

Appendix 14 Drainage Technical Addendum (September 2021)



TECHNICAL NOTE 1

DATE:	07 September 2021	CONFIDENTIALITY:	Public
SUBJECT:	Drainage Technical Addendum		
PROJECT:	Milton Keynes East	AUTHOR:	DSF
CHECKED:	BU	APPROVED:	SP

INTRODUCTION

This technical note is to accompany the drainage strategy document (MKE-WSP-XX-XX-C-RP-0001) as part of the Milton Keynes East planning application. The intention of this note is to provide further information regarding the ponds being submitted for full planning.

This information supplements section 4.4.9 – 5.0 of MKE-WSP-XX-XX-C-RP-0001 and provides a breakdown of the ponds being submitted for the full planning application with the volume of storage required for the highways only.

MAINTENANCE

The drainage drawings (MKE-WSP-ZZ-ZZ-C-DR-0591 and MKE-WSP-ZZ-ZZ-C-DR-0592) issued as part of the outline application identify ownership. This has been reiterated within the ponds section below.

It is the intention that maintenance responsibility will be set out as below.

- Attenuation facilities draining the highway only – Milton Keynes Highways
- Attenuation facilities taking both public highway and development runoff – Milton Keynes Parks Trust
- Pipework serving Highways only – Milton Keynes Highways
- Pipework serving development parcels and highway – Anglian Water Services

STAKEHOLDER LIAISON

Minutes of meetings with the IDB and LLFA are in Appendix A and Appendix B of this note. Of import are the requirements of the IDB to discharge at a rate of 4l/s per impermeable hectare and the LLFA to use CV values of 0.95. For the simulations run for Milton Keynes East the simulation criteria CV values have been updated to 0.95. It is important to note that design or synthetic run-off CV values do not impact the simulation results.

PONDS

Ponds have been designed in accordance with:

- CIRIA SuDS Manual C753
- Milton Keynes Surface Water Drainage Guidance for Developers January 2020 (MKSWSGD)



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All ponds have a maximum water depth of 2m and minimum 1 in 3 side slopes in accordance with MKSWSGD. The table below and calculations in Appendix C demonstrate the required storage volumes for the ponds for the Highway infrastructure only. This means that some ponds will have spare capacity. The intention is to revisit these ponds at reserved matters stage in order to assess the capacity to take residential runoff to the criteria applicable at the time of submission. In order to assist in reviewing calculations a schematic layout of the drainage model has been provided in Appendix D. Networks have been surcharged where appropriate to the River Ouzel 100 year flood level. The values provided in the table below all relate to the 1 in 100 year with 40% climate change. All freeboard quoted includes the 0.3m allowance as suggested within the CIRIA SuDS manual. Ponds that state “minimum 0.3m” under the freeboard with highway only water section are ponds with multiple stages. These have a minimum of 0.3m freeboard but may have slightly more at certain stages of the pond.

Pond reference	Pond Type	Proposed party responsible for maintenance	Available storage volume (m3)	Volume required by Highway only (m3)	Residual Volume (m3)	Freeboard with Highway only Water (m)
Pond 1	Integrated	Parks Trust	2,700	1,328	1,372	1.06
Pond 2	Highway only	Milton Keynes Highway Authority	1,400	1,345	55	0.381
Pond 3	Integrated	Parks Trust	1,300	567	733	1.097
Pond 5a	Integrated	Parks Trust	1,300	679	621	0.896
Pond 9	Integrated	Parks Trust	2,800	1,517	1,283	0.763
Pond 14	Integrated	Parks Trust	800	593	207	0.523
Pond 15	Integrated	Parks Trust	7,500	2,989	4,511	1.389
Pond 16	Integrated	Parks Trust	1,150	1,021	129	0.422



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Pond 18A-1	Highway Only	Milton Keynes Highway Authority	250	250	0	Minimum 0.3m
Pond 18A-2	Highway Only	Milton Keynes Highway Authority	1,800	1,800	0	Minimum 0.3m
Pond 18A-3	Highway Only	Milton Keynes Highway Authority	1,300	1,172	128	0.453
Pond 22	Integrated	Parks Trust	5,400	3,401	1,999	1.16
Pond 25	Highway Only	Milton Keynes Highway Authority	900	728	172	0.445
Pond 26	Highway Only	Milton Keynes Highway Authority	2,500	2,400	100	Minimum 0.3m
Pond 27A	Highway Only	Milton Keynes Highway Authority	1,450	1,406	44	Minimum 0.3m
Pond 27B	Highway Only	Milton Keynes Highway Authority	2,600	2,469	131	Minimum 0.3m



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TONGWELL STREET

The ambition on Tongwell street is to limit all additional impermeable area to 4l/s/impermeable hectare whilst the existing impermeable area will be discharged at the existing brownfield rates. These brownfield rates have been determined by running an indicative drainage network and applying the existing area to produce the discharge rates with FEH rainfall data. This will be revisited when CCTV information regarding the drainage system is available.

The drainage drawings for Tongwell are MKE-WSP-ZZ-ZZ-C-DR-0501 to MKE-WSP-ZZ-ZZ-C-DR-0504 and drawing MKE-WSP-ZZ-ZZ-C-DR-0529.



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APPENDIX A – MINUTES OF IDB MEETING



AGENDA & MEETING NOTES

PROJECT NUMBER	70057521	MEETING DATE	Click here to enter a date
PROJECT NAME	Milton Keynes East	VENUE	Teams
CLIENT	St James	RECORDED BY	-
MEETING SUBJECT	IDB Watercourses and SUDS Strategy		

PRESENT	WSP - Andy Smith, Simon Purcell, Daniel Fello IDB -Barry Cannon, Trevor Skelding and Thomas Irwin
APOLOGIES	N/A
DISTRIBUTION	As above plus: Ashley Spearing (St James) Allan Norcutt and Ana Gonzalez (WSP)
CONFIDENTIALITY	Confidential

ITEM	SUBJECT	ACTION	DUE
1	Introductions	-	-
2	Scheme Outline and Planning Strategy and Funding Implications WSP provided a summary of the planning strategy and implications of the HIF funding programme.	-	-
3	On-going Consultation WSP provided a summary of the on-going consultation with the other regulatory bodies	-	-
4	Impacted Watercourses – <i>The IDB maintain these watercourses and undertake the consenting service for MKC, when it is time to submit two separate applications are required to address the payment requirements but a single schedule of crossings etc is suitable.</i> <i>The IDB to provide a watercourse plan</i> <i>The IDB watercourses do not necessarily extend up to the headwaters, WSP to update the watercourse plan.</i>	Trevor	Received with thanks-
5	Flood Risk Summary - WSP provided a summary of the flood risk and works to date across the scheme	-	-
6	Historical flood records and Groundwater flooding – <i>IDB knowledge of flooding at Caldecote stream and Pineham only.</i>	Trevor to provide	Received with thanks-
7	Approach to drainage strategy	-	-

MEETING NOTES

<p>8</p>	<p>Designated Watercourses / de-designation / how to integrated</p> <p><i>New ditches can be maintained by Parks Trust or IDB – subject to suitable agreements.</i></p> <p><i>If a designated watercourse becomes urbanised then the frequency of works required to maintain its condition may increase this would be subject to a legal agreement (and commuted sum) with developer. Urbanised means if the development extends within 9m of each bank of the watercourse.</i></p> <p><i>The IDB byelaws require a 9m buffer strip to facilitate maintenance on both banks, this should ideally be a grass strip. Further discussions can be had about works / inclusion of aspects in this area but plans and physical evidence (i.e. current barriers – e.g. hedge lines) are required to facilitate these.</i></p>	<p>WSP to provide the IDB with the SUDS strategy once it is developed</p>	<p>TBC</p>
<p>9</p>	<p>Adoption of surface water features (SUDS and watercourses) – The IDB would consider adopting the surface water features but only to maintain their functionality, another body would need to be responsible for maintaining appearance e.g. litter picking.</p> <p>The IDB will provide a <u>single</u> quote for the adoption of the SUDS system in due course.</p>	<p>WSP to request a quote in due course</p>	<p>TBC</p>
<p>10</p>	<p>Linkages with the Parks Trust – The IDB and Parks Trust currently work together on maintaining open space, with the IDB undertaking the maintenance of their designated watercourses only.</p>		
<p>11</p>	<p>Maintenance requirements / access strips, spoil deposition / removal -</p> <p><i>When undertaking maintenance works the IDB will deposit the removed material on top of the bank, if the landowner would prefer for this not to be the case then it is up to them to remove it after. This is how they undertake maintenance works in other landowner urban areas in and around MK.</i></p> <p><i>Footpaths and all developed features are to be outside of the 9m's – no clash between public and IDB especially when works are being undertaken</i></p> <p><i>No commuted sums if everything outside the 9m buffer strip</i></p> <p><i>If discharge of surface water only into the IDB system then this is considered to be outside of the 9m buffer strip. However, the IDB will set the greenfield runoff rate, in this area it is considered to be 4l/s/contributing impermeable ha and the only charge from the IDB will be for outfall structure then £50 – can put in a verification request to the IDB</i></p> <p><i>If the greenfield calculations demonstrate an alternative greenfield rate then the evidence should be submitted to the IDB for their consideration.</i></p>		
<p>12</p>	<p>Relocation of watercourses – highway embankment and employment land</p> <p><i>If a watercourse is to be removed then the route is to obtain a legal agreement to extinguish it between the landowner and the IDB. This can take a long period est. 12 to 18 months due to solicitor involvement.</i></p> <p><i>If a diversion is to be undertaken then it needs to be supported by demonstrating ecological benefits / improvements.</i></p>	<p>WSP to submit information on the highway alignment, drainage and impacts</p>	

MEETING NOTES

	<p><i>Ideally there should be one legal agreement to cover everything, however, given the implications of the HIF funding on the highway development, we can look to have two different agreements otherwise timescales will not align.</i></p>		
13	<p>Online vs offline SUDS</p> <p><i>If the SUDS strategy is to include on-line ponds, then this could be considered subject to the inclusion of the buffer strip and commuted sums. Further details on the strategy are to be provided to the IDB once they are developed for their consideration.</i></p>		
14	<p>IDB Funding / Council tax precept</p> <p><i>Agricultural landowners pay a rate to cover the maintenance requirements, once an area becomes urbanised then MK council collect this on behalf of the IDB.</i></p>		
15	<p>AOB</p> <p>One set of drawings to be issued to avoid duplication of effort and time by the IDB, these are to show proposed access routes / points</p> <p>Two legal agreements one for highways and one for the remainder of the scheme</p> <p>WSP to provide digital and paper copies of any plans submitted</p> <p>As part of the submission WSP to provide a couple of paragraphs on why the proposed highway has to be where it is, given that this is on top of a designated IDB watercourse, the reasoning for this was verbally provided during the meeting.</p>		

NEXT MEETING

An invitation will be issued if an additional meeting is required.



