer +0% 30/120 Summer +0% 30/60 Winter Flooded Pipe Volume Flow / Overflow Flow Level (m <sup>3</sup> ) Cap. (1/s) (1/s) Status Exceede 0.000 0.17 86.0 OK 0.000 0.14 86.5 OK 0.000 0.02 3.0 OK	and Winter , 720, 960, 2160, 2880 1, 30, 100 0, 0, 40 Water Surcharged low Level Depth . (m) (m) 197.933 -0.540 197.824 -0.449 197.487 -0.338 197.487 -0.312 197.426 -0.210 197.426 -0.150 197.426 -0.124 197.426 -0.098
Duration(s) (min Return Period(s) (year Climate Change ( US/MH Return CI PN Name Storm Period C S1.000 S1 15 Winter 1 S1.001 S2 15 Winter 1 S1.002 S3 600 Winter 1 S1.003 S4 600 Winter 1 S1.004 S5 600 Winter 1 S1.005 S6 600 Winter 1 S1.005 S6 600 Winter 1 S1.006 S7 600 Winter 1 S1.007 S8 600 Winter 1 S1.007 S8 600 Winter 1 S1.007 S8 600 Winter 3 S1.007 S1 S1.000 S1 S1 S1.000 S1 S1 S1 S1 S1 S1 S1 S1 S1 S1	s) Summer s) 15, 30, 60, 120, 180, 240, 360, 480, 600 1440, s) %) imate First (X) First (Y) First (Z) Overf hange Surcharge Flood Overflow Act +0% +0% +0% 100/60 Winter +0% 100/60 Summer +0% 30/180 Winter +0% 30/120 Summer +0% 30/120 Summer +0% 30/60 Winter Flooded Pipe Volume Flow / Overflow Flow Level (m <sup>3</sup> ) Cap. (1/s) (1/s) Status Exceede 0.000 0.17 86.0 OK 0.000 0.14 86.5 OK 0.000 0.02 3.0 OK 0.000 0.01 2.9 OK	and Winter , 720, 960, 2160, 2880 1, 30, 100 0, 0, 40 Water Surcharged low Level Depth . (m) (m) 197.933 -0.540 197.824 -0.449 197.487 -0.338 197.487 -0.312 197.426 -0.210 197.426 -0.150 197.426 -0.124 197.426 -0.098
Duration(s) (min Return Period(s) (year Climate Change ( US/MH Return CI PN Name Storm Period C S1.000 S1 15 Winter 1 S1.001 S2 15 Winter 1 S1.002 S3 600 Winter 1 S1.003 S4 600 Winter 1 S1.004 S5 600 Winter 1 S1.005 S6 600 Winter 1 S1.005 S6 600 Winter 1 S1.006 S7 600 Winter 1 S1.007 S8 600 Winter 1 S1.007 S8 600 Winter 1 S1.007 S8 600 Winter 3 S1.001 S2 S1.000 S1 S1.000 S1 S1 S1.000 S1 S1 S1 S1 S1 S1 S1 S1 S1 S1	s) Summer s) 15, 30, 60, 120, 180, 240, 360, 480, 600 1440, s) %) imate First (X) First (Y) First (Z) Overf hange Surcharge Flood Overflow Act +0% +0% +0% 100/60 Winter +0% 30/180 Winter +0% 30/120 Summer +0% 30/120 Summer +0% 30/120 Summer +0% 30/60 Winter Flooded Pipe Volume Flow / Overflow Flow Level (m <sup>3</sup> ) Cap. (1/s) (1/s) Status Exceede 0.000 0.17 86.0 OK 0.000 0.14 86.5 OK 0.000 0.01 2.9 OK	and Winter , 720, 960, 2160, 2880 1, 30, 100 0, 0, 40 Water Surcharged low Level Depth . (m) (m) 197.933 -0.540 197.824 -0.449 197.487 -0.338 197.487 -0.312 197.426 -0.210 197.426 -0.120 197.426 -0.124 197.426 -0.098
Duration(s) (min Return Period(s) (year Climate Change ( US/MH Return CI PN Name Storm Period C S1.000 S1 15 Winter 1 S1.001 S2 15 Winter 1 S1.002 S3 600 Winter 1 S1.003 S4 600 Winter 1 S1.004 S5 600 Winter 1 S1.005 S6 600 Winter 1 S1.005 S6 600 Winter 1 S1.006 S7 600 Winter 1 S1.007 S8 600 Winter 1 S1.007 S8 600 Winter 3 S1.001 S2 S1.000 S1 S1.000 S1 S1 S1.000 S1 S1 S1.000 S1 S1 S1.000 S1 S1 S1.000 S1 S1 S1 S1.000 S1 S1 S1.000 S1 S1 S1 S1.000 S1 S1 S1 S1 S1 S1 S1 S1 S1 S1	<pre>s) Summer s) 15, 30, 60, 120, 180, 240, 360, 480, 600 1440, s) %) imate First (X) First (Y) First (Z) Overf hange Surcharge Flood Overflow Act +0% +0% +0% 100/60 Winter +0% 100/60 Summer +0% 30/120 Winter +0% 30/120 Winter +0% 30/120 Summer +0% 30/120 Summer +0% 30/60 Winter Flooded Pipe Volume Flow / Overflow Flow Level (m<sup>3</sup>) Cap. (1/s) Status Exceede 0.000 0.17 86.0 OK 0.000 0.14 86.5 OK 0.000 0.14 86.5 OK 0.000 0.01 2.9 OK 0.000 0.01 1.9 OK 0.000 0.01 1.9 OK</pre>	and Winter , 720, 960, 2160, 2880 1, 30, 100 0, 0, 40 Water Surcharged low Level Depth . (m) (m) 197.933 -0.540 197.824 -0.449 197.487 -0.338 197.487 -0.312 197.426 -0.210 197.426 -0.120 197.426 -0.124 197.426 -0.098

Hudrock	Concui	ltants Ltd	1								Paga 6
Hydrock (	consu.	Ltants Lto			For	t Hals	tood				Page 6
•						chment					
•					Cal	.ciiiieiit					
• Date 04/	00/202	1.0			Doo	igned	hu CM				Micro
		D-XX-XX-CA	-C-Mia	<b>m</b> 0		-	-				Drainage
				10		cked b					J
Innovyze					Net	WOIK Z	2018.1.1				
<u>30 yea</u>	<u>r Ret</u> Ma umber c Number	Area Hc anhole Headl Foul Sewage of Input Hyd of Online Rainfal: Margin Duratic	l Reduc Hot S t Start oss Coe per he rograph Control: L Model Region for Flo Profil	tion Fact tart (min Level (r ff (Globa ctare (1, s 0 Nuu s 2 Numb S 2 Numb S S S S S S S S S S S S S S S S S S S	<u>Simul</u> tor 1.0 ns) nm) al) 0.5 /s) 0.0 /s) 0.0 /s) 0.0 /s) 0.0 /s) 0.0 /s) 0.5 /s /s mber of S mber of S frand Wal Warning vsis Tim DTS S DVD S hertia S	al Resu ation C: 00 Add 0 00 Flow 00 Flow 00 Offling torage S 2 Rainfa SR M5-6 es R (mm) nestep 2 Status Status	<u>ilts by l</u> <u>riteria</u> ditional F MADD Fac per Persc Controls Structures <u>ll Detail</u> 0 (mm) 20 atio R 0	Flow - % of ctor * 10m <sup>3</sup> Inlet C on per Day s 0 Number s 3 Number <u>s</u> .700 Cv (S) .369 Cv (W) Increment	Total Flo /ha Storag oeffiecier (l/per/day of Time/A: of Real T: ummer) 0.7 inter) 0.8 300. (Extended OF 0 0 Summer and 0, 600, 72 1440, 216 1,	ow 0.000 ge 2.000 nt 0.800 y) 0.000 rea Diag ime Cont 750 340 0 .) F N N N N i Winter 20, 960,	) ) grams O crols O
	US/MH		Beturn	Climate	First	· (X)	First (V)	First (Z)	Overflow		Surcharged
PN	Name	Storm		Change	Surch		Flood	Overflow	Act.	(m)	(m)
01 000	01	15 57	20							100 000	-0.407
S1.000 S1.001	S1 S2	15 Winter 15 Winter	30 30	+0응 +0응						198.066	
S1.002	S3	960 Winter	30	+0%	100/60	Winter				197.786	
S1.003		960 Winter	30		100/60					197.786	
S1.004		960 Winter	30		30/180					197.726	
S1.005 S1.006		960 Winter 960 Winter	30 30		30/120 30/120					197.726 197.726	
s1.000		960 Winter	30		30/60					197.726	
							Disc				
			IIS/MH	Flooded Volume		Overf1	Pipe ow Flow		Level		
		PN	Name	(m <sup>3</sup> )	Cap.	(1/s)		Status	Exceeded		
		S1.00					212.3	OK			
		S1.00					211.5	OK			
		S1.00					2.6 2.6	OK			
		S1.00 S1.00						OK SURCHARGED			
		S1.00 S1.00						SURCHARGED			
		S1.00						SURCHARGED			
		s1.00						SURCHARGED			
1											

Hydrock	Consu	ltant	ts Ltd								I	Page 7
•						For	t Hals	tead				
						Cat	chment	С				
												Micco
Date 04/	09/20	19				Des	igned	by SM				
File 107	30-НҮ	D-XX-	-XX-CA-	C-Mic:	ro	Che	cked b	У				Drainage
Īnnovyze	1					Net	work 2	018.1.1				
<u>100 ye</u>	ar Re	turn	Period	Summa	ary of	Critic	al Res	ults by	Maximum I	Level (Ra	unk 1)	for Pond C
			Areal	Reduct	ion Fact		<u>ation Cr</u> )0 Add		Flow - % of	Total Flo	w 0.000	
					art (mir			MADD Fa	ctor * 10m³			
	м	anhold			Level (n			nor Pore	Inlet C on per Day	peffiecien		
	11				ctare (1/			per rers	on per bay	(1) per / day	, 0.000	
N		-	-						s 0 Number s 3 Number		-	
					91	nthatic	Painfa	ll Detail	e			
		R	ainfall	Model	<u>5 y</u>				<u>.5</u> ).700 Cv (Si	ummer) 0.7	50	
			F	Region	England	and Wal	es Ra	atio R (	.369 Cv (Wi	nter) 0.8	40	
			Margin	for Flo	od Risk	-		5 0		300.0		
					Analy		estep 2 tatus	.5 Second	l Increment	(Extended) OFI		
							tatus			01		
					In	ertia S	tatus			01	N	
				Profil	. ,					Summer and		
			Duratior	n(s) (m	ins) 1	5, 30,	60, 120	, 180, 2	40, 360, 480	), 600, 72 1440, 216		
	F	Return	Period	(s) (ye	ars)						30, 2000 30, 100	
			Climate	Change	(응)					0	, 0, 40	
	US/MH			Return	Climate	Firs	t (X)	First (Y	) First (Z)	Overflow		Surcharged Depth
PN	Name	St	orm	Period	Change	Surcl	harge	Flood	Overflow	Act.	(m)	(m)
S1.000	S1		Winter	100	+40%						198.225	
S1.001			Winter	100	+40%	100/00	57. j				198.181	
S1.002 S1.003			Winter Winter	100 100			Winter Summer				198.181	
s1.004			Winter	100			Winter				198.121	
S1.005	S6	1440	Winter	100	+40%	30/120	Winter				198.122	0.546
S1.006			Winter	100			Summer				198.122	
S1.007	S8	1440	Winter	100	+40%	30/60	Winter				198.122	0.598
					Flooded			Pipe				
					Volume				0+-+	Level		
			PN	Name	(m³)	Cap.	(1/s)	(1/s)	Status	Exceeded		
			S1.000			0.77		385.9	OK			
			S1.001					19.0	OK			
			S1.002 S1.003		0.000 0.000	0.02			SURCHARGED SURCHARGED			
			S1.003		0.000	0.01			SURCHARGED			
			s1.005			0.01			SURCHARGED			
			S1.006			0.01			SURCHARGED			
			S1.007	S8	0.000	0.00		0.0	SURCHARGED			

Hydrock Consultants Ltd			Page 1
	Fort Halstead		
	Catchment D		
			Micco
Date 04/09/2019	Designed by SM		
File 10730-HYD-XX-XX-CA-C-Micro	Checked by		Drainage
Īnnovyze	Network 2018.1.1		
STORM SEWER DE	IGN by the Modified Ra	tional Method	
<u>De</u> .	ign Criteria for Pond	<u>D</u>	
Pipe Size	s STANDARD Manhole Sizes S'	TANDARD	
FSR Ra	nfall Model - England and W	Wales	
Return Period (y	ears) 1	PIMP (%)	100
M5-60	(mm) 20.700 Add Fl	.ow / Climate Change (%)	0
		.mum Backdrop Height (m)	
Maximum Rainfall (m	n/hr) 50 Maxi	.mum Backdrop Height (m)	1.500
Maximum Time of Concentration (			
Foul Sewage (1/		Auto Design only (m/s)	
Volumetric Runoff C	oeff. 0.750 Min Slope	for Optimisation (1:X)	500
I	esigned with Level Soffits		
	5		
Netwo	rk Design Table for Por	<u>1d D</u>	
	a T.E. Base k (mins) Flow (l/s) (mm)		Auto Design
S1.000 10.000 0.050 200.0 0.9	4 5.00 0.0 0.600	o <mark>600</mark> Pipe/Conduit	a
		(00 D' (0 1 ')	<u> </u>

S1.001 5.000 0.373 13.4 0.000 0.00 0.0 0.600 o 600 Pipe/Conduit **666666** S1.002 10.000 0.026 384.6 0.000 0.00 0.0 0.600 o 600 Pipe/Conduit \$1.0035.0000.013384.60.000\$1.00410.0000.060166.70.000 o 600 Pipe/Conduit o 600 Pipe/Conduit 0.00 0.0 0.600 0.0 0.600 0.00 s1.005 10.000 0.026 384.6 0.000 0.0 0.600 o 600 Pipe/Conduit 0.00 S1.006 10.000 0.026 384.6 0.000 0.00 0.0 0.600 o 600 Pipe/Conduit \$1.007 10.000 0.026 384.6 0.000 0.00 0.0 0.600 o 600 Pipe/Conduit

### Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (1/s)	Flow (l/s)
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005	50.00 50.00 50.00 50.00 50.00 50.00	5.11 5.24 5.31 5.40	<b>197.723</b> 197.673 197.300 197.274 197.261 197.201	0.984 0.984 0.984 0.984 0.984 0.984 0.984	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	1.72 6.67 1.24 1.24 1.88 1.24	485.8 1887.1 349.4 349.4 532.6 349.4	133.2 133.2 133.2 133.2
s1.006 s1.007	50.00	5.67	197.175 197.149	0.984	0.0	0.0	0.0	1.24	349.4 349.4	133.2

#### Simulation Criteria for Pond D

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow 0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins)	0	Inlet Coeffiecient 0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day) 0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins) 60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins) 1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0 Number of Online Controls 2 Number of Storage Structures 3 Number of Real Time Controls 0

#### Synthetic Rainfall Details

. Fort Halstead Catchment D
Micco
· Date 04/09/2019 Designed by SM File 10730-HYD-XX-XX-CA-C-Micro Checked by
Innovyze Network 2018.1.1
Synthetic Rainfall Details
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 20.700 Cv (Winter) 0.840
M5-60 (mm)20.700Cv (Winter)0.840Ratio R0.370 Storm Duration (mins)30Profile TypeSummer
Profile Type Summer

Hydrock Consultant	s Ltd								Pag	ge 3	
•			Fort H	alstead							
			Catchm	ent D							
									N	licco	
Date 04/09/2019			Design	esigned by SM							
File 10730-HYD-XX-	-ХХ-СА-С-Мі	cro	Checke	d by						)rain	lage
Īnnovyze			Networ	k 2018.1.	1						
				els for Po							
<u>Hydro</u>	<u>-Brake® Opt</u>	cimum Man	hole: S4,	DS/PN: S	1.003,	Volu	ime (m³	): 1	1.4		
			Unit Refere	nce MD-SHE-	-0103-50	00-120	0-5000				
Design Head (m) 1.200											
		Des	ign Flow (l				5.0				
			Flush-E				culated				
			-	ive Minimi	ise upst		-				
			Applicat			2	Surface				
			Sump Availa Diameter (				Yes 103				
		Tn	vert Level	,		1	103				
	Minimum O		Diameter (	. ,		-	150				
			Diameter (				1200				
Control	Points	Head (m)	Flow (l/s)	Conti	rol Poir	its	Head	(m)	Flow (	1/s)	
Design Point	(Calculated)	1.200	5.0		K	ick-Fl	o® 0	.745		4.0	
	Flush-Flo <sup>™</sup>	0.354	5.0	Mean Flow	over He	ad Ran	ge	-		4.4	
The hydrological ca Optimum as specifie then these storage Depth (m) Flow (1/s)	d. Should a routing calc	nother typ ulations w	e of contro ill be inva	ol device ot alidated	ther tha	n a Hy	ydro-Bra	ke Op	timum®	be u	tilised
Depon (m) 110w (1/S)		210w (1/S)	Depth (III)	110w (1/S)	Depui	() ET	Um (1/5)	Lebi	(111)	TTOM.	(1/3)
0.100 3.4		4.1	2.000	6.3	-	000	8.8		7.000		11.5
0.200 4.7	1.000	4.6	2.200	6.6	4.5	500	9.3	3	7.500		11.8

0.100	2.7	0.000		2.000	0.5	4.000	0.0	1.000	11.5
0.200	4.7	1.000	4.6	2.200	6.6	4.500	9.3	7.500	11.8
0.300	5.0	1.200	5.0	2.400			9.8	8.000	12.2
0.400	5.0	1.400	5.4	2.600	7.2	5.500	10.2	8.500	12.6
0.500	4.9	1.600	5.7	3.000	7.7	6.000	10.7	9.000	12.9
0.600	4.7	1.800	6.0	3.500	8.3	6.500	11.1	9.500	13.3

Hydrock Con	sultants	Ltd										Page 4	1
•					Fort H	lalste	ad						
•					Catchm	nent D							-
·	0010				Det	<sup>1</sup>						Mic	ſO
Date 04/09/ File 10730-			Micro		Design Checke	-	SM						inage
Innovyze			MICIO		Networ		8 1 1	1					
111110 V y 2 C					NCCWOI	201	0.1.1						
			St	orage	Struct	ures	for P	ond	D				
		r	Tank or	Pond	Manhol	e. 53	. DS/	'PN•	S1 0	02			
		-			ert Level				01.0				
Depth (m)	Area (m²)	Depth (	m) Area	(m²)   D	epth (m)	Area	(m²)   I	Deptl	h (m)	Area (m²)	Depth (1	n) Area	(m²)
0.000	950.0	1.0	10	0.0	2.400		0.0		3.600	0.0	4.8	00	0.0
0.200				0.0	2.600		0.0		3.800	0.0	5.0		0.0
0.400 0.600				0.0	2.800		0.0		4.000	0.0			
0.600		1.8		0.0	3.000 3.200		0.0		4.200 4.400	0.0			
1.000	950.0			0.0	3.400		0.0		4.400	0.0			
		Deej	p Bore	Soaka	way Man	hole:	S5,	DS/	PN: S	1.004			
	Chambeı	r Invert	Level (	m) 173	.261 Inf	iltrat:	ion Co	effi	cient	Base (m/hı	c) 0.770	00	
	Chamber Di				.350				Sa	fety Facto	or 2	.0	
		ehole Dia Borehole			.300 .000								
			Side		Side		Side		_	Side			
		Depth (m)	Infil. Coef. (m/hr)	Depth (m)	Infil. Coef. (m/hr)	Depth (m)		:.	Depth (m)	Infil. Coef. (m/hr)			
		0.000		8.000	0.77000	8.001			8.000				
				1	way Man			I					
	Chambeı									Base (m/hi	<u>c)</u> 0.770	00	
	Chamber Di Bore	iameter/: ehole Dia			.350 .300				Sa	fety Facto	or 2	.0	
	E	Borehole	Depth (	m) 18	.000								
		Depth	Side Infil.	Depth	Side Infil.	Depth	Side		Denth	Side Infil.			
		(m)	Coef. (m/hr)	(m)	Coef. (m/hr)	(m)	Coef (m/h	:.	(m)	Coef. (m/hr)			
		0.000		8.000	0.77000	8.001			8.000				
		0.000	0.,,0000	10.000	0.,,0000	0.001	0.000			0.00000			

Hydrock	Cons	ultar	nts Lt	d										Pa	ge 5
•							Fort	Hals	tead						<u> </u>
							Catc	hment	D						
															Vicco
Date 04	/09/2	019					Desi	gned	by SM	1					
File 10	730-н	YD-XX	х-хх-с	A-C-N	licro		Chec	ked b	уу						Drainage
Īnnovyz	e						Netw	ork 2	2018.1	.1					
<u>1 yea</u>	ar Re <sup>.</sup>	turn	Perio	d Sum	mary	of Cr	ritical	Resu	<u>lts b</u>	<u>y Ma</u>	<u>ximum</u>	Level	(Ran}	<u>x 1) fo</u>	r Pond D
		Fou	H le Head l Sewag	Ho lot Sta lloss a re per	t Star art Le Coeff hecta	rt (min evel (m (Globa are (l/	m) C 1) 0.500 s) 0.000	Add Flow	ditiona MADD per Pe	al Flo Facto erson	or * 10r Inlet per Day	n³/ha St Coeffie y (l/per	orage cient /day)	2.000	ams ()
				-	-									ne Contro	
			Rainfal				nthetic FSI and Wales	R M5-6	0 (mm)	20.7		(Summer) (Winter)			
			Margi.		file(s	Analy: Ine	Warning sis Time DTS St DVD St ertia St	step 2 atus atus	.5 Sec	ond I	ncremen		OFF ON ON	Winter	
		Retur	Durat: n Peric Climat	ion(s) od(s)	(mins)	s) 1 s)	5, 30, 6	0, 120	), 180,	240,	, 360 <b>,</b> 4	180, 600	, 720 2160 1, 3		
PN	US/MH Name	St	torm		rn Cli od Ch		First Surcha			t (Y) ood	First Overfl	(Z) Over low Ac	flow: t.		Surcharged Depth (m)
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006 S1.007	S4 S5 S6 S7	15 1440 1440 1440 1440 1440	Winter Winter Winter Winter Winter Winter Winter		1 1 1 1 1 1 1	+0% +0% +0% +0%	30/15 00/2880 100/180 100/120 100/120 100/120 100/120	Winter Winter Winter Winter Winter	r r r r					198.008 197.866 197.496 197.496 197.441 197.441 197.441 197.441	-0.404 -0.378 -0.420 -0.360 -0.334
						Floode	ed		;	Pipe					
					US/MH	Volum	e Flow	/ Over		-		Level			
				PN	Name	(m³)	Cap.	(1/	/s) (	1/s)	Status	Exceede	d		
			S1	.000	S1	0.00	0.4	4	1	36.0	OK				
				.001	S2	0.00			1	.37.3	OK				
				.002	S3 S4	0.00				2.7 2.6	OK OK				
				.003	S4 S5	0.00				2.6 1.8	OK				
			S1	.005	S6	0.00	0.0	0		0.8	OK				
				.006	S7	0.00				0.7	OK				
			S1	.007	S8	0.00	0.0	J		0.0	OK				

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IYULUCK	Cons	ultar	nts Ltd								Pa	ge 6
•						Fort	Halste	ead				
						Cato	chment I	)				
											N	Micro
Date 04							.gned by	/ SM				Drainage
'ile 10	730-н	YD-XX	K-XX-CA-	-C-Mic	ro		cked by					
nnovyz	е					Netw	ork 201	.8.1.1				
<u>30 ye</u>	ear Re	turn	Period	Summa	ary of (		<u>l Resul</u>		aximum Le	evel (Ran	<u>k 1) fo</u>	<u>r Pond D</u>
			Hot	Hot S Start DSS Coe	tart (min Level (n ff (Globa	tor 1.00 ns) nm) al) 0.50	0 Addit 0 N 0 Flow pe	tional Fl MADD Fact	or * 10m³, Inlet Co	Total Flow /ha Storage peffiecient (l/per/day)	e 2.000 2.0800	
										of Time/Are of Real Tir		
			Rainfall			FS	R M5-60			mmer) 0.75 nter) 0.84		
			Margin	for Flo	ood Risk Analy	-	step 2.5	Second 1	Increment	300.0 (Extended) OFF		
					In	DVD St ertia St				ON ON		
			Duratio	Profil n(s) (m	. ,	15, 30,	60, 120,	180, 240		Summer and , 600, 720		
										1440, 2160	, 2880	
		Retur	n Period Climate	-							0, 100 0, 40	
PN	US/MH Name	St	-		Climate Change	First Surch		First (Y) Flood	First (Z Overflow	) Overflow Act.	Water Level (m)	2
S1.000	S1	15	Winter	30	+0%	30/15	Winter				198.344	0.02
S1.000	s2		Winter	30		100/2880					197.987	-0.28
S1.002			Winter	30	+0%	100/180					197.787	-0.11
S1.003 S1.004			Winter Winter	30 30	+0% +0%	100/120 100/180					197.787 197.731	-0.08 -0.13
S1.004 S1.005			Winter	30	+03 +08	100/180					197.731	-0.13
S1.006			Winter	30		100/120					197.731	-0.04
	-		Mintor	30	+0%	100/120	Summer				197.731	
S1.007	S8	2160	WINCEL									-0.01
S1.007	S8	2160	WINCEL									-0.01
S1.007	S8	2160	WINCEL		Flooded			Pipe		Level		-0.01
S1.007	S8	2160	PN					-	Status	Level Exceeded		-0.01
\$1.007	S8	2160	PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow	Flow (1/s)				-0.01
\$1.007	S8	2160		US/MH Name 0 S1	Flooded Volume (m <sup>3</sup> )	Flow / Cap. 1.08	Overflow	Flow (1/s)	<b>Status</b> URCHARGED OK			-0.01
\$1.007	S8	2160	<b>PN</b> <b>S1.000</b> <b>S1.002</b> <b>S1.002</b>	US/MH Name 0 S1 1 S2 2 S3	Flooded Volume (m <sup>3</sup> ) 0.000 0.000 0.000	Flow / Cap. 1.08 0.54 0.01	Overflow	Flow (1/s) 331.1 ST 331.0 2.3	URCHARGED OK OK			-0.01
\$1.007	S8	2160	PN <b>S1.000</b> <b>S1.002</b> <b>S1.002</b> <b>S1.002</b>	US/MH Name 0 S1 1 S2 2 S3 3 S4	Flooded Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000	Flow / Cap. 1.08 0.54 0.01 0.01	Overflow	Flow (1/s) 331.1 SI 331.0 2.3 2.3	URCHARGED OK OK OK			-0.01
S1.007	58	2160	PN \$1.000 \$1.000 \$1.000 \$1.000 \$1.000	US/MH Name 0 S1 1 S2 2 S3 3 S4 4 S5	Flooded Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000 0.000	Flow / Cap. 1.08 0.54 0.01 0.01 0.00	Overflow	Flow (1/s) 331.1 SI 331.0 2.3 2.3 1.4	URCHARGED OK OK OK OK			-0.01
S1.007	58	2160	PN <b>S1.000</b> <b>S1.002</b> <b>S1.002</b> <b>S1.002</b>	<b>US/MH</b> Name 0 <b>S1</b> 1 S2 2 S3 3 S4 4 S5 5 S6	Flooded Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Flow / Cap. 1.08 0.54 0.01 0.01 0.00 0.00	Overflow	Flow (1/s) 331.1 SI 331.0 2.3 2.3	URCHARGED OK OK OK			-0.01
S1.007	58	2160	PN \$1.000 \$1.000 \$1.000 \$1.000 \$1.000 \$1.000	<b>US/MH</b> Name 0 <b>S1</b> 1 S2 2 S3 3 S4 4 S5 5 S6 6 S7	Flooded Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Flow / Cap. 1.08 0.54 0.01 0.01 0.00 0.00 0.00	Overflow	Flow (1/s) 331.1 St 331.0 2.3 2.3 1.4 0.5	URCHARGED OK OK OK OK OK			-0.01
S1.007	58	2160	PN \$1.000 \$1.000 \$1.000 \$1.000 \$1.000 \$1.000 \$1.000	<b>US/MH</b> Name 0 <b>S1</b> 1 S2 2 S3 3 S4 4 S5 5 S6 6 S7	Flooded Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Flow / Cap. 1.08 0.54 0.01 0.01 0.00 0.00 0.00	Overflow	Flow (1/s) 331.1 SI 331.0 2.3 2.3 1.4 0.5 0.4	URCHARGED OK OK OK OK OK			-0.01
S1.007	58	2160	PN \$1.000 \$1.000 \$1.000 \$1.000 \$1.000 \$1.000 \$1.000	<b>US/MH</b> Name 0 <b>S1</b> 1 S2 2 S3 3 S4 4 S5 5 S6 6 S7	Flooded Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Flow / Cap. 1.08 0.54 0.01 0.01 0.00 0.00 0.00	Overflow	Flow (1/s) 331.1 SI 331.0 2.3 2.3 1.4 0.5 0.4	URCHARGED OK OK OK OK OK			-0.01
\$1.007	58	2160	PN \$1.000 \$1.000 \$1.000 \$1.000 \$1.000 \$1.000 \$1.000	<b>US/MH</b> Name 0 <b>S1</b> 1 S2 2 S3 3 S4 4 S5 5 S6 6 S7	Flooded Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Flow / Cap. 1.08 0.54 0.01 0.01 0.00 0.00 0.00	Overflow	Flow (1/s) 331.1 SI 331.0 2.3 2.3 1.4 0.5 0.4	URCHARGED OK OK OK OK OK			-0.01

Hydrock	Cons	ulta	nts Ltd								Pa	ge 7
•						Fort	Halste	ad			[	
						Cato	chment D	)				
•												Micro
Date 04	/09/2	019				Desi	lgned by	' SM				Drainage
File 10	730-н	YD-XX	X-XX-CA-	-C-Micr	0	Cheo	cked by					Janage
Īnnovyz	9					Netv	vork 201	8.1.1				
<u>100 y</u> e	<u>∍ar R</u> e	<u>eturr</u>		L Reduct	ion Fac	<u>Simula</u> tor 1.00	<u>tion Crit</u> 0 Addit	<u>eria</u> ional 1	Maximum 1 Flow - % of ctor * 10m <sup>3</sup>	Total Flow	w 0.000	<u>or Pond D</u>
		Fou	le Headlo l Sewage	oss Coef per hec	f (Globa tare (1	/s) 0.00	0 Flow pe 0		Inlet C on per Day s 0 Number		0.000	ums 0
1									3 Number			
					0.		D	Deteil	_			
			Rainfall			FS		(mm) 20	<u>s</u> .700 Cv (Si .369 Cv (W			
			Margin	for Floo		Warning		Second	Increment	300.0		
					Analy	DTS St	-	Second	Increment	(Excended) OFF		
						DVD St				ON		
					Ir	nertia St	atus			ON		
			Duratio	Profile n(s) (mi	. ,	15, 30,	60, 120,	180, 24	10, 360, 48	Summer and 0, 600, 720 1440, 2160	), 960,	
		Retur	n Period Climate	-						1, 3	30, 100 0, 40	
PN	US/MH Name	S		Return C Period (		First Surch	• •	first (1 Flood	() First (2 Overflo		Water Level (m)	Surcharged Depth (m)
S1.000	S1	15	Winter	100	+40%	30/15	Winter				198.635	0.312
S1.001			Winter	100	+40%	100/2880	Winter				198.281	0.008
S1.002 S1.003			Winter Winter	100 100	+40% +40%	100/180					198.280 198.281	0.380 0.407
S1.003			Winter	100	+40%	100/120					198.228	0.367
S1.005			Winter	100		100/120					198.228	0.427
S1.006 S1.007			Winter Winter	100 100	+40% +40%	100/120					198.228 198.228	0.453 0.479
01.007		2000		100	. 10 0	100,120	o dilitili o 1				100.000	0.170
				US/MH	Flooded		Overflow	Pipe Flow		Level		
			PN	Name	(m <sup>3</sup> )	Cap.	(1/s)	(1/s)	Status	Exceeded		
			S1.00	0 01	0.000	1.99		607 0	SURCHARGED			
			S1.00		0.000				SURCHARGED			
			S1.00		0.000				SURCHARGED			
			S1.00 S1.00		0.000				SURCHARGED SURCHARGED			
			S1.00	5 S6	0.000	0.00		0.4	SURCHARGED			
			S1.00		0.000				SURCHARGED			
			S1.00	7 S8	0.000	0.00		0.0	SURCHARGED			

Hydrock Consul	tants	Ltd										Page 1
•					For	t Ha	lstead	d				
					Cat	chme	nt E					
												Micco
Date 04/09/201	9				Des	igne	d by S	SM				— Micro
File 10730-HYD		-CA-C	-Micro	0		cked	-					Drainage
Īnnovyze							2018.	.1.1				
		STORM	<u>i sewe</u>	<u>r desi</u>	<u>GN by</u>	the	Modif	ied R	ation	ial M	ethod	
				<u>Desi</u>	gn Cri	lteri	a for	Pond	E			
			D.i		CULANDA	DD M-	nholo	0				
			Pip	e Sizes	STANDA	.RD Ma	nnole	Sizes	STANDA	ARD		
			F	SR Rain	fall Mc	del -	Engla	nd and	Wales			
		Retur		od (yea		1					PIMP (	
											ate Change (	
					or R 0						rop Height (	
	Ma	aximum	Rainfa	all (mm/	hr)	50		Max	imum i	Backd:	rop Height (	(m) 1.500
Maximu	n Time d										timisation (	
	5.7.			ge (l/s/							ign only (m/	
	VC	olumeti	ric Rur	noff Coe	II. U	. /50	ШI	n siop	e ior	Optii	misation (1:	X) 500
				Des	igned v	with 1	evel S	Soffits	5			
			1	Networl	k Desi	gn Ta	able f	for Pc	ond E			
PN	-		-	I.Area			ase				Section Typ	
	(m)	(m)	(1:X)	(ha)	(mins)	Flow	(l/s)	(mm)	SECT	(mm)		Design
S1.000	10.000	0.050	200.0	0.930	5.00		0.0	0.600	0	750	Pipe/Condui	it 🔒
S1.001	5.000	0.373	13.4	0.000	0.00		0 0	0 600	0	600	Pipe/Condui	it. 👗

S1.001	5.000	0.373	13.4	0.000	0.00	0.0	0.600	0	600	Pipe/Conduit 🧴
S1.002	10.000	0.026	384.6	0.000	0.00	0.0	0.600	0	600	Pipe/Conduit 🧴
S1.003	5.000	0.013	384.6	0.000	0.00	0.0	0.600	0	600	Pipe/Conduit 🧴
S1.004	10.000	0.060	166.7	0.000	0.00	0.0	0.600	0	450	Pipe/Conduit 🧴
S1.005	10.000	0.026	384.6	0.000	0.00	0.0	0.600	0	450	Pipe/Conduit 🔒
S1.006	10.000	0.026	384.6	0.000	0.00	0.0	0.600	0	450	Pipe/Conduit 🧴
S1.007	10.000	0.026	384.6	0.000	0.00	0.0	0.600	0	450	Pipe/Conduit 🧴

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (1/s)	Flow (1/s)
S1.000	50.00	5.08	197.723	0.930	0.0	0.0	0.0	1.98	872.6	125.9
S1.001	50.00	5.10	197.673	0.930	0.0	0.0	0.0	6.67	1887.1	125.9
S1.002	50.00	5.23	197.225	0.930	0.0	0.0	0.0	1.24	349.4	125.9
S1.003	50.00	5.30	197.199	0.930	0.0	0.0	0.0	1.24	349.4	125.9
S1.004	50.00	5.41	197.186	0.930	0.0	0.0	0.0	1.57	250.0	125.9
S1.005	50.00	5.57	197.126	0.930	0.0	0.0	0.0	1.03	163.9	125.9
S1.006	50.00	5.73	197.100	0.930	0.0	0.0	0.0	1.03	163.9	125.9
S1.007	50.00	5.89	197.074	0.930	0.0	0.0	0.0	1.03	163.9	125.9

# Simulation Criteria for Pond E

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow 0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins)	0	Inlet Coeffiecient 0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day) 0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins) 60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins) 1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0 Number of Online Controls 2 Number of Storage Structures 3 Number of Real Time Controls 0

#### Synthetic Rainfall Details

Hydrock Consultants Ltd		Page 2
•	Fort Halstead	
	Catchment E	
		Micco
Date 04/09/2019	Designed by SM	Micro Drainage
File 10730-HYD-XX-XX-CA-C-Micro	Checked by	Digiligh
Īnnovyze	Network 2018.1.1	
	Synthetic Rainfall Details	
Region	England and Wales Cv (Summer) 0.750	
M5-60 (mm) Ratio B	20.700 CV (Winter) 0.840 0.370 Storm Duration (mins) 30	
Profile Type	20.700 Cv (Winter) 0.840 0.370 Storm Duration (mins) 30 Summer	

Hydrock Consultants	Ltd										Pag	re 3	
•			Fort H	alste	ad								
•			Catchm	ent E									
											N	licro	
Date 04/09/2019			Design	ed by	SM								
File 10730-HYD-XX-X	X-CA-C-Micro	)	Checke	d by								Irain	aye
Īnnovyze			Networ	k 201	8.1.1	1							
			ne Contro					-	( )				
<u>Hydro-B</u>	rake® Optim	<u>um Man</u>	hole: S4,	DS/E	<u>'N: S</u>	1.003	<u>, V</u>	olume	e (m³)	: 11	.8		
		τ	Jnit Refere	ence MI	)-SHE-	-0103-5	5000-	1200-	5000				
			esign Head					1	.200				
		Des	ign Flow (1						5.0				
			Flush-F					alcul					
			Object Applicat		11n1m1	lse ups	strea		face				
		ç	Sump Availa					Sui	Yes				
		×.	Diameter (						103				
		Inv	vert Level	· /				197	.199				
	Minimum Outle	et Pipe	Diameter (	(mm)					150				
	Suggested I	Manhole	Diameter (	(mm)					1200				
Control Pe	oints He	ad (m)	Flow (l/s)		Contr	col Poi	Ints		Head	(m) E	low (	1/s)	
Design Point (C	alculated)	1.200	5.0				Kick	-Flo®	0.	745		4.0	
	Flush-Flo <sup>™</sup>	0.354	5.0	Mean	Flow	over H	ead 1	Range		-		4.4	
The hydrological cald	ulations have	heen h	ased on the	- Head	/Discł	arde v	relat	ionsh	in for	r the	Hydro	-Brake	R
Optimum as specified.						-			-		-		
then these storage ro								1		- 1			
Depth (m) Flow (l/s)	Depth (m) Flow	7 (l/s)	Depth (m)	Flow	(l/s)	Depth	(m)	Flow	(l/s)	Dept	:h (m)	Flow	(1/s)
0.100 3.4	0.800	4.1	2.000		6.3	4	.000		8.8		7.000		11.5
0.200 4.7	1.000	4.6	2.200		6.6	4	.500		9.3		7.500		11.8

0.100	2.4	0.000	4.1	2.000	0.5	4.000	0.0	7.000	11.J
0.200	4.7	1.000	4.6	2.200	6.6	4.500	9.3	7.500	11.8
0.300	5.0	1.200	5.0	2.400	6.9	5.000	9.8	8.000	12.2
0.400	5.0	1.400	5.4	2.600	7.2	5.500	10.2	8.500	12.6
0.500	4.9	1.600		3.000	7.7	6.000		9.000	12.9
0.600	4.7	1.800	6.0	3.500	8.3	6.500	11.1	9.500	13.3

ydrock Con	su⊥tants	ыtd											Pa	age 4	
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					Catchm	ent E									-
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ate 04/09/					Design	-	SM							Drai	
ile 10730-	HYD-XX-XX	CA-C-	Micro		Checke									Brai	nac
nnovyze					Networ	k 201	8.1.1	L							
			St	corage	Struct	ures	for F	Pond	E						
								(	- 4						
		- -	<u>Tank or</u>		<u>Manhol</u> ert Leve				<u></u>	<u>002</u>					
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0.000	800.0	1.0	01	0.0	2.400		0.0	3	8.600		0.0	1	800		0.0
0.200		1.0		0.0	2.400		0.0		3.800		0.0		000		0.0
0.400		1.6		0.0	2.800		0.0		.000		0.0	.			
	800.0	1.8		0.0	3.000		0.0		.200		0.0				
	800.0	2.0		0.0	3.200		0.0		.400		0.0				
1.000	800.0	2.2	00	0.0	3.400		0.0		.600		0.0				
		-		0.1		1 7	<u> </u>	D. 2 / -		1 00	4				
		Deep	<u>p Bore</u>	Soaka	way Man	nole:	S5,	US/E	-N: 5	i⊥.00	4				
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	Chamber Di				.500	u		~~ + + (		afety			2.0		
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		Sorehole													
			0 ÷ da	I		I	0:4	-		<b>0</b> ÷ •	1.				
		Denth	Side Infil	Denth	Side Infil.	Denth	Side		)enth	Sic Infi					
		(m)	Coef.	(m)		-	Coef		(m)						
		(,	(m/hr)	(,	(m/hr)	(,	(m/h:		()	(m/ł					
		0 000	0 77000		0 77000	0 001	0 000		0 000	0 00	0.0.0				
		0.000	0.77000	10.000	0.77000	0.001	0.000	10011	8.000	0.00	000				
		Deep	<u>p Bore</u>	Soaka	way Man	hole:	S6,	DS/E	<u>PN: 5</u>	31.00	<u>5</u>				
	Chamber Chamber Di				.976 Inf .350	iltrat	ion Co	effic		Base afety			000 2.0		
		ehole Dia Sorehole			.300 .000										
			Side		Side		Side			Sic	le				
			Infil.	-	Infil.	Depth			Pepth						
		(m)	Coef.	(m)	Coef.	(m)	Coef	-	(m)	Coe					
			(m/hr)		(m/hr)		(m/h:	r)		(m/ł	ır)				
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Hydrock Cor	nsult	ants Ltd										Page 5
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File 10730-	-HYD-	XX-XX-CA	-C-Micr	0	Chec	cked by						Drainag
Īnnovyze					Netw	ork 2018	8.1.1					
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<b>PN</b> S1.000	US/MH Name S1	urn Perioc Climate <b>Storm</b> 15 Winte	n(s) (mi l(s) (yea e Change <b>Return</b> <b>Period</b> r 1	(s) ns) 1 rs) (%) Climate Change +0%	DTS St DVD St ertia St .5, 30, 4 .5, 30, 5, 30, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5,	atus atus 60, 120, 1 st (X) charge 15 Winter	180, 240 Firs FJ	, 360, st (Y)	Summa 480, 60 1440 Firs	OFF Of 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	F N Winte 0, 960 0, 288 30, 10 , 0, 4 Overf:	, 0 0 <b>Water</b> low Level . (m) 197.984
<b>PN</b> S1.000 S1.001	US/MH Name S1 S2	urn Period Climate <b>Storm</b> 15 Winte 15 Winte	n(s) (mi (s) (yea Change <b>Return</b> <b>Period</b> r 1 r 1	(s) ns) 1 rs) (%) Climate Change +0% +0%	DTS St DVD St ertia St .5, 30, 4 Fir: Sur 100/14	st (X) charge 15 Winter	180, 240 Firs FJ	, 360, st (Y)	Summa 480, 60 1440 Firs	OFF Of 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	F N Winte 0, 960 0, 288 30, 10 , 0, 4 Overf:	<pre>, 0 0 Water low Level . (m) 197.984 197.861</pre>
PN S1.000 S1.001 S1.002	US/MH Name S1 S2 S3	urn Perioc Climate <b>Storm</b> 15 Winte 15 Winte 960 Winte	n(s) (mi l(s) (yea e Change <b>Return Period</b> r 1 r 1 r 1	(s) ns) 1 rs) (%) Climate Change +0% +0% +0%	DTS St DVD St ertia St 5, 30, 4 Fir: Sur 5 100/14 5 100/14	st (X) charge 15 Winter 60 Winter	180, 240 Firs FJ	, 360, at (Y) Lood	Summa 480, 60 1440 Firs Ove:	OFF Of 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	F N Winte 0, 960 0, 288 30, 10 , 0, 4 Overf:	<pre>, 0 0 Water low Level . (m) 197.984 197.861 197.486</pre>
<b>PN</b> S1.000 S1.001	US/MH Name S1 S2 S3 S4	urn Period Climate <b>Storm</b> 15 Winte 15 Winte	n(s) (mi (s) (yea Change <b>Return</b> <b>Period</b> r 1 r 1 r 1 r 1	(s) ns) 1 rs) (%) Climate Change +0% +0%	DTS St DVD St ertia St 5, 30, 4 Fir: Sur 100/14 100/14 100/14	st (X) charge 15 Winter	180, 240 Firs FJ	, 360, at (Y) Lood	Summa 480, 60 1440 Firs Ove:	OFF Of 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	F N Winte 0, 960 0, 288 30, 10 , 0, 4 Overf:	<pre>, 0 0 Water low Level . (m) 197.984 197.861</pre>
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PN         I           \$1.000         \$1.001           \$1.002         \$1.003           \$1.004         \$1.005           \$1.005         \$1.006	Return Pe Cli DS/MH Name Sto S1 2880 W S2 2880 W S3 2880 W S3 2880 W S5 2880 W S5 2880 W S5 2880 W S6 2880 W	ation(s) riod(s) (y mate Change Retu rm Per: inter : inter : inter : inter : inter : inter : Sur US/MH I Name S1 S2	ile(s) (mins) ge (%) urn Clima iod Chan 100 +4 100 +4 1000 +4 100 +4 1000 +4 100 +4 100 +4 100 +4 10	DVD Inertia 15, 30, 15, 30, 15, 30, 40% 100, 40% 100, 40% 100, 40% 30, 40% 30% 30, 40% 30% 30% 30% 30% 30% 30% 30% 30% 30% 3	Status Status Status , 60, 120, First (X) Surcharge 00/15 Winte (1440 Winte 00/60 Winte (1440 Winte 0/240 Winte 0/120 Winte 0/120 Summe Flow / Ov Cap. 0.03 0.03	First Flo er er er er er er Pig rerflow Flo (1/s) (1/ 16	360, 480 : (Y) ood ) Winter >> s) Sta	ummer an , 600, 7 1440, 21 1, First (Z Overflow I tus Ex ARGED	ON ON 720, 960 160, 288 30, 10 0, 0, 4 2) Overf w Act	Water         Bild       Water         Elow       Level         t.       (m)         198.773       198.773         198.773       198.773         198.773       198.773         198.773       198.773         198.713       198.713         198.713       198.713
PN         I           \$1.000         \$1.001           \$1.002         \$1.003           \$1.004         \$1.005           \$1.005         \$1.006	Return Pe Cli DS/MH Name Sto S1 2880 W S2 2880 W S3 2880 W S3 2880 W S5 2880 W S5 2880 W S6 2880 W S7 2880 W S8 2880 W S8 2880 W	ation(s) riod(s) (y mate Change Retu rm Per: inter : inter : inter : inter : inter : inter : Sur US/MH I Name S1 S2 S3	ile(s) (mins) years) ge (%) urn Clima iod Chan 100 +4 100 +4 1000 +4 100 +4 1000000000000000000000000000000000000	DVD Inertia 15, 30, 15, 30, 15, 30, 15, 30, 40% 100, 40% 100, 40% 30, 40% 30% 30, 40% 30% 30% 30% 30% 30% 30% 30% 30% 30% 3	Status Status Status , 60, 120, First (X) Surcharge 00/15 Winte (1440 Winte 00/60 Winte (1440 Winte 0/240 Winte 0/120 Winte 0/120 Summe Flow / Ov Cap. 0.03 0.03 0.03 0.02	First Flo er er er er er er er er flow Flo (1/s) (1/ 16 16 3	360, 480 (Y) od Winter Winter S S S S S S S S S S S S S	ummer an , 600, 7 1440, 21 1, First (Z Overflow I tus Ex ARGED ARGED FLOOD	ON ON 720, 960 160, 288 30, 10 0, 0, 4 2) Overf w Act Level sceeded	Water         Bild       Water         Elow       Level         t.       (m)         198.773       198.773         198.773       198.773         198.773       198.773         198.773       198.773         198.713       198.713         198.713       198.713
PN         I           \$1.000         \$1.001           \$1.002         \$1.003           \$1.004         \$1.005           \$1.005         \$1.006	Return Pe Cli DS/MH Name Sto S1 2880 W S2 2880 W S3 2880 W S3 2880 W S5 2880 W S5 2880 W S5 2880 W S7 2880 W S7 2880 W S8 2880 W S8 2880 W	ation(s) riod(s) (y mate Change Retu rm Per: inter : inter : inter : inter : inter : inter : Sur US/MH I Name S1 S2 S3 S4	ile(s) (mins) years) ge (%) urn Clima iod Chan 100 +4 100 +4 1000000000000000000000000000000000000	DVD Inertia 15, 30, 15, 30, 15, 30, 15, 30, 40% 100, 40% 100, 40% 100, 40% 30, 40% 30% 30% 30% 30% 30% 30% 30% 30% 30% 3	Status Status Status , 60, 120, First (X) Surcharge 00/15 Winte (1440 Winte 00/60 Winte (1440 Winte 0/240 Winte 0/120 Winte 0/120 Summe Flow / Ov Cap. 0.03 0.03 0.02 0.01	First Flo er er er er er er er flow Flo (1/s) (1/ 16 16 3 2	360, 480 (Y) ood Winter Winter So So So So So So So So So So	ummer an , 600, 7 1440, 21 1, First (Z Overflow I tus Ex ARGED ARGED FLOOD FLOOD	ON ON 720, 960 160, 288 30, 10 0, 0, 4 2) Overf w Act Level sceeded	Water         Bild       Water         Elow       Level         t.       (m)         198.773       198.773         198.773       198.773         198.773       198.773         198.773       198.773         198.713       198.713         198.713       198.713
PN         I           \$1.000         \$1.001           \$1.002         \$1.003           \$1.004         \$1.005           \$1.005         \$1.006	Return Pe Cli DS/MH Name Sto S1 2880 W S2 2880 W S3 2880 W S4 2880 W S5 2880 W S5 2880 W S5 2880 W S6 2880 W S7 2880 W S7 2880 W S8 2880 W S8 2880 W	ation(s) riod(s) (y mate Change Retu rm Per: inter inter inter inter inter inter Sur US/MH I Name S1 S2 S3 S4 S5	ile(s) (mins) years) ge (%) urn Clima iod Chan 100 +4 100 +5 100 +5 1000000000000000000000000000000000000	DVD Inertia 15, 30, 15, 30, 15, 30, 15, 30, 40% 100, 40% 100, 40% 100, 40% 30, 40% 30% 30% 30% 30% 30% 30% 30% 30% 30% 3	Status Status Status , 60, 120, First (X) Surcharge 00/15 Winte (1440 Winte 00/60 Winte (1440 Winte 0/240 Winte 0/120 Winte 0/120 Summe Flow / Ov Cap. 0.03 0.03 0.03 0.02 0.01 0.01	First Flo er er er er er er er er er flow Flo (1/s) (1/ 16 16 16 3 2 1	360, 480 (Y) od Winter Solution	Tummer an , 600, 7 1440, 21 1, First (Z Overflow Verflow ARGED ARGED FLOOD FLOOD RISK	ON ON 720, 960 160, 288 30, 10 0, 0, 4 2) Overf w Act Level sceeded	Water         Bild       Water         Elow       Level         t.       (m)         198.773       198.773         198.773       198.773         198.773       198.773         198.773       198.773         198.713       198.713         198.713       198.713
PN         I           \$1.000         \$1.001           \$1.002         \$1.003           \$1.004         \$1.005           \$1.005         \$1.006	Return Pe Cli DS/MH Name Sto S1 2880 W S2 2880 W S3 2880 W S3 2880 W S5 2880 W S5 2880 W S5 2880 W S7 2880 W S7 2880 W S8 2880 W S8 2880 W	ation(s) riod(s) (y mate Change Retu rm Per: inter : inter : inter : inter : inter : inter : Sur US/MH I Name S1 S2 S3 S4	ile(s) (mins) years) ge (%) urn Clima iod Chan 100 +4 100 +4 1000000000000000000000000000000000000	DVD Inertia 15, 30, 15, 30, 15, 30, 15, 30, 40% 100, 40% 100, 40% 100, 40% 30, 40% 30% 30% 30% 30% 30% 30% 30% 30% 30% 3	Status Status Status , 60, 120, First (X) Surcharge 00/15 Winte (1440 Winte 00/60 Winte (1440 Winte 0/240 Winte 0/120 Winte 0/120 Summe Flow / Ov Cap. 0.03 0.03 0.03 0.02 0.01 0.01	First Flo er er er er er er er er flow Flo (1/s) (1/ 16 16 16 3 2 1 0	360, 480 (Y) ood Winter Winter So So So So So So So So So So	Summer an 1440, 21 1, First (Z Overflow Verflow ARGED FLOOD FLOOD FLOOD RISK RISK	ON ON 720, 960 160, 288 30, 10 0, 0, 4 2) Overf w Act Level sceeded	Water         Bild       Water         Elow       Level         t.       (m)         198.773       198.773         198.773       198.773         198.773       198.773         198.773       198.773         198.713       198.713         198.713       198.713

Hydrock Consul	tants Ltd										Page 1	
				For	t Hal	stead	ł					
				Cat	chmen	t F						
											Micc	
Date 04/09/201	9			Des	igned	bv S	SM					
File 10730-HYD	-XX-XX-CA-	C-Micro			cked	-					Drair	nage
Innovyze					work	-	1.1					
111110 1 7 2 0					WOIN	2010.						
	STOR	M SEWER	DEST	GN by	the M	10dif	ied R	atior	nal M	lethod		
	<u></u>		2201	011 20 /	0110 1	100111	200 11	<u>a 01 01</u>				
			Desi	qn Cri	teria	a for	Pond	F				
				-			-					
		Pipe	Sizes	STANDA	RD Man	hole S	Sizes	STANDA	ARD			
	Dete			fall Mo		Englar	nd and	Wales	3	PIMP	(%) 100	
	Rett	rn Perioo אי		rs) mm) 20.	1 700		Add F	Flow /	Clim	ate Change	. ,	
				or 0.						rop Height		
	Maximur	n Rainfall	l (mm/	hr)	50		Мах	kimum	Backd	rop Height	(m) 1.500	
Maximu	m Time of Cor		•	,			2	-	-	timisation		
		il Sewage								ign only (m		
	Volumet	ric Runot	ff Coe	ff. 0.	.750	Mi	n Slop	pe for	Opti	misation (1	:X) 500	
			-			1 0						
			Des	igned v	vith Le	evel S	offits	5				
		No	tuorl	Desi	ар По	blo f	For De	and E				
		<u>Ne</u>	CWOIF	L DEST	yn ia.	DIG I	OI FC	JIIQ F				
	Length Fall	Slope T	Area	ጥ ድ	Ba	se	k	HYD	στα	Section Ty	De Auto	
PN				··	20					200010m 1y		
PN	-	(1:X)	(ha)	(mins)	Flow	(1/s)	(mm)	SECT	(mm)		Design	
	(m) (m)		(ha)					SECT	(mm)		Design	
S1.000	-	200.0	1.063	5.00		0.0	(mm) 0.600 0.600	0	750	Pipe/Condu Pipe/Condu	it 🔒	

SI.001	5.000	0.3/3	13.4	0.000	0.00	0.0	0.600	0	600	Pipe/Conduit	<b>ö</b>
S1.002	10.000	0.026	384.6	0.000	0.00	0.0	0.600	0	600	Pipe/Conduit	ā.
S1.003	5.000	0.013	384.6	0.000	0.00	0.0	0.600	0	600	Pipe/Conduit	ē
S1.004	10.000	0.060	166.7	0.000	0.00	0.0	0.600	0	450	Pipe/Conduit	ē
S1.005	10.000	0.026	384.6	0.000	0.00	0.0	0.600	0	450	Pipe/Conduit	ā
S1.006	10.000	0.026	384.6	0.000	0.00	0.0	0.600	0	450	Pipe/Conduit	ā.
S1.007	10.000	0.026	384.6	0.000	0.00	0.0	0.600	0	450	Pipe/Conduit	ē

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (1/s)	Flow (1/s)
<pre>\$1.000 \$1.001 \$1.002 \$1.003 \$1.004 \$1.005 \$1.006</pre>	50.00 50.00 50.00 50.00 50.00 50.00	5.10 5.23 5.30 5.41 5.57	197.723 197.673 197.225 197.199 197.186 197.126 197.100	1.063 1.063 1.063 1.063 1.063 1.063 1.063	0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	1.98 6.67 1.24 1.24 1.57 1.03 1.03	872.6 1887.1 349.4 349.4 250.0 163.9 163.9	143.9 143.9 143.9 143.9 143.9 143.9
S1.008 S1.007	50.00		197.100	1.063	0.0	0.0	0.0	1.03	163.9	

# Simulation Criteria for Pond F

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow 0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins)	0	Inlet Coeffiecient 0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day) 0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins) 60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins) 1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0 Number of Online Controls 2 Number of Storage Structures 3 Number of Real Time Controls 0

# Synthetic Rainfall Details

Hydrock Consultants Ltd		Page 2
•	Fort Halstead	
	Catchment F	
		Micco
Date 04/09/2019	Designed by SM	Micro Drainage
File 10730-HYD-XX-XX-CA-C-Micro	Checked by	Digiliga
Īnnovyze	Network 2018.1.1	
	Synthetic Rainfall Details	
Region	England and Wales Cv (Summer) 0.750	
M3-60 (MM) Ratio R	0.370 Storm Duration (mins) 30	
Profile Type	20.700 Cv (Winter) 0.840 0.370 Storm Duration (mins) 30 Summer	

Hydrock Consultants Ltd									Pag	ge 3	
•		Fort H	alstead								
		Catchm	ent F								
									N	licro	
Date 04/09/2019		Design	ed by SM								
File 10730-HYD-XX-XX-CA-C-Micr	0	Checke	d by							)rain	aye
Īnnovyze		Networ	k 2018.1	.1							
<u>Hydro-Brake® Optin</u>		ne Contro			8. V	olume	e (m <sup>3</sup>	): 1 <sup>-</sup>	1.8		
								/• ⊥.	<u> 0</u>		
		Nnit Refere sign Head		2-0103-	5000-		.200				
		gn Flow (1				T	5.0				
		Flush-F			C	Calcul	ated				
		Object	ive Minim	nise up	strea	am sto	rage				
		Applicat				Sur	face				
		ump Availa					Yes				
		Diameter ( ert Level	,			107	103 .199				
Minimum Out:			· · /			197	150				
	-	Diameter (					1200				
Control Points H	ead (m) 1	Flow (l/s)	Cont	rol Po	ints		Head	<b>(m)</b>	Flow (	1/s)	
Design Point (Calculated)	1.200	5.0			Kick	-Flo®	0.	.745		4.0	
Flush-Flo™	0.354		Mean Flow					_		4.4	
The hydrological calculations have	e been ba	used on the	Head/Disc	charge	relat	ionsh	nip fo:	r the	Hydro	-Brak	e®
Optimum as specified. Should ano then these storage routing calcul				other t	han a	a Hydr	o-Brai	ke Op	timum®	be u	tilised
Depth (m) Flow (l/s) Depth (m) Flo	ow (l/s)	Depth (m)	Flow (l/s)	Depth	(m)	Flow	(1/s)	Dept	th (m)	Flow	(1/s)
0.100 3.4 0.800	4.1	2.000	6.3	3 4	.000		8.8		7.000		11.5
0.200 4.7 1.000	4.6	2.200	6.6		.500		9.3	3	7.500		11.8

0.100	2.7	0.000		2.000	0.5	4.000	0.0	1.000	11.5
0.200	4.7	1.000	4.6	2.200	6.6	4.500	9.3	7.500	11.8
0.300	5.0	1.200	5.0	2.400			9.8	8.000	12.2
0.400	5.0	1.400	5.4	2.600	7.2	5.500	10.2	8.500	12.6
0.500	4.9	1.600	5.7	3.000	7.7	6.000	10.7	9.000	12.9
0.600	4.7	1.800	6.0	3.500	8.3	6.500	11.1	9.500	13.3

Hydrock Consult	ants Ltd						Pa	ige 4
•			Fort H	lalstead				
•			Catchm	lent F				
•								Micro
Date 04/09/2019		Minne	_	ed by SM				Drainage
File 10730-HYD- Innovyze	-xx-xx-ca-c-	MICIO	Checke	a by k 2018.1.1	1			
IIIIOVyZe			Networ		L			
		<u>Stora</u>	ge Struct	ures for E	ond F			
		<u>Tank or Po</u>	nd Manhol	e: S3, DS/	<u>'PN: S1.0</u>	02		
		I	nvert Leve	l (m) 197.30	0			
Depth (m) Area	a (m <sup>2</sup> ) Depth (	(m) Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	600.0 1.2				3.600	2501.8	4.800	3425.3
0.200 0.400		100 1184.8 100 1284.4	2.600	1842.8 1966.6	3.800 4.000		5.000	3593.3
0.400		1388.1		2094.4	4.200			
0.800	910.0 2.0	1495.7	3.200	2226.2	4.400	3101.4		
1.000	997.6 2.2	1607.4	3.400	2362.0	4.600	3261.3		
	Dee	<u>p Bore Soa</u>	kaway Man	hole: S5,	DS/PN: S	1.004		
	~		70 100 7 6					
	Chamber Invert nber Diameter/			iltration Co		Base (m/hr ifety Facto		
0.1141	Borehole Di	-	0.300			1007 10000	2 2.0	
	Borehole	Depth (m)	18.000					
		Side	Side	Side	e	Side		
	-			Depth Infi	-	Infil.		
	(m)	Coef. (m (m/hr)	n) Coef. (m/hr)	(m) Coef (m/h		Coef. (m/hr)		
	0.000							
	0.000	0.77000 8.0	00 0.77000	8.001 0.000	000118.000	0.00000		
	Dee	<u>p Bore Soa</u>	<u>kaway Man</u>	hole: S6,	DS/PN: S	1.005		
	Chamber Invert nber Diameter/	Length (m)	1.350	iltration Co		Base (m/hr afety Facto		
	Borehole Di Borehole	. ,	0.300 18.000					
		Side	Side	Sid		Side		
	-	- 1	th Infil.	Depth Infi				
	(m)	Coef. (m (m/hr)	n) Coef. (m/hr)	(m) Coef (m/h		Coef. (m/hr)		
	0 000	0.77000 8.0						
	0.000	0.77000 8.0	00 0.77000	18.001 0.000	00 1 18.000	0.00000		