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APPENDIX B – MINUTES OF LLFA AND HIGHWAY MEETING



AGENDA & MEETING NOTES

PROJECT NUMBER	70057521	MEETING DATE	05 July 2021
PROJECT NAME	MKE Planning Application	VENUE	Teams
CLIENT	Client	RECORDED BY	DSF
MEETING SUBJECT	Drainage		

PRESENT	Daniel Fello, Paul Shinkwin, Rachel Kilgallon
APOLOGIES	Apologies
DISTRIBUTION	As above plus: MKE Design Team
CONFIDENTIALITY	Confidential

ITEM	SUBJECT	ACTION	DUE
1	Review the treatment of water with the simple index method, where this fails use proprietary systems	WSP	Planning
2	Create a table for detailed planning that highlights what drainage networks are in each drawing	WSP	Planning
3	Include the HIF numbers in the drainage strategy plan	WSP	Planning
4	Ensure consideration of highway barriers for highway ponds	WSP	Planning
5	Pipes for modelling purposes to be different colour	WSP	Planning
6	Cv to be updated to 0.95	WSP	Planning
7	Proforma to be provided for discussion	Rachel	13/07/2021
8	Advise to be provided on preferred flow control method within highway ponds and what proprietary treatment systems would be adoptable if required	Paul	16/07/2021
9	Evidence to be provided in submission of IDB's agreement to 4l/s/lha	WSP	Planning

NEXT MEETING

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APPENDIX C – CALCULATIONS

HIF 1

WSP Group Ltd		Page 1
.	Milton Keynes East	
.	HIF 8 None pumped section	
.	Pump inflow excluded	
Date 26/05/2021	Designed by DSF	
File HIF 1 P0.3.MDX	Checked by PB	
XP Solutions	Network 2018.1.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Hif - 1

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	30
FEH Rainfall Version	2013
Site Location GB 489026 242081 SP 89026 42081	
Data Type	Point
Maximum Rainfall (mm/hr)	550
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.900
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Hif - 1


Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.000	4-8	0.000	8-12	0.529	12-16	1.506	16-20	1.855	20-24	0.550

Total Area Contributing (ha) = 4.440

Total Pipe Volume (m³) = 12080.875

Network Design Table for Hif - 1

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	27.849	0.118	236.5	0.000	5.00	0.0	0.600		o	675	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 (l/s)	Flow (l/s)
S1.000	142.10	5.27	56.814	0.000	0.0	0.0	0.0	1.70	608.3	0.0



Network Design Table for Hif - 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S2.000	66.102	0.916	72.2	0.124	5.00	0.0	0.600		o	225	Pipe/Conduit	🔒
S2.001	67.013	0.916	73.2	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	🔒
S2.002	55.530	0.194	286.2	0.026	0.00	0.0	0.600		o	300	Pipe/Conduit	🔒
S2.003	35.592	0.334	106.6	0.089	0.00	0.0	0.600		o	300	Pipe/Conduit	🔒
S3.000	68.968	0.493	139.9	0.074	5.00	0.0	0.600		o	225	Pipe/Conduit	🔒
S3.001	32.847	0.232	141.6	0.064	0.00	0.0	0.600		o	300	Pipe/Conduit	🔒
S3.002	35.144	0.211	166.6	0.035	0.00	0.0	0.600		o	300	Pipe/Conduit	🔒
S4.000	37.335	0.409	91.3	0.041	5.00	0.0	0.600		o	225	Pipe/Conduit	🔒
S4.001	52.565	0.205	256.4	0.091	0.00	0.0	0.600		o	300	Pipe/Conduit	🔒
S4.002	46.328	0.185	250.0	0.054	0.00	0.0	0.600		o	375	Pipe/Conduit	🔒
S5.000	67.665	0.677	99.9	0.121	5.00	0.0	3.000		o	300	Pipe/Conduit	🔒
S5.001	48.487	0.932	52.0	0.000	0.00	0.0	3.000		o	300	Pipe/Conduit	🔒
S5.002	55.768	0.755	73.9	0.067	0.00	0.0	3.000		o	300	Pipe/Conduit	🔒
S5.003	27.217	0.143	190.3	0.060	0.00	0.0	0.600		o	375	Pipe/Conduit	🔒
S5.004	28.366	0.192	147.7	0.033	0.00	0.0	0.600		o	375	Pipe/Conduit	🔒
S4.003	14.176	0.047	300.0	0.000	0.00	0.0	0.600		o	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 (l/s)	Flow (l/s)
S2.000	137.16	5.71	59.860	0.124	0.0	0.0	0.0	1.54	61.3	55.4
S2.001	129.93	6.44	58.944	0.124	0.0	0.0	0.0	1.53	60.9	55.4
S2.002	121.36	7.45	57.953	0.150	0.0	0.0	0.0	0.92	65.3	59.2
S2.003	118.36	7.84	57.498	0.239	0.0	0.0	0.0	1.52	107.6	92.1
S3.000	133.80	6.04	58.175	0.074	0.0	0.0	0.0	1.10	43.9	32.2
S3.001	129.82	6.46	57.607	0.139	0.0	0.0	0.0	1.32	93.3	58.5
S3.002	125.53	6.94	57.375	0.173	0.0	0.0	0.0	1.22	85.9	70.8
S4.000	140.00	5.45	58.389	0.041	0.0	0.0	0.0	1.37	54.4	18.7
S4.001	130.80	6.35	57.905	0.132	0.0	0.0	0.0	0.98	69.1	56.3
S4.002	124.77	7.03	57.321	0.186	0.0	0.0	0.0	1.14	126.1	75.5
S5.000	135.16	5.91	59.910	0.121	0.0	0.0	0.0	1.24	87.9	53.1
S5.001	130.57	6.38	59.233	0.121	0.0	0.0	0.0	1.73	121.9	53.1
S5.002	124.86	7.02	58.301	0.188	0.0	0.0	0.0	1.45	102.3	76.3
S5.003	122.01	7.36	57.471	0.248	0.0	0.0	0.0	1.31	144.7	98.2
S5.004	119.53	7.68	57.328	0.281	0.0	0.0	0.0	1.49	164.4	109.1
S4.003	118.00	7.88	57.061	0.467	0.0	0.0	0.0	1.17	185.8	179.2

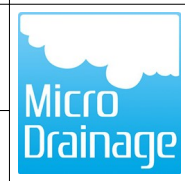


Network Design Table for Hif - 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S2.004	6.304	0.016	403.4	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
S2.005	23.037	0.055	420.2	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
S2.006	20.878	0.077	271.1	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
S1.001	9.812	0.070	140.2	0.000	0.00	0.0		0.045	o	225	Pipe/Conduit	
S1.002	10.520	0.070	150.3	0.000	0.00	0.0		0.045	o	225	Pipe/Conduit	
S6.000	73.388	0.198	370.6	0.112	5.00	0.0	0.600		o	300	Pipe/Conduit	
S6.001	59.614	0.831	71.7	0.062	0.00	0.0	0.600		o	375	Pipe/Conduit	
S6.002	65.026	0.528	123.2	0.242	0.00	0.0	0.600		o	450	Pipe/Conduit	
S6.003	22.839	0.528	43.3	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
S7.000	70.667	0.353	200.2	0.130	5.00	0.0	0.600		o	300	Pipe/Conduit	
S7.001	62.954	0.751	83.8	0.132	0.00	0.0	0.600		o	375	Pipe/Conduit	
S7.002	88.256	0.256	344.8	0.178	0.00	0.0	0.600		o	600	Pipe/Conduit	
S7.003	17.486	0.880	19.9	0.195	0.00	0.0	0.600		o	600	Pipe/Conduit	
S6.004	22.586	0.194	116.7	0.130	0.00	0.0	0.600		o	750	Pipe/Conduit	
S6.005	36.440	0.634	57.4	0.199	0.00	0.0	0.600		o	750	Pipe/Conduit	
S6.006	11.710	0.514	22.8	0.000	0.00	0.0	0.600		o	750	Pipe/Conduit	
S6.007	17.779	0.664	26.8	0.179	0.00	0.0	0.600		o	750	Pipe/Conduit	
S6.008	25.942	0.684	37.9	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S2.004	117.36	7.97	56.864	0.880	0.0	0.0	0.0	1.21	341.1	335.7
S2.005	115.03	8.30	56.848	0.880	0.0	0.0	0.0	1.18	334.1<	335.7
S2.006	113.41	8.53	56.773	0.880	0.0	0.0	0.0	1.47	416.8	335.7
S1.001	109.54	9.13	56.696	0.880	0.0	0.0	0.0	0.28	11.0<	335.7
S1.002	105.59	9.78	56.532	0.880	0.0	0.0	0.0	0.27	10.6<	335.7
S6.000	129.34	6.51	77.400	0.112	0.0	0.0	0.0	0.81	57.3	47.1
S6.001	125.24	6.97	77.127	0.174	0.0	0.0	0.0	2.14	236.5	70.7
S6.002	120.42	7.56	76.296	0.416	0.0	0.0	0.0	1.83	291.2	162.7
S6.003	119.48	7.69	75.769	0.416	0.0	0.0	0.0	3.10	492.7	162.7
S7.000	133.58	6.06	77.325	0.130	0.0	0.0	0.0	1.11	78.3	56.5
S7.001	128.56	6.59	76.972	0.262	0.0	0.0	0.0	1.98	218.7	109.4
S7.002	119.23	7.72	76.146	0.440	0.0	0.0	0.0	1.31	369.2	170.4
S7.003	118.83	7.77	75.890	0.634	0.0	0.0	0.0	5.48	1549.3	245.0
S6.004	117.75	7.92	75.050	1.180	0.0	0.0	0.0	2.59	1144.1	451.7
S6.005	116.55	8.08	74.856	1.380	0.0	0.0	0.0	3.70	1633.2	522.5
S6.006	116.31	8.12	74.222	1.380	0.0	0.0	0.0	5.88	2596.7	522.5
S6.007	115.92	8.17	73.708	1.559	0.0	0.0	0.0	5.42	2394.8	587.3
S6.008	114.49	8.37	73.044	1.559	0.0	0.0	0.0	2.13	84.7<	587.3



Network Design Table for Hif - 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S6.009	28.539	1.350	21.1	0.071	0.00	0.0	0.600		o	375	Pipe/Conduit	
S6.010	77.177	1.350	57.2	0.152	0.00	0.0	0.600		o	675	Pipe/Conduit	
S6.011	58.812	1.752	33.6	0.119	0.00	0.0	0.600		o	375	Pipe/Conduit	
S6.012	67.121	0.361	185.9	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
S6.013	71.903	1.444	49.8	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
S8.000	138.967	2.276	61.1	0.000	5.00	0.0	0.600		o	450	Pipe/Conduit	
S9.000	105.000	1.817	57.8	0.000	5.00	0.0	0.600		o	450	Pipe/Conduit	
S6.014	48.752	0.140	348.2	0.000	0.00	0.0	0.600		o	375	Pipe/Conduit	
S6.015	78.285	3.262	24.0	0.000	0.00	0.0	0.600	2 _ /		500	1:2 Ditch	
S6.016	85.833	1.717	50.0	0.000	0.00	0.0	0.600	2 _ /		500	1:2 Ditch	
S6.017	123.053	2.564	48.0	0.000	0.00	0.0	0.600	2 _ /		500	1:2 Ditch	
S10.000	44.624	2.230	20.0	0.058	5.00	0.0	0.600		o	375	Pipe/Conduit	
S10.001	58.458	1.627	35.9	0.065	0.00	0.0	0.600		o	375	Pipe/Conduit	
S10.002	66.499	2.163	30.7	0.086	0.00	0.0	0.600		o	375	Pipe/Conduit	
S10.003	97.480	2.928	33.3	0.105	0.00	0.0	0.600		o	450	Pipe/Conduit	
S10.004	101.171	3.035	33.3	0.138	0.00	0.0	0.600		o	450	Pipe/Conduit	
S10.005	44.955	1.752	25.7	0.095	0.00	0.0	0.600		o	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 (l/s)	Flow (l/s)
S6.009	113.67	8.49	70.706	1.630	0.0	0.0	0.0	3.96	436.9«	602.2
S6.010	111.21	8.86	69.056	1.783	0.0	0.0	0.0	3.47	1242.0	644.2
S6.011	109.22	9.18	68.132	1.902	0.0	0.0	0.0	3.14	346.4«	675.1
S6.012	104.77	9.93	66.305	1.902	0.0	0.0	0.0	1.49	236.6«	675.1
S6.013	102.48	10.34	65.944	1.902	0.0	0.0	0.0	2.89	459.1«	675.1
S8.000	135.34	5.89	67.561	0.000	0.0	0.0	0.0	2.61	414.4	0.0
S9.000	137.81	5.65	67.102	0.000	0.0	0.0	0.0	2.68	426.0	0.0
S6.014	98.17	11.19	64.500	1.902	0.0	0.0	0.0	0.97	106.6«	675.1
S6.015	97.05	11.42	65.145	1.902	0.0	0.0	0.0	5.57	1837.3	675.1
S6.016	95.32	11.79	61.883	1.902	0.0	0.0	0.0	3.85	1271.6	675.1
S6.017	93.01	12.31	60.166	1.902	0.0	0.0	0.0	3.93	1298.0	675.1
S10.000	143.18	5.18	73.700	0.058	0.0	0.0	0.0	4.07	449.1	27.0
S10.001	139.44	5.50	71.470	0.123	0.0	0.0	0.0	3.03	334.8	55.8
S10.002	135.82	5.84	69.844	0.209	0.0	0.0	0.0	3.28	362.1	92.2
S10.003	131.26	6.30	67.681	0.314	0.0	0.0	0.0	3.53	561.9	133.9
S10.004	126.90	6.78	64.753	0.452	0.0	0.0	0.0	3.53	561.6	186.5
S10.005	125.29	6.97	61.718	0.547	0.0	0.0	0.0	4.03	640.4	222.8












Network Design Table for Hif - 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S11.000	41.248	2.321	17.8	0.119	5.00	0.0	0.600		o	375	Pipe/Conduit	
S11.001	51.352	1.607	32.0	0.100	0.00	0.0	0.600		o	375	Pipe/Conduit	
S11.002	70.547	2.205	32.0	0.113	0.00	0.0	0.600		o	450	Pipe/Conduit	
S11.003	101.664	2.990	34.0	0.167	0.00	0.0	0.600		o	525	Pipe/Conduit	
S11.004	91.631	2.863	32.0	0.148	0.00	0.0	0.600		o	600	Pipe/Conduit	
S11.005	27.731	0.975	28.4	0.109	0.00	0.0	0.600		o	675	Pipe/Conduit	
S11.006	25.615	0.723	35.4	0.000	0.00	0.0	0.600		o	825	Pipe/Conduit	
S11.007	24.603	0.075	328.0	0.105	0.00	0.0	0.600		o	900	Pipe/Conduit	
S10.006	11.359	0.447	25.4	0.127	0.00	0.0	0.600		o	900	Pipe/Conduit	
S10.007	59.216	0.148	400.1	0.123	0.00	0.0	0.600		o	900	Pipe/Conduit	
S10.008	113.920	0.105	1085.0	0.000	0.00	0.0	0.600		o	1200	Pipe/Conduit	
S12.000	32.318	0.966	33.5	0.000	5.00	0.0	0.600		o	1500	Pipe/Conduit	
S10.009	28.952	0.113	256.2	0.000	0.00	0.0	0.600		o	375	Pipe/Conduit	
S10.010	177.396	0.443	400.0	0.000	0.00	0.0	0.600	2 _/_/		500	1:2 Ditch	
S10.011	229.708	0.588	390.7	0.000	0.00	0.0	0.600	2 _/_/		500	1:2 Ditch	
S6.018	114.495	0.286	400.0	0.000	0.00	0.0	0.600	2 _/_/		500	1:2 Ditch	
S6.019	94.333	0.314	300.4	0.000	0.00	0.0	0.600	2 _/_/		500	1:2 Ditch	
S6.020	25.174	0.325	77.5	0.000	0.00	0.0	0.600	2 _/_/		500	1:2 Ditch	

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 (l/s)	Flow (l/s)
S11.000	143.47	5.16	73.700	0.119	0.0	0.0	0.0	4.32	476.7	55.7
S11.001	140.33	5.43	71.379	0.219	0.0	0.0	0.0	3.22	355.1	100.0
S11.002	136.77	5.75	69.772	0.332	0.0	0.0	0.0	3.60	573.2	147.7
S11.003	132.32	6.19	67.492	0.499	0.0	0.0	0.0	3.85	833.6	214.6
S11.004	129.00	6.55	64.427	0.647	0.0	0.0	0.0	4.32	1220.1	271.2
S11.005	128.15	6.64	61.489	0.756	0.0	0.0	0.0	4.93	1762.8	314.7
S11.006	127.39	6.72	60.389	0.756	0.0	0.0	0.0	5.00	2671.4	314.7
S11.007	125.32	6.96	59.591	0.860	0.0	0.0	0.0	1.72	1097.0	350.4
S10.006	125.04	7.00	59.516	1.534	0.0	0.0	0.0	6.23	3962.8	623.5
S10.007	119.93	7.63	59.069	1.658	0.0	0.0	0.0	1.56	992.6	646.1
S10.008	108.38	9.31	58.921	1.658	0.0	0.0	0.0	1.13	1274.8	646.1
S12.000	144.56	5.07	59.657	0.000	0.0	0.0	0.0	7.43	13123.6	0.0
S10.009	105.84	9.74	58.816	1.658	0.0	0.0	0.0	1.13	124.5<	646.1
S10.010	94.72	11.92	58.633	1.658	0.0	0.0	0.0	1.35	446.9<	646.1
S10.011	83.82	14.72	58.190	1.658	0.0	0.0	0.0	1.37	452.2<	646.1
S6.018	79.33	16.13	57.602	3.559	0.0	0.0	0.0	1.35	446.9<	917.7
S6.019	76.45	17.13	57.316	3.559	0.0	0.0	0.0	1.56	516.3<	917.7
S6.020	76.08	17.27	57.002	3.559	0.0	0.0	0.0	3.09	1020.8	917.7

Network Design Table for Hif - 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S6.021	15.706	0.590	26.6	0.000	0.00	0.0	0.600	2	_/	500	1:2 Ditch	
S1.003	17.870	0.060	300.0	0.000	0.00	0.0	0.600	2	_/	500	1:2 Ditch	
S1.004	27.388	0.091	300.0	0.000	0.00	0.0	0.600		o	675	Pipe/Conduit	
S1.005	68.216	0.227	300.0	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
S1.006	64.793	0.216	300.0	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
S1.007	93.565	0.187	500.0	0.000	0.00	0.0	0.600	2	_/	500	1:2 Ditch	
S1.008	88.864	0.178	500.0	0.000	0.00	0.0	0.600	2	_/	500	1:2 Ditch	
S1.009	88.864	0.178	500.0	0.000	0.00	0.0	0.600	2	_/	500	1:2 Ditch	
S1.010	12.148	0.060	202.5	0.000	0.00	0.0	0.600	2	_/	1200	1:2 Ditch	

Network Results Table

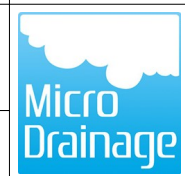
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S6.021	75.95	17.32	56.677	3.559	0.0	0.0	0.0	5.29	1744.3	917.7
S1.003	75.44	17.51	56.087	4.440	0.0	0.0	0.0	1.57	516.6	1088.4
S1.004	74.64	17.81	56.027	4.440	0.0	0.0	0.0	1.51	539.6	1088.4
S1.005	72.59	18.62	55.936	4.440	0.0	0.0	0.0	1.40	396.0	1088.4
S1.006	70.76	19.39	55.709	4.440	0.0	0.0	0.0	1.40	396.0	1088.4
S1.007	67.92	20.68	55.493	4.440	0.0	0.0	0.0	1.21	399.3	1088.4
S1.008	65.45	21.91	55.306	4.440	0.0	0.0	0.0	1.21	399.3	1088.4
S1.009	63.18	23.13	55.128	4.440	0.0	0.0	0.0	1.21	399.3	1088.4
S1.010	63.01	23.23	54.950	4.440	0.0	0.0	0.0	2.12	1145.7	1088.4

WSP Group Ltd		Page 7
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Milton Keynes East HIF 8 None pumped section Pump inflow excluded		
Date 26/05/2021 File HIF 1 P0.3.MDX		
Designed by DSF Checked by PB		
XP Solutions		Network 2018.1.1

Manhole Schedules for Hif - 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
HW108	58.286	1.472	Open Manhole	1500	S1.000	56.814	675				
109	62.778	2.918	Open Manhole	1050	S2.000	59.860	225				
110	61.155	2.211	Open Manhole	1200	S2.001	58.944	225	S2.000	58.944	225	
111	59.453	1.500	Open Manhole	1200	S2.002	57.953	300	S2.001	58.028	225	
112	58.998	1.500	Open Manhole	1200	S2.003	57.498	300	S2.002	57.759	300	263
113	59.600	1.425	Open Manhole	1200	S3.000	58.175	225				
114	59.107	1.500	Open Manhole	1200	S3.001	57.607	300	S3.000	57.682	225	
115	58.875	1.500	Open Manhole	1200	S3.002	57.375	300	S3.001	57.375	300	
116	59.814	1.425	Open Manhole	1200	S4.000	58.389	225				
117	59.405	1.500	Open Manhole	1200	S4.001	57.905	300	S4.000	57.980	225	
118	58.996	1.675	Open Manhole	1350	S4.002	57.321	375	S4.001	57.700	300	304
119	62.441	2.531	Open Manhole	1050	S5.000	59.910	300				
120	61.153	1.920	Open Manhole	1200	S5.001	59.233	300	S5.000	59.233	300	
121	59.801	1.500	Open Manhole	1200	S5.002	58.301	300	S5.001	58.301	300	
122	59.046	1.575	Open Manhole	1500	S5.003	57.471	375	S5.002	57.546	300	
123	58.922	1.594	Open Manhole	1500	S5.004	57.328	375	S5.003	57.328	375	
124	58.813	1.752	Open Manhole	1500	S4.003	57.061	450	S4.002	57.136	375	
125	58.826	1.962	Open Manhole	1800	S2.004	56.864	600	S5.004	57.136	375	
								S2.003	57.164	300	
								S3.002	57.164	300	
								S4.003	57.014	450	
126	58.000	1.152	Open Manhole	1500	S2.005	56.848	600	S2.004	56.848	600	
HW127	58.000	1.227	Open Manhole	1200	S2.006	56.773	600	S2.005	56.793	600	20
POND 5a	58.296	1.600	Open Manhole	1050	S1.001	56.696	225	S1.000	56.696	675	
								S2.006	56.696	600	
FC129	58.200	1.668	Open Manhole	1800	S1.002	56.532	225	S1.001	56.626	225	94
130	78.259	0.859	Open Manhole	1200	S6.000	77.400	300				
131	78.000	0.873	Open Manhole	1350	S6.001	77.127	375	S6.000	77.202	300	
132	77.120	0.824	Open Manhole	1350	S6.002	76.296	450	S6.001	76.296	375	
133	78.661	2.893	Open Manhole	1350	S6.003	75.769	450	S6.002	75.768	450	
134	78.283	0.958	Open Manhole	1200	S7.000	77.325	300				
135	78.378	1.406	Open Manhole	1350	S7.001	76.972	375	S7.000	76.972	300	
136	77.483	1.337	Open Manhole	1500	S7.002	76.146	600	S7.001	76.221	375	
137	78.377	2.487	Open Manhole	1500	S7.003	75.890	600	S7.002	75.890	600	
138	77.000	1.990	Open Manhole	1800	S6.004	75.050	750	S6.003	75.241	450	
								S7.003	75.010	600	
139	76.000	1.144	Open Manhole	1800	S6.005	74.856	750	S6.004	74.856	750	
140	75.906	1.684	Open Manhole	1800	S6.006	74.222	750	S6.005	74.222	750	