Hvdrock (	Consul	ltants Lto	1								Page 5
					Fort	Halstea	ad				
					Catch	ment F					
Date 04/0	09/201	19			Desig	ned by	SM				Micro
		D-XX-XX-CA	-C-Mic	ro	-	ed by	011				Drainage
Īnnovyze				.10		rk 2018	2 1 1				
TIMOVYZE					Netwo	IK ZUIC					
Nu	Ma umber c Number	Area Ho anhole Headl Foul Sewage of Input Hyd of Online Rainfal: Margin	Al Reduc Hot S Dt Start Loss Coe e per he Control: I Model Region for Flo Profil on(s) (m	tion Fac tart (mi Level () ff (Glob ctare (1 s 0 Nu s 2 Numb S S England bod Risk Analy Ir .e(s) hins)	Simulati tor 1.000 ns) 0 mm) 0 al) 0.500 /s) 0.000 mber of Of er of Stor ynthetic R FSR and Wales Warning (n ysis Times DTS Sta DVD Sta hertia Sta	Lon Crite Additi MP Flow per ffline Co age Stru ainfall M M5-60 (r Ratio mm) tep 2.5 f tus tus	eria ADD Fact r Persor ontrols actures <u>Details</u> mm) 20. o R 0. Second	.ow - % o: for * 10m Inlet ( n per Day 0 Number 3 Number 700 Cv (S 369 Cv (W Increment	f Total Fl ha Stora Coeffiecie (1/per/da of Time/A of Real T fummer) 0.1 finter) 0.1 Summer) 0.1 (Extended OF C Summer and 0, 600, 72 1440, 21	ow 0.000 ge 2.000 nt 0.800 y) 0.000 rea Diag ime Cont 750 340 34	rams O rols O
			e Change	e (%)					(	0, 0, 40 Water	Surcharged
PN	US/MH Name	Storm		Climate Change	First (. Surchar		st (Y) lood	<pre>First (Z) Overflow</pre>	Overflow Act.	Level (m)	Depth (m)
				-		-					
S1.000 S1.001	S1 S2	15 Winter 15 Winter	1		100/15 Su: 100/15 Su:					198.004 197.874	
s1.001		960 Winter	1		30/240 Wi					197.577	
S1.003	S4	960 Winter	1		30/240 Wi					197.577	
\$1.004 \$1.005		960 Winter 960 Winter	1	+0% +0%	30/120 Su: 30/60 Wi					197.516 197.516	
s1.005		960 Winter	1		30/60 Su					197.516	
S1.007	S8	960 Winter	1	+0%	30/60 Su	mmer				197.516	-0.008
				Flood	led		Pipe				
			US/	MH Volu	me Flow /	Overflo	w Flow		Level		
		1	PN Nai	me (m³	) Cap.	(l/s)	(l/s)	Status I	Exceeded		
		S1.	.000	s1 0.0	00 0.29		146.8	OK			
			.001	S2 0.0	000 0.24		148.4				
			.002	s3 0.0			2.5				
			.003 .004	s4 0.0 s5 0.0			2.4 1.6				
			.004 .005	ss 0.0			1.6				
			.006	s7 0.0			0.5				
		S1.	.007	S8 0.0	0.00		0.0	OK			
1											

ydrock	Consu	± cuirt	<u></u>								Page 6
						Fort Ha					
						Catchme	ent F				
											Micro
ate 04/	09/20	19				Designe	ed by SM				Drainac
ile 107	30-НҮ	D-XX-	-XX-CA-	C-Mic:	ro	Checked	d by				ייייייייייייייייייייייייייייייייייייייי
nnovyze						Network	c 2018.1.1				
<u>30 yea</u>	ar Ret	urn	Period	Summa	ry of C	ritical Re	esults by	<u>Maximum L</u>	evel (Rar	nk 1)	for Pond
			Areal	Reduct	ion Fact	Simulation	<u>Criteria</u> Additional :	Flow - % of	Total Flo	w 0.000	
						ns) 0	MADD Fa	ctor * 10m <sup>3</sup>			
	м	anhold				um) 0 500 F1	ow per Pers		oeffiecien		
	M					(s) 0.000 F1	low per Perso	ы рег рау	(турегудау	) 0.000	
Nı		-	-				ine Controls e Structures			-	
					Sy	nthetic Rain	nfall Detail	<u>s</u>			
		R	ainfall F		England		5-60 (mm) 20 Ratio R 0				
				-	-	Warning (mm)			300.0		
			nargin .	101 110		-	p 2.5 Second	Increment			
						DTS Status	S		OFE	7	
					_	DVD Status			ON		
					In	ertia Status	S		ON	1	
				Profile	a ( g )				Summer and	Winter	
	F	leturn		(s) (yea	ins) 1 ars)	L5, 30, 60,	120, 180, 24		1440, 216 1, 3	0, 960,	
	F	leturn	Duration Period(	n(s) (m: (s) (yea	ins) 1 ars)	15, 30, 60,	120, 180, 24		0, 600, 72 1440, 216 1, 3	0, 960, 0, 2880 30, 100 , 0, 40	Surcharge
	us/mh	Return	Duratior Period( Climate	n(s) (m: (s) (yea Change <b>Return</b>	ins) 1 ars) (%) Climate	First (X)	First (Y	10, 360, 480 ) First (Z)	0, 600, 72 1440, 2166 1, 3 0 Overflow	0, 960, 0, 2880 30, 100 , 0, 40 Water Level	Depth
PN		Return	Duratior Period( Climate	n(s) (m: (s) (yea Change <b>Return</b>	ins) 1 ars) (%)		First (Y	40, 360, 480	0, 600, 72 1440, 216 1, 3 0	0, 960, 0, 2880 30, 100 , 0, 40 Water	-
<b>PN</b> 51.000	us/mh	Return St	Duratior Period( Climate	n(s) (m: (s) (yea Change <b>Return</b>	ins) 1 ars) (%) Climate Change	First (X)	First (Y 9 Flood	10, 360, 480 ) First (Z)	0, 600, 72 1440, 2166 1, 3 0 Overflow	0, 960, 0, 2880 30, 100 , 0, 40 Water Level	Depth (m)
	US/MH Name	teturn st 15	Duration Period( Climate	n(s) (m: (s) (yea Change <b>Return</b> <b>Period</b>	ins) 1 ars) (%) Climate Change +0%	First (X) Surcharge	First (Y Flood	10, 360, 480 ) First (Z)	0, 600, 72 1440, 2166 1, 3 0 Overflow	0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m)	Depth (m) 5 -0.26
S1.000 S1.001 S1.002	US/MH Name S1 S2 S3	st 15 15 1440	Duration Period Climate Corm Winter Winter Winter Winter	n(s) (m: (s) (yea Change Return Period 30	(%) Climate Change +0% +0% +0%	First (X) Surcharge 100/15 Summ 100/15 Summ 30/240 Wint	First (Y Flood Mer Mer Mer	10, 360, 480 ) First (Z)	0, 600, 72 1440, 2166 1, 3 0 Overflow	0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.205	Depth (m) 5 -0.26 L -0.26 7 0.13
S1.000 S1.001 S1.002 S1.003	US/MH Name S1 S2 S3 S4	<b>st</b> 15 15 1440 1440	Duration Period Climate Corm Winter Winter Winter Winter Winter Winter	n(s) (m: (s) (yea Change Return Period 30 30 30 30	(%) Climate Change +0% +0% +0% +0% +0%	First (X) Surcharge 100/15 Summ 100/15 Summ 30/240 Wint 30/240 Wint	First (Y Flood Mer Mer Mer Ser	10, 360, 480 ) First (Z)	0, 600, 72 1440, 2166 1, 3 0 Overflow	0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.205 198.011 197.955	Depth (m) 5 -0.26 L -0.26 7 0.13 3 0.15
S1.000 S1.001 S1.002 S1.003 S1.004	<b>US/MH</b> Name S1 S2 S3 S4 S5	<b>st</b> 15 15 1440 1440 1440	Duration Period Climate Climate Winter Winter Winter Winter Winter Winter	n(s) (m: (s) (yea Change Return Period 30 30 30 30 30 30	<pre>ins) 1 ars) (%) Climate Change +0% +0% +0% +0% +0% +0%</pre>	First (X) Surcharge 100/15 Summ 100/15 Summ 30/240 Wint 30/240 Wint 30/120 Summ	First (Y Flood Mer Mer Ser Ser Ser	10, 360, 480 ) First (Z)	0, 600, 72 1440, 2166 1, 3 0 Overflow	0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.205 198.011 197.955 197.958	<b>Depth</b> (m) 5 -0.26 7 0.13 3 0.15 7 0.26
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6	<b>St</b> 15 15 1440 1440 1440 1440	Duration Period Climate Climate Winter Winter Winter Winter Winter Winter Winter	n(s) (m: (s) (yea Change Return Period 30 30 30 30 30 30 30	ins) 1 ars) (%) Climate Change +0% +0% +0% +0% +0% +0%	First (X) Surcharge 100/15 Summ 100/15 Summ 30/240 Wint 30/240 Wint 30/120 Summ 30/60 Wint	First (Y Flood her her er er her er	10, 360, 480 ) First (Z)	0, 600, 72 1440, 2166 1, 3 0 Overflow	0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.205 198.011 197.955 197.955 197.855	Depth (m) 5 -0.26 7 0.13 3 0.15 7 0.26 7 0.32
S1.000 S1.001 S1.002 S1.003 S1.004	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 15 15 1440 1440 1440 1440 1440	Duration Period Climate Climate Winter Winter Winter Winter Winter Winter	n(s) (m: (s) (yea Change Return Period 30 30 30 30 30 30	<pre>ins) 1 ars) (%)  Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0% +0%</pre>	First (X) Surcharge 100/15 Summ 100/15 Summ 30/240 Wint 30/240 Wint 30/120 Summ	First (Y Flood Mer Mer Ser Ser Ser Ser Ser Ser Ser	10, 360, 480 ) First (Z)	0, 600, 72 1440, 2166 1, 3 0 Overflow	0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.205 198.011 197.955 197.958	Depth (m) 5 -0.26 7 0.13 8 0.15 7 0.26 7 0.32 7 0.34
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 15 15 1440 1440 1440 1440 1440	Duration Period Climate Climate Winter Winter Winter Winter Winter Winter Winter Winter Winter	n(s) (m: (s) (yea Change Return Period 30 30 30 30 30 30 30 30 30	<pre>ins) 1 ars) (%)  Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0% +0%</pre>	First (X) Surcharge 100/15 Summ 100/15 Summ 30/240 Wint 30/240 Wint 30/120 Summ 30/60 Wint 30/60 Summ	First (Y Flood Mer Mer Ser Ser Ser Ser Ser Ser Ser	10, 360, 480 ) First (Z)	0, 600, 72 1440, 2166 1, 3 0 Overflow	0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.205 198.011 197.955 197.955 197.895 197.895	Depth (m) 5 -0.26 7 0.13 8 0.15 7 0.26 7 0.32 7 0.34
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 15 15 1440 1440 1440 1440 1440	Duration Period Climate Climate Winter Winter Winter Winter Winter Winter Winter Winter Winter	n(s) (m: (s) (yea Change Return Period 30 30 30 30 30 30 30 30 30 30	<pre>ins) 1 ars) (%) Climate Change +0% +0% +0% +0% +0% +0% +0% +0% Flooded</pre>	First (X) Surcharge 100/15 Summ 100/15 Summ 30/240 Wint 30/240 Wint 30/20 Summ 30/60 Summ 30/60 Summ	First (Y Flood her her her her her her her her her	10, 360, 480 ) First (Z)	0, 600, 72 1440, 216 1, 3 0 Overflow Act.	0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.205 198.011 197.955 197.955 197.895 197.895	Depth (m) 5 -0.26 7 0.13 3 0.15 7 0.26 7 0.32 7 0.34
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 15 15 1440 1440 1440 1440 1440	Duration Period Climate Climate Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter	(s) (m: Change Change Return Period 30 30 30 30 30 30 30 30 30	ins)       1         ars)       (%)         Climate       6         Change       +0%         +0%       +0%         +0%       +0%         +0%       +0%         +0%       +0%         +0%       +0%         Flooded       Volume	First (X) Surcharge 100/15 Summ 100/15 Summ 30/240 Wint 30/240 Wint 30/20 Summ 30/60 Summ 30/60 Summ 30/60 Summ	First (Y Flood Her Her Her Her Her Her Her Her Her Fipe	10, 360, 480 ) First (Z) Overflow	0, 600, 72 1440, 2160 1, 3 0 Overflow Act.	0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.205 198.011 197.955 197.955 197.895 197.895	Depth (m) 5 -0.26 7 0.13 8 0.15 7 0.26 7 0.32 7 0.34
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 15 15 1440 1440 1440 1440 1440	Duration Period Climate Climate Winter Winter Winter Winter Winter Winter Winter Winter Winter	n(s) (m: (s) (yea Change Return Period 30 30 30 30 30 30 30 30 30 30	<pre>ins) 1 ars) (%) Climate Change +0% +0% +0% +0% +0% +0% +0% +0% Flooded</pre>	First (X) Surcharge 100/15 Summ 100/15 Summ 30/240 Wint 30/240 Wint 30/20 Summ 30/60 Summ 30/60 Summ 30/60 Summ	First (Y Flood her her her her her her her her her	10, 360, 480 ) First (Z)	0, 600, 72 1440, 216 1, 3 0 Overflow Act.	0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.205 198.011 197.955 197.955 197.895 197.895	Depth (m) 5 -0.26 7 0.13 8 0.15 7 0.26 7 0.32 7 0.34
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 15 15 1440 1440 1440 1440 1440	Duration Period Climate Climate Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter	(s) (m: (s) (yea Change Return Period 30 30 30 30 30 30 30 30 30 30 30 30 30	ins)       1         ars)       (%)         Climate       6         Change       +0%         +0%       +0%         +0%       +0%         +0%       +0%         +0%       +0%         +0%       +0%         Flooded       Volume	First (X) Surcharge 100/15 Summ 100/15 Summ 30/240 Wint 30/240 Wint 30/20 Summ 30/60 Summ 30/60 Summ 30/60 Summ	First (Y Flood Her Her Her Her Her Her Her Her Her Fipe	10, 360, 480 ) First (Z) Overflow	0, 600, 72 1440, 2160 1, 3 0 Overflow Act.	0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.205 198.011 197.955 197.955 197.895 197.895	Depth (m) 5 -0.26 7 0.13 8 0.15 7 0.26 7 0.32 7 0.34
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 15 15 1440 1440 1440 1440 1440	Duration Period Climate Climate Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter	(s) (m: (s) (yea Change Return Period 30 30 30 30 30 30 30 30 30 30 30 30 30	<pre>ins) 1 ars) (%)  Climate Change +0% +0% +0% +0% +0% +0% +0% Flooded Volume (m³)</pre>	First (X) Surcharge 100/15 Summ 100/15 Summ 30/240 Wint 30/240 Wint 30/20 Summ 30/60 Summ 30/60 Summ 510w / Over Cap. (1 0.72	First (Y Flood her her her her her her her her her her	40, 360, 484 ) First (Z) Overflow Status	0, 600, 72 1440, 2160 1, 3 0 Overflow Act.	0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.205 198.011 197.955 197.955 197.895 197.895	Depth (m) 5 -0.26 7 0.13 8 0.15 7 0.26 7 0.32 7 0.34
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 15 15 1440 1440 1440 1440 1440	Duration Period Climate Climate Winter	(s) (m: (s) (yea Change Return Period 30 30 30 30 30 30 30 30 30 30 30 30 30	<pre>ins) 1 ars) (%)  Climate Change +0% +0% +0% +0% +0% +0% +0% Flooded Volume (m<sup>3</sup>) 0.000 0.000 0.000</pre>	First (X) Surcharge 100/15 Summ 100/15 Summ 30/240 Wint 30/240 Wint 30/60 Wint 30/60 Summ 30/60 Summ Flow / Over Cap. (1 0.72 0.59 0.01	First (Y Flood Her Her Her Her Her Her Pipe rflow Flow L/s) (1/s) 361.5 364.0	AO, 360, 480 ) First (Z) Overflow Status	0, 600, 72 1440, 2160 1, 3 0 Overflow Act.	0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.205 198.011 197.955 197.955 197.895 197.895	Depth (m) 5 -0.26 7 0.13 8 0.15 7 0.26 7 0.32 7 0.34
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 15 15 1440 1440 1440 1440 1440	Duration Period ( Climate Climate Winter Win	(s) (m: (s) (yea Change Return Period 30 30 30 30 30 30 30 30 30 30 30 30 30	<pre>ins) 1 ars) (%)  Climate Change +0% +0% +0% +0% +0% +0% +0% Flooded Volume (m³) 0.000 0.000 0.000 0.000</pre>	First (X) Surcharge 100/15 Summ 100/15 Summ 30/240 Wint 30/240 Wint 30/60 Wint 30/60 Summ 30/60 Summ Flow / Over Cap. (1 0.72 0.59 0.01 0.01	First (Y Flood her her her her her her her <b>Pipe</b> rflow Flow (1/s) 361.5 364.0 2.9 2.8	AO, 360, 480 ) First (Z) Overflow Overflow SURCHARGED SURCHARGED	0, 600, 72 1440, 2160 1, 3 0 Overflow Act.	0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.205 198.011 197.955 197.955 197.895 197.895	Depth (m) 5 -0.26 7 0.13 8 0.15 7 0.26 7 0.32 7 0.34
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 15 15 1440 1440 1440 1440 1440	Duration Period Climate Climate Winter S1.0000	(s) (m: (s) (yea Change Return Period 30 30 30 30 30 30 30 30 30 30 30 30 30	<pre>ins) 1 ars) (%)  Climate Change +0% +0% +0% +0% +0% +0% +0% +0% Flooded Volume (m³) 0.000 0.000 0.000 0.000</pre>	First (X) Surcharge 100/15 Summ 100/15 Summ 30/240 Wint 30/240 Wint 30/60 Wint 30/60 Summ 30/60 Summ Flow / Over Cap. (1 0.72 0.59 0.01 0.01 0.01	First (Y Flood her her her her her her her <b>Pipe</b> flow Flow (1/s) 361.5 364.0 2.9 2.8 1.7	AO, 360, 480 ) First (Z) Overflow Overflow SURCHARGED SURCHARGED SURCHARGED	0, 600, 72 1440, 2160 1, 3 0 Overflow Act.	0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.205 198.011 197.955 197.955 197.895 197.895	Depth (m) 5 -0.26 7 0.13 8 0.15 7 0.26 7 0.32 7 0.34
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 15 15 1440 1440 1440 1440 1440	Duration Period Climate Climate Winter S1.0000 S1.001 S1.002	(s) (m: (s) (yea Change Return Period 30 30 30 30 30 30 30 30 30 30 30 30 30	<pre>ins) 1 ars) (%)  Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0% flooded Volume (m³) 0.000 0.000 0.000 0.000 0.000 0.000</pre>	First (X) Surcharge 100/15 Summ 100/15 Summ 30/240 Wint 30/240 Wint 30/60 Wint 30/60 Summ 30/60 Summ <b>Flow / Ove:</b> Cap. (1 0.72 0.59 0.01 0.01 0.01 0.01	First (Y Flood her her her her her her her <b>Pipe</b> flow Flow (1/s) 361.5 364.0 2.9 2.8 1.7 0.8	AO, 360, 480 ) First (Z) Overflow Overflow SURCHARGED SURCHARGED SURCHARGED SURCHARGED SURCHARGED	0, 600, 72 1440, 2160 1, 3 0 Overflow Act.	0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.205 198.011 197.955 197.955 197.895 197.895	Depth (m) 5 -0.26 7 0.13 8 0.15 7 0.26 7 0.32 7 0.34
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 15 15 1440 1440 1440 1440 1440	Duration Period Climate Climate Winter S1.0000	(s) (m: (s) (yea Change Return Period 30 30 30 30 30 30 30 30 30 30 30 30 30	<pre>ins) 1 ars) (%)  Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0% flooded Volume (m³) 0.000 0.000 0.000 0.000 0.000 0.000</pre>	First (X) Surcharge 100/15 Summ 100/15 Summ 30/240 Wint 30/240 Wint 30/60 Wint 30/60 Summ 30/60 Summ Flow / Over Cap. (1 0.72 0.59 0.01 0.01 0.01	First (Y Flood her her her her her her her <b>Pipe</b> flow Flow (1/s) 361.5 364.0 2.9 2.8 1.7 0.8 0.6	AO, 360, 480 ) First (Z) Overflow Overflow SURCHARGED SURCHARGED SURCHARGED	0, 600, 72 1440, 2160 1, 3 0 Overflow Act.	0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.205 198.011 197.955 197.955 197.895 197.895	Depth (m) 5 -0.26 7 0.13 8 0.15 7 0.26 7 0.32 7 0.34

Hvdrock	Consult	ants Ltd								Р	age 7
•					For	t Halste	ead			-	
•					Cato	chment H	ŗ				
• Date 04/	09/2019				Des	igned by	z SM				Micro
		XX-XX-CA-	-C-Mici	ro		cked by					Drainage
Īnnovyze	!					work 201	8.1.1				
											_
<u>100 ye</u>	ar Retu:	rn Perioc	d Summa	ary of (	Critica	al Resul	ts by	Maximum I	evel (Ra	ink 1)	<u>for Pond F</u>
Ν	Fo umber of Number o	Hot nole Headlo nul Sewage Input Hydr of Online C Rainfall Margin	Hot St Start per hec cographs Controls Model Region 1 for Flo Profile n(s) (m: (s) (yea	Eart (min Level (n Ef (Globa Stare (1/ s 0 Num s 2 Numbe <u>Sy</u> England o od Risk Analy In e(s) 1 ars)	or 1.00 (s) (m) (1) 0.50 (s) 0.00 (ber of St (er of St (er of St (er of St (er of St) (er of St) (er of St) (ber o	0 N 0 Flow pe 0 Offline ( 0 orage Str <u>Rainfall</u> SR M5-60 es Rat (mm) estep 2.5 tatus tatus tatus	Lional 1 MADD Fac er Perso Controls ructures <u>Detail</u> (mm) 20 io R 0 Second	on per Day s O Number s 3 Number <u>s</u> .700 Cv (Su .369 Cv (Wi	<pre>/ha Storag beffiecien (l/per/day of Time/Ar of Real Ti mmmer) 0.7 .nter) 0.8</pre>	e 2.000 t 0.800 ) 0.000 rea Diagn me Contr 50 40 0 F N N Winter 0, 960,	
	US/MH			Climate				) First (Z)		Level	
PN	Name	Storm	Period	Change	Surch	arge	Flood	Overflow	Act.	(m)	(m)
S1.000 S1.001		15 Winter 80 Winter	100 100		100/15 100/15					198.572 198.484	0.099 0.211
S1.001		80 Winter	100		30/240					198.483	0.658
S1.003		80 Winter	100		30/240					198.484	0.685
S1.004 S1.005		80 Winter 80 Winter	100 100	+40% +40%	30/120 30/60					198.424 198.424	0.788 0.848
S1.005		80 Winter	100		30/60					198.424	0.874
S1.007		80 Winter	100		30/60					198.424	0.900
				Flooded	Flow /	Orromflor	Pipe		T orro 1		
		PN	Name	(m <sup>3</sup> )	Flow / Cap.	Overflow (1/s)	(1/s)	Status	Level Exceeded		
					-						
		S1.00		0.000	1.33 0.03			SURCHARGED SURCHARGED			
		S1.00	2 S3	0.000	0.01		2.9	FLOOD RISK			
		S1.00		0.000	0.01			FLOOD RISK			
		S1.00		0.000	0.01			SURCHARGED			
		S1.00 S1.00		0.000	0.01 0.01			SURCHARGED SURCHARGED			
		S1.00 S1.00		0.000	0.01			SURCHARGED			
			20								

Hydrock Consul	tants Ltd						Page 1
			Fort Halstea	ad			
			Catchment G				
							Micco
Date 04/09/201	.9		Designed by	SM			
File 10730-HYD	-XX-XX-CA-C	-Micro	Checked by				Drainage
Înnovyze			Network 2018	8.1.1			
	STORM	SEWER DESIG	N by the Modi	fied Rati	onal M	ethod	
		Design	n Criteria fo	<u>r Pond G</u>			
		Pipe Sizes S	TANDARD Manhole	Sizes STA	NDARD		
		FSR Rainfa	.ll Model - Engl	and and Wa	les		
	Retur	n Period (years	-			PIMP (%)	100
		M5-60 (mm	n) 20.700	Add Flow	/ Clima	ate Change (%)	0
			R 0.370			cop Height (m)	
		Rainfall (mm/hr	,			rop Height (m)	
Maximu		entration (mins			-	timisation (m)	
		Sewage (l/s/ha				ign only (m/s)	1.00
	Volumetr	ic Runoff Coeff	E. 0.750 N	iin Slope i	or Optin	misation (1:X)	500
		Desi	qned with Level	Soffits			
		Desit	gned with level	5011105			
		Network	Design Table	for Pond	G		
		Network	Design Table	for Pond	G		
PN	Length Fall	<u>Network</u> Slope I.Area	-			Section Type	Auto
PN	Length Fall (m) (m)	Slope I.Area	-	k H			Auto Design
	-	Slope I.Area (1:X) (ha) (	T.E. Base mins) Flow (1/s	k H	YD DIA CT (mm)		

S1.001	5.000	0.373	13.4	0.000	0.00	0.0	0.600	0	600	Pipe/Conduit	<u> </u>
S1.002	10.000	0.026	384.6	0.000	0.00	0.0	0.600	0	600	Pipe/Conduit	ē
S1.003	5.000	0.013	384.6	0.000	0.00	0.0	0.600	0	600	Pipe/Conduit	ē
S1.004	10.000	0.060	166.7	0.000	0.00	0.0	0.600	0	450	Pipe/Conduit	ē
S1.005	10.000	0.026	384.6	0.000	0.00	0.0	0.600	0	450	Pipe/Conduit	ē
S1.006	10.000	0.026	384.6	0.000	0.00	0.0	0.600	0	450	Pipe/Conduit	ē
S1.007	10.000	0.026	384.6	0.000	0.00	0.0	0.600	0	450	Pipe/Conduit	ē

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (1/s)	Flow (1/s)
<pre>\$1.000 \$1.001 \$1.002 \$1.003 \$1.004 \$1.005 \$1.006</pre>	50.00 50.00 50.00 50.00 50.00 50.00	5.10 5.23 5.30 5.41 5.57	197.723 197.673 197.225 197.199 197.186 197.126 197.100	1.036 1.036 1.036 1.036 1.036 1.036	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	1.24 1.24 1.57 1.03	872.6 1887.1 349.4 349.4 250.0 163.9	140.3 140.3 140.3 140.3 140.3
S1.006 S1.007	50.00 50.00		197.100	1.036 1.036	0.0	0.0	0.0	1.03 1.03	163.9 163.9	

# Simulation Criteria for Pond G

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow 0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins)	0	Inlet Coeffiecient 0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day) 0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins) 60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins) 1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0 Number of Online Controls 2 Number of Storage Structures 3 Number of Real Time Controls 0

# Synthetic Rainfall Details

Hydrock Consultants Ltd		Page 2
•	Fort Halstead	
•	Catchment G	
		Micro
Date 04/09/2019	Designed by SM	Micro Drainage
File 10730-HYD-XX-XX-CA-C-Micro	Checked by	Drainiage
Īnnovyze	Network 2018.1.1	
	Synthetic Rainfall Details	
Region M5-60 (mm)	England and Wales Cv (Summer) 0 20.700 Cv (Winter) 0	
M5-60 (mm) Ratio R Profile Type	0.370 Storm Duration (mins)	
Profile Type	Summer	

Hydrock Consultants	s Ltd										Pa	ge 3	
•			Fort H	alstead							Г		
•			Catchm	ent G									
											N	Aicro	
Date 04/09/2019			Design	ed by SI	1								
File 10730-HYD-XX-X	XX-CA-C-Mic	ro	Checke	d by								)rain	Idye
Īnnovyze			Networ	k 2018.3	.1								
		<u>Onli</u>	<u>ne Contro</u>	ols for	Pond	<u>1 G</u>							
<u>Hydro-</u>	<u>Brake® Opti</u>	lmum Man	hole: S4,	DS/PN:	S1.	.003,	Vo	lume	e (m³	): 11	1.8		
			Unit Refere	ence MD-SI	HE-01	103-50	00-1	1200-	5000				
			esign Head					1	.200				
		Des	ign Flow (1					_	5.0				
			Flush-H					alcul					
			Applicat	ive Min	LM1Se	e upst	rear		rage face				
			Appileat Sump Availa					Sur	Yes				
			Diameter						103				
		In	vert Level	, ,				197	.199				
	Minimum Out	tlet Pipe	Diameter	(mm)					150				
	Suggested	d Manhole	Diameter	(mm)					1200				
Control 1	Points	Head (m)	Flow (l/s)	Co	ntrol	l Poin	ts		Head	<b>(m)</b>	Flow (	(1/s)	
Design Point (	Calculated)	1.200	5.0			K	ick-	Flo®	0.	.745		4.0	
	Flush-Flo™	0.354	5.0	Mean Flo	w ove	er Hea	ad R	ange		-		4.4	
The hydrological cal	culations hav	ve been b	ased on the	e Head/Di	schar	rge re	lat	ionsh	ip fo	r the	Hydro	-Brak	e®
Optimum as specified	d. Should and	other typ	e of contro	ol device									
then these storage r	couting calcu	lations w	ill be inva	alidated									
Depth (m) Flow (l/s)	Depth (m) Fl	.ow (l/s)	Depth (m)	Flow (1/:	s) De	epth (	(m)	Flow	(l/s)	Dept	th (m)	Flow	(1/s)
0.100 3.4	0.800	4.1	2.000	6	. 3	4.0	00		8.8		7.000		11.5
0.200 4.7	1.000	4.6	2.200	6	. 6	4.5	500		9.3		7.500		11.8

0.200	4.7	1.000	4.6	2.200	6.6	4.500	9.3	7.500	11.8
0.300	5.0	1.200	5.0	2.400			9.8	8.000	12.2
0.400	5.0	1.400		2.600		5.500	10.2	8.500	12.6
0.500	4.9	1.600	5.7	3.000	7.7	6.000	10.7	9.000	12.9
0.600	4.7	1.800	6.0	3.500	8.3	6.500	11.1	9.500	13.3

ydrock Con	sultants :	Ltd			1_					P	age 4
					Fort H		ad				
					Catchm	nent G					
											Micro
ate 04/09/					Designed by SM						Drainag
ile 10730-	HYD-XX-XX	-CA-C-	Micro		Checke						Didiride
nnovyze					Networ	rk 201	8.1.1				
			<u>st</u>	orage	Struct	ures i	for Por	nd G			
			Tank or	Pond	Manhol	e. 53	NG/PN	I• S1 0	0.2		
					ert Level				<u></u>		
Depth (m)	Area (m²)	Depth (	m) Area	(m²)   D	epth (m)	Area	(m²) Der	oth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	577.0	1.2	:00 10	058.1	2.400	16	34.0	3.600	2454.6	4.800	3370.0
0.200	647.1	1.4	00 11	52.4	2.600	18	02.4	3.800	2597.1	5.000	3536.7
0.400			00 12		2.800	19	24.8	4.000			
	799.5		00 13			20		4.200	I		
0.800 1.000	881.7 967.9	2.0 2.2		159.3 569.6	3.200 3.400		81.7 16.1	4.400 4.600	3048.8 3207.4		
	I			0		h - 7			1 004		
		Dee	<u>p Bore</u>	Soaka	way Man	inole:	55, DS	5/PN: S	1.004		
						iltrati	on Coef		Base (m/hr		
	Chamber Di		Length ( ameter (		.500 .300			Sa	fety Facto	r 2.0	
			Depth (	'							
				I		I	0:1-	1	0:1-		
		Depth	Side Infil.	Depth	Side Infil.	Depth	Side Infil.	Depth	Side Infil.		
		(m)	Coef.	(m)		(m)	Coef.	(m)			
			(m/hr)		(m/hr)		(m/hr)		(m/hr)		
		0.000	0.77000	8.000	0.77000	8.001	0.00000	18.000	0.00000		
				1		1		1			
		Dee	<u>p Bore</u>	Soaka	way Man	hole:	<u>s6, D</u> 5	S/PN: S	1.005		
	Chamber Di Bore	ameter/ hole Di		m) 1 m) 0	.976 Inf .350 .300 .000	iltrati	on Coef		Base (m/hr fety Facto		
			Side		Side		Side		Side		
		Depth	Infil.	Depth	Infil.	Depth	Infil.	Depth			
		(m)	Coef. (m/hr)	(m)	Coef. (m/hr)	(m)	Coef. (m/hr)	(m)	Coef. (m/hr)		
		0.000	0.77000	8.000	0.77000	8.001	0.00000	18.000	0.00000		

Hvdrock (	Consul	ltants Ltd	1									Page 5
						Fort H	alstead	d				
						Catchm	ent G					
								Micco				
Date 04/0	09/201	L 9				Design	ed by S	SM				Micro
File 1073	30-HYI	D-XX-XX-CA	A-C-Mi	cro		Checke	-					Drainage
Īnnovyze						Networ		.1.1				
-												
<u>1 year</u>	<u>Retu</u>	urn Period	l Summ	ary of	Cri	tical Re	esults	by Ma	aximum	Level (Ra	nk 1)	for Pond G
						Simulatio	n Criter	ria				
		Area	al Redu	uction F	-				Low - % d	of Total Fl	.ow 0.00	0
						0	MAI	DD Fact		m³/ha Stora	2	
	M=	Hc nhole Headl		t Level			low per	Parson		Coeffiecie		
		Foul Sewage					iow bei	reisoi	i per baj	y (i/pei/ua	IY) 0.00	0
		f Input Hyd of Online										-
	number	or ourrie	CONCEC	JIS Z NU	umet	or scorag	ye arruc	LULES		r or redi j	. ING CON	CTOTO N
					Synt	hetic Rai						
		Rainfall			.d					(Summer) 0. (Winter) 0.		
			Reg10	II ENGLAI	iu ali	u wales	Ratio	K U.	309 CV 1	willer) 0.	040	
		Margin	for F			rning (mm				300		
				Ana	-		-	econd	Incremen	t (Extended		
						DTS Statu DVD Statu					FF DN	
						tia Statu				(	NC	
			Prof	ile(s)						Summer an	d Winte	r
		Duratio	on(s)	(mins)	15	, 30, 60,	120, 18	30, 240	), 360, 4	180, 600, 7		
	D.	eturn Perio		······································						1440, 21	60, 288 30, 10	
	E.	Climate									0, 0, 4	
											Water	Surcharged
	US/MH		Retur	n Climat	te	First (X)	Firs	t (Y)	First (2	<ol> <li>Overflow</li> </ol>		
PN	Name	Storm		d Chang		Surcharge		ood	Overflo		(m)	(m)
S1.000	S1	15 Winter		1 +(	)응 10	0/15 Summ	er				197.99	9 -0.474
s1.001	s2	15 Winter				0/15 Wint					197.87	
S1.002		960 Winter				)/240 Wint					197.57	
S1.003		960 Winter				)/180 Wint					197.57	
S1.004 S1.005		960 Winter 960 Winter				)/120 Summ 80/60 Wint					197.51 197.51	
S1.005		960 Winter				80/60 Wine 80/60 Summ					197.51	
S1.007		960 Winter				80/60 Summ					197.51	5 -0.009
				Flo	oded	L		Pipe				
			U	S/MH Vo	lume	Flow / C	verflow	Flow		Level		
		1	PN N	Iame (	m³)	Cap.	(1/s)	(l/s)	Status	Exceeded		
		S1.	.000	S1 (	0.000	0.28		143.1	OK			
		S1.	.001	S2 (	0.000	0.24		144.6	OK			
			.002		.000			2.5				
			.003					2.4				
			.004 .005		).000 ).000			1.6 0.7				
			.006		0000			0.5				
			.007		0.000			0.0				

ydrock	Consu	r canc	Б ПСС								age 6
							Halstead				
						Catchm	nent G				
											Micro
ate 04/	09/20	19				Design	ned by SM				Drainag
ile 107	30-HY	D-XX-	XX-CA-	C-Mic:	ro	Checke	ed by				טומוומע
nnovyze						Networ	ck 2018.1.1				
<u>30 yea</u>	ar Ret	urn E	Period	Summa	ry of C	ritical B	Results by 1	Maximum Le	evel (Rar	nk 1) f	or Pond (
			Areal	Reduct	ion Fact		on Criteria Additional H	Flow - % of	Total Flow	w 0.000	
					art (min			ctor * 10m³,			
					Level (m	nm) 0			peffiecient		
	М					al) 0.500 E (s) 0.000	flow per Perso	on per Day	(l/per/day)	) 0.000	
NI		-	-				fline Controls age Structures			-	
	Nullibe.		IIIIIe C	01101015			infall Detail		JI NEAI II	me conci	015 0
		Ra	ainfall	Model	<u>57</u>		M5-60 (mm) 20		mmer) 0.75	50	
			F	Region	England a		Ratio R 0				
		1	Margin 1	for Flo		Warning (m			300.0		
					Analy	sis Timesto DTS Statu	ep 2.5 Second	Increment	(Extended) OFF		
						DIS Stati			OFF		
					In	ertia Stati			ON		
				Profile	e(s)			S	Summer and	Winter	
		Γ			. ,	15, 30, 60,	120, 180, 24				
			Ouration	n(s) (m:	ins) 1	15, 30, 60,	120, 180, 24		), 600, 720 1440, 2160	), 960, ), 2880	
	R	leturn	Ouration Period(	n(s) (m: (s) (yea	ins) 1 ars)	15, 30, 60,	120, 180, 24		0, 600, 720 1440, 2160 1, 3	), 960, ), 2880 30, 100	
	R	leturn	Ouration	n(s) (m: (s) (yea	ins) 1 ars)	L5, 30, 60,	120, 180, 24		0, 600, 720 1440, 2160 1, 3	), 960, ), 2880	
	F	leturn	Ouration Period(	n(s) (m: (s) (yea	ins) 1 ars)	L5, 30, 60,	120, 180, 24		0, 600, 720 1440, 2160 1, 3	0, 960, 0, 2880 30, 100 , 0, 40	Surcharge
	r US/MH	leturn	Ouration Period( Climate	n(s) (m: (s) (yea Change <b>Return</b>	ins) 1 ars) (%) Climate	First (X	() First (Y)	10, 360, 480 ) First (Z)	0, 600, 720 1440, 2160 1, 3 0, Overflow	), 960, ), 2880 30, 100 , 0, 40 Water Level	Surcharge Depth
PN		Return C	Ouration Period( Climate	n(s) (m: (s) (yea Change <b>Return</b>	ins) 1 ars) (%)		() First (Y)	40, 360, 480	0,600,720 1440,2160 1,3 0,	0, 960, 0, 2880 30, 100 0, 40 Water	-
<b>PN</b> 51.000	us/mh	eturn C Sta	Ouration Period( Climate	n(s) (m: (s) (yea Change <b>Return</b>	ins) 1 ars) (%) Climate Change	First (X	() First (Y) ge Flood	10, 360, 480 ) First (Z)	0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	), 960, ), 2880 30, 100 , 0, 40 Water Level	Depth (m)
	US/MH Name	eturn C <b>St</b> 15 1	Duration Period( Climate	n(s) (m: (s) (yea Change Return Period	ins) 1 ars) (%) Climate Change +0%	First (X Surcharc	() First (Y) ge Flood	10, 360, 480 ) First (Z)	0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	), 960, ), 2880 30, 100 0, 40 Water Level (m)	<b>Depth</b> (m) -0.27
S1.000	US/MH Name S1 S2	eturn C <b>St</b> 15 1 15 1	Duration Period( Climate	n(s) (m: (s) (yea Change Return Period 30	(%) Climate Change +0% +0%	First (X Surcharg 100/15 Sum	() First (Y) ge Flood nmer hter	10, 360, 480 ) First (Z)	0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	<pre>), 960, ), 2880 30, 100 . 0, 40 Water Level (m) 198.196</pre>	<b>Depth</b> (m) -0.27 -0.26
S1.000 S1.001	US/MH Name S1 S2 S3	Seturn C Sta 15 1 15 1 1440 1	Duration Period( Climate orm	n(s) (m: (s) (yea Change Return Period 30 30	(%) Climate Change +0% +0% +0% +0%	First (X Surcharg 100/15 Sun 100/15 Wir	() First (Y) ge Flood mmer hter hter	10, 360, 480 ) First (Z)	0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	<pre>), 960, ), 2880 30, 100 . 0, 40 Water Level (m) 198.196 198.006</pre>	Depth (m) -0.27 -0.26 0.13
S1.000 S1.001 S1.002	US/MH Name S1 S2 S3 S4	Seturn C 15 1 1440 1 1440 1	Duration Period( Climate orm	n(s) (m: (s) (yea Change Return Period 30 30 30	(%) Climate Change +0% +0% +0% +0% +0%	First (X Surcharg 100/15 Sun 100/15 Wir 30/240 Wir	() First (Y) ge Flood mmer hter hter hter	10, 360, 480 ) First (Z)	0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	<pre>D, 960, 0, 2880 30, 100 0, 40 Water Level (m) 198.196 198.006 197.958</pre>	Depth (m) -0.27 -0.26 0.13 0.16
S1.000 S1.001 S1.002 S1.003	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6	St. 15 1 1440 1 1440 1 1440 1	Period ( Climate orm Winter Winter Winter Winter Winter Winter Winter Winter	n(s) (m: (s) (yea Change Return Period 30 30 30 30	(%) Climate Change +0% +0% +0% +0% +0%	First (X Surcharg 100/15 Sun 100/15 Wir 30/240 Wir 30/180 Wir 30/120 Sun 30/60 Wir	() First (Y) ge Flood nmer hter hter hter hter hter hter hter	10, 360, 480 ) First (Z)	0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	<pre>), 960, ), 2880 30, 100 0, 40 Water Level (m) 198.196 198.006 197.958 197.959</pre>	Depth (m) -0.27 -0.26 0.13 0.16 0.26 0.32
S1.000 S1.001 S1.002 S1.003 S1.004	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6	St. 15 1 1440 1 1440 1 1440 1	Period ( Climate orm : Winter Winter Winter Winter Winter Winter Winter	(s) (m: Change Return Period 30 30 30 30 30 30	ins) 1 ars) (%) Climate Change +0% +0% +0% +0% +0% +0% +0%	First (X Surcharg 100/15 Sun 100/15 Wir 30/240 Wir 30/180 Wir 30/120 Sun 30/60 Wir 30/60 Sun	() First (Y) ge Flood nmer hter hter hter hter hter hter hter ht	10, 360, 480 ) First (Z)	0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	<pre>D, 960, 0, 2880 30, 100 0, 40 Water Level (m) 198.196 198.006 197.958 197.959 197.898 197.898</pre>	Depth (m) -0.27 -0.26 0.13 0.16 0.26 0.32 0.34
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	St. 15 1 1440 1 1440 1 1440 1 1440 1 1440 1	Period ( Climate orm Winter Winter Winter Winter Winter Winter Winter Winter	n(s) (m: (s) (yea Change Return Period 30 30 30 30 30 30 30	ins) 1 ars) (%) Climate Change +0% +0% +0% +0% +0% +0% +0%	First (X Surcharg 100/15 Sun 100/15 Wir 30/240 Wir 30/180 Wir 30/120 Sun 30/60 Wir	() First (Y) ge Flood nmer hter hter hter hter hter hter hter ht	10, 360, 480 ) First (Z)	0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	<pre>), 960, ), 2880 30, 100 0, 40 Water Level (m) 198.196 198.006 197.958 197.959 197.898</pre>	Depth (m) -0.27 -0.26 0.13 0.16 0.26 0.32 0.34
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	St. 15 1 1440 1 1440 1 1440 1 1440 1 1440 1	Period ( Climate orm Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter	n(s) (m: (s) (yea Change Return Period 30 30 30 30 30 30 30 30 30	ins) 1 ars) (%) Climate Change +0% +0% +0% +0% +0% +0% +0%	First (X Surcharg 100/15 Sun 100/15 Wir 30/240 Wir 30/120 Sun 30/60 Wir 30/60 Sun 30/60 Sun	() First (Y) ge Flood nmer hter hter hter hter hter hter hter ht	10, 360, 480 ) First (Z)	0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	<pre>D, 960, 0, 2880 30, 100 0, 40 Water Level (m) 198.196 198.006 197.958 197.959 197.898 197.898</pre>	Depth (m) -0.27 -0.26 0.13 0.16 0.26 0.32 0.34
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	St. 15 1 1440 1 1440 1 1440 1 1440 1 1440 1	Period ( Climate orm Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter	n(s) (m: (s) (yea Change Return Period 30 30 30 30 30 30 30 30 30 30	ins) 1 ars) (%) Climate Change +0% +0% +0% +0% +0% +0% +0% Flooded Volume	First (X Surcharg 100/15 Sun 100/15 Wir 30/240 Wir 30/120 Sun 30/60 Wir 30/60 Sun 30/60 Sun 30/60 Sun	() First (Y) ge Flood mmer hter hter hter hter mmer mmer Pipe erflow Flow	10, 360, 480 ) First (Z)	0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	<pre>D, 960, 0, 2880 30, 100 0, 40 Water Level (m) 198.196 198.006 197.958 197.959 197.898 197.898</pre>	Depth (m) -0.27 -0.26 0.13 0.16 0.26 0.32 0.34
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	St. 15 1 1440 1 1440 1 1440 1 1440 1 1440 1	Period ( Climate orm Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter	n(s) (m: (s) (yea Change Return Period 30 30 30 30 30 30 30 30 30 30	<pre>ins) 1 ars) (%)  Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0%</pre> H0% Flooded	First (X Surcharg 100/15 Sun 100/15 Wir 30/240 Wir 30/120 Sun 30/60 Wir 30/60 Sun 30/60 Sun 30/60 Sun	() First (Y) ge Flood mmer hter hter hter hter mmer mmer Pipe	10, 360, 480 ) First (Z)	0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	<pre>D, 960, 0, 2880 30, 100 0, 40 Water Level (m) 198.196 198.006 197.958 197.959 197.898 197.898</pre>	Depth (m) -0.27 -0.26 0.13 0.16 0.26 0.32 0.34
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	St. 15 1 1440 1 1440 1 1440 1 1440 1 1440 1	Period ( Climate Climate orm Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter	(s) (m: (s) (yea Change Return Period 30 30 30 30 30 30 30 30 30 30 30 30 30	<pre>ins) 1 ars) (%)  Climate Change +0% +0% +0% +0% +0% +0% +0% Flooded Volume (m<sup>3</sup>)</pre>	First (X Surcharg 100/15 Sun 100/15 Wir 30/240 Wir 30/120 Sun 30/60 Wir 30/60 Sun 30/60 Sun Flow / Ove Cap.	() First (Y) ge Flood mmer hter hter hter mmer mmer Pipe erflow Flow (1/s) (1/s)	90, 360, 480 9 First (Z) Overflow Status	0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	<pre>D, 960, 0, 2880 30, 100 0, 40 Water Level (m) 198.196 198.006 197.958 197.959 197.898 197.898</pre>	Depth (m) -0.27 -0.26 0.13 0.16 0.26 0.32 0.34
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	St. 15 1 1440 1 1440 1 1440 1 1440 1 1440 1	Duration Period ( Climate orm Winter Winter Winter Winter Winter Winter Winter Winter Winter	(s) (m: (s) (yea Change Return Period 30 30 30 30 30 30 30 30 30 30 30 30 30	ins) 1 ars) (%) Climate Change +0% +0% +0% +0% +0% +0% +0% Flooded Volume	First (X Surcharg 100/15 Sun 100/15 Wir 30/240 Wir 30/120 Sun 30/60 Wir 30/60 Sun 30/60 Sun 510w / Ov Cap. 0 0.70	() First (Y) ge Flood mmer hter hter hter hter mmer mmer Pipe erflow Flow	10, 360, 480 ) First (Z) Overflow	0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	<pre>D, 960, 0, 2880 30, 100 0, 40 Water Level (m) 198.196 198.006 197.958 197.959 197.898 197.898</pre>	Depth (m) -0.27 -0.26 0.13 0.16 0.26 0.32 0.34
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	St. 15 1 1440 1 1440 1 1440 1 1440 1 1440 1	Period ( Climate Climate orm Winter Winter Winter Winter Winter Winter Winter Winter Winter Sl.000	(s) (m: (s) (yea Change Return Period 30 30 30 30 30 30 30 30 30 30 30 30 30	<pre>ins) 1 ars) (%)  Climate Change +0% +0% +0% +0% +0% +0% +0% Flooded Volume (m<sup>3</sup>) 0.000</pre>	First (X Surcharg 100/15 Sun 100/15 Wir 30/240 Wir 30/120 Sun 30/60 Wir 30/60 Sun 30/60 Sun 510w / Ov Cap. 0 0.70	() First (Y) ge Flood mmer hter hter hter mmer hter mmer Pipe erflow Flow (1/s) (1/s) 352.5 354.7	10, 360, 480 ) First (Z) Overflow Status OK	0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	<pre>D, 960, 0, 2880 30, 100 0, 40 Water Level (m) 198.196 198.006 197.958 197.959 197.898 197.898</pre>	Depth (m) -0.27 -0.26 0.13 0.16 0.26 0.32 0.34
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	St. 15 1 1440 1 1440 1 1440 1 1440 1 1440 1	Period ( Climate Climate orm Winter Winter Winter Winter Winter Winter Winter Winter Sl.000 Sl.001	(s) (m: (s) (yea Change Return Period 30 30 30 30 30 30 30 30 30 30 30 30 30	<pre>ins) 1 ars) (%)  Climate Change +0% +0% +0% +0% +0% +0% +0% Flooded Volume (m³) 0.000 0.000</pre>	First (X Surcharg 100/15 Sun 100/15 Wir 30/240 Wir 30/120 Sun 30/60 Wir 30/60 Sun 30/60 Sun 5Flow / Ov Cap. 0 0.70 0.58	() First (Y) ge Flood mmer hter hter hter mmer mer Pipe erflow Flow (1/s) 352.5 354.7 2.9	<ul> <li>Status</li> <li>OK</li> </ul>	0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	<pre>D, 960, 0, 2880 30, 100 0, 40 Water Level (m) 198.196 198.006 197.958 197.959 197.898 197.898</pre>	Depth (m) -0.27 -0.26 0.13 0.16 0.26 0.32 0.34
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	St. 15 1 1440 1 1440 1 1440 1 1440 1 1440 1	Period ( Climate Climate orm Winter Winter Winter Winter Winter Winter Winter Winter S1.000 S1.001 S1.002	(s) (m: (s) (yea Change Return Period 30 30 30 30 30 30 30 30 30 30 30 30 30	<pre>ins) 1 ars) (%)  Climate Change +0% +0% +0% +0% +0% +0% +0% Flooded Volume (m<sup>3</sup>) 0.000 0.000 0.000</pre>	First (X Surcharg 100/15 Sun 100/15 Wir 30/240 Wir 30/120 Sun 30/60 Sun 30/60 Sun 30/60 Sun <b>Flow / Ove</b> Cap. 0 0.70 0.58 0.01	() First (Y) ge Flood mmer hter hter hter mmer mer Pipe Pipe Flow (1/s) 352.5 354.7 2.9 2.8	Status OK SURCHARGED	0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	<pre>D, 960, 0, 2880 30, 100 0, 40 Water Level (m) 198.196 198.006 197.958 197.959 197.898 197.898</pre>	Depth (m) -0.27 -0.26 0.13 0.16 0.26 0.32 0.34
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	St. 15 1 1440 1 1440 1 1440 1 1440 1 1440 1	Period ( Climate Climate orm Winter Winter Winter Winter Winter Winter Winter Winter S1.000 S1.001 S1.002 S1.003	(s) (m: (s) (yea Change Return Period 30 30 30 30 30 30 30 30 30 30 30 30 30	<pre>ins) 1 ars) (%)  Climate Change +0% +0% +0% +0% +0% +0% +0% Flooded Volume (m<sup>3</sup>) 0.000 0.000 0.000</pre>	First (X Surcharg 100/15 Sun 100/15 Wir 30/240 Wir 30/120 Sun 30/60 Sun 30/60 Sun 30/60 Sun 5Flow / Ov Cap. 0 0.70 0.58 0.01 0.01 0.01	<pre>() First (Y) ge Flood mmer tter tter tter mmer tter mmer mer (1/s)</pre>	Status Status OK SURCHARGED SURCHARGED	0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	<pre>D, 960, 0, 2880 30, 100 0, 40 Water Level (m) 198.196 198.006 197.958 197.959 197.898 197.898</pre>	Depth (m) -0.27 -0.26 0.13 0.16 0.26 0.32 0.34
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	St. 15 1 1440 1 1440 1 1440 1 1440 1 1440 1	Period ( climate climate orm Winter Winter Winter Winter Winter Winter Winter Winter S1.000 S1.001 S1.002 S1.003 S1.004	(s) (m: (s) (yea Change Return Period 30 30 30 30 30 30 30 30 30 30 30 30 30	<pre>ins) 1 ars) (%)  Climate Change +0% +0% +0% +0% +0% +0% +0% +0% Flooded Volume (m³) 0.000 0.000 0.000 0.000</pre>	First (X Surcharg 100/15 Sun 100/15 Wir 30/240 Wir 30/120 Sun 30/60 Sun 30/60 Sun 30/60 Sun 5Flow / Ov Cap. 0 0.70 0.58 0.01 0.01 0.01	() First (Y) ge Flood mmer hter hter hter mmer mmer mmer <b>Pipe</b> erflow Flow (1/s) 352.5 354.7 2.9 2.8 1.7 0.8	Status OK SURCHARGED SURCHARGED	0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	<pre>D, 960, 0, 2880 30, 100 0, 40 Water Level (m) 198.196 198.006 197.958 197.959 197.898 197.898</pre>	Depth (m) -0.27 -0.26 0.13 0.16 0.26 0.32 0.34
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	St. 15 1 1440 1 1440 1 1440 1 1440 1 1440 1	Period ( climate climate orm Winter Winter Winter Winter Winter Winter Winter Winter S1.000 S1.001 S1.002 S1.003 S1.004 S1.005	(s) (m: (s) (yea Change Return Period 30 30 30 30 30 30 30 30 30 30 30 30 30	<pre>ins) 1 ars) (%)  Climate Change +0% +0% +0% +0% +0% +0% +0% +0% Flooded Volume (m³) 0.000 0.000 0.000 0.000 0.000 0.000</pre>	First (X Surcharg 100/15 Sun 100/15 Wir 30/240 Wir 30/120 Sun 30/60 Sun 30/60 Sun 30/60 Sun 5Flow / Ov Cap. 0 0.70 0.58 0.01 0.01 0.01 0.01	() First (Y) ge Flood mmer hter hter hter mmer mer mer mer Serflow Flow (1/s) 352.5 354.7 2.9 2.8 1.7 0.8 0.6	First (Z) Overflow          Status         OK         SURCHARGED         SURCHARGED         SURCHARGED         SURCHARGED         SURCHARGED         SURCHARGED	<pre>0, 600, 720 1440, 2160     1, 3     0, Overflow Act. Level</pre>	<pre>D, 960, 0, 2880 30, 100 0, 40 Water Level (m) 198.196 198.006 197.958 197.959 197.898 197.898</pre>	Depth (m) -0.27 -0.26 0.13 0.16 0.26 0.32 0.34

Hydrock	Consu	ltants Ltd								P	age 7
nyaroex					For	t Halste	ad			1	
					-	chment G					
							-				Micco
Date 04/	09/20	19			Des	igned by	z SM				Micro
		D-XX-XX-CA-	-C-Mic:	ro		cked by	011				Drainage
-						work 201	8 1 1				
1											
	<u>ar Ret</u> Ma umber c	Hot anhole Headlo Foul Sewage of Input Hydr r of Online C Rainfall	L Reduct Hot St Start per hec cographs Controls Model Region	tion Fact tart (mir Level (m ff (Globa ctare (1/ s 0 Num s 2 Numbe <u>Sy</u> England . pod Risk	<u>Simula</u> cor 1.00 um) al) 0.50 ('s) 0.00 mber of er of St <u>rthetic</u> F: and Wald Warning sis Tim DTS S	al Resul ation Crit DO Addit O N DO Flow pe DO Offline C torage Str : Rainfall SR M5-60 es Rat (mm) uestep 2.5	teria tional F MADD Fac er Perso Controls ructures <u>Detail</u> (mm) 20 io R 0	Flow - % of ctor * 10m³/ Inlet Co on per Day o s 0 Number o s 3 Number o	Total Flo /ha Storag beffiecien (l/per/day of Time/Ar of Real Ti mmer) 0.7 nter) 0.8 300.0	w 0.000 e 2.000 t 0.800 ) 0.000 ea Diagn me Contr 50 40	cams O
	R US/MH	eturn Period Climate	(s) (yea Change	ars)				10, 360, 480 ) First (Z)	1440, 2160 1, 3 0	0, 2880 30, 100 , 0, 40 Water	Surcharged
PN	Name	Storm		Change		harge	Flood	Overflow	Act.	(m)	(m)
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006 S1.007	S3 S4 S5 S6 S7	<pre>15 Winter 2880 Winter 2880 Winter 2880 Winter 2880 Winter 2880 Winter 2880 Winter</pre>	100 100 100 100 100 100 100	+40% +40% +40% +40% +40%		Winter Winter Winter Summer Winter Summer				<b>198.563</b> 198.483 198.483 198.484 198.424 198.424 198.424 198.424	0.090 0.210 0.658 0.685 0.788 0.848 0.874 0.900
			IIS /MH	Flooded		Overflow	Pipe Flow		Level		
		PN	Name	(m <sup>3</sup> )	Cap.	(1/s)	(1/s)	Status	Exceeded		
					-						
		S1.000 S1.001						SURCHARGED SURCHARGED			
		s1.002						FLOOD RISK			
		S1.003	3 S4	0.000	0.01		2.8	FLOOD RISK			
		S1.004						SURCHARGED			
		S1.005 S1.005						SURCHARGED SURCHARGED			
		s1.00 <sup>°</sup>						SURCHARGED			

Hydrock Consultants Ltd		Page 1
•	Fort Halstead	
	Catchment H	
		Micco
Date 04/09/2019	Designed by SM	——— Micro
File 10730-HYD-XX-XX-CA-C-Micro		Drainage
Innovyze	Network 2018.1.1	
CTODM CENT	DESIGN by the Medified Dational M	Inthad
STORM SEWER	R DESIGN by the Modified Rational M	
	<u>Design Criteria for Pond H</u>	
	<u> </u>	
Pipe	Sizes STANDARD Manhole Sizes STANDARD	
FS Return Perio	R Rainfall Model - England and Wales od (vears) 1	PIMP (%) 100
	15-60 (mm) 20.700 Add Flow / Clim	
		rop Height (m) 0.200
Maximum Rainfa	.l (mm/hr) 50 Maximum Backd	rop Height (m) 1.500
	on (mins) 30 Min Design Depth for Op	timisation (m) 1.200
	e (l/s/ha) 0.000 Min Vel for Auto Des	2 2
Volumetric Runo	off Coeff. 0.750 Min Slope for Optin	misation (1:X) 500
	Designed with Level Soffits	
Ν	etwork Design Table for Pond H	
-		
PN Length Fall Slope		Section Type Auto
(m) (m) (1:X)	(ha) (mins) Flow (1/s) (mm) SECT (mm)	Design
S1.000 10.000 0.050 200.0	0.648 5.00 0.0 0.600 o 750	Pipe/Conduit 🔒
s1.001 5.000 0.373 13.4	0.000 0.00 0.0 0.600 o 600	Pipe/Conduit 🔒

S1.001	5.000	0.373	13.4	0.000	0.00	0.0	0.600	0	600	Pipe/Conduit	ā.
S1.002	10.000	0.026	384.6	0.000	0.00	0.0	0.600	0	600	Pipe/Conduit	ā.
S1.003	5.000	0.013	384.6	0.000	0.00	0.0	0.600	0	600	Pipe/Conduit	ā.
S1.004	10.000	0.060	166.7	0.000	0.00	0.0	0.600	0	450	Pipe/Conduit	ā.
S1.005	10.000	0.026	384.6	0.000	0.00	0.0	0.600	0	450	Pipe/Conduit	ā.
S1.006	10.000	0.026	384.6	0.000	0.00	0.0	0.600	0	450	Pipe/Conduit	ă.
S1.007	10.000	0.026	384.6	0.000	0.00	0.0	0.600	0	450	Pipe/Conduit	ā.

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (1/s)	Flow (l/s)
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005	50.00 50.00 50.00 50.00 50.00 50.00	5.10 5.23 5.30 5.41	197.723 197.673 197.225 197.199 197.186 197.126	0.648 0.648 0.648 0.648 0.648 0.648	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	1.98 6.67 1.24 1.24 1.57 1.03	872.6 1887.1 349.4 349.4 250.0 163.9	87.7 87.7 87.7 87.7 87.7 87.7
S1.006 S1.007	50.00 50.00		197.100 197.074	0.648 0.648	0.0	0.0 0.0	0.0 0.0	1.03 1.03	163.9 163.9	87.7 87.7

# Simulation Criteria for Pond H

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow 0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins)	0	Inlet Coeffiecient 0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day) 0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins) 60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins) 1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0 Number of Online Controls 2 Number of Storage Structures 3 Number of Real Time Controls 0

#### Synthetic Rainfall Details

Hydrock Consultants Ltd		Page 2
•	Fort Halstead	
	Catchment H	
		Micco
Date 04/09/2019	Designed by SM	—— Micro Drainage
File 10730-HYD-XX-XX-CA-C-Micro	Checked by	Diamaye
Īnnovyze	Network 2018.1.1	
	<u>Synthetic Rainfall Details</u>	
Region H M5-60 (mm)	England and Wales Cv (Summer) 0.750	
Ratio R	20.700 Cv (Winter) 0.840 0.370 Storm Duration (mins) 30 Summer	
Profile Type	Summer	

Hydrock Consultant	ts Ltd									Pag	ge 3	
•			Fort H	alstead								
•			Catchm	ent H								
										N	licro	
Date 04/09/2019			Design	ed by SM								
File 10730-HYD-XX·	-XX-CA-C-Mi	cro	Checke	d by							Inain	aye
Īnnovyze			Networ	k 2018.1.	1							
Hydro	-Brake® Opt			DS/PN: S		. Vc	olume	e (m <sup>3</sup>	): 11	1.8		
<u>iiyato</u>									/• ±.	<u> 0</u>		
			Unit Refere esign Head	nce MD-SHE	-0103-5	000-		.200				
			ign Flow (1				1	5.0				
			Flush-H			С	alcul	ated				
			-	ive Minim	ise ups	trea		-				
			Applicat				Sur	face				
			Sump Availa					Yes				
		Tn	Diameter vert Level	,			107	103 .199				
	Minimum O		Diameter	( )			191	150				
		-	Diameter					1200				
Control	Points	Head (m)	Flow (l/s)	Cont	rol Poi	nts		Head	(m) 1	Flow (	1/s)	
Design Point	(Calculated)	1.200	5.0		I	Kick	-Flo®	0.	.745		4.0	
	Flush-Flo™		5.0	Mean Flow	over He	ead 1	Range		-		4.4	
The hydrological ca	loulations b	arra haar b	and on the	Upad/Dias	harra -	-1-+	ionch	in fo	r +h-	Undrag	Drol-	
Optimum as specifie					-			-		-		
then these storage									op		u	
Depth (m) Flow (l/s	Depth (m) H	[low (l/s)	Depth (m)	Flow (l/s)	Depth	(m)	Flow	(1/s)	Dept	:h (m)	Flow	(l/s)
0.100 3.4	1 0.800	4.1	2.000	6.3	4.	000		8.8		7.000		11.5
0.200 4.1	7 1.000	4.6	2.200	6.6	4.	500		9.3	3	7.500		11.8

0.100	2.7	0.000		2.000	0.5	4.000	0.0	1.000	11.5
0.200	4.7	1.000	4.6	2.200	6.6	4.500	9.3	7.500	11.8
0.300	5.0	1.200	5.0	2.400			9.8	8.000	12.2
0.400	5.0	1.400	5.4	2.600	7.2	5.500	10.2	8.500	12.6
0.500	4.9	1.600	5.7	3.000	7.7	6.000	10.7	9.000	12.9
0.600	4.7	1.800	6.0	3.500	8.3	6.500	11.1	9.500	13.3

Weir Manhole: S8, DS/PN: S1.007, Volume (m<sup>3</sup>): 3.8

Discharge Coef 0.544 Width (m) 1.000 Invert Level (m) 198.750  $\,$ 

ate 04/09/2019       Designed by SM         ile 10730-HYD-XX-XX-CA-C-Micro       Checked by         nnovyze       Network 2018.1.1         Storage Structures for Pond H         Tank or Pond Manhole: S3, DS/PN: S1.002         Invert Level (m) 197.300         Depth (m) Area (m <sup>2</sup> )         1.200       851.6         2.400       1585.4         3.600       2545.3		ultants :										Page 4
Ite 04/09/2019         Designed by SM Checked by         Designed by SM Checked by           NetWork 2018.1.1           Storage Structures for Pond H           Storage Structures for Pond H           Tank or Pond Manhole: S3, DS/PN: S1,002           Invert Level (m) 197.300           Pepth (m) Area (m²) Pepth (m²) Pep								ad				
Destined by SM         Destined by SM           Lie 10730-HYD-XX-XX-CA-C-Micro         Network 2018.1.1           Checked by           Destined by SM           Destined by SM           Destined by SM           Destined by SM           Checked by           Network 2018.1.1           Storage Structures for Pond H           Tank or Pond Manhole: S3, DS/PN: S1.002           Invert Level (m) 197.300           Depth (m) Area (m²) Depth (m²) Dep						Catchm	nent H					
Destined by SM         Destined by SM           Lie 10730-HYD-XX-XX-CA-C-Micro         Network 2018.1.1           Checked by           Destined by SM           Destined by SM           Destined by SM           Destined by SM           Checked by           Network 2018.1.1           Storage Structures for Pond H           Tank or Pond Manhole: S3, DS/PN: S1.002           Invert Level (m) 197.300           Depth (m) Area (m²) Depth (m²) Dep												Micro
Internet         Encoded by           Network 2018.1.1           Storage Structures for Pond H           Tank or Pond Manhole: S3, DS/PN: S1.002           Invert Level (m) 197.300           Depth (m) Area (m <sup>2</sup> )         Addition (m <sup>2</sup> )         Depth (m) Area							-	SM				Drainaq
Storage Structures for Pond H           Storage Structures for Pond H           Tank or Pond Manhole: S3, DS/PN: S1.002           Invert Level (m) 197.300           Depth (m) Area (m²) Depth (m²) Depth (m²) Depth (m²) Depth (m²) Depth (m) Area (m²) Depth (m) Area (m²) Depth (m) D.77000 Safety Factor 2.0 Breachel Depth (m) 1.350 Safety Factor 2.0 Breachel Diameter/Length (m) 1.350 Safety Factor 2.0 Breachel Diameter (m?) D.300           Bere Soakaway Manhole: S6, DS/PN: S1.005           Chamber Invert Level (m) 178.976 Infiltration Coefficient Base (m/hr) 0.77000 Chamber Diameter/Length (m) 1.350 Safety Factor 2.0 Borehole Diameter (m) 0.300 Borehole Diameter (m) 0.300		YD-XX-XX	-CA-C-	Micro			-					Drainacy
Tank or Fond Manhole: S3, DS/FN: S1.002         Invert Level (m) 197.300         Depth (m) Area (m²)       Depth (m²) <thdepth (m²)<="" th="">       Depth (m²)</thdepth>	novyze					Networ	k 201	8.1.1				
Invert Level (m) 197.30         Pepth (m)       Area (m²)       Pepth (m²)       Area (m²)       Pepth (m²)       Area (m²)       Pepth (m²)       Area (m²)       Pept				<u>st</u>	orage	Struct	ures	for Pon	d <u>H</u>			
Invert Level (m) 197.30         Pepth (m)       Area (m²)       Pepth (m²)       Area (m²)       Pepth (m²)       Area (m²)       Pepth (m²)       Area (m²)       Pept			,	Tank or	Pond	Manhol	۵. دع	עם / מע	· s1 0	12		
0.000       344.0       1.200       851.6       2.400       1585.4       3.600       2545.3       4.800       373         0.400       488.1       1.600       1071.0       2.800       1880.2       4.000       2915.6       5.000       395         0.400       488.1       1.600       1071.0       2.800       1880.2       4.000       2915.6       5.000       395         0.600       569.5       1.800       1190.2       3.000       2037.1       4.200       3110.2       4.000       3110.2         0.800       657.3       2.000       1315.6       3.200       2260.2       4.400       311.1       3100       310.2         0.000       751.3       2.200       1447.4       3.400       2369.6       4.600       3518.1         Deep Bore Soakaway Manhole: S5, DS/FN: S1.004         Chamber Invert Level (m) 173.186 Infiltration Coefficient Base (m/hr) 0.77000         Borehole Depth (m) 18.000         Depth Infil.       (m/hr)       0.300         Borehole Depth (m) 18.000       8.001       0.0000       18.000       0.0000         Depth Infil.       (m/hr)       0.300       0.300       0.300 <td< td=""><td></td><td></td><td>-</td><td></td><td></td><td></td><td></td><td></td><td>• 61.0</td><td></td><td></td><td></td></td<>			-						• 61.0			
0.200       412.9       1.400       958.2       2.600       1729.7       3.800       2727.3       5.000       395         0.400       488.1       1.600       1071.0       2.800       1880.2       4.000       2915.6       5.000       395         0.600       565.5       1.800       1190.2       3.000       2200.2       4.400       3311.0       2.000       1315.6       3.200       2200.2       4.400       3311.0       310.2       2.000       147.4       3.400       2369.6       4.600       3518.1       5.000       395         Deep Bore Soakaway Manhole: S5, DS/PN: S1.004         Chamber Invert Level (m) 173.186 Infiltration Coefficient Base (m/hr) 0.77000         Chamber Invert Level (m) 173.186 Infiltration Coefficient Base (m/hr) 0.77000         Borehole Diameter (m) 0.300         Borehole Depth (m) 1.800         Borehole Depth (m) 18.000         Depth Infil.         (m/hr)       0.000 0.77000       8.001 0.00000       18.000 0.0000       18.000       0.0000         Depth Infil.       (m/hr)       0.300         Depth Infil.       (m/hr)       0.77000         0.000 0.77000       8	Depth (m)	Area (m²)	Depth (	m) Area					oth (m) 2	Area (m²)	Depth (m	) Area (m²)
0.400       488.1       1.600       1071.0       2.800       1880.2       4.000       2915.6         0.600       569.5       1.800       1190.2       3.000       2207.1       4.200       3111.0         0.600       657.3       2.000       1315.6       3.200       2200.2       4.400       3311.0         Deep Bore Soakaway Manhole: S5, DS/PN: S1.004         Deep Bore Soakaway Manhole: S5, DS/PN: S1.004         Chamber Invert Level (m) 173.186 Infiltration Coefficient Base (m/hr) 0.77000         Chamber Invert Level (m) 173.186 Infiltration Coefficient Base (m/hr) 0.77000         Chamber Invert Level (m) 173.186 Infilt         Deept Tinvert Level (m) 173.186 Infilt         Deept Infil.         (m) Coef.         (m)       0.300         Borehole Diameter (m) 0.300         Borehole Depth (m) 18.000         Deept Soakaway Manhole: S6, DS/PN: S1.005         Chamber Invert Level (m) 178.976 Infiltration Coefficient Base (m/hr) 0.77000         Chamber Diameter/Length (m) 1.350         Safety Factor 2.0         Borehole Diameter (m) 0.300         Borehole Diameter (m) 1.350         Safety	0.000	344.0	1.2	8 00	351.6	2.400	15	85.4	3.600	2545.3	4.80	0 3731.5
0.600       569.5       1.800       1190.2       3.000       2037.1       4.200       3110.2         0.800       657.3       2.000       1315.6       3.200       2200.2       4.400       3311.0         1.000       751.3       2.200       1447.4       3.400       2369.6       4.600       3518.1         Deep Bore Soakaway Manhole: S5, DS/PN: S1.004         Chamber Invert Level (m) 173.186 Infiltration Coefficient Base (m/hr) 0.77000         Chamber Invert Level (m) 173.186 Infiltration Coefficient Base (m/hr) 0.77000         Side         Depth Infil.         (m)       0.300         Bore Soakaway Manhole: S5, DS/PN: S1.004         Depth Infil.         (m)       0.300         Bore Marker (m)         Side         Depth Infil.         (m)       Coef.         (m/hr)       0.000       0.7000       8.001       0.00000       18.000       0.00000         Dept Soakaway Manhole: S6, DS/PN: S1.005         Chamber Invert Level (m) 178.976 Infiltration Coefficient Base (m/hr) 0.77000         Chamber Diameter/Length (m) 1.350       Safety Factor 2.0						2.600	17				5.00	0 3951.2
0.800       657.3       2.000       1315.6       3.200       2200.2       4.400       3311.0         1.000       751.3       2.200       1447.4       3.400       2369.6       4.600       3518.1         Deep Bore Soakaway Manhole: S5, DS/PN: S1.004         Chamber Invert Level (m) 173.186 Infiltration Coefficient Base (m/hr) 0.77000         Chamber Jiameter/Length (m) 1.500         Side         Deepth Infil.         (m) 0.300         Borehole Depth (m) 18.000         Side         Deep Bore Soakaway Manhole: Side         Depth Infil.         (m/hr)       0.000       0.77000         Borehole Depth (m) 18.000         Depth Infil.         (m/hr)       0.000       0.77000         0.000       0.77000       8.001       0.0000         Deep Bore Soakaway Manhole: S6, DS/PN: S1.005         Chamber Invert Level (m) 178.976 Infiltration Coefficient Base (m/hr) 0.77000         Chamber Diameter/Length (m) 1.350         Safety Factor 2.0         Borehole Diameter (m) 0.300         Borehole Diameter (m) 1.350												
1.000       751.3       2.200       1447.4       3.400       2369.6       4.600       3518.1         Deep Bore Soakaway Manhole: S5, DS/FN: S1.004         Chamber Invert Level (m) 173.186 Infiltration Coefficient Base (m/hr) 0.77000 Chamber Diameter/Length (m) 1.500         Safety Factor 2.0         Borehole Diameter (m) 0.300         Borehole Depth (m) 18.000         Depth Infil. (m) Coef. (m/hr)         O .000 0.77000         Depth Infil. (m) Coef. (m/hr)         0.000 0.77000         Depth Infil. (m) Coef.         Optimized for the set of the set												
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Chamber Diameter/Length (m) 1.500 Borehole Diameter (m) 0.300 Borehole Depth (m) 18.000			<u>Dee</u> j	<u>p Bore</u>	Soaka	way Man	hole:	S5, DS	/PN: S	1.004		
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Hydrock (	Consu	ltants Ltd									Page 5
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· Date 04/0	00/20	1.0			Decim	ad by C	Γ.Λ.				Micro
			C Min		-	ned by S	M				Drainage
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<u>1 year</u>	<u>r Retu</u>	arn Period	Summar	<u>ry of Cr</u>	itical B	Results	by Ma	<u>iximum</u> 1	Level (Ra	ank 1)	for Pond H
	umber c	Hot anhole Headlo Foul Sewage of Input Hydr	Hot St Start pss Coef per hec	cart (mins Level (mm f (Global ctare (l/s 0 Numk	() 0 () 0.500 () 0.000 () 0.000	Additio MAD Flow per fline Con	nal Fl D Fact Persor trols	tor * 10m Inlet n per Day 0 Number	r of Time/2	age 2.000 ent 0.800 ay) 0.000 Area Diag	0 0 grams 0
	Number	of Online C	ontrols	2 Number	of Stora	age Struc	tures	3 Number	r or Real '	l'ime Cont	trols U
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		Rainfall		En er le re el					Summer) 0.		
			Region .	England a	nd wales	Ratio	R U.	369 CV (	Winter) 0.	.840	
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										Water	Surcharged
	US/MH	:	Return	Climate	First (X	) First	: (Y)		) Overflow	v Level	Depth
PN	Name	Storm	Period	Change	Surcharg	e Flo	bod	Overflow	w Act.	(m)	(m)
s1.000	S1	15 Winter	1	+0%						197.939	9 -0.534
S1.001			1	+0%						197.828	
S1.002		600 Winter	1		0/480 Win					197.510	
S1.003		600 Winter	1		0/360 Win					197.510	
S1.004		600 Winter	1		0/120 Win					197.455	
s1.005 s1.006		600 Winter 600 Winter	1 1		30/60 Win 30/60 Win					197.455	
s1.000		600 Winter	1		30/60 Will 30/60 Sum					197.45	
					_						
			119/1	Floode MH Volume		Owerflow	Pipe Flow		Level		
		PI			Cap.	(1/s)			Exceeded		
		~ * *		o1 0 00	-						
		S1.0 S1.0		s1 0.00 s2 0.00			89.8 90.5				
		SI.( S1.(		SZ 0.00 S3 0.00			90.5 3.0				
		S1.(		ss 0.00 s4 0.00			2.8				
		S1.(		s4 0.00 s5 0.00			2.0				
		S1.0 S1.0		ss 0.00			0.9				
		S1.0		so 0.00			0.9				
		S1.0		S8 0.00			0.0				