Milton Keynes East
HIF 8 None pumped section
Pump inflow excluded



Date 26/05/2021
File HIF 1 PO.3.MDX

Designed by DSF
Checked by PB

XP Solutions Network 2018.1.1

Manhole Schedules for Hif - 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdr (mm)
HW141	75.629	1.921	Open Manhole	1800	S6.007	73.708	750	S6.006	73.708	750	
POND 2	75.044	2.000	Open Manhole	1800	S6.008	73.044	225	S6.007	73.044	750	
FC143	73.059	2.353	Open Manhole	1350	S6.009	70.706	375	S6.008	72.360	225	150
144	71.814	2.758	Open Manhole	1500	S6.010	69.056	675	S6.009	69.356	375	
145	69.998	2.292	Open Manhole	1500	S6.011	68.132	375	S6.010	67.706	675	
146	68.040	1.735	Open Manhole	1350	S6.012	66.305	450	S6.011	66.380	375	
HW147	68.246	2.302	Open Manhole	1350	S6.013	65.944	450	S6.012	65.944	450	
149	69.231	1.670	Open Manhole	1350	S8.000	67.561	450				
151	68.855	1.753	Open Manhole	1350	S9.000	67.102	450				
POND 3	66.500	2.000	Open Manhole	1350	S6.014	64.500	375	S6.013	64.500	450	
								S8.000	65.285	450	80
								S9.000	65.285	450	80
FC153	67.263	2.903	Open Manhole	1500	S6.015	65.145	500	S6.014	64.360	375	
154	63.088	1.205	Junction		S6.016	61.883	500	S6.015	61.883	500	
155	61.563	1.397	Junction		S6.017	60.166	500	S6.016	60.166	500	
156	76.224	2.524	Open Manhole	1350	S10.000	73.700	375				
157	73.085	1.615	Open Manhole	1350	S10.001	71.470	375	S10.000	71.470	375	
158	71.452	1.609	Open Manhole	1350	S10.002	69.844	375	S10.001	69.843	375	
159	69.418	1.737	Open Manhole	1350	S10.003	67.681	450	S10.002	67.681	375	
160	66.471	1.718	Open Manhole	1350	S10.004	64.753	450	S10.003	64.753	450	
161	63.498	1.780	Open Manhole	1350	S10.005	61.718	450	S10.004	61.718	450	
162	76.131	2.431	Open Manhole	1350	S11.000	73.700	375				
163	72.864	1.485	Open Manhole	1350	S11.001	71.379	375	S11.000	71.379	375	
164	71.462	1.690	Open Manhole	1350	S11.002	69.772	450	S11.001	69.772	375	
165	69.320	1.828	Open Manhole	1500	S11.003	67.492	525	S11.002	67.567	450	
166	66.302	1.875	Open Manhole	1500	S11.004	64.427	600	S11.003	64.502	525	
167	63.573	2.084	Open Manhole	1500	S11.005	61.489	675	S11.004	61.564	600	
168	62.504	2.115	Open Manhole	1800	S11.006	60.389	825	S11.005	60.514	675	
169	62.061	2.470	Open Manhole	1800	S11.007	59.591	900	S11.006	59.666	825	
170	61.918	2.402	Open Manhole	1800	S10.006	59.516	900	S10.005	59.966	450	
								S11.007	59.516	900	
171	62.279	3.210	Open Manhole	1800	S10.007	59.069	900	S10.006	59.069	900	
HW172	61.510	2.589	Open Manhole	2100	S10.008	58.921	1200	S10.007	58.921	900	
177	62.731	3.074	Open Manhole	2400	S12.000	59.657	1500				
POND 1	60.691	2.000	Open Manhole	2400	S10.009	58.816	375	S10.008	58.816	1200	
								S12.000	58.691	1500	
FC179	60.861	2.228	Open Manhole	1500	S10.010	58.633	500	S10.009	58.703	375	150
180	60.533	2.343	Junction		S10.011	58.190	500	S10.010	58.190	500	

Manhole Schedules for Hif - 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
181	60.011	2.409	Junction		S6.018	57.602	500	S6.017	57.602	500	
								S10.011	57.602	500	
182	59.094	1.778	Junction		S6.019	57.316	500	S6.018	57.316	500	
183	58.637	1.635	Junction		S6.020	57.002	500	S6.019	57.002	500	
184	58.139	1.462	Junction		S6.021	56.677	500	S6.020	56.677	500	
185	58.178	2.091	Open Manhole	1500	S1.003	56.087	500	S1.002	56.462	225	300
								S6.021	56.087	500	
186	58.257	2.230	Open Manhole	1500	S1.004	56.027	675	S1.003	56.027	500	
187	58.257	2.321	Open Manhole	1500	S1.005	55.936	600	S1.004	55.936	675	
188	58.326	2.617	Open Manhole	1500	S1.006	55.709	600	S1.005	55.709	600	
189	57.200	1.707	Open Manhole	1050	S1.007	55.493	500	S1.006	55.493	600	
190	57.200	1.894	Open Manhole	1050	S1.008	55.306	500	S1.007	55.306	500	
191	57.269	2.141	Open Manhole	1050	S1.009	55.128	500	S1.008	55.128	500	
92	57.000	2.050	Junction		S1.010	54.950	1200	S1.009	54.950	500	
804	57.000	2.110	Open Manhole	1200		OUTFALL		S1.010	54.890	1200	

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Area Summary for Hif - 1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.000	0.000	0.000
2.000	User	-	100	0.073	0.073	0.073
	User	-	100	0.051	0.051	0.124
2.001	-	-	100	0.000	0.000	0.000
2.002	User	-	100	0.026	0.026	0.026
2.003	User	-	100	0.035	0.035	0.035
	User	-	100	0.054	0.054	0.089
3.000	User	-	100	0.074	0.074	0.074
3.001	User	-	100	0.064	0.064	0.064
3.002	User	-	100	0.035	0.035	0.035
4.000	User	-	100	0.041	0.041	0.041
4.001	User	-	100	0.024	0.024	0.024
	User	-	100	0.068	0.068	0.091
4.002	User	-	100	0.054	0.054	0.054
5.000	User	-	100	0.065	0.065	0.065
	User	-	100	0.056	0.056	0.121
5.001	-	-	100	0.000	0.000	0.000
5.002	User	-	100	0.067	0.067	0.067
5.003	User	-	100	0.060	0.060	0.060
5.004	User	-	100	0.033	0.033	0.033
4.003	-	-	100	0.000	0.000	0.000
2.004	-	-	100	0.000	0.000	0.000
2.005	-	-	100	0.000	0.000	0.000
2.006	-	-	100	0.000	0.000	0.000
1.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.000	0.000	0.000
6.000	User	-	100	0.112	0.112	0.112
6.001	User	-	100	0.062	0.062	0.062
6.002	User	-	100	0.242	0.242	0.242
6.003	-	-	100	0.000	0.000	0.000
7.000	User	-	100	0.130	0.130	0.130
7.001	User	-	100	0.132	0.132	0.132
7.002	User	-	100	0.178	0.178	0.178
7.003	User	-	100	0.195	0.195	0.195
6.004	User	-	100	0.130	0.130	0.130
6.005	User	-	100	0.199	0.199	0.199
6.006	-	-	100	0.000	0.000	0.000
6.007	User	-	100	0.179	0.179	0.179
6.008	-	-	100	0.000	0.000	0.000
6.009	User	-	100	0.071	0.071	0.071
6.010	User	-	100	0.152	0.152	0.152
6.011	User	-	100	0.119	0.119	0.119
6.012	-	-	100	0.000	0.000	0.000
6.013	-	-	100	0.000	0.000	0.000
8.000	-	-	100	0.000	0.000	0.000
9.000	-	-	100	0.000	0.000	0.000
6.014	-	-	100	0.000	0.000	0.000
6.015	-	-	100	0.000	0.000	0.000
6.016	-	-	100	0.000	0.000	0.000
6.017	-	-	100	0.000	0.000	0.000
10.000	User	-	100	0.058	0.058	0.058

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Area Summary for Hif - 1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
10.001	User	-	100	0.065	0.065	0.065
10.002	User	-	100	0.086	0.086	0.086
10.003	User	-	100	0.105	0.105	0.105
10.004	User	-	100	0.138	0.138	0.138
10.005	User	-	100	0.095	0.095	0.095
11.000	User	-	100	0.119	0.119	0.119
11.001	User	-	100	0.100	0.100	0.100
11.002	User	-	100	0.113	0.113	0.113
11.003	User	-	100	0.167	0.167	0.167
11.004	User	-	100	0.148	0.148	0.148
11.005	User	-	100	0.109	0.109	0.109
11.006	-	-	100	0.000	0.000	0.000
11.007	User	-	100	0.105	0.105	0.105
10.006	User	-	100	0.127	0.127	0.127
10.007	User	-	100	0.123	0.123	0.123
10.008	-	-	100	0.000	0.000	0.000
12.000	-	-	100	0.000	0.000	0.000
10.009	-	-	100	0.000	0.000	0.000
10.010	-	-	100	0.000	0.000	0.000
10.011	-	-	100	0.000	0.000	0.000
6.018	-	-	100	0.000	0.000	0.000
6.019	-	-	100	0.000	0.000	0.000
6.020	-	-	100	0.000	0.000	0.000
6.021	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
1.010	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				4.440	4.440	4.440

Free Flowing Outfall Details for Hif - 1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.010	804	57.000	54.890	0.000	1200	0

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Online Controls for Hif - 1

Hydro-Brake® Optimum Manhole: FC129, DS/PN: S1.002, Volume (m³): 4.6

Unit Reference	MD-SHE-0121-6000-0600-6000
Design Head (m)	0.600
Design Flow (l/s)	6.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	121
Invert Level (m)	56.532
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200


Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.600	6.0
Flush-Flo™	0.202	6.0
Kick-Flo®	0.435	5.2
Mean Flow over Head Range	-	5.0

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.3	1.200	8.3	3.000	12.8	7.000	19.2
0.200	6.0	1.400	8.9	3.500	13.8	7.500	19.9
0.300	5.9	1.600	9.5	4.000	14.7	8.000	20.5
0.400	5.5	1.800	10.0	4.500	15.5	8.500	21.1
0.500	5.5	2.000	10.6	5.000	16.3	9.000	21.8
0.600	6.0	2.200	11.0	5.500	17.1	9.500	22.4
0.800	6.9	2.400	11.5	6.000	17.8		
1.000	7.6	2.600	12.0	6.500	18.5		

Hydro-Brake® Optimum Manhole: POND 2, DS/PN: S6.008, Volume (m³): 12.1

Unit Reference	MD-SHE-0104-6200-1900-6200
Design Head (m)	1.900
Design Flow (l/s)	6.2
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	104
Invert Level (m)	73.044
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

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Hydro-Brake® Optimum Manhole: POND 2, DS/PN: S6.008, Volume (m³): 12.1

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.900	6.2
Flush-Flo™	0.455	5.6
Kick-Flo®	0.926	4.4
Mean Flow over Head Range	-	5.1

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.5	1.200	5.0	3.000	7.7	7.000	11.5
0.200	5.0	1.400	5.4	3.500	8.3	7.500	11.9
0.300	5.4	1.600	5.7	4.000	8.8	8.000	12.2
0.400	5.5	1.800	6.0	4.500	9.3	8.500	12.6
0.500	5.5	2.000	6.3	5.000	9.8	9.000	12.9
0.600	5.5	2.200	6.6	5.500	10.2	9.500	13.3
0.800	5.1	2.400	6.9	6.000	10.7		
1.000	4.6	2.600	7.2	6.500	11.1		