Hydrock C	onsul	ltants Ltd	l							]	Page 6
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Date 04/0	9/201	9			Des	igned k	by SM				
File 1073	0-HYI	D-XX-XX-CA	-C-Mic	ro		cked by	-				Drainage
Īnnovyze							)18.1.1				
Nur	Ma nber o Number	Area Ho Inhole Headl Foul Sewage of Input Hyd of Online Rainfal: Margin Duratio	Il Reduct Hot St to Start .oss Coef e per hec rographs Controls I Model Region : for Flo Profile on(s) (m:	cion Fact cart (min Level (r Ef (Globa ctare (l, s 0 Nuu s 2 Numb S 2 England od Risk Analy Ir e(s) ins)	Simula tor 1.00 ns) nm) al) 0.50 (s) 0.00 mber of er of St <u>mthetic</u> FS and Wale Warning rsis Time DTS St DVD St aertia St	tion Cr 0 Add 0 0 Flow 0 Offline orage S Rainfal SR M5-60 es Ra (mm) estep 2. tatus tatus tatus	<u>iteria</u> MADD Fac per Perso Controls tructures <u>1 Detail:</u> (mm) 20 tio R 0 5 Second	Ylow - % of tor * 10m³ Inlet C on per Day 0 Number 3 Number <u>5</u> .700 Cv (S) .369 Cv (W) Increment	Total Flo /ha Storag oeffiecier (l/per/day of Time/A of Real T: ummer) 0.7 inter) 0.8 300. (Extended OF 0 0 Summer and 0, 600, 72 1440, 216	ow 0.000 ge 2.000 nt 0.800 y) 0.000 rea Diag ime Cont 250 340 0 ) F N N N N A Winter 20, 960,	) ) grams O crols O
1	us/mh		-	Climate	First	(X) I	First (Y)	First (Z)	Overflow		Surcharged Depth
PN	Name	Storm	Period	Change	Surcha	arge	Flood	Overflow	Act.	(m)	(m)
S1.000	S1	15 Winter	30	+0%						198.075	-0.398
S1.001	S2	15 Winter	30	+0%						197.925	
S1.002 S1.003		960 Winter 960 Winter	30 30		30/480 T 30/360 T					197.846	
S1.003		960 Winter	30		30/120					197.786	
S1.005		960 Winter	30		30/60 1					197.786	
S1.006		960 Winter	30		30/60 1					197.786	
S1.007	S8	960 Winter	30	+0%	30/60 \$	Summer				197.786	0.262
				Flooded			Pipe		_		
		PN	US/MH Name	Volume (m³)	Flow / Cap.	Overflo (1/s)		Status	Level Exceeded		
			Rame	(	cap.	(1/3)	(1/3)	blacus	Inceeded		
		S1.00		0.000			221.8	OK			
		S1.00 S1.00		0.000			221.1	OK SURCHARGED			
		S1.00		0.000				SURCHARGED			
		S1.00		0.000				SURCHARGED			
		S1.00		0.000			0.7	SURCHARGED			
		S1.00		0.000				SURCHARGED			
		S1.00	)7 S8	0.000	0.00		0.0	SURCHARGED			

YULOCK	Consu	ltant	ts Ltd								P	age 7
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ile 107	730-HY	D-XX-	-XX-CA-	-C-Mic	ro	Che	cked by					Diamage
nnovyze	9					Net	work 201	8.1.1				
	M Jumber	anhole Foul of Inp	Areal Hot Headlo Sewage Dut Hydr	Reduct Hot St Start ss Coef per hec ographs	tion Fact tart (min Level (m Ef (Globa ttare (l/ tare (l/	<u>Simula</u> for 1.00 (s) (l) 0.50 (s) 0.00 (s) 0.00	Ation Crit 0 Addit 0 M 0 00 Flow pe 00 0ffline C	<u>eria</u> Lional I MADD Fac Per Perso Controls	Flow - % of ctor * 10m³	Total Flo /ha Storag peffiecien (l/per/day of Time/Ar	w 0.000 e 2.000 t 0.800 ) 0.000 ea Diag:	
			Margin :	Region : for Flo Profile	England o od Risk Analy In e(s)	FS and Wale Warning sis Time DTS St DVD St ertia St	es Rat (mm) estep 2.5 tatus tatus tatus	(mm) 20 io R 0 Second	.700 Cv (Su .369 Cv (Wi	nter) 0.8 300.0 (Extended) OFF ON ON Summer and	40 5 1 1 Winter 0, 960,	
	r		Period Climate							1,	30, 100 , 0, 40	
PN	US/MH Name	I	Climate	Change Return		First Surch		irst (Y) Flood	) First (Z) Overflow	1, 0	30, 100 , 0, 40 Water	Surcharged Depth (m)
	US/MH Name	St	Climate	Change Return Period	(%) Climate Change					1, Overflow	30, 100 , 0, 40 Water Level (m)	Depth (m)
<b>PN</b> S1.000 S1.001	US/MH Name S1	<b>St</b> 1440	Climate	Change Return	(%) Climate					1, Overflow	30, 100 , 0, 40 Water Level	<b>Depth</b> (m) -0.200
S1.000 S1.001 S1.002	US/MH Name S1 S2 S3	<b>St</b> 1440 1440 1440	Climate corm Winter Winter Winter Winter	Change Return Period 100 100 100	(%) Climate Change +40% +40% +40%	<b>Surch</b> 30/480	M <b>arge</b> Winter			1, Overflow	<pre>30, 100 , 0, 40 Water Level (m) 198.273 198.273 198.271</pre>	Depth (m) -0.200 0.000 0.446
S1.000 S1.001 S1.002 S1.003	US/MH Name S1 S2 S3 S4	<b>St</b> 1440 1440 1440 1440	Climate corm Winter Winter Winter Winter Winter	Change Return Period 100 100 100 100	(%) Climate Change +40% +40% +40% +40%	Surch 30/480 30/360	Winter Winter			1, Overflow	<pre>30, 100 , 0, 40 Water Level (m) 198.273 198.273 198.271 198.271</pre>	Depth (m) -0.200 0.000 0.446 0.472
S1.000 S1.001 S1.002 S1.003 S1.004	<b>US/MH</b> Name S1 S2 S3 S4 S5	<b>St</b> 1440 1440 1440 1440 1440	Climate Corm Winter Winter Winter Winter Winter Winter	Change Return Period 100 100 100 100 100	(%) Climate Change +40% +40% +40% +40% +40%	Surch 30/480 30/360 30/120	Winter Winter Winter Winter			1, Overflow	<pre>30, 100 , 0, 40 Water Level (m) 198.273 198.273 198.271 198.271 198.211</pre>	Depth (m) -0.200 0.000 0.446 0.472 0.575
S1.000 S1.001 S1.002 S1.003	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6	<b>St</b> 1440 1440 1440 1440 1440 1440	Climate corm Winter Winter Winter Winter Winter	Change Return Period 100 100 100 100	(%) Climate Change +40% +40% +40% +40% +40%	Surch 30/480 30/360	Winter Winter Winter Winter Winter			1, Overflow	<pre>30, 100 , 0, 40 Water Level (m) 198.273 198.273 198.271 198.271</pre>	Depth (m) -0.200 0.000 0.446 0.472 0.575 0.635
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 1440 1440 1440 1440 1440 1440 1440	Climate Corm Winter Winter Winter Winter Winter Winter	<b>Return</b> <b>Period</b> 100 100 100 100 100	(%) <b>Climate</b> <b>Change</b> +40% +40% +40% +40% +40% +40% +40%	Surch 30/480 30/360 30/120 30/60	Winter Winter Winter Winter Winter Winter			1, Overflow	<pre>30, 100 , 0, 40 Water Level (m) 198.273 198.271 198.271 198.211 198.211</pre>	Depth (m) -0.200 0.446 0.472 0.575 0.635 0.661
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 1440 1440 1440 1440 1440 1440 1440	Climate Corm Winter Winter Winter Winter Winter Winter Winter	Change Return Period 100 100 100 100 100 100 100	(%) <b>Climate</b> <b>Change</b> +40% +40% +40% +40% +40% +40% +40%	Surch 30/480 30/360 30/120 30/60 30/60	Winter Winter Winter Winter Winter Winter			1, Overflow	<pre>30, 100 , 0, 40 Water Level (m) 198.273 198.271 198.271 198.211 198.211 198.211</pre>	Depth (m) -0.200 0.446 0.472 0.575 0.635 0.661
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 1440 1440 1440 1440 1440 1440 1440	Climate Corm Winter Winter Winter Winter Winter Winter Winter	Return           Period           100           100           100           100           100           100           100           100           100           100           100           100           100           100           100           100	(%) <b>Climate</b> <b>Change</b> +40% +40% +40% +40% +40% +40% <b>Flooded</b>	Surch 30/480 30/360 30/120 30/60 30/60 30/60	Winter Winter Winter Winter Winter Summer	Flood		1, 0 Overflow Act.	<pre>30, 100 , 0, 40 Water Level (m) 198.273 198.271 198.271 198.211 198.211 198.211</pre>	Depth (m) -0.200 0.446 0.472 0.575 0.635 0.661
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 1440 1440 1440 1440 1440 1440 1440	Climate Corm Winter Winter Winter Winter Winter Winter Winter Winter	Change Return Period 100 100 100 100 100 100 100 10	(%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Volume	Surch 30/480 30/360 30/60 30/60 30/60	Winter Winter Winter Winter Winter Summer Overflow	Flood Pipe Flow	Overflow	1, 0 Overflow Act.	<pre>30, 100 , 0, 40 Water Level (m) 198.273 198.271 198.271 198.211 198.211 198.211</pre>	Depth (m) -0.200 0.446 0.472 0.575 0.635 0.661
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 1440 1440 1440 1440 1440 1440 1440	Climate Corm Winter Winter Winter Winter Winter Winter Winter	Return           Period           100           100           100           100           100           100           100           100           100           100           100           100           100           100           100           100	(%) <b>Climate</b> <b>Change</b> +40% +40% +40% +40% +40% +40% <b>Flooded</b>	Surch 30/480 30/360 30/120 30/60 30/60 30/60	Winter Winter Winter Winter Winter Summer	Flood		1, 0 Overflow Act.	<pre>30, 100 , 0, 40 Water Level (m) 198.273 198.271 198.271 198.211 198.211 198.211</pre>	Depth (m) -0.200 0.000 0.446 0.472 0.575 0.635 0.661
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 1440 1440 1440 1440 1440 1440 1440	Climate Corm Winter Winter Winter Winter Winter Winter Winter Winter	Change Return Period 100 100 100 100 100 100 100 10	(%) Climate Change +40% +40% +40% +40% +40% +40% Flooded Volume (m <sup>3</sup> )	Surch 30/480 30/360 30/120 30/60 30/60 30/60 Flow / Cap. 0.04	Winter Winter Winter Winter Winter Summer Overflow (1/s)	Flood Pipe Flow	Overflow	1, 0 Overflow Act.	<pre>30, 100 , 0, 40 Water Level (m) 198.273 198.271 198.271 198.211 198.211 198.211</pre>	Depth (m) -0.200 0.000 0.446 0.472 0.575 0.635 0.661
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 1440 1440 1440 1440 1440 1440 1440	Climate Corm Winter Winter Winter Winter Winter Winter Winter Winter S1.0000 S1.001	Change Return Period 100 100 100 100 100 100 100 10	<pre>(%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Volume (m³) 0.000 0.000</pre>	Surch 30/480 30/360 30/120 30/60 30/60 <b>Flow /</b> Cap. 0.04 0.03	Winter Winter Winter Winter Winter Summer Overflow (1/s)	Flood Pipe Flow (1/s) 19.7 19.5	<b>Status</b> OK	1, 0 Overflow Act.	<pre>30, 100 , 0, 40 Water Level (m) 198.273 198.271 198.271 198.211 198.211 198.211</pre>	Depth (m) -0.200 0.000 0.446 0.472 0.575 0.635 0.661
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 1440 1440 1440 1440 1440 1440 1440	Climate Corm Winter Winter Winter Winter Winter Winter Winter Winter S1.000 S1.001 S1.002	Change Return Period 100 100 100 100 100 100 100 10	<pre>(%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Volume (m³) 0.000 0.000 0.000</pre>	Surch 30/480 30/360 30/120 30/60 30/60 <b>Flow /</b> Cap. 0.04 0.03 0.02	Winter Winter Winter Winter Winter Summer Overflow (1/s)	Flood Pipe Flow (1/s) 19.7 19.5 2.9	Overflow Status OK OK SURCHARGED	1, 0 Overflow Act.	<pre>30, 100 , 0, 40 Water Level (m) 198.273 198.271 198.271 198.211 198.211 198.211</pre>	Depth (m) -0.200 0.000 0.446 0.472 0.575 0.635 0.661
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 1440 1440 1440 1440 1440 1440 1440	Climate Corm Winter Winter Winter Winter Winter Winter Winter Winter S1.000 S1.001 S1.002 S1.003	Change Return Period 100 100 100 100 100 100 100 10	(%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000	Surch 30/480 30/360 30/120 30/60 30/60 Flow / Cap. 0.04 0.03 0.02 0.01	Winter Winter Winter Winter Winter Summer Overflow (1/s)	Flood Pipe Flow (1/s) 19.7 19.5 2.9 2.9	Overflow Status OK OK SURCHARGED SURCHARGED	1, 0 Overflow Act.	<pre>30, 100 , 0, 40 Water Level (m) 198.273 198.271 198.271 198.211 198.211 198.211</pre>	Depth (m) -0.200 0.000 0.446 0.472 0.575 0.635 0.661
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 1440 1440 1440 1440 1440 1440 1440	Climate Corm Winter Winter Winter Winter Winter Winter Winter Winter S1.000 S1.001 S1.002 S1.003 S1.004	Change Return Period 100 100 100 100 100 100 100 10	(%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000 0.000	Surch 30/480 30/360 30/120 30/60 30/60 <b>Flow /</b> <b>Cap.</b> 0.04 0.03 0.02 0.01 0.01	Winter Winter Winter Winter Winter Summer Overflow (1/s)	Flood Pipe Flow (1/s) 19.7 19.5 2.9 2.9 1.8	Overflow Status OK OK SURCHARGED SURCHARGED SURCHARGED	1, 0 Overflow Act.	<pre>30, 100 , 0, 40 Water Level (m) 198.273 198.271 198.271 198.211 198.211 198.211</pre>	Depth (m) -0.200 0.000 0.446 0.472 0.575 0.635 0.661
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 1440 1440 1440 1440 1440 1440 1440	Climate Corm Winter Winter Winter Winter Winter Winter Winter Winter S1.000 S1.001 S1.002 S1.003	Change Return Period 100 100 100 100 100 100 100 10	(%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000 0.000 0.000	Surch 30/480 30/360 30/120 30/60 30/60 Flow / Cap. 0.04 0.03 0.02 0.01	Winter Winter Winter Winter Winter Summer Overflow (1/s)	Flood Pipe Flow (1/s) 19.7 19.5 2.9 2.9 1.8 0.9	Overflow Status OK OK SURCHARGED SURCHARGED	1, 0 Overflow Act.	<pre>30, 100 , 0, 40 Water Level (m) 198.273 198.271 198.271 198.211 198.211 198.211</pre>	Depth (m) -0.200 0.446 0.472 0.575 0.635 0.661
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 1440 1440 1440 1440 1440 1440 1440	Climate Corm Winter Winter Winter Winter Winter Winter Winter Winter S1.000 S1.001 S1.002 S1.003 S1.004 S1.005	Change Return Period 100 100 100 100 100 100 100 10	(%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Surch 30/480 30/360 30/120 30/60 30/60 Flow / Cap. 0.04 0.03 0.02 0.01 0.01	Winter Winter Winter Winter Summer Overflow (1/s)	Flood Pipe Flow (1/s) 19.7 19.5 2.9 2.9 1.8 0.9 0.6	Overflow Status OK OK SURCHARGED SURCHARGED SURCHARGED SURCHARGED	1, 0 Overflow Act.	<pre>30, 100 , 0, 40 Water Level (m) 198.273 198.271 198.271 198.211 198.211 198.211</pre>	Depth (m) -0.200 0.446 0.472 0.575 0.635 0.661
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 1440 1440 1440 1440 1440 1440 1440	Climate Corm Winter Winter Winter Winter Winter Winter Winter Winter S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	Change Return Period 100 100 100 100 100 100 100 10	(%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Surch 30/480 30/360 30/120 30/60 30/60 Flow / Cap. 0.04 0.03 0.02 0.01 0.01 0.01	Winter Winter Winter Winter Summer Overflow (1/s)	Flood Pipe Flow (1/s) 19.7 19.5 2.9 2.9 1.8 0.9 0.6	Overflow Status OK OK SURCHARGED SURCHARGED SURCHARGED SURCHARGED SURCHARGED	1, 0 Overflow Act.	<pre>30, 100 , 0, 40 Water Level (m) 198.273 198.271 198.271 198.211 198.211 198.211</pre>	Depth (m) -0.200 0.446 0.472 0.575 0.635 0.661
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 1440 1440 1440 1440 1440 1440 1440	Climate Corm Winter Winter Winter Winter Winter Winter Winter Winter S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	Change Return Period 100 100 100 100 100 100 100 10	(%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Surch 30/480 30/360 30/120 30/60 30/60 Flow / Cap. 0.04 0.03 0.02 0.01 0.01 0.01	Winter Winter Winter Winter Summer Overflow (1/s)	Flood Pipe Flow (1/s) 19.7 19.5 2.9 2.9 1.8 0.9 0.6	Overflow Status OK OK SURCHARGED SURCHARGED SURCHARGED SURCHARGED SURCHARGED	1, 0 Overflow Act.	<pre>30, 100 , 0, 40 Water Level (m) 198.273 198.271 198.271 198.211 198.211 198.211</pre>	Depth (m) -0.200 0.446 0.472 0.575 0.635 0.661
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6 S7	<b>St</b> 1440 1440 1440 1440 1440 1440 1440	Climate Corm Winter Winter Winter Winter Winter Winter Winter Winter S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006	Change Return Period 100 100 100 100 100 100 100 10	(%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Surch 30/480 30/360 30/120 30/60 30/60 Flow / Cap. 0.04 0.03 0.02 0.01 0.01 0.01	Winter Winter Winter Winter Summer Overflow (1/s)	Flood Pipe Flow (1/s) 19.7 19.5 2.9 2.9 1.8 0.9 0.6	Overflow Status OK OK SURCHARGED SURCHARGED SURCHARGED SURCHARGED SURCHARGED	1, 0 Overflow Act.	<pre>30, 100 , 0, 40 Water Level (m) 198.273 198.271 198.271 198.211 198.211 198.211</pre>	Depth (m) -0.200 0.446 0.472 0.575 0.635 0.661

Hydrock Consultants Ltd					Page 1
•	For	t Halstead			
	Cat	chment J			
					Micro
Date 04/09/2019	Des	signed by SM			
File 10730-HYD-XX-XX-CA-C-M	licro Che	ecked by			Drainage
Īnnovyze	Net				
STORM S	SEWER DESIGN by	the Modified	Rational	Method	
	<u>Design Cri</u>	iteria for Pom	nd J		
	Pipe Sizes STANDA	ARD Manhole Size	s STANDARD		
	FSR Rainfall Mc	odel - England a	nd Wales		
Return	Period (years)	1	ia wares	PIMP (%)	100
	M5-60 (mm) 20		l Flow / Cl	imate Change (%)	0
	Ratio R 0	.370 N	linimum Bac	kdrop Height (m)	0.200
	infall (mm/hr)	50 N	laximum Bac	kdrop Height (m)	1.500
Maximum Time of Concen	tration (mins)	-	-	Optimisation (m)	
Foul S	5 ( ) )			esign only (m/s)	
Volumetric	Runoff Coeff. 0	.750 Min Sl	ope for Op	timisation (1:X)	500
	Designed	with Level Soffi	+ 0		
	Designed	WICH Devel Solli			
	<u>Network Desi</u>	<u>gn Table for</u>	<u>Pond J</u>		
	lope I.Area T.E.	Base k		IA Section Type	
(m) (m) (1	1:X) (ha) (mins)	Flow (l/s) (mr	n) SECT (n	m)	Design
s1.000 10.000 0.050 20	00.0 1.466 5.00	0.0 0.6	00 o <del>(</del>	00 Pipe/Conduit	<b>e</b>
s1.001 5.000 1.373	3.6 0.000 0.00	0.0 0.6	00 o 6	00 Pipe/Conduit	ď
S1.002 10.000 0.026 38	84.6 0.000 0.00	0.0 0.6	00 05	25 Pipe/Conduit	ď
S1.003 5.000 0.013 38	84.6 0.000 0.00	0.0 0.6	00 o <del>(</del>	00 Pipe/Conduit	ď
S1.004 10.000 0.060 16				00 Pipe/Conduit	ď
S1.005 10.000 0.026 38	84.6 0.000 0.00	0.0 0.6	00 o <del>(</del>	00 Pipe/Conduit	ď
S1.006 10.000 0.026 38	84.6 0.000 0.00	0.0 0.6	00 o <del>(</del>	00 Pipe/Conduit	e e
S1.007 10.000 0.026 38	84.6 0.000 0.00	0.0 0.6	00 o <del>(</del>	00 Pipe/Conduit	ă l

#### Network Results Table

PN	Rain	T.C.	US/IL	Σ I.Area	$\Sigma$ Base		Add Flow	Vel	Cap	Flow
	(mm/hr)	(mins)	(m)	(ha)	Flow (l/s)	(l/s)	(l/s)	(m/s)	(1/s)	(1/s)
S1.000	50.00	5.10	197.723	1.466	0.0	0.0	0.0	1.72	485.8	198.5
S1.001	50.00	5.10	197.673	1.466	0.0	0.0	0.0	12.82	3624.0	198.5
S1.002	50.00	5.25	196.300	1.466	0.0	0.0	0.0	1.14	245.9	198.5
S1.003	50.00	5.32	196.199	1.466	0.0	0.0	0.0	1.24	349.4	198.5
S1.004	50.00	5.41	196.186	1.466	0.0	0.0	0.0	1.88	532.6	198.5
S1.005	50.00	5.54	196.126	1.466	0.0	0.0	0.0	1.24	349.4	198.5
S1.006	50.00	5.68	196.100	1.466	0.0	0.0	0.0	1.24	349.4	198.5
S1.007	50.00	5.81	196.074	1.466	0.0	0.0	0.0	1.24	349.4	198.5

#### Simulation Criteria for Pond J

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow 0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins)	0	Inlet Coeffiecient 0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day) 0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins) 60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins) 1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0 Number of Online Controls 2 Number of Storage Structures 4 Number of Real Time Controls 0

#### Synthetic Rainfall Details

Rainfall Model FSR Return Period (years) 1

Hydrock Consultants Ltd		Page 2
•	Fort Halstead	
	Catchment J	
		Micro
Date 04/09/2019	Designed by SM	——— Micro Drainage
File 10730-HYD-XX-XX-CA-C-Micro	Checked by	Diginarie
Īnnovyze	Network 2018.1.1	
<u>Syn</u>	thetic Rainfall Details	
Pogion Engl	and and Wales Cv (Summer) 0.750	
M5-60 (mm)	20.700 Cv (Winter) 0.750	
Ratio R	20.700 Cv (Winter) 0.840 0.370 Storm Duration (mins) 30 Summer	
Profile Type	Summer	

Hydrock Consultants	; Ltd								Pag	ge 3	
•			Fort H	alstead							
			Catchm	ent J							
									N	licro	
Date 04/09/2019			Design	ed by SM							
File 10730-HYD-XX-X	XX-CA-C-Mic	cro	Checke	-						Irain	age
Īnnovyze			Networ	k 2018.1.	1						
Hudro-I	Brake® Opt:			ols for Po		Volur	no (m <sup>3</sup>	۱ <b>۰</b> ۱ <sup>-</sup>	7 5		
	<u>stakee opt</u>	LIIIUIII Maii	<u>noie: 54,</u>	D5/PN: 5	1.005,	VOLUI	ne (m-	): 1	<u>/.5</u>		
				nce MD-SHE-	-0103-50	00-120					
			esign Head				1.200				
		Des	ign Flow (1 Flush-E			Cala	5.0 ulated				
				ive Minimi	ise unst						
			Applicat		LDC upbe		urface				
			Sump Availa				Yes				
			Diameter (	mm)			103				
		In	vert Level	(m)		1	96.274				
	Minimum Ou	tlet Pipe	Diameter (	mm)			150				
	Suggeste	d Manhole	Diameter (	mm)			1200				
Control E	oints	Head (m)	Flow (l/s)	Conti	rol Poin	ts	Head	(m) 1	Flow (	1/s)	
Design Point (	Calculated)	1.200	5.0		K	ick-Flc	® 0.	.745		4.0	
	Flush-Flo™	0.354	5.0	Mean Flow	over Hea	ad Rang	le	-		4.4	
		1 1				1	-hin C		TTl-	D	- 0
The hydrological cal Optimum as specified					-		-		-		
then these storage r					LIIEI UIId	ша пу	aro-bra	ve ob	CTIIIUIII®	be u	LTTZEO
Depth (m) Flow (l/s)	Depth (m) Fi	Low (l/s)	Depth (m)	Flow (l/s)	Depth	(m) Flo	w (l/s)	Dept	:h (m)	Flow	(1/s)
0.100 3.4	0.800	4.1	2.000	6.3	4.0	000	8.8	3	7.000		11.5
0.200 4.7	1.000	4.6	2.200	6.6	4.5	500	9.3	3	7.500		11.8

0.100	2.7	0.000		2.000	0.5	4.000	0.0	1.000	11.5
0.200	4.7	1.000	4.6	2.200	6.6	4.500	9.3	7.500	11.8
0.300	5.0	1.200	5.0	2.400			9.8	8.000	12.2
0.400	5.0	1.400	5.4	2.600	7.2	5.500	10.2	8.500	12.6
0.500	4.9	1.600	5.7	3.000	7.7	6.000	10.7	9.000	12.9
0.600	4.7	1.800	6.0	3.500	8.3	6.500	11.1	9.500	13.3

Weir Manhole: S8, DS/PN: S1.007, Volume (m<sup>3</sup>): 7.1

Discharge Coef 0.544 Width (m) 1.000 Invert Level (m) 198.760  $\,$ 

ydrock Con	SUILANTS	шса			Ecot 1	Iolo+ ·	- d				Page 4
					Fort H						
					Catchn	nent J					
	0.0.1.0				D.		014				Micro
ate 04/09/					Desigr	_	SM				Drainaq
ile 10730-	HYD-XX-XX	-CA-C-	Micro		Checke						Drainiag
nnovyze					Networ	ck 201	8.1.1				
			St	corage	Struct	ures	for Po	nd J			
			Tank oı	r Pond	Manhol	.e: S3	, DS/P	N: S1.(	002		
					ert Leve						
Depth (m)	Area (m²)	Depth (	m) Area	(m²)   I	)epth (m)	Area	(m²) De	epth (m)	Area (m²)	Depth (m	n) Area (m²)
0.000	650.0	1.2		421.2	2.400		23.8	3.600			1573.3
0.200				466.0	2.600		82.2	3.800		5.00	1658.8
0.400		1.6		513.0		) 8		4.000 4.200			
0.600 0.800				562.3 613.9	3.000 3.200		05.7 70.8	4.200			
1.000	650.0	2.0		667.7	3.400		38.2	4.600			
			D - · ·	Cerl.		h o 1 -			1 004		
		Dee	<u>h Role</u>	БОАКА	way Mar	inole:	53, D	S/PN: S	51.004		
						iltrat	Lon Coe		Base (m/h:		
	Chamber Di		5		.500			Sa	afety Facto	or 2.	0
			ameter (		.300						
	E	sorenole	Depth (	(m) 18	.000						
			Side	1	Side		Side		Side		
		Depth	Infil.	-	Infil.	-		_	Infil.		
		(m)	Coef. (m/hr)	(m)	Coef. (m/hr)	(m)	Coef. (m/hr)		Coef. (m/hr)		
		0.000	0.77000	8.000	0.77000	8.001	0.0000	0 18.000	0.00000		
		Dee	<u>p Bore</u>	Soaka	way Mar	hole:	<u>s6, D</u>	S/PN: S	<u>51.005</u>		
	Chamber	Invert	Level	(m) 178	.126 Inf	iltrat	Lon Coe	fficient	Base (m/h:	r) 0.7700	0
	Chamber Di		5		.350			Sa	afety Facto	or 2.	0
			ameter ( Depth (	. ,	.300						
				I	0:1-	1	0:1-	I	0:1-		
		Depth	Side Infil.	Depth	Side Infil.	Depth	Side Infil.	Depth	Side Infil.		
		(m)	Coef.	(m)	Coef.	(m)	Coef.	-	Coef.		
			(m/hr)		(m/hr)		(m/hr)		(m/hr)		
		0.000	0.77000	8.000	0.77000	8.001	0.0000	0 18.000	0.00000		
				I		I		S/PN: S			
		. Tr '	Terral	(m) 170	100	41e		ee: -: ·	Dee- ( /)		0
	Chamber Di Bore	ameter/ hole Di		(m) 1 (m) 0	.100 Inf .500 .300 .000	⊥⊥trat:	ion Coe:		Base (m/h: afety Facto		
			Side		Side	1	Side	I	Side		
		Depth	Infil.	Depth	Infil.	Depth					
		(m)	Coef.	(m)	Coef.	(m)	Coef.		Coef.		
			(m/hr)		(m/hr)		(m/hr)		(m/hr)		
		0.000	0.77000	8.000	0.77000	8.001	0.0000	0 18.000	0.00000		
				1		1		1			