Hydro-Brake® Optimum Manhole: POND 3, DS/PN: S6.014, Volume (m³): 52.5

Unit Reference	MD-SHE-0131-7600-0800-7600
Design Head (m)	0.800
Design Flow (l/s)	7.6
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	131
Invert Level (m)	64.500
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	7.6
Flush-Flo™	0.251	7.6
Kick-Flo®	0.557	6.4
Mean Flow over Head Range	-	6.5

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.7	0.300	7.5	0.500	7.0	0.800	7.6
0.200	7.5	0.400	7.4	0.600	6.6	1.000	8.4

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Hydro-Brake® Optimum Manhole: POND 3, DS/PN: S6.014, Volume (m³): 52.5

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
1.200	9.2	2.400	12.7	5.000	18.1	8.000	22.7
1.400	9.9	2.600	13.2	5.500	18.9	8.500	23.3
1.600	10.5	3.000	14.2	6.000	19.7	9.000	24.0
1.800	11.1	3.500	15.2	6.500	20.5	9.500	24.6
2.000	11.7	4.000	16.2	7.000	21.3		
2.200	12.2	4.500	17.2	7.500	22.0		

Hydro-Brake® Optimum Manhole: POND 1, DS/PN: S10.009, Volume (m³): 187.6

Unit Reference	MD-SHE-0134-1000-1800-1000
Design Head (m)	1.800
Design Flow (l/s)	10.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	134
Invert Level (m)	58.816
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.800	10.0
Flush-Flo™	0.525	10.0
Kick-Flo®	1.089	7.9
Mean Flow over Head Range	-	8.7

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.8	1.200	8.3	3.000	12.7	7.000	19.1
0.200	8.6	1.400	8.9	3.500	13.7	7.500	19.7
0.300	9.5	1.600	9.5	4.000	14.6	8.000	20.3
0.400	9.8	1.800	10.0	4.500	15.4	8.500	20.9
0.500	10.0	2.000	10.5	5.000	16.2	9.000	21.5
0.600	9.9	2.200	11.0	5.500	17.0	9.500	22.1
0.800	9.6	2.400	11.5	6.000	17.7		
1.000	8.7	2.600	11.9	6.500	18.4		

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Storage Structures for Hif - 1

Tank or Pond Manhole: POND 5a, DS/PN: S1.001

Invert Level (m) 56.696

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	900.0	1.600	1100.0

Tank or Pond Manhole: POND 2, DS/PN: S6.008

Invert Level (m) 73.044

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	600.0	2.000	1200.0

Tank or Pond Manhole: POND 3, DS/PN: S6.014


Invert Level (m) 64.500

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	525.0	2.000	1000.0

Tank or Pond Manhole: POND 1, DS/PN: S10.009

Invert Level (m) 58.816

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	800.0	0.175	1550.0	1.875	1900.0

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF


Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	HW108	480 Summer	2	+0%					56.873
S2.000	109	15 Summer	2	+0%	100/15 Summer				59.963
S2.001	110	15 Summer	2	+0%	100/15 Summer				59.045
S2.002	111	15 Summer	2	+0%	100/15 Summer				58.095
S2.003	112	15 Summer	2	+0%	30/15 Summer				57.633
S3.000	113	15 Summer	2	+0%	100/15 Summer				58.268
S3.001	114	15 Summer	2	+0%	100/15 Summer				57.719
S3.002	115	15 Summer	2	+0%	30/15 Summer				57.505
S4.000	116	15 Summer	2	+0%	100/15 Summer				58.450
S4.001	117	15 Summer	2	+0%	100/15 Summer				58.031
S4.002	118	15 Summer	2	+0%	30/15 Summer				57.456
S5.000	119	15 Summer	2	+0%	100/15 Summer				60.020
S5.001	120	15 Summer	2	+0%	100/15 Summer				59.324
S5.002	121	15 Summer	2	+0%	100/15 Summer				58.423
S5.003	122	15 Summer	2	+0%	30/15 Summer				57.622
S5.004	123	15 Summer	2	+0%	30/15 Summer				57.474
S4.003	124	15 Summer	2	+0%	30/15 Summer				57.357

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Pipe	Level Exceeded
		Depth (m)	Volume (m ³)			Flow (l/s)	
S1.000	HW108	-0.616	0.000	0.00		0.0	OK
S2.000	109	-0.122	0.000	0.42		24.7	OK
S2.001	110	-0.124	0.000	0.41		23.9	OK
S2.002	111	-0.158	0.000	0.45		27.8	OK
S2.003	112	-0.165	0.000	0.40		40.1	OK
S3.000	113	-0.132	0.000	0.34		14.6	OK
S3.001	114	-0.188	0.000	0.29		25.1	OK
S3.002	115	-0.170	0.000	0.38		30.2	OK
S4.000	116	-0.164	0.000	0.16		8.2	OK
S4.001	117	-0.174	0.000	0.37		23.9	OK
S4.002	118	-0.240	0.000	0.27		31.6	OK
S5.000	119	-0.190	0.000	0.28		23.8	OK
S5.001	120	-0.209	0.000	0.20		23.2	OK
S5.002	121	-0.178	0.000	0.34		33.4	OK
S5.003	122	-0.224	0.000	0.33		42.2	OK
S5.004	123	-0.229	0.000	0.32		46.6	OK
S4.003	124	-0.154	0.000	0.61		73.5	OK

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S2.004	125	15 Summer	2	+0%	30/15 Summer			
S2.005	126	15 Summer	2	+0%	30/15 Summer			
S2.006	HW127	15 Summer	2	+0%	100/15 Summer			
S1.001	POND 5a	480 Summer	2	+0%	5/360 Summer			
S1.002	FC129	480 Summer	2	+0%	2/120 Summer			
S6.000	130	15 Summer	2	+0%	100/15 Summer			
S6.001	131	15 Summer	2	+0%				
S6.002	132	15 Summer	2	+0%	100/15 Summer			
S6.003	133	15 Summer	2	+0%	100/15 Summer			
S7.000	134	15 Summer	2	+0%	100/15 Summer			
S7.001	135	15 Summer	2	+0%	100/15 Summer			
S7.002	136	15 Summer	2	+0%				
S7.003	137	15 Summer	2	+0%				
S6.004	138	15 Summer	2	+0%	100/15 Summer			
S6.005	139	15 Summer	2	+0%				
S6.006	140	15 Summer	2	+0%				
S6.007	HW141	15 Summer	2	+0%	100/120 Summer			
S6.008	POND 2	480 Winter	2	+0%	2/30 Summer			
S6.009	FC143	30 Summer	2	+0%				
S6.010	144	15 Summer	2	+0%				
S6.011	145	15 Summer	2	+0%				
S6.012	146	15 Summer	2	+0%	100/15 Summer			
S6.013	HW147	15 Summer	2	+0%				
S8.000	149	120 Winter	2	+0%				
S9.000	151	120 Winter	2	+0%				
S6.014	POND 3	4320 Winter	2	+0%	2/360 Summer			
S6.015	FC153	4320 Winter	2	+0%				
S6.016	154	4320 Winter	2	+0%				
S6.017	155	4320 Winter	2	+0%				
S10.000	156	15 Summer	2	+0%				
S10.001	157	15 Summer	2	+0%				
S10.002	158	15 Summer	2	+0%				
S10.003	159	15 Summer	2	+0%				
S10.004	160	15 Summer	2	+0%				
S10.005	161	15 Summer	2	+0%				
S11.000	162	15 Summer	2	+0%				
S11.001	163	15 Summer	2	+0%				
S11.002	164	15 Summer	2	+0%				
S11.003	165	15 Summer	2	+0%				
S11.004	166	15 Summer	2	+0%				
S11.005	167	15 Summer	2	+0%				
S11.006	168	15 Summer	2	+0%				
S11.007	169	15 Summer	2	+0%	100/15 Summer			
S10.006	170	15 Summer	2	+0%	100/15 Summer			
S10.007	171	15 Summer	2	+0%	100/15 Summer			
S10.008	HW172	15 Summer	2	+0%				
S12.000	177	120 Winter	2	+0%				
S10.009	POND 1	480 Summer	2	+0%	30/120 Summer			

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.	Pump inflow excluded	
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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S2.004	125	57.327	-0.137	0.000	0.97	139.1	OK	
S2.005	126	57.162	-0.286	0.000	0.54	139.5	OK	
S2.006	HW127	57.051	-0.322	0.000	0.44	138.5	OK	
S1.001	POND 5a	56.873	-0.048	0.000	0.63	6.8	OK	
S1.002	FC129	56.847	0.090	0.000	0.57	6.0	SURCHARGED	
S6.000	130	77.535	-0.165	0.000	0.41	22.7	OK	
S6.001	131	77.223	-0.279	0.000	0.14	31.9	OK	
S6.002	132	76.453	-0.293	0.000	0.25	68.7	OK	
S6.003	133	75.894	-0.325	0.000	0.17	69.3	OK	
S7.000	134	77.448	-0.177	0.000	0.33	25.1	OK	
S7.001	135	77.093	-0.254	0.000	0.22	46.0	OK	
S7.002	136	76.337	-0.409	0.000	0.21	70.9	OK	
S7.003	137	76.025	-0.465	0.000	0.11	99.4	OK	
S6.004	138	75.318	-0.482	0.000	0.27	188.2	OK	
S6.005	139	75.068	-0.538	0.000	0.17	217.9	OK	
S6.006	140	74.446	-0.526	0.000	0.19	218.5	OK	
S6.007	HW141	73.930	-0.528	0.000	0.19	243.9	OK	
S6.008	POND 2	73.534	0.265	0.000	0.07	5.2	SURCHARGED	
S6.009	FC143	70.753	-0.328	0.000	0.04	14.2	OK	
S6.010	144	69.138	-0.593	0.000	0.03	39.0	OK	
S6.011	145	68.240	-0.267	0.000	0.18	59.1	OK	
S6.012	146	66.462	-0.293	0.000	0.26	57.4	OK	
S6.013	HW147	66.052	-0.342	0.000	0.13	57.0	OK	
S8.000	149	67.561	-0.450	0.000	0.00	0.0	OK	
S9.000	151	67.102	-0.450	0.000	0.00	0.0	OK	
S6.014	POND 3	65.268	0.393	0.000	0.05	4.9	SURCHARGED	
S6.015	FC153	65.149	-2.114	0.000	0.00	4.9	OK	
S6.016	154	61.891	-1.197	0.000	0.00	4.9	OK	
S6.017	155	60.173	-1.390	0.000	0.00	4.9	OK	
S10.000	156	73.742	-0.333	0.000	0.03	11.8	OK	
S10.001	157	71.537	-0.308	0.000	0.07	22.7	OK	
S10.002	158	69.927	-0.292	0.000	0.11	37.1	OK	
S10.003	159	67.778	-0.353	0.000	0.10	54.7	OK	
S10.004	160	64.867	-0.336	0.000	0.14	76.9	OK	
S10.005	161	61.838	-0.330	0.000	0.16	92.2	OK	
S11.000	162	73.757	-0.318	0.000	0.06	24.3	OK	
S11.001	163	71.467	-0.287	0.000	0.13	41.3	OK	
S11.002	164	69.873	-0.349	0.000	0.11	60.1	OK	
S11.003	165	67.610	-0.407	0.000	0.11	89.1	OK	
S11.004	166	64.554	-0.473	0.000	0.10	113.4	OK	
S11.005	167	61.635	-0.529	0.000	0.10	131.2	OK	
S11.006	168	60.546	-0.668	0.000	0.08	131.0	OK	
S11.007	169	59.895	-0.596	0.000	0.25	145.6	OK	
S10.006	170	59.766	-0.650	0.000	0.17	256.2	OK	
S10.007	171	59.450	-0.519	0.000	0.32	267.2	OK	
S10.008	HW172	59.306	-0.815	0.000	0.23	263.7	OK	
S12.000	177	59.657	-1.500	0.000	0.00	0.0	OK	


.	Milton Keynes East	
.	HIF 8 None pumped section	
.	Pump inflow excluded	

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1


PN	US/MH Name	Water Surcharged			Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)			
S10.009	POND 1	59.057	-0.134	0.000	0.08		9.0	OK	

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.	Milton Keynes East	
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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S10.010	FC179	480 Summer	2	+0%					58.659
S10.011	180	480 Summer	2	+0%					58.215
S6.018	181	4320 Winter	2	+0%					57.629
S6.019	182	4320 Winter	2	+0%					57.345
S6.020	183	4320 Winter	2	+0%					57.017
S6.021	184	4320 Winter	2	+0%					56.687
S1.003	185	480 Summer	2	+0%					56.142
S1.004	186	480 Summer	2	+0%					56.109
S1.005	187	480 Summer	2	+0%					56.014
S1.006	188	480 Summer	2	+0%					55.787
S1.007	189	480 Summer	2	+0%					55.545
S1.008	190	480 Summer	2	+0%					55.360
S1.009	191	480 Summer	2	+0%					55.191
S1.010	92	360 Summer	2	+0%					55.095

PN	US/MH Name	Surcharged		Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status	
S10.010	FC179	-2.202	0.000	0.00	0.00	9.0	OK	
S10.011	180	-2.318	0.000	0.00	0.00	9.0	OK	
S6.018	181	-2.382	0.000	0.00	0.00	9.7	OK	
S6.019	182	-1.749	0.000	0.00	0.00	9.7	OK	
S6.020	183	-1.620	0.000	0.00	0.00	9.7	OK	
S6.021	184	-1.452	0.000	0.00	0.00	9.7	OK	
S1.003	185	-2.036	0.000	0.00	0.00	14.8	OK	
S1.004	186	-0.593	0.000	0.04	0.04	14.8	OK	
S1.005	187	-0.522	0.000	0.04	0.04	14.8	OK	
S1.006	188	-0.522	0.000	0.04	0.04	14.8	OK	
S1.007	189	-1.655	0.000	0.00	0.00	14.8	OK	
S1.008	190	-1.840	0.000	0.00	0.00	14.8	OK	
S1.009	191	-2.078	0.000	0.00	0.00	14.8	OK	
S1.010	92	-1.905	0.000	0.00	0.00	14.8	OK	

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	HW108	360 Summer	5	+0%					56.921
S2.000	109	15 Summer	5	+0%	100/15 Summer				59.983
S2.001	110	15 Summer	5	+0%	100/15 Summer				59.065
S2.002	111	15 Summer	5	+0%	100/15 Summer				58.123
S2.003	112	15 Summer	5	+0%	30/15 Summer				57.658
S3.000	113	15 Summer	5	+0%	100/15 Summer				58.285
S3.001	114	15 Summer	5	+0%	100/15 Summer				57.738
S3.002	115	15 Summer	5	+0%	30/15 Summer				57.528
S4.000	116	15 Summer	5	+0%	100/15 Summer				58.460
S4.001	117	15 Summer	5	+0%	100/15 Summer				58.055
S4.002	118	15 Summer	5	+0%	30/15 Summer				57.557
S5.000	119	15 Summer	5	+0%	100/15 Summer				60.040
S5.001	120	15 Summer	5	+0%	100/15 Summer				59.339
S5.002	121	15 Summer	5	+0%	100/15 Summer				58.445
S5.003	122	15 Summer	5	+0%	30/15 Summer				57.649
S5.004	123	15 Summer	5	+0%	30/15 Summer				57.564
S4.003	124	15 Summer	5	+0%	30/15 Summer				57.511

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Pipe	Level Exceeded
		Depth (m)	Volume (m ³)			Flow (l/s)	
S1.000	HW108	-0.568	0.000	0.00		0.0	OK
S2.000	109	-0.102	0.000	0.56		33.1	OK
S2.001	110	-0.104	0.000	0.54		32.1	OK
S2.002	111	-0.130	0.000	0.60		37.2	OK
S2.003	112	-0.140	0.000	0.54		53.6	OK
S3.000	113	-0.115	0.000	0.45		19.3	OK
S3.001	114	-0.169	0.000	0.39		33.3	OK
S3.002	115	-0.147	0.000	0.51		40.2	OK
S4.000	116	-0.154	0.000	0.21		11.0	OK
S4.001	117	-0.150	0.000	0.49		32.1	OK
S4.002	118	-0.139	0.000	0.36		41.9	OK
S5.000	119	-0.170	0.000	0.37		31.9	OK
S5.001	120	-0.194	0.000	0.27		31.1	OK
S5.002	121	-0.156	0.000	0.45		44.8	OK
S5.003	122	-0.197	0.000	0.45		56.5	OK
S5.004	123	-0.139	0.000	0.42		60.7	OK
S4.003	124	0.000	0.000	0.74		89.2	OK

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Milton Keynes East
HIF 8 None pumped section
Pump inflow excluded



Date 26/05/2021
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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
S2.004	125	15	Winter	5	+0%	30/15	Summer	
S2.005	126	15	Summer	5	+0%	30/15	Summer	
S2.006	HW127	15	Summer	5	+0%	100/15	Summer	
S1.001	POND 5a	360	Summer	5	+0%	5/360	Summer	
S1.002	FC129	360	Summer	5	+0%	2/120	Summer	
S6.000	130	15	Summer	5	+0%	100/15	Summer	
S6.001	131	15	Summer	5	+0%			
S6.002	132	15	Summer	5	+0%	100/15	Summer	
S6.003	133	15	Summer	5	+0%	100/15	Summer	
S7.000	134	15	Summer	5	+0%	100/15	Summer	
S7.001	135	15	Summer	5	+0%	100/15	Summer	
S7.002	136	15	Summer	5	+0%			
S7.003	137	15	Summer	5	+0%			
S6.004	138	15	Summer	5	+0%	100/15	Summer	
S6.005	139	15	Summer	5	+0%			
S6.006	140	15	Summer	5	+0%			
S6.007	HW141	15	Summer	5	+0%	100/120	Summer	
S6.008	POND 2	480	Winter	5	+0%	2/30	Summer	
S6.009	FC143	15	Summer	5	+0%			
S6.010	144	15	Summer	5	+0%			
S6.011	145	15	Summer	5	+0%			
S6.012	146	15	Summer	5	+0%	100/15	Summer	
S6.013	HW147	15	Summer	5	+0%			
S8.000	149	120	Winter	5	+0%			
S9.000	151	120	Winter	5	+0%			
S6.014	POND 3	4320	Winter	5	+0%	2/360	Summer	
S6.015	FC153	4320	Winter	5	+0%			
S6.016	154	4320	Winter	5	+0%			
S6.017	155	4320	Winter	5	+0%			
S10.000	156	15	Summer	5	+0%			
S10.001	157	15	Summer	5	+0%			
S10.002	158	15	Summer	5	+0%			
S10.003	159	15	Summer	5	+0%			
S10.004	160	15	Summer	5	+0%			
S10.005	161	15	Summer	5	+0%			
S11.000	162	15	Summer	5	+0%			
S11.001	163	15	Summer	5	+0%			
S11.002	164	15	Summer	5	+0%			
S11.003	165	15	Summer	5	+0%			
S11.004	166	15	Summer	5	+0%			
S11.005	167	15	Summer	5	+0%			
S11.006	168	15	Summer	5	+0%			
S11.007	169	15	Summer	5	+0%	100/15	Summer	
S10.006	170	15	Summer	5	+0%	100/15	Summer	
S10.007	171	15	Summer	5	+0%	100/15	Summer	
S10.008	HW172	15	Summer	5	+0%			
S12.000	177	120	Winter	5	+0%			
S10.009	POND 1	360	Winter	5	+0%	30/120	Summer	

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S2.004	125	57.464	0.000	0.000	1.07	153.2	OK	
S2.005	126	57.202	-0.246	0.000	0.65	167.4	OK	
S2.006	HW127	57.086	-0.287	0.000	0.53	167.9	OK	
S1.001	POND 5a	56.921	0.000	0.000	0.66	7.1	SURCHARGED	
S1.002	FC129	56.896	0.139	0.000	0.57	6.0	SURCHARGED	
S6.000	130	77.561	-0.139	0.000	0.54	29.9	OK	
S6.001	131	77.240	-0.262	0.000	0.19	42.2	OK	
S6.002	132	76.481	-0.265	0.000	0.34	92.3	OK	
S6.003	133	75.915	-0.304	0.000	0.23	92.9	OK	
S7.000	134	77.471	-0.154	0.000	0.45	33.6	OK	
S7.001	135	77.114	-0.233	0.000	0.30	61.8	OK	
S7.002	136	76.368	-0.378	0.000	0.28	95.3	OK	
S7.003	137	76.047	-0.443	0.000	0.15	133.3	OK	
S6.004	138	75.366	-0.434	0.000	0.37	252.4	OK	
S6.005	139	75.104	-0.503	0.000	0.23	292.1	OK	
S6.006	140	74.482	-0.490	0.000	0.26	293.0	OK	
S6.007	HW141	73.966	-0.492	0.000	0.26	327.4	OK	
S6.008	POND 2	73.656	0.387	0.000	0.08	5.4	SURCHARGED	
S6.009	FC143	70.760	-0.321	0.000	0.05	18.7	OK	
S6.010	144	69.151	-0.580	0.000	0.05	52.7	OK	
S6.011	145	68.259	-0.248	0.000	0.25	79.8	OK	
S6.012	146	66.492	-0.263	0.000	0.35	77.3	OK	
S6.013	HW147	66.072	-0.322	0.000	0.18	76.9	OK	
S8.000	149	67.561	-0.450	0.000	0.00	0.0	OK	
S9.000	151	67.102	-0.450	0.000	0.00	0.0	OK	
S6.014	POND 3	65.280	0.405	0.000	0.05	5.3	SURCHARGED	
S6.015	FC153	65.149	-2.114	0.000	0.00	5.3	OK	
S6.016	154	61.891	-1.197	0.000	0.00	5.3	OK	
S6.017	155	60.173	-1.390	0.000	0.00	5.3	OK	
S10.000	156	73.747	-0.328	0.000	0.04	15.9	OK	
S10.001	157	71.549	-0.296	0.000	0.10	30.5	OK	
S10.002	158	69.940	-0.279	0.000	0.15	49.7	OK	
S10.003	159	67.793	-0.338	0.000	0.14	73.4	OK	
S10.004	160	64.888	-0.315	0.000	0.19	103.2	OK	
S10.005	161	61.859	-0.309	0.000	0.21	123.7	OK	
S11.000	162	73.768	-0.307	0.000	0.08	32.6	OK	
S11.001	163	71.482	-0.272	0.000	0.17	55.5	OK	
S11.002	164	69.889	-0.333	0.000	0.15	80.3	OK	
S11.003	165	67.629	-0.388	0.000	0.15	118.2	OK	
S11.004	166	64.573	-0.454	0.000	0.13	150.9	OK	
S11.005	167	61.657	-0.507	0.000	0.14	174.7	OK	
S11.006	168	60.569	-0.645	0.000	0.11	174.4	OK	
S11.007	169	59.949	-0.542	0.000	0.33	194.1	OK	
S10.006	170	59.808	-0.608	0.000	0.23	342.0	OK	
S10.007	171	59.517	-0.452	0.000	0.43	357.8	OK	
S10.008	HW172	59.371	-0.750	0.000	0.30	352.6	OK	
S12.000	177	59.657	-1.500	0.000	0.00	0.0	OK	