Hydrock Consultants Ltd		Page 5
•	Fort Halstead	
	Catchment J	
•		— Micro
Date 04/09/2019	Designed by SM	Drainage
File 10730-HYD-XX-XX-CA-C-Micro	Checked by	brainage
Innovyze	Network 2018.1.1	
<u>1 year Return Period Summary</u>	of Critical Results by Maximum Level (Rank )	1) for Pond J
Hot Star Hot Start Le Manhole Headloss Coeff Foul Sewage per hecta	(Global) 0.500 Flow per Person per Day (1/per/day) 0	2.000 0.800 0.000
	Number of Storage Structures 4 Number of Real Time	-
-	Synthetic Rainfall Details FSR M5-60 (mm) 20.700 Cv (Summer) 0.750 gland and Wales Ratio R 0.369 Cv (Winter) 0.840 Risk Warning (mm) 300.0	
	Analysis Timestep 2.5 Second Increment (Extended) DTS Status DVD Status Inertia Status ON	
Profile(: Duration(s) (min: Return Period(s) (year: Climate Change (	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 1440, 2160, 1, 30,	960, 2880 100
US/MH Return Cl PN Name Storm Period Ch	imate First (X) First (Y) First (Z) Overflow I	Mater Surcharged Level Depth (m) (m)
S1.000S115Winter1S1.001S215Winter1S1.002S31440Winter1S1.003S41440Winter1S1.004S51440Winter1S1.005S61440Winter1S1.006S71440Winter1S1.007S81440Winter1	+0%       100/720       Winter       19         +0%       30/60       Winter       19         +0%       30/60       Summer       19         +0%       30/120       Summer       19         +0%       30/60       Winter       19         +0%       30/60       Winter       19         +0%       30/60       Winter       19	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$
US/MH PN Name	Flooded Pipe Volume Flow / Overflow Flow Level (m <sup>3</sup> ) Cap. (1/s) (1/s) Status Exceeded	
\$1.000       \$1         \$1.001       \$2         \$1.002       \$3         \$1.003       \$4         \$1.004       \$5         \$1.005       \$6         \$1.006       \$7         \$1.007       \$8	0.000         0.66         202.9         OK           0.000         0.17         204.0         OK           0.000         0.02         3.5         OK           0.000         0.02         3.5         OK           0.000         0.01         2.5         OK           0.000         0.01         1.5         OK           0.000         0.00         0.5         OK           0.000         0.00         0.0         OK	

Hydrock	Consi	ıltan	ts Ltd								Pa	age 6
•						For	t Halst	ead				
•						Cat	chment	J				
•	001-	0.1.0										Micro
												Drainage
-		YD-XX	-XX-CA	-C-Mic	ro							
Innovyze	2					Net	WORK 20	18.1.1				
<u>30 yea</u>	ar Re	turn	Period	l Summa	ary of C	ritica	l Resul	ts by	<u>Maximum Le</u>	evel (Rar	<u>nk 1) f</u>	or Pond J
N	umber	Foul of In	Ho Le Headl Sewage uput Hyd:	Hot S t Start oss Coe per he rograph:	tart (mir Level (n ff (Globa ctare (l/ s 0 Nur	tor 1.00 ns) nm) al) 0.50 's) 0.00 nber of	00 Addi 0 00 Flow p 00 0ffline	tional 1 MADD Fac per Perso Controls	ctor * 10m³/ Inlet Cc on per Day o s 0 Number c	The Storage pefficcient (1/per/day) of Time/Are	e 2.000 t 0.800 ) 0.000 ea Diagr	
			Rainfall	Model	Sy	nthetic F	Rainfall SR M5-60	<u>l Detail</u> (mm) 20	<u>s</u> .700 Cv (Su	mmer) 0.75	50	
				Region	England	and Wale	es Rat	tio R 0	.369 Cv (Wi	nter) 0.84	10	
			Margin	for Flo	Analy	sis Tim DTS S <sup>.</sup> DVD S <sup>.</sup>	estep 2.! tatus tatus	5 Second	Increment	(Extended) OFF ON	,	
					111	eilia S	LALUS			ON		
	:	Return	n Period	n(s) (m (s) (ye	nins) 1 ears)	L5, 30,	60, 120,	180, 24	10, 360, 480	, 600, 720 1440, 2160 1, 3	), 960, ), 2880	
	US/MH			Return	Climate	First	<b>: (X)</b>	First (Y	) First (Z)	Overflow		Surcharged Depth
PN	Name				Change	Surch		Flood		Act.	(m)	(m)
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S1.006 S1.007	S4 S5 S6 S7	15 2160 2160 2160 2160 2160	Winter Winter Winter Winter Winter Winter Winter	30 30 30 30 30 30 30 30	+0% +0% +0% +0% +0% +0% +0%	100/720 30/60 30/60 30/120 30/60 30/60	Summer Winter Summer Summer Winter Winter Summer				<b>198.507</b> 197.950 197.348 197.348 197.264 197.264 197.264	-0.323 0.523 0.549 0.478 0.538 0.564
			PN	US/MH Name	Flooded I Volume (m³)		Overflow (l/s)	Pipe w Flow (l/s)	Status	Level Exceeded		
			S1.00			-			SURCHARGED			
			\$1.00 \$1.00 \$1.00 \$1.00 \$1.00 \$1.00 \$1.00 \$1.00	1 S2 2 S3 3 S4 4 S5 5 S6 6 S7	2 0.000 3 0.000 4 0.000 5 0.000 5 0.000 7 0.000	0.43 0.02 0.01 0.01 0.01		504.7 3.4 3.1 2.2 1.2 0.3	OK SURCHARGED SURCHARGED SURCHARGED SURCHARGED			
			51.00	, 58	, 0.000	0.00		0.0	SURCHARGED			

Hydrock	Consi	ıltan	ts Ltd								Pa	age 7
•						For	t Halst	ead				
						Cat	chment	J				
•	100/00	210				Dee						Micro
Date 04, File 10				-C-Mic	ro		igned b cked by	-				Drainage
Innovyze					10		work 20					
	~											
<u>100 ye</u>	ear Re	eturn	Period	d Summa	ary of (	Critica	<u>al Resu</u>	<u>lts by</u>	<u>Maximum I</u>	evel (Ra	<u>nk 1) i</u>	<u>for Pond J</u>
1	Number	Foul of In	Ho e Headlo Sewage put Hydi	Hot St Start pss Coer per heo cographs	tart (min Level (m ff (Globa ctare (l/ s 0 Num	or 1.00 m) 1) 0.50 s) 0.00	0 0 00 Flow p 00 Offline	itional H MADD Fac per Perso Controls	Flow - % of ctor * 10m³, Inlet Co on per Day s 0 Number o s 4 Number o	/ha Storage beffiecient (l/per/day) of Time/Are	e 2.000 z 0.800 0.000 ea Diagr	
	nunibe	er or	UIIIIIe (	.01101013			-			JI NEAL III	lie conci	015 0
		Ţ	Rainfall	Model	Sy		Rainfali		<u>s</u> .700 Cv (Su	mmer) 0.75	50	
		-			England				.369 Cv (Wi			
			Margin	for Flc	-	-	estep 2. tatus tatus	5 Second	Increment	300.0 (Extended) OFF ON ON		
		Return	Duratio n Period Climate	(s) (ye	ins) 1 ars)	.5, 30,	60, 120,	180, 24	10, 360, 480	1440, 2160 1, 3	), 960, ), 2880 30, 100 0, 40	Surcharged
	US/MH			Return	Climate	First	: (X)	First (Y	) First (Z)	Overflow		2
PN	Name	St	torm	Period	Change	Surch	large	Flood	Overflow	Act.	(m)	(m)
\$1.000 \$1.001 \$1.002 \$1.003 \$1.004 \$1.005 \$1.006 \$1.007	S3 S4 S5 S6 S7	2880 2880 2880 2880 2880 2880 2880	Winter Winter Winter Winter Winter Winter Winter	100 100 100 100 100 100 100	+40% +40% +40% +40% +40% +40% +40%	100/720 30/60 30/60 30/120 30/60 30/60	Summer Winter Winter Summer Winter Winter Summer				199.080 198.592 198.592 198.592 198.508 198.507 198.508 198.508	0.319 1.767 1.793 1.722 1.781 1.808
			PN	US/MH Name	Flooded Volume (m³)		Overflor (l/s)	Pipe w Flow (l/s)	Status	Level Exceeded		
			S1.00	0 S1	0.000	2.95		902.9	FLOOD RISK			
			S1.00 S1.00			0.02			SURCHARGED FLOOD RISK			
			S1.00	3 S4	0.000	0.01		3.2	FLOOD RISK			
			S1.00 S1.00			0.01			FLOOD RISK FLOOD RISK			
			S1.00 S1.00 S1.00	6 S7	0.000	0.00		0.4	FLOOD RISK FLOOD RISK FLOOD RISK			

Hydrock Consultants Ltd		Page 1
•	Fort Halstead	
	Catchment K	
		Micco
Date 04/09/2019	Designed by SM	Micro
File 10730-HYD-XX-XX-CA-C-Micro	Checked by	Drainage
Înnovyze	Network 2018.1.1	
11110 v y 2 e	Network 2010.1.1	
STORM SEWER	DESIGN by the Modified Rational Met	hod
	biston by the noutried National net	
	Design Criteria for Pond K	
	<u>bebryn orreerra for rona n</u>	
Pipe S	izes STANDARD Manhole Sizes STANDARD	
-		
	Rainfall Model - England and Wales	
Return Period		PIMP (%) 100
M5	-60 (mm) 20.700 Add Flow / Climat Ratio R 0.370 Minimum Backdro	2
Maximum Rainfall		p Height (m) 0.200 p Height (m) 1.500
	(mins) 30 Min Design Depth for Optic	
	(l/s/ha) 0.000 Min Vel for Auto Desig	
Volumetric Runof		
	Designed with Level Soffits	
Net	work Design Table for Pond K	
PN Length Fall Slope I.		ection Type Auto
(m) (m) (1:X) (	ha) (mins) Flow (1/s) (mm) SECT (mm)	Design
s1.000 10.000 0.050 200.0 0	.422 5.00 0.0 0.600 o 750 P	ipe/Conduit 🦀
S1.001 5.000 0.373 13.4 0	.000 0.00 0.0 0.600 0 600 P	ipe/Conduit 🔒

ě.	nduit	Pipe/Cond	600	0	0.600	0.0	0.00	0.000	384.6	0.026	10.000	S1.002
ě.	nduit	Pipe/Cond	600	0	0.600	0.0	0.00	0.000	384.6	0.013	5.000	S1.003
ě.	nduit	Pipe/Cond	450	0	0.600	0.0	0.00	0.000	166.7	0.060	10.000	S1.004
Á.	nduit	Pipe/Cond	450	0	0.600	0.0	0.00	0.000	384.6	0.026	10.000	S1.005
	nduit				0.600	0.0	0.00	0.000	384.6	0.026	10.000	S1.006

#### Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (1/s)	Add Flow (l/s)	Vel (m/s)	Cap (1/s)	Flow (1/s)
S1.000	50.00	5.08	197.723	0.422	0.0	0.0	0.0	1.98	872.6	57.1
S1.001	50.00	5.10	197.673	0.422	0.0	0.0	0.0	6.67	1887.1	57.1
S1.002	50.00	5.23	197.225	0.422	0.0	0.0	0.0	1.24	349.4	57.1
S1.003	50.00	5.30	197.199	0.422	0.0	0.0	0.0	1.24	349.4	57.1
S1.004	50.00	5.41	197.186	0.422	0.0	0.0	0.0	1.57	250.0	57.1
S1.005	50.00	5.57	197.126	0.422	0.0	0.0	0.0	1.03	163.9	57.1
S1.006	50.00	5.73	197.100	0.422	0.0	0.0	0.0	1.03	163.9	57.1

#### Simulation Criteria for Pond K

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow 0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins)	0	Inlet Coeffiecient 0.800
Hot Start Level (mm)	0	Flow per Person per Day (1/per/day) 0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins) 60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins) 1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0 Number of Online Controls 2 Number of Storage Structures 3 Number of Real Time Controls 0

### Synthetic Rainfall Details

	Rainfal	l Model			FSR	M5-60	(mm)	20.700
Return	Period	(years)			1	Rat	cio R	0.370
		Region	England	and	Wales	Profile	Туре	Summer

Hydrock Consultants Ltd		Page 2
•	Fort Halstead	
	Catchment K	
		Micco
Date 04/09/2019	Designed by SM	Micro Drainage
File 10730-HYD-XX-XX-CA-C-Micro	Checked by	Diamaye
Īnnovyze	Network 2018.1.1	
Syr	nthetic Rainfall Details	
Cv (Summe Cv (Winte	er) 0.750 Storm Duration (mins) 30 er) 0.840	

Hydrock Consultant	s Ltd								Pac	ge 3	
•			Fort H	alstead							
			Catchm	ent K							
									N	/icro	
Date 04/09/2019			Design	ed by SM							
File 10730-HYD-XX-	ХХ-СА-С-Мі	cro	Checke	d by						)rain	age
Īnnovyze			Networ	k 2018.1.	1						
		<u>Onli</u>	<u>ne Contro</u>	ols for Po	ond K						
<u>Hydro-</u>	<u>-Brake® Opt</u>	<u>cimum Man</u>	hole: S4,	DS/PN: S	1.003,	Vol	ume (m³	): 1	1.8		
			Unit Refere	nce MD-SHE-	-0103-50	000-12	00-5000				
		D	esign Head	(m)			1.200				
		Des	ign Flow (l	/s)			5.0				
			Flush-F				culated				
			-	ive Minimi	ise upst	cream	-				
			Applicat				Surface				
			Sump Availa Diameter (				Yes 103				
		Tn	vert Level	,			197.199				
	Minimum O		Diameter (	. ,			150				
		-	Diameter (				1200				
Control	Points	Head (m)	Flow (l/s)	Conti	rol Poir	nts	Head	(m)	Flow (	1/s)	
Design Point	(Calculated)	1.200	5.0		K	ick-F	lo® 0	.745		4.0	
	Flush-Flo <sup>TM</sup>		5.0	Mean Flow	over He	ad Rai	nge	-		4.4	
The hydrological ca Optimum as specifie then these storage	d. Should a routing calc	nother typ ulations w	e of contro ill be inva	ol device ot alidated	ther tha	an a H	lydro-Bra	ike Op	timum®	be u	tilised
Depth (m) Flow (1/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth	(m) F:	low (l/s	) Dept	th (m)	Flow	(l/s)
0.100 3.4	0.800	4.1	2.000	6.3	4.	000	8.	8	7.000		11.5
0.200 4.7	1.000	4.6	2.200	6.6	4.	500	9.	3	7.500		11.8

0.100	2.7	0.000		2.000	0.5	4.000	0.0	1.000	11.5
0.200	4.7	1.000	4.6	2.200	6.6	4.500	9.3	7.500	11.8
0.300	5.0	1.200	5.0	2.400			9.8	8.000	12.2
0.400	5.0	1.400	5.4	2.600	7.2	5.500	10.2	8.500	12.6
0.500	4.9	1.600	5.7	3.000	7.7	6.000	10.7	9.000	12.9
0.600	4.7	1.800	6.0	3.500	8.3	6.500	11.1	9.500	13.3

Weir Manhole: S7, DS/PN: S1.006, Volume (m<sup>3</sup>): 3.8

Discharge Coef 0.544 Width (m) 1.000 Invert Level (m) 198.750  $\,$ 

Hydrock Con	sultants	Ltd								1	Page 4
•					Fort H	lalste	ad				
•					Catchm	nent K					
•											Micro
Date 04/09/		~ ~ ~			Design	-	SM				Drainage
File 10730-	HYD-XX-XX	-CA-C-	Micro		Checke Networ	-	0 1 1				Brainage
Innovyze					Networ	CK ZUI	8.1.1				
			<u>St</u>	orage	Struct	ures	for Por	nd K			
			Tank or	Pond	Manhol	e. 53	חק/פת	I• S1 0	02		
		-			ert Level						
Depth (m)	Area (m²)	Depth (	m) Area	(m²) [D	epth (m)	Area	(m²) Der	oth (m)	Area (m²)	Depth (m	) Area (m²)
0.000	442.0	1.2	00 -	751.0	2.400	11	41.5	3.600	1613.3	4.80	0 2166.6
0.200		1.4	00 8	310.4	2.600		14.4	3.800		5.00	0 2266.8
0.400			8 00		2.800		89.7	4.000			
0.600 0.800		1.8 2.0	00 9	936.1 002.3	3.000 3.200		67.2 47.0	4.200 4.400			
1.000		2.0		070.7	3.200		29.0	4.400	2068.8		
		Deer	n Bore	Soaka	way Man	hole.	S5 D9	S/PN· S	1 004		
			-		-						
	Chamber Chamber Di					iltrati	on Coef		Base (m/hr fety Facto		
			ameter (		.300			Sd	llety facto	2.	0
	В	orehole	Depth (	m) 18	.000						
			Side		Side		Side	1	Side		
		-		-	Infil.	-		-	Infil.		
		(m)	Coef. (m/hr)	(m)	Coef. (m/hr)	(m)	Coef. (m/hr)	(m)	Coef. (m/hr)		
		0 000	0 77000	8 000	0.77000	8 001	0 00000	18 000	0 00000		
				1				I			
		<u>Dee</u>	<u>p Bore</u>	Soaka	way Man	hole:	<u>s6, D</u> S	S/PN: S	1.005		
	Chamber Di Bore	ameter/ hole Di		m) 1 m) 0	.976 Inf .350 .300 .000	iltrati	on Coef:		Base (m/hr fety Facto		
			Side		Side		Side		Side		
		-	Infil.	-	Infil.	-	Infil.	Depth	Infil.		
		(m)	Coef. (m/hr)	(m)	Coef. (m/hr)	(m)	Coef. (m/hr)	(m)	Coef. (m/hr)		
		0 000				0 001		10.000			
		0.000	0.//000	8.000	0.77000	8.001	0.00000	178.000	0.00000		

drock	Consu	ltant	5 LLU											Page 5
								Fort	Halst	ead				
								Catch	ment 1	K				
														Micro
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<b>PN</b> \$1.000 \$1.001 \$1.002 \$1.003 \$1.004 \$1.005	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6	Durati eturn Perio Climat Storm 15 Winter 15 Winter 960 Winter 960 Winter 960 Winter 960 Winter	on(s) (m d(s) (ye e Change Period 100 100 100 100 100 100 100 100	Ir le(s) mins) ears) e (%) Climate Change +40% +40% +40% +40% +40% +40% +40% +40% Flooded H Volume (m <sup>3</sup> )	DTS Statu DVD Statu hertia Statu 15, 30, 60, First (X) Surcharge 100/360 Win 100/240 Win 100/240 Win 100/60 Win 100/60 Sum Flow / Ove Cap. (	First (Y) Flood ter ter ter mer ter mer Flow Flow	S 0, 360, 480 First (Z) Overflow	OFF ON ON Summer and 0, 600, 724 1440, 2160 1, 3 0 Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.113 197.883 197.883 197.883 197.883	Surcharge Depth (m) 3 -0.32 3 0.05 3 0.08 2 0.18 2 0.24
PN \$1.000 \$1.001 \$1.002 \$1.003 \$1.004 \$1.005	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6	Durati eturn Perio Climat Storm 15 Winter 15 Winter 960 Winter 960 Winter 960 Winter 960 Winter 960 Winter 960 Winter 960 Winter 960 Si.0	on(s) (m d(s) (ye e Change Period 100 100 100 100 100 100 100 100 100 10	Ir Le(s) mins) ears) e (%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Flooded Molume (m <sup>3</sup> ) 1 0.000 2 0.000	DTS Statu DVD Statu hertia Statu 15, 30, 60, First (X) Surcharge 100/360 Win 100/240 Win 100/60 Win 100/60 Sum 100/60 Sum 100/60 Sum 100/60 Sum 100/60 Sum	First (Y) Flood ter ter ter mer ter mer ter mer ter mer ter mer ter mer ter mer ter ter (Y)	S 0, 360, 480 First (Z) Overflow Status	OFF ON ON Summer and 0, 600, 724 1440, 2160 1, 3 0 Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.113 197.883 197.883 197.883 197.883	Surcharge Depth (m) 3 -0.32 3 0.05 3 0.08 2 0.18 2 0.24
PN \$1.000 \$1.001 \$1.002 \$1.003 \$1.004 \$1.005	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6	Durati eturn Perio Climat Storm 15 Winter 15 Winter 960 Winter 960 Winter 960 Winter 960 Winter 960 Winter 960 Winter 960 Si.0 S1.0 S1.0	on(s) (m d(s) (ye e Change Period 100 100 100 100 100 100 100 100 100 10	Ir Le(s) mins) ears) e (%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Volume (m <sup>3</sup> ) 1 0.000 2 0.000 3 0.000	DTS Statu DVD Statu hertia Statu 15, 30, 60, First (X) Surcharge 100/360 Win 100/240 Win 100/60 Win 100/60 Sum 100/60 Sum <b>1</b> 00/60 Sum <b>1</b> 00/60 Sum <b>1</b> 00/60 Sum	First (Y) First (Y) Flood ter ter ter mer ter mer <b>Pipe</b> Flow I/s) (1/s) 263.4 260.7 2.9	S 0, 360, 480 First (Z) Overflow Status OK OK SURCHARGED	OFF ON ON Summer and 0, 600, 724 1440, 2160 1, 3 0 Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.113 197.883 197.883 197.883 197.883	Surcharge Depth (m) 3 -0.32 3 0.05 3 0.08 2 0.18 2 0.24
PN S1.000 S1.001 S1.002 S1.003 S1.004 S1.005	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6	Durati eturn Perio Climat Storm 15 Winter 15 Winter 960 Winter 960 Winter 960 Winter 960 Winter 960 Winter 960 Winter 960 Sinter	on(s) (m d(s) (ye e Change Period 100 100 100 100 100 100 100 100 100 10	Ir Le(s) mins) ears) e (%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Wolume (m <sup>3</sup> ) 1 0.000 2 0.000 3 0.000 4 0.000	DTS Statu DVD Statu hertia Statu 15, 30, 60, First (X) Surcharge 100/360 Win 100/240 Win 100/240 Win 100/60 Win 100/60 Sum 100/60 Sum 100/60 Sum 100/60 Sum 100/60 Sum	First (Y) First (Y) Flood ter ter ter mer Pipe Flow I/s) (1/s) 263.4 260.7 2.9 2.9	S 0, 360, 480 First (Z) Overflow Status OK SURCHARGED SURCHARGED	OFF ON ON Summer and 0, 600, 724 1440, 2160 1, 3 0 Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.113 197.883 197.883 197.883 197.883	Surcharge Depth (m) 3 -0.32 3 0.05 3 0.08 2 0.18 2 0.24
PN S1.000 S1.001 S1.002 S1.003 S1.004 S1.005	<b>US/MH</b> Name S1 S2 S3 S4 S5 S6	Durati eturn Perio Climat Storm 15 Winter 15 Winter 960 Winter 960 Winter 960 Winter 960 Winter 960 Winter 960 Winter 960 Si.0 S1.0 S1.0	on(s) (m d(s) (ye e Change Period 100 100 100 100 100 100 100 100 100 10	Ir Le(s) mins) ears) e (%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Wolume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000 0.000	DTS Statu DVD Statu hertia Statu 15, 30, 60, First (X) Surcharge 100/360 Win 100/240 Win 100/60 Win 100/60 Sum 100/60 Sum 100/60 Sum 100/60 Sum 100/60 Sum 100/60 Sum 100/60 Sum	First (Y) First (Y) Flood ter ter ter mer Pipe erflow Flow 1/s) (1/s) 263.4 260.7 2.9 2.9 1.7	S 0, 360, 480 First (Z) Overflow Status OK OK SURCHARGED	OFF ON ON Summer and 0, 600, 724 1440, 2160 1, 3 0 Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.113 197.883 197.883 197.883 197.883	Surcharge Depth (m) 3 -0.32 3 0.05 3 0.08 2 0.18 2 0.24

Hydrock Consultants Ltd		Page 1
•	Fort Halstead	
	Catchment L	
		Micro
Date 04/09/2019	Designed by SM	Drainage
File 10730-HYD-XX-XX-CA-C-Micro	Checked by	Diamaye
Īnnovyze	Network 2018.1.1	
STORM SEWER DESIGN	by the Modified Rational Method	
Design	<u>Criteria for Pond L</u>	
Pipe Sizes ST	ANDARD Manhole Sizes STANDARD	
ESR Rainfal	.1 Model - England and Wales	
Return Period (years)	-	100
M5-60 (mm)	20.700 Add Flow / Climate Change (%)	0
Ratio F	R 0.370 Minimum Backdrop Height (m)	
Maximum Rainfall (mm/hr)		1.500
	30 Min Design Depth for Optimisation (m)	
	0.000 Min Vel for Auto Design only (m/s)	
Volumetric Runoff Coeff.	. 0.750 Min Slope for Optimisation (1:X)	500
Design	ned with Level Soffits	
Network I	Design Table for Pond L	
PN Length Fall Slope I.Area T	.E. Base k HYD DIA Section Type	Auto
(m) (m) (1:X) (ha) (m	ins) Flow (l/s) (mm) SECT (mm) D	esign
s1.000 10.000 0.050 200.0 0.956	5.00 0.0 0.600 o 750 Pipe/Conduit	<b>a</b>
s1.001 5.000 0.873 5.7 0.000	0.00 0.0 0.600 o 600 Pipe/Conduit	ă

8	Pipe/Conduit	600	0	0.600	0.0	0.00	0.000	384.6	0.026	10.000	S1.002
ā	Pipe/Conduit	600	0	0.600	0.0	0.00	0.000	384.6	0.013	5.000	S1.003
	Pipe/Conduit			0.600	0.0	0.00	0.000	166.7	0.060	10.000	S1.004
Ă.				0.600	0.0	0.00	0.000	384.6	0.026	10.000	S1.005
Ă.				0.600	0.0	0.00	0.000	384.6	0.026	10.000	S1.006

#### Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (1/s)	Flow (1/s)
S1.000	50.00	5.08	197.723	0.956	0.0	0.0	0.0	1.98	872.6	129.5
S1.001	50.00	5.09	197.673	0.956	0.0	0.0	0.0	10.22	2889.0	129.5
S1.002	50.00	5.23	196.800	0.956	0.0	0.0	0.0	1.24	349.4	129.5
S1.003	50.00	5.29	196.774	0.956	0.0	0.0	0.0	1.24	349.4	129.5
S1.004	50.00	5.40	196.761	0.956	0.0	0.0	0.0	1.57	250.0	129.5
S1.005	50.00	5.56	196.701	0.956	0.0	0.0	0.0	1.03	163.9	129.5
S1.006	50.00	5.72	196.675	0.956	0.0	0.0	0.0	1.03	163.9	129.5

#### Simulation Criteria for Pond L

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow 0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins)	0	Inlet Coeffiecient 0.800
Hot Start Level (mm)	0	Flow per Person per Day (1/per/day) 0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins) 60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins) 1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0 Number of Online Controls 2 Number of Storage Structures 3 Number of Real Time Controls 0

### Synthetic Rainfall Details

	Rainfal	l Model			FSR	M5-60	(mm)	20.700
Return	Period	(years)			1	Rat	cio R	0.370
		Region	England	and	Wales	Profile	Туре	Summer

Hydrock Consultants Ltd		Page 2
•	Fort Halstead	
	Catchment L	
		Micco
Date 04/09/2019	Designed by SM	— Micro Drainage
File 10730-HYD-XX-XX-CA-C-Micro	Checked by	Digitigh
Īnnovyze	Network 2018.1.1	
Cunt	hetic Rainfall Details	
<u></u>	metit Raimaii Detaiis	
Cv (Summer	) 0.750 Storm Duration (mins) 30	
Cv (Winter)		

Hydrock Consultant	s Ltd							Pag	re 3	
•			Fort Ha	alstead						
			Catchme	ent L						
								N		
Date 04/09/2019			Designe	ed by SM						
File 10730-HYD-XX-	ХХ-СА-С-Мі	cro	Checked	d by					rainag	P
Īnnovyze			Networ	x 2018.1.	1					
Hudro	-Brake® Opt		ne Contro			olume (m <sup>3</sup>	). 1/	1 1		
	-blake@ Opt	JIIIUIII Maii	<u>noie: 54,</u>	DS/FN: S	1.005, 00		): 14	<u>+.4</u>		
			Unit Refere		-0103-5000-					
			esign Head			1.200				
		Des	ign Flow (l Flush-F		<i>.</i>	5.0 Calculated				
				ive Minimi						
			Applicat		rse upscree	Surface				
			Sump Availa			Yes				
			Diameter (			103				
		In	vert Level	(m)		196.774				
	Minimum O	utlet Pipe	Diameter (	mm)		150				
	Suggest	ed Manhole	Diameter (	mm)		1200				
Control	Points	Head (m)	Flow (l/s)	Conti	col Points	Head	(m) 1	Flow (	1/s)	
Design Point	(Calculated)	1.200	5.0		Kick	-Flo® 0	.745		4.0	
	Flush-Flo <sup>TM</sup>		5.0	Mean Flow	over Head	Range	-		4.4	
The hydrological ca	loulations h	arra haan h	acad on the	Hood /Dicch	argo rolat	-ionchin fo	r tho	Uudro	-Proko®	
Optimum as specifie					-	-		-		ised
then these storage					unci chian c	a nyaro bia	ine op	C I III UIII	DC UCII.	1000
Depth (m) Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Dept	:h (m)	Flow (1,	/s)
0.100 3.4	0.800	4.1	2.000	6.3	4.000	8.8	3	7.000	11	1.5
0.200 4.7		4.6	2.200	6.6	4.500	9.3	3	7.500		1.8

0.200	4.7	1.000	4.6	2.200	6.6	4.500	9.3	7.500	11.8
0.300	5.0	1.200	5.0	2.400			9.8	8.000	12.2
0.400	5.0	1.400	5.4	2.600	7.2	5.500	10.2	8.500	12.6
0.500	4.9	1.600	5.7	3.000	7.7	6.000	10.7	9.000	12.9
0.600	4.7	1.800	6.0	3.500	8.3	6.500	11.1	9.500	13.3
	1		1		1				

Weir Manhole: S7, DS/PN: S1.006, Volume (m<sup>3</sup>): 4.4

Discharge Coef 0.544 Width (m) 1.000 Invert Level (m) 198.750

Hydrock Con	sultants	Ltd									Page 4
•					Fort H	lalste	ad				
					Catchn	nent L					
Date 04/09/	2019				Desigr	ned by	SM				
File 10730-	НҮД-ХХ-ХХ	-CA-C-	Micro		Checke	ed by					Drainage
Innovyze					Networ	ck 201	8.1.1				
			St	orage	Struct	ures	for Por	nd L			
				. D 1	Marilari				0.0		
		-	<u>Tank or</u>		<u>Manhol</u> ert Leve			<u>n: SI.U</u>	<u>02</u>		
Depth (m)	Area (m²)	Depth (	m) Area					oth (m)	Area (m²)	Depth (m	) Area (m²)
0.000		- 0.6		541.0	1.200		38.5	1.800	1292.6		
0.100	436.2	0.7	00 6	586.6	1.300	) 9	93.6	1.900	1357.1	2.50	
0.200			00		1.400		50.2	2.000			
0.300	513.4 554.4	0.9	00 T	333.0	1.500 1.600		08.5 68.2	2.100 2.200			
0.500		1.1		385.0	1.700		29.6	2.300	1630.8		
		Dee	p Bore	Soaka	way Mar	hole:	<u>s5, D</u>	S/PN: S	1.004		
	Chamber	Invert	Level (	m) 173	.186 Inf	iltrati	on Coef	ficient	Base (m/h:	r) 0.7700	0
	Chamber Di		-					Sa	fety Facto	or 2.	0
			ameter ( Depth (	'	.300 .000						
				,		I	a · 1	i.	a : 1		
		Depth	Side Infil.	Depth	Side Infil.	Depth	Side Infil.	Depth	Side Infil.		
		(m)	Coef.	(m)		(m)	Coef.	(m)	Coef.		
			(m/hr)		(m/hr)		(m/hr)		(m/hr)		
		0.000	0.77000	8.000	0.77000	8.001	0.00000	18.000	0.00000		
		Dee	p Bore	Soaka	way Mar	hole:	S6, D5	S/PN: S	1.005		
	Chamber	Invert	Level (	m) 178	- .976 Inf	iltrati	on Coef	ficient	Base (m/h:	r) 0.7700	0
	Chamber Di Bore	ameter/ hole Di	Length ( ameter (	m) 1 m) 0	.350 .300				ifety Facto		
	В	orehole	Depth (	m) 18	.000						
		Depth	Side Infil.	Depth	Side Infil.	Depth	Side Infil.	Depth	Side Infil.		
		(m)	Coef.	(m)	Coef.	(m)	Coef.	(m)	Coef.		
			(m/hr)		(m/hr)		(m/hr)		(m/hr)		
		0.000	0.77000	8.000	0.77000	8.001	0.00000	18.000	0.00000		

Hydrock Consultants Ltd		Page 5
•	Fort Halstead	
	Catchment L	
		Micco
Date 04/09/2019	Designed by SM	— Micro
File 10730-HYD-XX-XX-CA-C-Micro	Checked by	Drainage
Innovyze	Network 2018.1.1	
1 year Return Period Summary	of Critical Results by Maximum Level (Ran	k 1) for Pond L
	Simulation Criteria	
	n Factor 1.000 Additional Flow - % of Total Flow t (mins) 0 MADD Factor * 10m³/ha Storage	
	vel (mm) 0 Inlet Coefficien	
	(Global) 0.500 Flow per Person per Day (l/per/day	) 0.000
Foul Sewage per hecta	re (1/s) 0.000	
Number of Input Hydrographs	Number of Offline Controls 0 Number of Time/Ar	ea Diagrams ()
	Number of Storage Structures 3 Number of Real Time	-
Rainfall Model	<u>Synthetic Rainfall Details</u> FSR M5-60 (mm) 20.700 Cv (Summer) 0.75	5.0
	gland and Wales Ratio R 0.369 Cv (Winter) 0.84	
Margin for Flood	Risk Warning (mm) 300.0	
	Analysis Timestep 2.5 Second Increment (Extended) DTS Status OFF	
	DVD Status ON	
	Inertia Status ON	1
Profile(	S) Summer and	Winter
Duration(s) (min	s) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720	
Deturn Devied(c) (com	1440, 2160	
Return Period(s) (year Climate Change (		30, 100 , 0, 40
		, , ,
US/MH Return Cl	imate First (X) First (Y) First (Z) Overflow	Water Surcharged
PN Name Storm Period C		(m) (m)
	······································	
S1.000 S1 15 Winter 1		197.987 -0.486
S1.001         S2         15 Winter         1           S1.002         S3         960 Winter         1		197.825 -0.448 197.157 -0.243
S1.002 S3 500 Winter 1		197.157 -0.217
S1.004 S5 960 Winter 1		197.097 -0.114
S1.005 S6 960 Winter 1		197.097 -0.054
S1.006 S7 960 Winter 1	+0% 30/60 Summer	197.097 -0.028
	Flooded Pipe	
US/MH	Volume Flow / Overflow Flow Level	
PN Name	(m <sup>3</sup> ) Cap. (l/s) (l/s) Status Exceeded	
S1.000 S1	0.000 0.26 132.3 OK	
S1.001 S2	0.000 0.14 133.3 OK	
S1.002 S3	0.000 0.02 2.9 OK	
\$1.003 \$4 \$1.004 \$5	0.000 0.01 2.8 OK 0.000 0.01 2.0 OK	
S1.004 S5 S1.005 S6	0.000 0.01 2.0 OK 0.000 0.01 1.1 OK	
S1.006 S7	0.000 0.00 0.0 OK	

Hydrock	Consu	ltan	ts Ltd								:	Page 6
•						For	t Hals	tead				
						Cat	chment	L				
												Micco
Date 04/	09/20	19				Des	igned b	by SM				Micro
File 107			-XX-CA-	-C-Mic	ro		cked by	-				Drainage
Īnnovyze							-	018.1.1				
<u>30 yea</u>	ar Ret	urn	Period	Summa	ry of C	ritica	al Resu	lts by	<u>Maximum Le</u>	evel (Rai	nk 1)	for Pond L
			Areal	Peduct	ion Fact		ation Cr		Flow - % of	Total Elo	w 0 000	1
			Aleal		cart (mir				ctor * 10m³,			
			Hot		Level (m	,				peffiecien		
	M							per Pers	on per Day	(l/per/day	) 0.000	)
		Foul	Sewage	per hec	ctare (1/	's) 0.00	)0					
N	umber (	of In	out Hydr	ographs	s O Nur	nber of	Offline	Control:	s 0 Number (	of Time/Ar	ea Diad	grams O
		-							s 3 Number (		-	
					0	wthatia	Deinfe	ll Deteil	~			
		R	ainfall	Model	<u>5</u> Y			<u>11 Detail</u> ) (mm) 20		mmer) 0.7	50	
					England				.369 Cv (Wi			
			Margin	for Flo	od Risk	-		5 Second	lIncrement	300.(		
					Allaly		tatus	.5 560010	Increment	(Excended) OFF		
							status			01	V	
					In	ertia S	tatus			01	4	
				Profil	e(s)				S	Summer and	Winter	
			Duratio	a(s) (m	ins) 1	L5, 30,	60, 120	, 180, 24	40, 360, 480			
	D	oturn	Period	(c) (wo	220)					1440, 216	0, 2880 30, 100	
	IN IN		Climate	-							, 0, 40	
											Water	Surcharged
	US/MH			Return	Climate	Firs	t (X)	First (Y	) First (Z)	Overflow	Level	Depth
PN	Name	St	torm	Period	Change	Surc	harge	Flood	Overflow	Act.	(m)	(m)
s1.000	S1	15	Winter	30	+0읭	100/15	Summer				198.17	1 -0.302
S1.001	S2		Winter	30	+0%						197.92	
S1.002			Winter	30			Winter				197.57	
S1.003			Winter	30			Winter Summer				197.57 197.51	
S1.004 S1.005			Winter Winter	30 30	+0종 +0왕		Summer Summer				197.51	
s1.006			Winter	30			Summer				197.51	
					Flooded			Pipe				
				US/MH	Volume		Overflo	-		Level		
			PN	Name	(m³)	Cap.			Status	Exceeded		
			S1.000	0 S1	0.000	0.65		326.0	OK			
			S1.000			0.85		326.0	OK			
			S1.002						SURCHARGED			
			S1.003			0.01			SURCHARGED			
			S1.004			0.01			SURCHARGED			
			S1.005 S1.006			0.01			SURCHARGED SURCHARGED			
				- 1								
1												

udrock (	Consult	tants Ltd							1 1	l' ane
yulock (	CONSUL				Fort Ha	latord				Page 7
					Catchme	ні L				
/										Micro
te 04/0					Designe	ed by SM				Drainad
le 1073	30-HYD-	-XX-XX-CA-	-C-Mic	ro	Checked	l by				
novyze					Network	2018.1.1				
Nu	Man F umber of	Areal Hot hole Headlo Youl Sewage Input Hydr of Online C Rainfall H	L Reduct Hot St Start per hec cographs Controls Model Region 1	cion Fact cart (min Level (m Ef (Globa ctare (1/ s 0 Num s 2 Numbe <u>Svr</u> England a rod Risk V	Simulation or 1.000 s) 0 m) 0 l) 0.500 Fl s) 0.000 aber of Offl er of Storage nthetic Rain FSR M5 and Wales	Additional F MADD Fac ow per Persc ine Controls e Structures <u>hfall Details</u> 5-60 (mm) 20 Ratio R 0	rlow - % of tor * 10m³/ Inlet Co on per Day of 3 Number of 3 Number of 5 .700 Cv (Su .369 Cv (Wi	Total Flo /ha Storag beffiecien (l/per/day of Time/Ar of Real Ti mmer) 0.79 nter) 0.84 300.0	w 0.000 e 2.000 t 0.800 ) 0.000 ea Diag me Cont 50 40	rams O
		Duration	Profile n(s) (m:	Ine e(s)	sis Timestep DTS Status DVD Status ertia Status 5, 30, 60, 3	5	s 0, 360, 480	OFF ON Summer and 0, 600, 720	Winter 0, 960,	
	Ret	Duration turn Period Climate	n(s) (m: (s) (yea	Ine e(s) ins) 1 ars)	DTS Status DVD Status ertia Status	5	s 0, 360, 480	OFF ON ON Summer and 0, 600, 720 1440, 2160 1, 3	Winter 0, 960, 0, 2880 30, 100 , 0, 40	
	Re1 US/MH	turn Period Climate	n(s) (m: (s) (yea Change <b>Return</b>	Ine ins) 1 ars) (%) Climate	DTS Status DVD Status ertia Status	5	S 0, 360, 480 First (Z)	OFF ON ON Summer and 0, 600, 720 1440, 2160 1, 3 0,	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water	Surcharge
PN		turn Period Climate	n(s) (m: (s) (yea Change <b>Return</b>	Ine e(s) ins) 1 ars) (%)	DTS Status DVD Status ertia Status	5 5 120, 180, 24 First (Y)	S 0, 360, 480	OFF ON ON Summer and 0, 600, 720 1440, 2160 1, 3 0,	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water	Surcharge
	US/MH	turn Period Climate	n(s) (m: (s) (yea Change <b>Return</b>	Ine e(s) ins) 1 ars) (%) Climate Change	DTS Status DVD Status ertia Status 5, 30, 60, 3 First (X)	5 5 120, 180, 24 First (Y) Flood	S 0, 360, 480 First (Z)	OFF ON ON Summer and 0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level	Surcharge Depth (m)
<b>PN</b> <b>S1.000</b> S1.001	US/MH Name S1 S2 2	turn Period Climate Storm 15 Winter 880 Winter	n(s) (m: (s) (yea Change Return Period 100 100	Ine e(s) ins) 1 ars) (%) Climate Change +40% +40%	DTS Status DVD Status ertia Status 5, 30, 60, 3 First (X) Surcharge 100/15 Summe	First (Y) Flood	S 0, 360, 480 First (Z)	OFF ON OW Summer and 0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.538 198.101	Surcharge Depth (m) 0.06 1 -0.17
<b>PN</b> <b>S1.000</b> <b>S1.001</b> <b>S1.002</b>	US/MH Name S1 S2 2 S3 2	turn Period Climate Storm 15 Winter 880 Winter 880 Winter	n(s) (m: (s) (yea Change <b>Return</b> <b>Period</b> 100 100 100	Ine e(s) ins) 1 ars) (%) Climate Change +40% +40% +40%	DTS Status DVD Status ertia Status 5, 30, 60, 3 First (X) Surcharge 100/15 Summa 30/180 Wint	First (Y) Flood er er	S 0, 360, 480 First (Z)	OFF ON OW Summer and 0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.538 198.101 198.101	Surcharge Depth (m) 0.06 1 -0.17 1 0.70
<b>PN</b> <b>S1.000</b> <b>S1.001</b> <b>S1.002</b> <b>S1.003</b>	US/MH Name S1 S2 2 S3 2 S4 2	turn Period Climate Storm 15 Winter 880 Winter 880 Winter 880 Winter	n(s) (m: (s) (yea Change Return Period 100 100 100 100	Ine e(s) ins) 1 ars) (%) Climate Change +40% +40% +40% +40%	DTS Status DVD Status ertia Status 5, 30, 60, 3 First (X) Surcharge 100/15 Summ 30/180 Wint 30/180 Wint	First (Y) Flood er er er	S 0, 360, 480 First (Z)	OFF ON OW Summer and 0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.538 198.101 198.101	Surcharge Depth (m) 0.06 1 -0.17 1 0.70 1 0.72
<b>PN</b> <b>S1.000</b> S1.001 S1.002 S1.003 S1.004	US/MH Name S1 S2 2 S3 2 S3 2 S4 2 S5 2	turn Period Climate Storm 15 Winter 880 Winter 880 Winter 880 Winter 880 Winter	n(s) (m: (s) (yea Change Return Period 100 100 100 100 100	Ine e(s) ins) 1 ars) (%) Climate Change +40% +40% +40% +40% +40%	DTS Status DVD Status ertia Status 5, 30, 60, 3 First (X) Surcharge 100/15 Summ 30/180 Wint 30/180 Wint 30/120 Summ	First (Y) Flood er er er er	S 0, 360, 480 First (Z)	OFF ON OW Summer and 0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.538 198.101 198.101 198.101 198.101	Surcharge Depth (m) 0.06 1 -0.17 1 0.70 1 0.72 1 0.83
<b>PN</b> <b>S1.000</b> <b>S1.001</b> <b>S1.002</b> <b>S1.003</b>	US/MH Name S1 S2 2 S3 2 S3 2 S4 2 S5 2 S5 2 S6 2	turn Period Climate Storm 15 Winter 880 Winter 880 Winter 880 Winter	n(s) (m: (s) (yea Change Return Period 100 100 100 100	Ine e(s) ins) 1 ars) (%) Climate Change +40% +40% +40% +40% +40% +40%	DTS Status DVD Status ertia Status 5, 30, 60, 3 First (X) Surcharge 100/15 Summ 30/180 Wint 30/180 Wint 30/120 Summ	First (Y) Flood er er er er er	S 0, 360, 480 First (Z)	OFF ON OW Summer and 0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.538 198.101 198.101	Surcharge Depth (m) 0.06 1 -0.17 1 0.70 1 0.72 1 0.83 1 0.89
PN \$1.000 \$1.001 \$1.002 \$1.003 \$1.004 \$1.005	US/MH Name S1 S2 2 S3 2 S3 2 S4 2 S5 2 S5 2 S6 2	turn Period Climate Storm 15 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Winter	n(s) (m: (s) (yea Change Return Period 100 100 100 100 100 100	Ine e(s) ins) 1 ars) (%) Climate Change +40% +40% +40% +40% +40% +40%	DTS Status DVD Status ertia Status 5, 30, 60, 3 First (X) Surcharge 100/15 Summ 30/180 Wint 30/180 Wint 30/120 Summ	First (Y) Flood er er er er er	S 0, 360, 480 First (Z)	OFF ON OW Summer and 0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.538 198.101 198.101 198.101 198.041	Surcharge Depth (m) 0.06 1 -0.17 1 0.70 1 0.72 1 0.83 1 0.85
PN \$1.000 \$1.001 \$1.002 \$1.003 \$1.004 \$1.005	US/MH Name S1 S2 2 S3 2 S3 2 S4 2 S5 2 S5 2 S6 2	turn Period Climate Storm 15 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Winter	n(s) (m: (s) (yea Change Return Period 100 100 100 100 100 100	Ine e(s) ins) 1 ars) (%) Climate Change +40% +40% +40% +40% +40% +40% +40%	DTS Status DVD Status ertia Status 5, 30, 60, 3 First (X) Surcharge 100/15 Summ 30/180 Wint 30/180 Wint 30/120 Summ	First (Y) Flood er er er er er er er er	S 0, 360, 480 First (Z)	OFF ON OW Summer and 0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.538 198.101 198.101 198.101 198.041	Surcharge Depth (m) 0.06 1 -0.17 1 0.70 1 0.72 1 0.83 1 0.85
PN \$1.000 \$1.001 \$1.002 \$1.003 \$1.004 \$1.005	US/MH Name S1 S2 2 S3 2 S3 2 S4 2 S5 2 S5 2 S6 2	turn Period Climate Storm 15 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Winter	n(s) (m: (s) (yea Change Return Period 100 100 100 100 100 100	Ine e(s) ins) 1 ars) (%) Climate Change +40% +40% +40% +40% +40% +40% +40% +40%	DTS Status DVD Status ertia Status 5, 30, 60, 3 First (X) Surcharge 100/15 Summ 30/180 Wint 30/180 Wint 30/120 Summ	First (Y) Flood er er er er er er er er er er	S 0, 360, 480 First (Z)	OFF ON OW Summer and 0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.538 198.101 198.101 198.101 198.041	Surcharge Depth (m) 0.06 1 -0.17 1 0.70 1 0.72 1 0.83 1 0.85
PN \$1.000 \$1.001 \$1.002 \$1.003 \$1.004 \$1.005	US/MH Name S1 S2 2 S3 2 S3 2 S4 2 S5 2 S5 2 S6 2	turn Period Climate Storm 15 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Winter	n(s) (m: (s) (yea Change Return Period 100 100 100 100 100 100	Ine e(s) ins) 1 ars) (%) Climate Change +40% +40% +40% +40% +40% +40% +40% +40%	DTS Status DVD Status ertia Status 5, 30, 60, 3 First (X) Surcharge 100/15 Summ 30/180 Wint 30/180 Wint 30/120 Summ 30/60 Summ 30/60 Summ	First (Y) Flood er er er er er er er er er er	S 0, 360, 480 First (Z) Overflow	OFF ON ON Summer and 0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.538 198.101 198.101 198.101 198.041	Surcharge Depth (m) 0.06 1 -0.17 1 0.70 1 0.72 1 0.83 1 0.85
<b>PN</b> <b>S1.000</b> S1.001 S1.002 S1.003 S1.004 S1.005	US/MH Name S1 S2 2 S3 2 S3 2 S4 2 S5 2 S5 2 S6 2	turn Period Climate Storm 15 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Winter	n(s) (m: (s) (yea Change Return Period 100 100 100 100 100 100 100 100	Ine e(s) ins) 1 ars) (%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Volume (m <sup>3</sup> )	DTS Status DVD Status ertia Status 5, 30, 60, 3 First (X) Surcharge 100/15 Summ 30/180 Wint 30/180 Wint 30/180 Summ 30/60 Summ 30/60 Summ	First (Y) Flood er er er er er er er flow Flow /s) (1/s)	S 0, 360, 480 First (Z) Overflow Status	OFF ON ON Summer and 0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.538 198.101 198.101 198.101 198.041	Surcharge Depth (m) 0.06 1 -0.17 1 0.70 1 0.72 1 0.83 1 0.89
<b>PN</b> <b>S1.000</b> S1.001 S1.002 S1.003 S1.004 S1.005	US/MH Name S1 S2 2 S3 2 S3 2 S4 2 S5 2 S5 2 S6 2	turn Period Climate Storm 15 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Winter	n(s) (m: (s) (yea Change Return Period 100 100 100 100 100 100 100 100 100 10	Ine e(s) ins) 1 ars) (%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Volume (m <sup>3</sup> ) 0.000	DTS Status DVD Status ertia Status 5, 30, 60, 3 First (X) Surcharge 100/15 Summ 30/180 Wint 30/180 Wint 30/180 Wint 30/60 Summ 30/60 Summ <b>Flow / Over</b> Cap. (1 1.19	First (Y) Flood er er er er er er flow Flow /s) (1/s) 596.2	S 0, 360, 480 First (Z) Overflow Status SURCHARGED	OFF ON ON Summer and 0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.538 198.101 198.101 198.101 198.041	Surcharge Depth (m) 0.06 1 -0.17 1 0.70 1 0.72 1 0.83 1 0.89
PN \$1.000 \$1.001 \$1.002 \$1.003 \$1.004 \$1.005	US/MH Name S1 S2 2 S3 2 S3 2 S4 2 S5 2 S5 2 S6 2	turn Period Climate Storm 15 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Winter	n(s) (m: (s) (yea Change Return Period 100 100 100 100 100 100 100 100 100 10	Ine e(s) ins) 1 ars) (%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Volume (m <sup>3</sup> ) 0.000 0.000	DTS Status DVD Status ertia Status 5, 30, 60, 3 First (X) Surcharge 100/15 Summ 30/180 Wint 30/180 Wint 30/180 Summ 30/60 Summ 30/60 Summ <b>Flow / Over</b> Cap. (1 1.19 0.02	First (Y) Flood er er er er er er (1/s) 596.2 17.1	S 0, 360, 480 First (Z) Overflow Status SURCHARGED OK	OFF ON ON Summer and 0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.538 198.101 198.101 198.101 198.041	Surcharge Depth (m) 0.06 1 -0.17 1 0.70 1 0.72 1 0.83 1 0.89
PN \$1.000 \$1.001 \$1.002 \$1.003 \$1.004 \$1.005	US/MH Name S1 S2 2 S3 2 S3 2 S4 2 S5 2 S5 2 S6 2	turn Period Climate Storm 15 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Winter	n(s) (m: (s) (yea Change Return Period 100 100 100 100 100 100 100 100 100 10	Ine e(s) ins) 1 ars) (%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Volume (m <sup>3</sup> ) 0.000 0.000 0.000	DTS Status DVD Status ertia Status 5, 30, 60, 3 First (X) Surcharge 100/15 Summ 30/180 Wint 30/180 Wint 30/180 Wint 30/60 Summ 30/60 Summ 30/60 Summ	First (Y) Flood er er er er er er flow Flow /s) (1/s) 596.2 17.1 2.4	S 0, 360, 480 First (Z) Overflow Status SURCHARGED	OFF ON ON Summer and 0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.538 198.101 198.101 198.101 198.041	Surcharge Depth (m) 0.06 1 -0.17 1 0.70 1 0.72 1 0.83 1 0.89
PN \$1.000 \$1.001 \$1.002 \$1.003 \$1.004 \$1.005	US/MH Name S1 S2 2 S3 2 S3 2 S4 2 S5 2 S5 2 S6 2	turn Period Climate Storm 15 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Sinter 880 Sinter	n(s) (m: (s) (yea Change Return Period 100 100 100 100 100 100 100 100 100 10	Ine e(s) ins) 1 ars) (%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000 0.000	DTS Status DVD Status ertia Status 5, 30, 60, 3 First (X) Surcharge 100/15 Summ 30/180 Wint 30/180 Wint 30/180 Summ 30/60 Summ 30/60 Summ <b>Flow / Over</b> Cap. (1 1.19 0.02 0.01	First (Y) Flood er er er er er er flow Flow /s) (1/s) 596.2 17.1 2.4 2.3	S 0, 360, 480 First (Z) Overflow Status SURCHARGED OK SURCHARGED	OFF ON ON Summer and 0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.538 198.101 198.101 198.101 198.041	Surcharge Depth (m) 0.06 1 -0.17 1 0.70 1 0.72 1 0.83 1 0.89
PN \$1.000 \$1.001 \$1.002 \$1.003 \$1.004 \$1.005	US/MH Name S1 S2 2 S3 2 S3 2 S4 2 S5 2 S5 2 S6 2	turn Period Climate Storm 15 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Winter 880 Sinter 880 Sinter 880 Sinter 880 Sinter 880 Sinter	n(s) (m: (s) (yea Change Return Period 100 100 100 100 100 100 100 100 100 10	Ine e(s) ins) 1 ars) (%) Climate Change +40% +40% +40% +40% +40% +40% +40% Flooded Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000 0.000 0.000	DTS Status DVD Status ertia Status 5, 30, 60, 3 First (X) Surcharge 100/15 Summ 30/180 Wint 30/180 Wint 30/180 Summ 30/60 Summ 30/60 Summ <b>Flow / Over</b> Cap. (1 1.19 0.02 0.01 0.01	First (Y) Flood er er er er er er (1/s) 596.2 17.1 2.4 2.3 1.4	S 0, 360, 480 First (Z) Overflow Surcharged SURCHARGED SURCHARGED	OFF ON ON Summer and 0, 600, 720 1440, 2160 1, 3 0, Overflow Act.	Winter 0, 960, 0, 2880 30, 100 , 0, 40 Water Level (m) 198.538 198.101 198.101 198.101 198.041	Surcharge Depth (m) 0.06 1 -0.17 1 0.70 1 0.72 1 0.83 1 0.89

Hydrock Consultants Ltd		Page 1
•	Fort Halstead	
	Catchment L	
• Date 04/09/2019	Designed by SM	Micro
File 10730-HYD-XX-XX-CA-C-Micro	Checked by	Drainage
Īnnovyze	Network 2018.1.1	
STORM SEWER DES	IGN by the Modified Rational Method	
STORM SEWER DES	ion by the mouthed National Method	
Des	<u>ign Criteria for Pond M</u>	
Pipe Size	s STANDARD Manhole Sizes STANDARD	
FSR Rai	nfall Model - England and Wales	
Return Period (ye	5	100
-	(mm) 20.700 Add Flow / Climate Change (%)	0
Rat	io R 0.370 Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm	n/hr) 50 Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (m		
Foul Sewage (1/s		1.00
Volumetric Runoff Co	peff. 0.750 Min Slope for Optimisation (1:X)	500
De	esigned with Level Soffits	
Netwo	rk Design Table for Pond M	
<i>"</i> т	ndicates pipe capacity < flow	
~ - 1	nurcates pipe Capacity < 110w	
PN Length Fall Slope I.Are	a T.E. Base k HYD DIA Section Type	Auto
(m) (m) (1:X) (ha)		Design

S1.000	10.000	0.050	200.0	1.690	5.00	0.0	0.600	0	750	Pipe/Conduit 🔒
S1.001	5.000	1.373	3.6	0.000	0.00	0.0	0.600	0	750	Pipe/Conduit 🤒
S1.002	10.000	0.026	384.6	0.000	0.00	0.0	0.600	0	750	Pipe/Conduit 🤷
S1.003	5.000	0.013	384.6	0.000	0.00	0.0	0.600	0	600	Pipe/Conduit 🤷
S1.004	10.000	0.060	166.7	0.000	0.00	0.0	0.600	0	450	Pipe/Conduit 🤷
S1.005	10.000	0.026	384.6	0.000	0.00	0.0	0.600	0	450	Pipe/Conduit 🤒
S1.006	10.000	0.026	384.6	0.000	0.00	0.0	0.600	0	450	Pipe/Conduit 🧯

#### Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (1/s)	Flow (1/s)
S1.000	50.00	5.08	197.723	1.690	0.0	0.0	0.0	1.98	872.6	228.8
S1.001	50.00	5.09	197.673	1.690	0.0	0.0	0.0	14.72	6503.8	228.8
S1.002	50.00	5.21	196.300	1.690	0.0	0.0	0.0	1.42	627.7	228.8
S1.003	50.00	5.27	196.274	1.690	0.0	0.0	0.0	1.24	349.4	228.8
S1.004	50.00	5.38	196.261	1.690	0.0	0.0	0.0	1.57	250.0	228.8
S1.005	50.00	5.54	196.201	1.690	0.0	0.0	0.0	1.03	163.9«	228.8
S1.006	50.00	5.70	196.175	1.690	0.0	0.0	0.0	1.03	163.9«	228.8

#### Simulation Criteria for Pond M

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow 0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins)	0	Inlet Coeffiecient 0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day) 0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins) 60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins) 1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0 Number of Online Controls 2 Number of Storage Structures 4 Number of Real Time Controls 0

### Synthetic Rainfall Details

Hydrock Consultants Ltd		Page 2
•	Fort Halstead	
	Catchment L	
		Micco
Date 04/09/2019	Designed by SM	Micro Drainage
File 10730-HYD-XX-XX-CA-C-Micro	Checked by	Dialitacje
Īnnovyze	Network 2018.1.1	
Synthe	tic Rainfall Details	
Rainfall Model	FSR Profile Type Summer	
Return Period (years) Region Engl	and and Wales Cv (Winter) 0.750	
M5-60 (mm)	20.700 Storm Duration (mins) 30	
Ratio R	0.370	

Hydrock Consultant	ts Ltd							Page 3	
•			Fort H	alstead					
•			Catchm	ent L					
								Micro	
Date 04/09/2019			Design	ed by SM					
File 10730-HYD-XX-	-XX-CA-C-Mi	cro	Checke	d by				Drain	lage
Īnnovyze			Networ	k 2018.1.	1				
Hydro	-Brake® Opt			ls for Po		Jume (m <sup>3</sup>	)• 18 7	7	
<u>inyuro</u>	DIAKE® Opt	Intuni Mari	<u>11016. 54</u>	<u></u>	1.005, 00		/. 10./	<u> </u>	
				nce MD-SHE-	-0103-5000-				
			esign Head ign Flow (l			1.200			
		Des	Flush-F		С	alculated			
			Object	ive Minimi	ise upstrea	m storage			
			Applicat			Surface			
		:	Sump Availa			Yes			
		-	Diameter (	,		103			
	Minimum O		vert Level Diameter (	. ,		196.274 150			
			Diameter (			1200			
Control			Flow (l/s)		rol Points	Head	(m) Flo	w (l/s)	
Design Point	(Calculated)	1.200	5.0		Kick	-Flo® 0.	745	4.0	
Design roine	Flush-Flo™			Mean Flow			-	4.4	
The hydrological ca	loulations b	ave been b	ased on the	Head /Disch	arge relat	ionshin fo	r the Ut	dro-Brok	<b>A</b> ®
Optimum as specifie					-	-	-		
then these storage						1	111	u	
Depth (m) Flow (l/s)	Depth (m) H	[]ow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth	(m) Flow	(1/s)
0.100 3.4	0.800	4.1	2.000	6.3	4.000	8.8	7.	000	11.5
0.200 4.7	1.000	4.6	2.200	6.6	4.500	9.3	7.	500	11.8

0.100	3.4	0.000	4.1	2.000	0.3	4.000	0.0	7.000	II.J
0.200	4.7	1.000	4.6	2.200	6.6	4.500	9.3	7.500	11.8
0.300	5.0	1.200	5.0	2.400			9.8	8.000	12.2
0.400	5.0	1.400	5.4	2.600	7.2	5.500	10.2	8.500	12.6
0.500	4.9	1.600	5.7	3.000		6.000		9.000	12.9
0.600	4.7	1.800	6.0	3.500	8.3	6.500	11.1	9.500	13.3
	1				1				