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Milton Keynes East
HIF 8 None pumped section
Pump inflow excluded



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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1


PN	US/MH Name	Water		Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)				
S10.009	POND 1	59.109	-0.082	0.000	0.09			9.4	OK	

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Milton Keynes East		
HIF 8 None pumped section Pump inflow excluded		
Date 26/05/2021		Designed by DSF
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XP Solutions		Network 2018.1.1

5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S10.010	FC179	360 Winter	5	+0%					58.661
S10.011	180	360 Winter	5	+0%					58.216
S6.018	181	4320 Summer	5	+0%					57.636
S6.019	182	4320 Summer	5	+0%					57.352
S6.020	183	4320 Summer	5	+0%					57.021
S6.021	184	4320 Summer	5	+0%					56.689
S1.003	185	4320 Summer	5	+0%					56.144
S1.004	186	4320 Summer	5	+0%					56.112
S1.005	187	4320 Summer	5	+0%					56.018
S1.006	188	4320 Summer	5	+0%					55.791
S1.007	189	4320 Summer	5	+0%					55.548
S1.008	190	4320 Summer	5	+0%					55.362
S1.009	191	4320 Summer	5	+0%					55.194
S1.010	92	4320 Summer	5	+0%					55.096

PN	US/MH Name	Surcharged		Flooded	Pipe		Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	
S10.010	FC179	-2.200	0.000	0.00		9.4	OK
S10.011	180	-2.317	0.000	0.00		9.4	OK
S6.018	181	-2.375	0.000	0.00		12.3	OK
S6.019	182	-1.742	0.000	0.00		12.3	OK
S6.020	183	-1.616	0.000	0.00		12.3	OK
S6.021	184	-1.450	0.000	0.00		12.3	OK
S1.003	185	-2.034	0.000	0.00		16.2	OK
S1.004	186	-0.590	0.000	0.04		16.2	OK
S1.005	187	-0.518	0.000	0.05		16.2	OK
S1.006	188	-0.518	0.000	0.05		16.2	OK
S1.007	189	-1.652	0.000	0.00		16.2	OK
S1.008	190	-1.838	0.000	0.00		16.2	OK
S1.009	191	-2.075	0.000	0.00		16.2	OK
S1.010	92	-1.905	0.000	0.00		16.2	OK

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.	HIF 8 None pumped section	
.	Pump inflow excluded	
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XP Solutions	Network 2018.1.1	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	HW108	360 Summer	30	+0%					57.063
S2.000	109	15 Summer	30	+0%	100/15 Summer				60.034
S2.001	110	15 Summer	30	+0%	100/15 Summer				59.114
S2.002	111	15 Summer	30	+0%	100/15 Summer				58.213
S2.003	112	15 Summer	30	+0%	30/15 Summer				57.847
S3.000	113	15 Summer	30	+0%	100/15 Summer				58.327
S3.001	114	15 Summer	30	+0%	100/15 Summer				57.819
S3.002	115	15 Summer	30	+0%	30/15 Summer				57.717
S4.000	116	15 Summer	30	+0%	100/15 Summer				58.482
S4.001	117	15 Summer	30	+0%	100/15 Summer				58.143
S4.002	118	15 Summer	30	+0%	30/15 Summer				57.751
S5.000	119	15 Summer	30	+0%	100/15 Summer				60.085
S5.001	120	15 Summer	30	+0%	100/15 Summer				59.373
S5.002	121	15 Summer	30	+0%	100/15 Summer				58.511
S5.003	122	15 Summer	30	+0%	30/15 Summer				57.889
S5.004	123	15 Summer	30	+0%	30/15 Summer				57.779
S4.003	124	15 Summer	30	+0%	30/15 Summer				57.655

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

PN	US/MH Name	Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)			
S1.000	HW108	-0.426	0.000	0.00		0.0	OK	
S2.000	109	-0.051	0.000	0.92		54.6	OK	
S2.001	110	-0.055	0.000	0.90		53.0	OK	
S2.002	111	-0.040	0.000	0.98		60.6	OK	
S2.003	112	0.049	0.000	0.92		91.5	SURCHARGED	
S3.000	113	-0.073	0.000	0.75		31.8	OK	
S3.001	114	-0.088	0.000	0.70		59.7	OK	
S3.002	115	0.042	0.000	0.86		67.9	SURCHARGED	
S4.000	116	-0.132	0.000	0.35		18.1	OK	
S4.001	117	-0.062	0.000	0.95		62.3	OK	
S4.002	118	0.055	0.000	0.71		82.7	SURCHARGED	
S5.000	119	-0.125	0.000	0.62		52.6	OK	
S5.001	120	-0.160	0.000	0.44		51.4	OK	
S5.002	121	-0.090	0.000	0.79		78.1	OK	
S5.003	122	0.043	0.000	0.73		92.5	SURCHARGED	
S5.004	123	0.076	0.000	0.68		98.5	SURCHARGED	
S4.003	124	0.144	0.000	1.44		174.9	SURCHARGED	

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Milton Keynes East
HIF 8 None pumped section
Pump inflow excluded



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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
S2.004	125	15 Summer	30	+0%	30/15 Summer			
S2.005	126	15 Summer	30	+0%	30/15 Summer			
S2.006	HW127	15 Summer	30	+0%	100/15 Summer			
S1.001	POND 5a	360 Summer	30	+0%	5/360 Summer			
S1.002	FC129	360 Summer	30	+0%	2/120 Summer			
S6.000	130	15 Summer	30	+0%	100/15 Summer			
S6.001	131	15 Summer	30	+0%				
S6.002	132	15 Summer	30	+0%	100/15 Summer			
S6.003	133	15 Summer	30	+0%	100/15 Summer			
S7.000	134	15 Summer	30	+0%	100/15 Summer			
S7.001	135	15 Summer	30	+0%	100/15 Summer			
S7.002	136	15 Summer	30	+0%				
S7.003	137	15 Summer	30	+0%				
S6.004	138	15 Summer	30	+0%	100/15 Summer			
S6.005	139	15 Summer	30	+0%				
S6.006	140	15 Summer	30	+0%				
S6.007	HW141	15 Summer	30	+0%	100/120 Summer			
S6.008	POND 2	480 Winter	30	+0%	2/30 Summer			
S6.009	FC143	15 Summer	30	+0%				
S6.010	144	15 Summer	30	+0%				
S6.011	145	15 Summer	30	+0%				
S6.012	146	15 Summer	30	+0%	100/15 Summer			
S6.013	HW147	15 Summer	30	+0%				
S8.000	149	120 Winter	30	+0%				
S9.000	151	120 Winter	30	+0%				
S6.014	POND 3	4320 Winter	30	+0%	2/360 Summer			
S6.015	FC153	4320 Winter	30	+0%				
S6.016	154	4320 Winter	30	+0%				
S6.017	155	4320 Winter	30	+0%				
S10.000	156	15 Summer	30	+0%				
S10.001	157	15 Summer	30	+0%				
S10.002	158	15 Summer	30	+0%				
S10.003	159	15 Summer	30	+0%				
S10.004	160	15 Summer	30	+0%				
S10.005	161	15 Summer	30	+0%				
S11.000	162	15 Summer	30	+0%				
S11.001	163	15 Summer	30	+0%				
S11.002	164	15 Summer	30	+0%				
S11.003	165	15 Summer	30	+0%				
S11.004	166	15 Summer	30	+0%				
S11.005	167	15 Summer	30	+0%				
S11.006	168	15 Summer	30	+0%				
S11.007	169	15 Summer	30	+0%	100/15 Summer			
S10.006	170	15 Summer	30	+0%	100/15 Summer			
S10.007	171	15 Summer	30	+0%	100/15 Summer			
S10.008	HW172	15 Summer	30	+0%				
S12.000	177	120 Winter	30	+0%				
S10.009	POND 1	360 Winter	30	+0%	30/120 Summer			

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S2.004	125	57.553	0.089	0.000	2.31	331.6	SURCHARGED	
S2.005	126	57.453	0.005	0.000	1.27	328.2	SURCHARGED	
S2.006	HW127	57.333	-0.040	0.000	1.00	317.0	OK	
S1.001	POND 5a	57.063	0.142	0.000	0.68	7.4	SURCHARGED	
S1.002	FC129	57.038	0.281	0.000	0.57	6.0	SURCHARGED	
S6.000	130	77.627	-0.073	0.000	0.83	45.5	OK	
S6.001	131	77.277	-0.225	0.000	0.32	71.8	OK	
S6.002	132	76.578	-0.168	0.000	0.67	181.8	OK	
S6.003	133	75.982	-0.237	0.000	0.45	183.6	OK	
S7.000	134	77.527	-0.098	0.000	0.74	55.5	OK	
S7.001	135	77.178	-0.169	0.000	0.56	114.6	OK	
S7.002	136	76.481	-0.265	0.000	0.54	182.8	OK	
S7.003	137	76.116	-0.374	0.000	0.30	265.4	OK	
S6.004	138	75.531	-0.269	0.000	0.73	504.3	OK	
S6.005	139	75.222	-0.385	0.000	0.47	588.7	OK	
S6.006	140	74.608	-0.364	0.000	0.52	586.6	OK	
S6.007	HW141	74.093	-0.365	0.000	0.52	660.0	OK	
S6.008	POND 2	73.980	0.711	0.000	0.08	5.4	SURCHARGED	
S6.009	FC143	70.787	-0.294	0.000	0.11	40.3	OK	
S6.010	144	69.201	-0.530	0.000	0.10	116.5	OK	
S6.011	145	68.330	-0.177	0.000	0.53	172.1	OK	
S6.012	146	66.611	-0.144	0.000	0.75	166.0	OK	
S6.013	HW147	66.138	-0.256	0.000	0.38	164.2	OK	
S8.000	149	67.561	-0.450	0.000	0.00	0.0	OK	
S9.000	151	67.102	-0.450	0.000	0.00	0.0	OK	
S6.014	POND 3	65.313	0.438	0.000	0.06	6.3	SURCHARGED	
S6.015	FC153	65.150	-2.113	0.000	0.00	6.3	OK	
S6.016	154	61.893	-1.195	0.000	0.00	6.3	OK	
S6.017	155	60.175	-1.388	0.000	0.00	6.3	OK	
S10.000	156	73.761	-0.314	0.000	0.06	26.2	OK	
S10.001	157	71.580	-0.265	0.000	0.19	58.5	OK	
S10.002	158	69.984	-0.235	0.000	0.30	100.6	OK	
S10.003	159	67.846	-0.285	0.000	0.28	148.3	OK	
S10.004	160	64.955	-0.248	0.000	0.40	211.6	OK	
S10.005	161	61.932	-0.236	0.000	0.44	254.4	OK	
S11.000	162	73.788	-0.287	0.000	0.12	53.8	OK	
S11.001	163	71.524	-0.230	0.000	0.32	103.8	OK	
S11.002	164	69.941	-0.281	0.000	0.30	159.2	OK	
S11.003	165	67.693	-0.324	0.000	0.30	236.8	OK	
S11.004	166	64.643	-0.384	0.000	0.27	302.9	OK	
S11.005	167	61.738	-0.426	0.000	0.28	353.1	OK	
S11.006	168	60.654	-0.560	0.000	0.22	356.5	OK	
S11.007	169	60.142	-0.349	0.000	0.68	400.9	OK	
S10.006	170	59.952	-0.464	0.000	0.47	709.4	OK	
S10.007	171	59.766	-0.203	0.000	0.87	723.7	OK	
S10.008	HW172	59.603	-0.518	0.000	0.58	675.4	OK	
S12.000	177	59.657	-1.500	0.000	0.00	0.0	OK	