Weir Manhole: S7, DS/PN: S1.006, Volume (m<sup>3</sup>): 1.4

Discharge Coef 0.544 Width (m) 1.000 Invert Level (m) 198.750  $\,$ 

					The set of	- 1 - +	l				
						alstea	aa				
					Catchm	ient L					
• Date 04/09/2019						l l	OM				Micro
					Design		SM				Drainac
ile 10730-		Checke									
nnovyze					Networ	K 2018	3.1.1				
			St	corage	Struct	ures f	for Pon	d M			
			<u></u>	20100	001400	4200 1		<u>a 11</u>			
		-	Tank or	r Pond	Manhol	e: S3,	DS/PN	: S1.0	02		
				Tnu	ert Leve	1 (m) 1	96 300				
				TIIA	ert reve	L (III) L	90.500				
Depth (m)	Area (m²)	Depth (	m) Area	(m²) [	epth (m)	Area	(m²) Dep	oth (m)	Area (m²)	Depth (n	n) Area (m²)
0.000	350.0	0.6	00	350.0	1.200		31.5	1.800	1107.1		1489.2
0.100				350.0	1.300		31.8	1.900		2.50	1558.4
0.200		0.8		350.0	1.400		33.7	2.000			
0.300				639.9	1.500		37.2	2.100			
0.400				685.5	1.600		92.3	2.200			
0.500	350.0	1.1	00	732.7	1.700	104	18.9	2.300	1421.6		
		Dee	p Bore	Soaka	way Man	hole:	S5, DS	/PN: S	1.004		
					=						
						iltrati	on Coeff		Base (m/h:		
	Chamber Di		5		.500			Sa	fety Facto	or 2.	.0
			ameter (		.300						
	В	orehole	Depth (	m) 18	.000						
			Side	1	Side		Side		Side		
		Depth	Infil.	Depth	Infil.	Depth	Infil.	Depth	Infil.		
		(m)	Coef.	(m)	Coef.	(m)	Coef.	(m)	Coef.		
			(m/hr)		(m/hr)		(m/hr)		(m/hr)		
		0.000	0.77000	8.000	0.77000	8.001	0.00000	18.000	0.00000		
		0.000	0.77000	8.000	0.77000	8.001	0.00000	18.000	0.00000		
				I	0.77000 way Man	I		1			
	Chamber	Dee	<u>p Bore</u>	Soaka	way Man	hole:	<u>s6, Ds</u>	/PN: S	1.005	r) 0 7700	20
		<u>Dee</u> Invert	<u>p Bore</u> Level (	<u>Soaka</u> m) 178	<u>way Man</u> .976 Inf	hole:	<u>s6, Ds</u>	/PN: S	<u>1.005</u> Base (m/h:		
	Chamber Di	<u>Dee</u> Invert ameter/	<u>p Bore</u> Level (	<u>Soaka</u> (m) 178 (m) 1	way Man	hole:	<u>s6, Ds</u>	/PN: S	1.005		
	Chamber Di Bore	<u>Dee</u> Invert ameter/ hole Di	<u>p Bore</u> Level ( Length (	<u>Soaka</u> (m) 178 (m) 1 (m) 0	<u>way Man</u> .976 Inf .350	hole:	<u>s6, Ds</u>	/PN: S	<u>1.005</u> Base (m/h:		
	Chamber Di Bore	<u>Dee</u> Invert ameter/ hole Di	p Bore Level ( Length ( ameter ( Depth (	<u>Soaka</u> (m) 178 (m) 1 (m) 0	way Man .976 Inf .350 .300 .000	hole:	<u>S6, DS</u> on Coefi	/PN: S	<u>1.005</u> Base (m/h: fety Facto		
	Chamber Di Bore	Dee Invert ameter/ hole Di orehole	p Bore Level ( Length ( ameter ( Depth ( <b>Side</b>	<u>Soaka</u> (m) 178 (m) 1 (m) 0 (m) 18	way Man .976 Inf .350 .300 .000 <b>Side</b>	hole: iltrati	S6, DS on Coeff Side	/ <u>PN: S</u> ficient Sa	<u>1.005</u> Base (m/h: fety Facto <b>Side</b>		
	Chamber Di Bore	Dee Invert ameter/ hole Di orehole Depth	p Bore Level ( Length ( ameter ( Depth ( Side Infil.	<u>Soaka</u> (m) 178 (m) 1 (m) 0 (m) 18	way Man .976 Inf .350 .300 .000 Side Infil.	hole: iltrati Depth	S6, DS on Coeff Side Infil.	/PN: S ficient Sa	1.005 Base (m/h: fety Facto Side Infil.		
	Chamber Di Bore	Dee Invert ameter/ hole Di orehole	p Bore Level ( Length ( ameter ( Depth ( <b>Side</b>	<u>Soaka</u> (m) 178 (m) 1 (m) 0 (m) 18	way Man .976 Inf .350 .300 .000 <b>Side</b>	hole: iltrati	S6, DS on Coeff Side	/ <u>PN: S</u> ficient Sa	<u>1.005</u> Base (m/h: fety Facto <b>Side</b>		
	Chamber Di Bore	Dee Invert ameter/ hole Di orehole Depth (m)	p Bore Level ( Length ( ameter ( Depth ( Side Infil. Coef. (m/hr)	Soaka (m) 178 (m) 1 (m) 0 (m) 18 Depth (m)	way Man .976 Inf .350 .300 .000 Side Infil. Coef. (m/hr)	hole: iltrati Depth (m)	S6, DS on Coeff Side Infil. Coef. (m/hr)	Depth (m)	1.005 Base (m/h: fety Facto Side Infil. Coef. (m/hr)		
	Chamber Di Bore	Dee Invert ameter/ hole Di orehole Depth (m)	p Bore Level ( Length ( ameter ( Depth ( Side Infil. Coef. (m/hr)	Soaka (m) 178 (m) 1 (m) 0 (m) 18 Depth (m)	way Man .976 Inf .350 .300 .000 Side Infil. Coef.	hole: iltrati Depth (m)	S6, DS on Coeff Side Infil. Coef. (m/hr)	Depth (m)	1.005 Base (m/h: fety Facto Side Infil. Coef. (m/hr)		
	Chamber Di Bore	Dee Invert ameter/ hole Di orehole Depth (m) 0.000	p Bore Level ( Length ( ameter ( Depth ( Side Infil. Coef. (m/hr) 0.77000	Soaka (m) 178 (m) 1 (m) 0 (m) 18 Depth (m) 8.000	way Man .976 Inf .350 .300 .000 Side Infil. Coef. (m/hr)	hole: iltrati Depth (m) 8.001	Side Side Infil. Coef. (m/hr) 0.00000	Depth (m) (18.000	1.005 Base (m/h: fety Facto Side Infil. Coef. (m/hr) 0.00000		
	Chamber Di Bore B	Dee Invert ameter/ hole Di orehole Depth (m) 0.000 Dee	p Bore Level ( Length ( Depth ( Side Infil. Coef. (m/hr) 0.77000 p Bore	Soaka (m) 178 (m) 1 (m) 0 (m) 18 Depth (m) 8.000 Soaka	way Man .976 Inf .350 .300 .000 Side Infil. Coef. (m/hr) 0.77000 way Man	hole: iltrati Depth (m) 8.001 hole:	S6, DS on Coeff Side Infil. Coef. (m/hr) 0.00000 S7, DS	Depth (m) 18.000	1.005 Base (m/h: fety Facto Side Infil. Coef. (m/hr) 0.00000 1.006	or 2.	. 0
	Chamber Di Bore B	Dee Invert ameter/ hole Di orehole Depth (m) 0.000 Dee	p Bore Level ( Length ( Depth ( Side Infil. Coef. (m/hr) 0.77000 p Bore Level (	<pre>Soaka (m) 178 (m) 1 (m) 0 (m) 18 Depth (m) 8.000 Soaka (m) 179</pre>	<pre>way Man .976 Inf .350 .300 .000 Side Infil. Coef. (m/hr) 0.77000 way Man .100 Inf</pre>	hole: iltrati Depth (m) 8.001 hole:	S6, DS on Coeff Side Infil. Coef. (m/hr) 0.00000 S7, DS	/PN: S ficient Sa Depth (m) 18.000 /PN: S	1.005 Base (m/h: fety Facto Side Infil. Coef. (m/hr) 0.00000 1.006 Base (m/h:	pr 2.	.0
	Chamber Di Bore B Chamber Chamber Di	Dee Invert ameter/ hole Di orehole Depth (m) 0.000 Dee Invert ameter/	p Bore Level ( Length ( ameter ( Depth ( Side Infil. Coef. (m/hr) 0.77000 p Bore Level ( Length (	Soaka (m) 178 (m) 1 (m) 0 (m) 18 Depth (m) 8.000 Soaka (m) 179 (m) 1	<pre>way Man .976 Inf .350 .300 .000 Side Infil. Coef. (m/hr) 0.77000 way Man .100 Inf .350</pre>	hole: iltrati Depth (m) 8.001 hole:	S6, DS on Coeff Side Infil. Coef. (m/hr) 0.00000 S7, DS	/PN: S ficient Sa Depth (m) 18.000 /PN: S	1.005 Base (m/h: fety Facto Side Infil. Coef. (m/hr) 0.00000 1.006	pr 2.	.0
	Chamber Di Bore Chamber Chamber Di Bore	Dee Invert ameter/ hole Di orehole Depth (m) 0.000 Dee Invert ameter/ hole Di	p Bore Level ( Length ( Depth ( Side Infil. Coef. (m/hr) 0.77000 p Bore Level (	<pre>Soaka (m) 178 (m) 1 (m) 0 (m) 18 Depth (m) 8.000 Soaka (m) 179 (m) 1 (m) 0 </pre>	<pre>way Man .976 Inf .350 .300 .000 Side Infil. Coef. (m/hr) 0.77000 way Man .100 Inf</pre>	hole: iltrati Depth (m) 8.001 hole:	S6, DS on Coeff Side Infil. Coef. (m/hr) 0.00000 S7, DS	/PN: S ficient Sa Depth (m) 18.000 /PN: S	1.005 Base (m/h: fety Facto Side Infil. Coef. (m/hr) 0.00000 1.006 Base (m/h:	pr 2.	.0
	Chamber Di Bore Chamber Chamber Di Bore	Dee Invert ameter/ hole Di orehole Depth (m) 0.000 Dee Invert ameter/ hole Di	p Bore Level ( Length ( ameter ( Depth ( Side Infil. Coef. (m/hr) 0.77000 p Bore Level ( Length ( ameter ( Depth (	<pre>Soaka (m) 178 (m) 1 (m) 0 (m) 18 Depth (m) 8.000 Soaka (m) 179 (m) 1 (m) 0 </pre>	<pre>way Man .976 Inf .350 .300 .000 Side Infil. Coef. (m/hr) 0.77000 way Man .100 Inf .350 .300</pre>	hole: iltrati Depth (m) 8.001 hole:	S6, DS on Coeff Side Infil. Coef. (m/hr) 0.00000 S7, DS on Coeff	/PN: S ficient Sa Depth (m) 18.000 /PN: S	<pre>1.005 Base (m/h: fety Facto Side Infil. Coef. (m/hr) 0.00000 1.006 Base (m/h: fety Facto</pre>	pr 2.	.0
	Chamber Di Bore Chamber Chamber Di Bore	Dee Invert ameter/ hole Di orehole Depth (m) 0.000 Dee Invert ameter/ hole Di orehole	p Bore Level ( Length ( ameter ( Depth ( Side Infil. Coef. (m/hr) 0.77000 p Bore Level ( Length ( ameter ( Depth ( Side	<pre>' Soaka 'm) 178 'm) 1 'm) 0 'm) 18 ' Depth (m) '8.000 Soaka 'm) 179 'm) 1 'm) 0 'm) 18 ' ''''''''''''''''''''''''''''''''''</pre>	<pre>way Man .976 Inf .350 .300 Side Infil. Coef. (m/hr) 0.77000 way Man .100 Inf .350 .300 .000 Side</pre>	hole: iltrati Depth (m) 8.001 hole: iltrati	Side Infil. Coef. (m/hr) 0.00000 S7, DS on Coeff	/PN: S ficient Sa Depth (m) 18.000 /PN: S ficient Sa	<pre>1.005 Base (m/h: fety Facto Side Infil. Coef. (m/hr) 0.00000 1.006 Base (m/h: fety Facto Side</pre>	pr 2.	.0
	Chamber Di Bore Chamber Chamber Di Bore	Dee Invert ameter/ hole Di orehole Depth (m) 0.000 Dee Invert ameter/ hole Di orehole Depth	p Bore Level ( Length ( ameter ( Depth ( Side Infil. Coef. (m/hr) 0.77000 p Bore Level ( Length ( ameter ( Depth ( Side Infil.	Soaka (m) 178 (m) 1 (m) 0 (m) 18 Depth (m) 18 (m) 179 (m) 1 (m) 0 (m) 18 Depth	<pre>way Man .976 Inf .350 .300 Side Infil. Coef. (m/hr) 0.77000 way Man .100 Inf .350 .300 .000 Side Infil.</pre>	hole: iltrati Depth (m) 8.001 hole: iltrati	S6, DS on Coeff Infil. Coef. (m/hr) 0.00000 S7, DS on Coeff Side Infil.	/PN: S ficient Sa Depth (m) 18.000 /PN: S ficient Sa Depth	1.005 Base (m/h: fety Factor Side Infil. Coef. (m/hr) 0.00000 1.006 Base (m/h: fety Factor Side Infil.	pr 2.	.0
	Chamber Di Bore Chamber Chamber Di Bore	Dee Invert ameter/ hole Di orehole Depth (m) 0.000 Dee Invert ameter/ hole Di orehole	p Bore Level ( Length ( ameter ( Depth ( Side Infil. Coef. (m/hr) 0.77000 p Bore Level ( Length ( ameter ( Depth ( Side Infil. Coef.	<pre>' Soaka 'm) 178 'm) 1 'm) 0 'm) 18 ' Depth (m) '8.000 Soaka 'm) 179 'm) 1 'm) 0 'm) 18 ' ''''''''''''''''''''''''''''''''''</pre>	<pre>way Man .976 Inf .350 .300 Side Infil. Coef. (m/hr) 0.77000 way Man .100 Inf .350 .300 .000 Side Infil. Coef.</pre>	hole: iltrati Depth (m) 8.001 hole: iltrati	S6, DS on Coeff Infil. Coef. (m/hr) 0.00000 S7, DS on Coeff Side Infil. Coef.	/PN: S ficient Sa Depth (m) 18.000 /PN: S ficient Sa	1.005 Base (m/h: fety Factor Side Infil. Coef. (m/hr) 0.00000 1.006 Base (m/h: fety Factor Side Infil. Coef.	pr 2.	.0
	Chamber Di Bore Chamber Chamber Di Bore	Dee Invert ameter/ hole Di orehole Depth (m) 0.000 Dee Invert ameter/ hole Di orehole Depth	p Bore Level ( Length ( ameter ( Depth ( Side Infil. Coef. (m/hr) 0.77000 p Bore Level ( Length ( ameter ( Depth ( Side Infil.	Soaka (m) 178 (m) 1 (m) 0 (m) 18 Depth (m) 18 (m) 179 (m) 1 (m) 0 (m) 18 Depth	<pre>way Man .976 Inf .350 .300 Side Infil. Coef. (m/hr) 0.77000 way Man .100 Inf .350 .300 .000 Side Infil.</pre>	hole: iltrati Depth (m) 8.001 hole: iltrati	S6, DS on Coeff Infil. Coef. (m/hr) 0.00000 S7, DS on Coeff Side Infil.	/PN: S ficient Sa Depth (m) 18.000 /PN: S ficient Sa Depth	1.005 Base (m/h: fety Factor Side Infil. Coef. (m/hr) 0.00000 1.006 Base (m/h: fety Factor Side Infil.	pr 2.	.0
	Chamber Di Bore Chamber Chamber Di Bore	Dee Invert ameter/ hole Di orehole Depth (m) 0.000 Dee Invert ameter/ hole Di orehole Depth (m)	p Bore Level ( Length ( ameter ( Depth ( Side Infil. Coef. (m/hr) 0.77000 p Bore Level ( Length ( ameter ( Depth ( Side Infil. Coef. (m/hr)	Soaka (m) 178 (m) 1 (m) 0 (m) 18 Depth (m) 8.000 Soaka (m) 179 (m) 1 (m) 18 (m) 18 Depth (m) 18	<pre>way Man .976 Inf .350 .300 Side Infil. Coef. (m/hr) 0.77000 way Man .100 Inf .350 .300 .000 Side Infil. Coef.</pre>	hole: iltrati Depth (m) 8.001 hole: iltrati	S6, DS on Coeff Side Infil. Coef. (m/hr) 0.00000 S7, DS on Coeff Side Infil. Coef. (m/hr)	<pre>/PN: S ficient Sa Depth (m) 18.000 /PN: S ficient Sa Depth (m) (m)</pre>	1.005 Base (m/h: fety Facto Side Infil. Coef. (m/hr) 0.00000 1.006 Base (m/h: fety Facto Side Infil. Coef. (m/hr)	pr 2.	.0
	Chamber Di Bore Chamber Chamber Di Bore	Dee Invert ameter/ hole Di orehole Depth (m) 0.000 Dee Invert ameter/ hole Di orehole Depth (m)	p Bore Level ( Length ( ameter ( Depth ( Side Infil. Coef. (m/hr) 0.77000 p Bore Level ( Length ( ameter ( Depth ( Side Infil. Coef. (m/hr)	Soaka (m) 178 (m) 1 (m) 0 (m) 18 Depth (m) 8.000 Soaka (m) 179 (m) 1 (m) 18 (m) 18 Depth (m) 18	<pre>way Man .976 Inf .350 .300 .000 Side Infil. Coef. (m/hr) 0.77000 way Man .100 Inf .350 .300 .000 Side Infil. Coef. (m/hr)</pre>	hole: iltrati Depth (m) 8.001 hole: iltrati	S6, DS on Coeff Side Infil. Coef. (m/hr) 0.00000 S7, DS on Coeff Side Infil. Coef. (m/hr)	<pre>/PN: S ficient Sa Depth (m) 18.000 /PN: S ficient Sa Depth (m) (m)</pre>	1.005 Base (m/h: fety Facto Side Infil. Coef. (m/hr) 0.00000 1.006 Base (m/h: fety Facto Side Infil. Coef. (m/hr)	pr 2.	.0
	Chamber Di Bore Chamber Chamber Di Bore	Dee Invert ameter/ hole Di orehole Depth (m) 0.000 Dee Invert ameter/ hole Di orehole Depth (m)	p Bore Level ( Length ( ameter ( Depth ( Side Infil. Coef. (m/hr) 0.77000 p Bore Level ( Length ( ameter ( Depth ( Side Infil. Coef. (m/hr)	Soaka (m) 178 (m) 1 (m) 0 (m) 18 Depth (m) 8.000 Soaka (m) 179 (m) 1 (m) 18 (m) 18 Depth (m) 18	<pre>way Man .976 Inf .350 .300 .000 Side Infil. Coef. (m/hr) 0.77000 way Man .100 Inf .350 .300 .000 Side Infil. Coef. (m/hr)</pre>	hole: iltrati Depth (m) 8.001 hole: iltrati	S6, DS on Coeff Side Infil. Coef. (m/hr) 0.00000 S7, DS on Coeff Side Infil. Coef. (m/hr)	<pre>/PN: S ficient Sa Depth (m) 18.000 /PN: S ficient Sa Depth (m) (m)</pre>	1.005 Base (m/h: fety Facto Side Infil. Coef. (m/hr) 0.00000 1.006 Base (m/h: fety Facto Side Infil. Coef. (m/hr)	pr 2.	.0
	Chamber Di Bore Chamber Chamber Di Bore	Dee Invert ameter/ hole Di orehole Depth (m) 0.000 Dee Invert ameter/ hole Di orehole Depth (m)	p Bore Level ( Length ( ameter ( Depth ( Side Infil. Coef. (m/hr) 0.77000 p Bore Level ( Length ( ameter ( Depth ( Side Infil. Coef. (m/hr)	Soaka (m) 178 (m) 1 (m) 0 (m) 18 Depth (m) 8.000 Soaka (m) 179 (m) 1 (m) 18 (m) 18 Depth (m) 18	<pre>way Man .976 Inf .350 .300 .000 Side Infil. Coef. (m/hr) 0.77000 way Man .100 Inf .350 .300 .000 Side Infil. Coef. (m/hr)</pre>	hole: iltrati Depth (m) 8.001 hole: iltrati	S6, DS on Coeff Side Infil. Coef. (m/hr) 0.00000 S7, DS on Coeff Side Infil. Coef. (m/hr)	<pre>/PN: S ficient Sa Depth (m) 18.000 /PN: S ficient Sa Depth (m) (m)</pre>	1.005 Base (m/h: fety Facto Side Infil. Coef. (m/hr) 0.00000 1.006 Base (m/h: fety Facto Side Infil. Coef. (m/hr)	pr 2.	.0

Hydrock	Cons	ulta	nts Ltd								Pa	age 5
•						For	t Hals	tead				
						Cato	chment	L				
•												Micro
	Date 04/09/2019							oy SM				Drainage
-	File 10730-HYD-XX-XX-CA-C-Micro							Y				brainage
Innovyz	e					Neti	work 20	018.1.1				
<u>1 ye</u>	ar Re	turn	Period	Summar	y of C:	ritical	l Resul	lts by 1	Maximum I	evel (Rani	k 1) fo	or Pond M
						Simula	tion Cr	itoria				
			Area	l Reduct	ion Fact				Flow - % o	f Total Flow	0.000	
			II.e		art (min	,	0 0	MADD Fa		<sup>3</sup> /ha Storage		
		Manho			Level (m f (Globa	,		per Pers		Coeffiecient (l/per/day)		
			l Sewage									
	Number	of I	nput Hyd	rographs	0 Nun	nber of	Offline	Control	s 0 Number	of Time/Are	ea Diagr	ams 0
										of Real Tir	-	
					Sv	nthetic	Rainfa	ll Detail	5			
			Rainfall	Model	<u></u>					Summer) 0.75	0	
				Region 1	England	and Wale	es Ra	atio R (	.369 Cv (M	Vinter) 0.84	0	
			Margin	for Flo	od Risk	Warning	(mm)			300.0		
					Analy		-	.5 Second	l Increment	(Extended)		
						DTS St DVD St				OFF ON		
					In	ertia St	tatus			ON		
				Profile	. ,		co 100	100 0		Summer and		
			Duratio	on(s) (m:	lns) 1	15, 30,	60, 120	, 180, 24	40, 360, 48	30, 600, 720 1440, 2160		
		Retur	n Period	· · · · <del>·</del>						1, 3	0, 100	
			Climate	e Change	(%)					0,	0, 40	
	US/MH			Return C	limato	First	( <b>Y</b> )	First (	V) First (	Z) Overflow		Surcharged Depth
PN	Name	S		Period (		Surch		Flood			(m)	(m)
s1.000	S1	15	Winter	1	+0%	30/15	Summer				198.08'	7 -0.386
s1.000	S1 S2		Winter	1		100/1440					197.852	
S1.002			Winter	1	+0%		Winter				197.168	
\$1.003 \$1.004			Winter Winter	1 1	+0% +0%		Winter Summer				197.17	
S1.005			Winter	1	+0%	1/60	Winter				197.074	4 0.423
S1.006	S7	1440	Winter	1	+0%	1/60	Winter				197.074	4 0.449
				TTC /MT	Flooded		0	Pipe		T arra 1		
			PN	Name	Volume (m³)	Flow / Cap.	(1/s)		Status	Level Exceeded		
			01 00	0 01	0 000	-				,		
			S1.00 S1.00		0.000 0.000			233.9 235.3	01 01			
			S1.00	2 S3	0.000	0.01		3.3	SURCHARGE			
			S1.00 S1.00		0.000				SURCHARGEI SURCHARGEI			
			S1.00	5 S6	0.000	0.01		1.3	SURCHARGE	C		
			S1.00	6 S7	0.000	0.00		0.0	SURCHARGEI	C		

Hydrock	Cons	ulta	nts Lto	3							Pa	qe 6
		arcar				For	t Halste	ead				90 0
						-	chment :					
												Micco
Date 04	/09/2	019				Des	igned by	y SM				Micro
File 10	File 10730-HYD-XX-XX-CA-C-Micro						cked by	-				Drainage
Īnnovyz								18.1.1				
<u>30 ye</u>	ar Re	eturn	Perio	<u>d Summa</u>	<u>ary of (</u>	<u>Critica</u>	<u>l Resul</u>	<u>ts by</u>	<u>Maximum 1</u>	Level (Ran	<u>ık 1) fo</u>	or Pond M
						<u>Simul</u> a	ation Cri	teria				
			Area							f Total Flow		
			H		Start (mi: t Level (1		0	MADD Fa		³/ha Storage Coeffiecient		
		Manho						er Pers		(l/per/day)		
		Fou	l Sewage	e per he	ectare (l	/s) 0.00	0					
	Number	of Ti	nput. Hyc	lrograph	us O Nu	mber of	Offline	Control	s 0 Number	of Time/Are	ea Diagra	ams O
										of Real Tir	-	
					C .	unthotic	Rainfall	l Dotoil	-			
			Rainfal	l Model						Summer) 0.75	50	
				Region	England					Vinter) 0.84		
			Margin	for Fl	ood Risk	Warning	(mm)			300.0		
			nargin	101 11		-		5 Second	l Increment	(Extended)		
						DTS St				OFF		
					TT	DVD Si nertia Si				ON ON		
						101014 0	cucuo			011		
				Profil	le(s)					Summer and	Winter	
			Durati			15, 30,	60, 120,	180, 2	40, 360, 48	30, 600, 720		
										1440, 2160	-	
		Retur	cn Perio	d(s) (ye e Change							30, 100 0, 40	
			OTTING	5 onunge	5 (0)					•7	0, 10	
											Matan	Surcharged
	US/MH			Return	Climate	First	: (X)	First (	Y) First (	Z) Overflow		Depth
PN	Name	S	torm	Period	Change	Surch		Flood			(m)	(m)
s1.000	S1	15	Winter	30	+0%	30/15	5 Summer				198.502	0.029
S1.001	s2		Winter	30		100/1440					197.964	
S1.002			Winter	30	+0%		) Winter				197.793	
S1.003			Winter Winter	30 30	+0%		) Winter				197.797 197.700	
\$1.004 \$1.005			Winter Winter	30	+0% +0%		) Summer ) Winter				197.700	
s1.006			Winter	30	+0%		) Winter				197.699	
					Flooded	1		Pipe				
				US/MI	H Volume		Overflow	-		Level		
			PN	Name	e (m³)	Cap.	(1/s)	(1/s)	Status	Exceeded		
			s1.00	00 S1	1 0.000	) 1.14		574.3	SURCHARGEI	D		
			S1.00	01 S2	2 0.000	0.31		577.2	OF	ĸ		
			S1.00						SURCHARGEI			
			S1.00 S1.00						SURCHARGEI SURCHARGEI			
			S1.00 S1.00						SURCHARGEI			
			S1.00						SURCHARGEI			
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Consi	ıltar	nts Ltd								Pa	qe 7
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# Appendix 14.2

# **UTILITIES ASSESSMENT REPORT**





# FORT HALSTEAD

Site Redevelopment

# **Utilities Statement**

September 2019





# CONTENTS

1.	Introductio	on	. 3
	1.1	General	. 3
2.	Existing U	tility Services to Residential Properties	. 4
	2.1	General	. 4
	2.2	Residential Water Supply	. 4
	2.3	Fire Mains	. 4
	2.4	Foul Drainage	. 4
	2.5	Surface Water Drainage	. 4
	2.6	Electrical Supply	. 5
	2.7	Telecom Services	. 5
	2.8	Gas	. 5
3.	Existing U	tility Services to Main Site	. 6
	3.1	General	. 6
	3.2	Water Supply	. 6
	3.3	Foul Drainage	. 6
	3.4	Rainwater Drainage	. 6
	3.5	Electrical Supplies	. 6
	3.6	Telecom Services	. 6
4.	Proposed	Utility Services (Existing Residential Properties)	. 7
	4.1	General	. 7
	4.2	Residential Water Supply	. 7
	4.3	Fire Mains	. 7
	4.4	Drainage	. 7
	4.5	Rainwater Drainage	. 7
	4.6	Electrical Supplies	. 8
	4.7	Telecoms	. 8
5.	Proposed	Utility Services (Development Site)	. 9
	5.1	General	9
	5.2	Water Supply	. 9
	5.3	Foul Drainage	. 9
	5.4	Rainwater Drainage	. 9
	5.5	Electrical Supplies	10



	5.6	Telecoms
6.	Conclusior	

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### Introduction

### 1.1 General

The site is currently owned by the Merseyside Pension Fund (MPF) and is leased to the Defence Science and Technology Laboratory (DSTL) who are currently responsible for the operation, maintenance and security of the site. DSTL will have vacated the site prior to the commencement of the redevelopment, however QinetiQ, who are currently a sub tenant of DSTL will remain in a part of the site within a newly fenced enclosure to the Southwest of the fort.

This report outlines the existing utility services serving the site and the strategy required to serve the proposed development.

In considering the utilities strategy it is important to understand the utilities which serve the existing 77 residential properties, located in Beckman Close, Crow Drive, Fort Road and Armstrong Close all in the area off Crow Drive to the North of the main site; currently have some dependence on the utilities serving the main DSTL Site. The report explains the dependence, and how they will be affected by the development works.

The utility services covered in this report include the following:

- Water Supply. (Including Fire Mains where applicable)
- Foul Drainage.
- Surface Water Drainage.
- Electricity.
- Telecommunications.

It should be noted that there is no mains gas serving the current site and it not intended to provide a gas supply to the proposed development.



### **Existing Utility Services to Residential Properties**

### 2.1 General

This section describes the current utility services serving the existing residential properties which are located at the Northern end of the site, on and around Crow Drive.

Each utility services currently feeding the existing residential properties is described in the following sections of this report.

### 2.2 Residential Water Supply

The water supply to each of the existing residential properties is fed from the main DSTL site infrastructure. Potable water is supplied via underground cold-water tanks located within the secured DSTL area near the North-West corner where the Thames Water main feeding the site enters. The underground tanks which are replenished by the incoming Thames Water supply also feed the buildings on the DSTL site.

The water supply to the residential properties is metered in four locations:

- Serving: 1 20 Armstrong Close Plus the Officers Club
- Serving: 17 46 Fort Road
- Serving: 1 16 Fort Road
- Serving: 1, 3, 5 & 7 Crow Drive and 1 7 Beckman Close

From the metering points the water is distributed to each property via underground pipework.

The management of the common parts of the existing residential areas is split between two companies who are billed by DSTL for the water used as measured by the meters. This cost is passed on to each of the residential properties as part of their service charges.

### 2.3 Fire Mains

The fire hydrants in the residential roads are fed from the DSTL boosted fire main system. This is a separate system to the potable water supply.

### 2.4 Foul Drainage

The existing foul drainage from the Northern areas of the site runs through the residential area, crossing Crow Drive between Fort Road and the main gate house before running through the woodland to the main sewer in Star Hill.

The drainage system downstream of the residential properties has been adopted by Thames Water, who are therefore now responsible for the maintenance and upkeep.

### 2.5 Surface Water Drainage

Surface water from the residential properties and the surrounding roads collects into a series of pipework networks which drain into the surrounding woodland, some of the outfalls are outside of the existing residential boundary.

There is no surface water connection to an offsite utility sewerage system.



### **Existing Utility Services to Residential Properties**

### 2.6 Electrical Supply

Each residential property has a metered supply directly from UKPN energy infrastructure.

Two UKPN substations are located along Crow Drive, fed from a High Voltage network ring entering the site from Polhill to the North of the site and up the hill from the quarry to the East of the site.

- UKPN Substation 01: located near the Polhill entrance to the site and feeds the properties in Polhill around the former Polhill Arms, and via overhead wires to Beaumont Yard and the adjacent property to the west of Crow Drive.
- UKPN substation 02: is on foot path between Crow Drive trackway and Fort Road, West
  of Crow Drive. This substation supplies all the existing residential properties and the street
  lighting in the roads serving the houses.

Note, there is a separate High Voltage supply serving the main DSTL site, which has its own High Voltage and Low Voltage infrastructure. There is no interconnection between this supply and the supply currently feeding the existing residential properties.

### 2.7 Telecom Services

The existing residential properties are served by a below-ground BT infrastructure network from Polhill.

Beaumont Yard and the adjacent house is fed from overhead lines from Polhill.

### 2.8 Gas

Currently there is no mains gas supply to the site, however some of the residential properties are connected to a community bottled gas service.

All the equipment and pipework for this system is contained within the confines of the residential area.



### **Existing Utility Services to Main Site**

### 3.1 General

This section describes the current utility services serving the main development area of the site currently occupied managed and maintained by DSTL.

### 3.2 Water Supply

The existing Thames Water supply enters the site at the North-Western corner near the end of the footpath leading from Knockholt Pound village.

The water supply is metered by Thames Water and from this point it becomes a private supply which is currently maintained and managed by DSTL.

The mains water feeds below ground storage tanks for both the potable water supply and the fire hydrant supply. Both these supplies are boosted downstream of the storage tanks.

The water distribution serves each of the buildings on the site as well as feeding the submetered supplies to the existing residential properties as described in the previous section.

### 3.3 Foul Drainage

Foul water drainage from the entire site is via a gravity system which connects to the main sewer in Polhill. The network of drainage generally flows towards, and combines with, the residential area system. From this point to the Polhill sewer the system has been adopted by Thames Water. The upstream part of the system within the DSTL secured area, is currently privately owned.

### 3.4 Rainwater Drainage

The surface water drainage system from each building and the road gullies, combines into a series of piped systems discharging into natural soakaways or into open culverts which discharge onto the open land or wooded areas around the perimeter of the site.

### 3.5 Electrical Supplies

The UKPN High Voltage electrical supply emanates from the A224 East of the site. Buried cables cut through the fields rising the hill to the South of the quarry before entering the secure area of the site just North of the fort. The High Voltage incomer and metering panel is located in building A23.

From this point, a private High Voltage network connects to several transformers generally located in compounds around the secured DSTL part of the site, each providing a low voltage network serving the various buildings in the area of the substation.

### 3.6 Telecom Services

Telecom services are distributed via a below ground network of cable ducts distributing both incoming telecom services and data services between buildings.



### **Proposed Utility Services (Existing Residential Properties)**

### 4.1 General

The proposed Utility Supplies serving the existing residential properties are described in this section.

It is proposed to retain and maintain the existing Utility Supplies serving the site on a temporary basis whilst new and upgraded supplies are put in place to form the permeant infrastructure.

### 4.2 Residential Water Supply

A new metered Thames Water supply pipe will be laid to the boundary of each of the existing residential properties as soon as practicable at the start of the redevelopment. Whilst the new supply is being implemented the existing supply will be retained and operated.

It will be the responsibility of the owner of each of the existing residential properties to procure the installation of the water service pipe connection between the boundary meter location into their property. This supply pipe being the responsibility of the building owners and not the supply company.

Thames Water has advised that the existing water supply to the site has enough capacity to directly feed the existing residential accommodation as well as the commercial buildings which are to be retained. Depending on final programming therefore, either the new supply to existing residential properties will be connected directly to the existing incoming supply to the site, or it will be connected as part of the new feed to the site. Either way, once connected, the existing residential properties will be supplied with water directly from Thames Water who will then remain responsible for the supply of water to the existing residential properties.

The water main as it crosses the development site will be part of the new infrastructure which will eventually supply the new properties, so the route will be chosen along intended lines of road and footpaths.

### 4.3 Fire Mains

As part of the installation of Thames Water supplies to the existing residential properties, new roadway fire hydrants will be installed.

This will provide the required fire hydrant coverage to the existing residential properties to allow the existing private Fire Hydrant system fed from the existing DSTL infrastructure to be abandoned.

### 4.4 Drainage

The existing foul drainage system serving the existing residential properties has been adopted by Thames Water, therefore no further works are envisaged for the part of the system serving the existing residential properties although, local modifications will be required downstream to allow connection of the new properties proposed for the helicopter pad site.

### 4.5 Rainwater Drainage

The existing system of soakaways / run off, will be retained for the existing residential properties.



### **Proposed Utility Services (Existing Residential Properties)**

### 4.6 Electrical Supplies

The existing residential properties all have metered supplies directly from UKPN, therefore the responsibility to maintain the electrical supply to the residential properties is with UKPN and thus there will be no change in this responsibility.

### 4.7 Telecoms

There is no anticipated change to the telecoms network in the area of the existing residential properties.



### **Proposed Utility Services (Development Site)**

### 5.1 General

This section describes the Utility Services connections proposed for the main development area of the site.

### 5.2 Water Supply

A new water supply will be provided to the site by Thames Water.

The new water main will connect to the existing infrastructure in Knockholt Pound situated to the West of the site. The new main will run along Star Hill Road and enter the site at the Star Hill entrance.

New Thames Water distribution across the site following the road and footpath routes will supply all the new and existing properties.

There may be some off-site reinforcement of the network required as the result of this and other developments on the Thames Water network. If required, this will be part of Thames Water ongoing programme of renewing and reinforcing the network.

### 5.3 Foul Drainage

The existing Thames Water gravity foul drain system exits the eastern side of the site towards Polhill.

It has been advised by Thames Water that the existing outfall has sufficient capacity to serve the existing residential properties and the new proposed development.

A CCTV survey of the drainage system has indicated that the existing outfall is in a good and serviceable condition and suitable for re-use.

The gravity foul drainage system across the development site will be totally renewed to suit the layout of the new properties, all of which will be connected to the existing Thames Water network.

Once the new sections of the gravity drainage system are installed and operational, the system will be adopted by Thames Water.

### 5.4 Rainwater Drainage

The existing system of soakaways / run off, will be retained for the existing residential properties.

For the new and refurbished properties which form part of the planning application, new surface water drainage will be provided incorporating above and below ground attenuation ponds discharging into a series of drainage bore holes.

The existing surface water drainage system serving the newly formed QinetiQ area will be retained.

No surface water will be discharged into the foul drainage system.



### **Proposed Utility Services (Development Site)**

### 5.5 Electrical Supplies

Separate to the infrastructure serving the existing residential properties, there is a High Voltage UKPN electrical supply which serves the existing DSTL site.

This supply Leaves the A224 and crosses the field South of the quarry and enters the development site East of the Fort.

UKPN will extend the High Voltage supply to feed a number of substations across the development site. The substations will each feed an area of residential and commercial properties depending on load and location.

All retained buildings will be provided with a new metered UKPN supply, which will allow the end users to choose and switch energy suppliers as required.

As part of the works it will be necessary to upgrade the supply to the site to meet the needs of the new development, the final design and timing of this reinforcement will depend on the final timescale and phasing of the development works.

### 5.6 Telecoms

There is an extensive existing telecoms cable network serving the existing site.

This telecoms network will be adapted and renewed as required to meet the requirements if the new development. 0



### Conclusion

In conclusion, relatively early in the development process the existing residential properties will be provided with a new Thames Water supply which will allow them to be separate and not dependant on the existing DSTL site. This supply will also provide Fire Hydrants in the footpaths allowing the Fire Brigade access to water in the normal way.

The other utility services to the existing residential properties, including electricity, drainage, and telecoms, are supplied separately to the DSTL site and will remain unaffected by the development.

The development site will be provided with new utility services with power, water and foul drainage for each building being directly connected to the relevant utility provider.

All properties will have a utilities electrical meter which will allow the occupier to choose and switch – when required – their electricity provider.

All buildings (New and Existing) on the final development will be supported with new infrastructure directly by the Utility providers.