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Milton Keynes East
HIF 8 None pumped section
Pump inflow excluded



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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1


PN	US/MH Name	Water Surcharged			Flooded		Pipe		Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status	
S10.009	POND 1	59.257	0.066	0.000	0.09		9.9	SURCHARGED	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S10.010	FC179	360 Winter	30	+0%					58.662
S10.011	180	360 Winter	30	+0%					58.218
S6.018	181	4320 Summer	30	+0%					57.644
S6.019	182	4320 Summer	30	+0%					57.361
S6.020	183	4320 Summer	30	+0%					57.026
S6.021	184	4320 Summer	30	+0%					56.692
S1.003	185	4320 Summer	30	+0%					56.155
S1.004	186	4320 Summer	30	+0%					56.124
S1.005	187	4320 Summer	30	+0%					56.030
S1.006	188	4320 Summer	30	+0%					55.803
S1.007	189	4320 Summer	30	+0%					55.557
S1.008	190	4320 Summer	30	+0%					55.371
S1.009	191	4320 Summer	30	+0%					55.202
S1.010	92	4320 Summer	30	+0%					55.096

PN	US/MH Name	Surcharged		Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status	
S10.010	FC179	-2.199	0.000	0.00		9.9	OK	
S10.011	180	-2.315	0.000	0.00		9.9	OK	
S6.018	181	-2.367	0.000	0.00		15.2	OK	
S6.019	182	-1.733	0.000	0.00		15.2	OK	
S6.020	183	-1.611	0.000	0.00		15.2	OK	
S6.021	184	-1.447	0.000	0.00		15.2	OK	
S1.003	185	-2.023	0.000	0.00		21.1	OK	
S1.004	186	-0.578	0.000	0.05		21.1	OK	
S1.005	187	-0.506	0.000	0.06		21.1	OK	
S1.006	188	-0.506	0.000	0.06		21.1	OK	
S1.007	189	-1.643	0.000	0.00		21.1	OK	
S1.008	190	-1.829	0.000	0.00		21.1	OK	
S1.009	191	-2.067	0.000	0.00		21.1	OK	
S1.010	92	-1.905	0.000	0.00		21.1	OK	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Hif - 1

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	HW108	480 Winter	100	+40%					57.400
S2.000	109	15 Summer	100	+40%	100/15 Summer				62.338
S2.001	110	15 Summer	100	+40%	100/15 Summer				60.672
S2.002	111	15 Summer	100	+40%	100/15 Summer				58.838
S2.003	112	15 Summer	100	+40%	30/15 Summer				58.565
S3.000	113	15 Summer	100	+40%	100/15 Summer				59.532
S3.001	114	15 Summer	100	+40%	100/15 Summer				58.755
S3.002	115	15 Summer	100	+40%	30/15 Summer				58.459
S4.000	116	15 Summer	100	+40%	100/15 Summer				59.038
S4.001	117	15 Summer	100	+40%	100/15 Summer				58.908
S4.002	118	15 Summer	100	+40%	30/15 Summer				58.477
S5.000	119	15 Summer	100	+40%	100/15 Summer				60.564
S5.001	120	15 Summer	100	+40%	100/15 Summer				59.884
S5.002	121	15 Summer	100	+40%	100/15 Summer				59.494
S5.003	122	15 Summer	100	+40%	30/15 Summer				58.633
S5.004	123	15 Summer	100	+40%	30/15 Summer				58.457
S4.003	124	15 Summer	100	+40%	30/15 Summer				58.247


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Pump inflow excludedDate 26/05/2021
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100 year Return Period Summary of Critical Results by Maximum Level (Rank
1) for Hif - 1

PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Pipe	Status	Level Exceeded
		Depth (m)	Volume (m ³)			Flow (l/s)		
S1.000	HW108	-0.089	0.000	0.00		0.0	OK	
S2.000	109	2.253	0.000	1.56		92.3	SURCHARGED	
S2.001	110	1.503	0.000	1.36		80.4	SURCHARGED	
S2.002	111	0.585	0.000	1.44		89.4	SURCHARGED	
S2.003	112	0.767	0.000	1.26		125.2	SURCHARGED	
S3.000	113	1.132	0.000	1.23		52.5	FLOOD RISK	
S3.001	114	0.848	0.000	1.09		92.8	SURCHARGED	
S3.002	115	0.784	0.000	1.42		112.0	SURCHARGED	
S4.000	116	0.424	0.000	0.60		31.1	SURCHARGED	
S4.001	117	0.703	0.000	1.55		100.8	SURCHARGED	
S4.002	118	0.781	0.000	1.08		124.9	SURCHARGED	
S5.000	119	0.354	0.000	1.11		95.1	SURCHARGED	
S5.001	120	0.351	0.000	0.71		83.4	SURCHARGED	
S5.002	121	0.893	0.000	1.08		106.4	SURCHARGED	
S5.003	122	0.787	0.000	1.07		135.3	SURCHARGED	
S5.004	123	0.754	0.000	1.04		150.7	SURCHARGED	
S4.003	124	0.736	0.000	2.25		272.9	SURCHARGED	

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Date 26/05/2021		Milton Keynes East
File HIF 1 P0.3.MDX		HIF 8 None pumped section
		Pump inflow excluded
		Designed by DSF
		Checked by PB
XP Solutions		Network 2018.1.1


100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Hif - 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
S2.004	125	15 Summer	100	+40%	30/15 Summer			
S2.005	126	15 Summer	100	+40%	30/15 Summer			
S2.006	HW127	15 Summer	100	+40%	100/15 Summer			
S1.001	POND 5a	480 Winter	100	+40%	5/360 Summer			
S1.002	FC129	480 Winter	100	+40%	2/120 Summer			
S6.000	130	15 Summer	100	+40%	100/15 Summer			
S6.001	131	15 Summer	100	+40%				
S6.002	132	15 Summer	100	+40%	100/15 Summer			
S6.003	133	15 Summer	100	+40%	100/15 Summer			
S7.000	134	15 Summer	100	+40%	100/15 Summer			
S7.001	135	15 Summer	100	+40%	100/15 Summer			
S7.002	136	15 Summer	100	+40%				
S7.003	137	15 Summer	100	+40%				
S6.004	138	15 Summer	100	+40%	100/15 Summer			
S6.005	139	15 Summer	100	+40%				
S6.006	140	15 Summer	100	+40%				
S6.007	HW141	360 Winter	100	+40%	100/120 Summer			
S6.008	POND 2	960 Winter	100	+40%	2/30 Summer			
S6.009	FC143	15 Summer	100	+40%				
S6.010	144	15 Summer	100	+40%				
S6.011	145	15 Summer	100	+40%				
S6.012	146	15 Summer	100	+40%	100/15 Summer			
S6.013	HW147	15 Summer	100	+40%				
S8.000	149	120 Winter	100	+40%				
S9.000	151	120 Winter	100	+40%				
S6.014	POND 3	4320 Summer	100	+40%	2/360 Summer			
S6.015	FC153	4320 Summer	100	+40%				
S6.016	154	4320 Summer	100	+40%				
S6.017	155	4320 Summer	100	+40%				
S10.000	156	15 Summer	100	+40%				
S10.001	157	15 Summer	100	+40%				
S10.002	158	15 Summer	100	+40%				
S10.003	159	15 Summer	100	+40%				
S10.004	160	15 Summer	100	+40%				
S10.005	161	15 Summer	100	+40%				
S11.000	162	15 Summer	100	+40%				
S11.001	163	15 Summer	100	+40%				
S11.002	164	15 Summer	100	+40%				
S11.003	165	15 Summer	100	+40%				
S11.004	166	15 Summer	100	+40%				
S11.005	167	15 Summer	100	+40%				
S11.006	168	15 Summer	100	+40%				
S11.007	169	15 Summer	100	+40%	100/15 Summer			
S10.006	170	15 Summer	100	+40%	100/15 Summer			
S10.007	171	15 Summer	100	+40%	100/15 Summer			
S10.008	HW172	15 Summer	100	+40%				
S12.000	177	120 Winter	100	+40%				
S10.009	POND 1	480 Winter	100	+40%	30/120 Summer			

WSP Group Ltd		Page 38
.	Milton Keynes East	
.	HIF 8 None pumped section	
.	Pump inflow excluded	
Date 26/05/2021	Designed by DSF	
File HIF 1 P0.3.MDX	Checked by PB	
XP Solutions	Network 2018.1.1	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Hif - 1

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S2.004	125	58.011	0.547	0.000	3.51	504.2	SURCHARGED	
S2.005	126	57.766	0.318	0.000	1.91	496.3	FLOOD RISK	
S2.006	HW127	57.517	0.144	0.000	1.57	498.7	SURCHARGED	
S1.001	POND 5a	57.400	0.479	0.000	0.65	7.0	SURCHARGED	
S1.002	FC129	57.369	0.612	0.000	0.67	7.0	SURCHARGED	
S6.000	130	78.056	0.356	0.000	1.52	83.5	FLOOD RISK	
S6.001	131	77.337	-0.165	0.000	0.58	129.1	OK	
S6.002	132	77.010	0.264	0.000	1.19	322.6	FLOOD RISK	
S6.003	133	76.221	0.002	0.000	0.80	327.1	SURCHARGED	
S7.000	134	78.056	0.431	0.000	1.33	99.8	FLOOD RISK	
S7.001	135	77.365	0.018	0.000	0.97	199.6	SURCHARGED	
S7.002	136	76.684	-0.062	0.000	0.94	320.2	OK	
S7.003	137	76.206	-0.284	0.000	0.53	471.0	OK	
S6.004	138	75.891	0.091	0.000	1.26	864.7	SURCHARGED	
S6.005	139	75.381	-0.225	0.000	0.82	1018.5	OK	
S6.006	140	74.780	-0.192	0.000	0.90	1012.8	OK	
S6.007	HW141	74.697	0.239	0.000	0.13	164.1	SURCHARGED	
S6.008	POND 2	74.663	1.394	0.000	0.08	5.8	SURCHARGED	
S6.009	FC143	70.814	-0.267	0.000	0.18	70.8	OK	
S6.010	144	69.254	-0.477	0.000	0.19	211.4	OK	
S6.011	145	68.504	-0.003	0.000	0.92	296.9	OK	
S6.012	146	67.028	0.273	0.000	1.33	291.4	SURCHARGED	
S6.013	HW147	66.216	-0.178	0.000	0.67	287.4	OK	
S8.000	149	67.561	-0.450	0.000	0.00	0.0	OK	
S9.000	151	67.102	-0.450	0.000	0.00	0.0	OK	
S6.014	POND 3	65.403	0.528	0.000	0.08	7.5	SURCHARGED	
S6.015	FC153	65.151	-2.112	0.000	0.00	7.5	OK	
S6.016	154	61.895	-1.193	0.000	0.00	7.5	OK	
S6.017	155	60.176	-1.387	0.000	0.00	7.5	OK	
S10.000	156	73.785	-0.290	0.000	0.12	48.0	OK	
S10.001	157	71.622	-0.223	0.000	0.34	107.5	OK	
S10.002	158	70.043	-0.176	0.000	0.54	184.8	OK	
S10.003	159	67.915	-0.216	0.000	0.51	272.4	OK	
S10.004	160	65.049	-0.154	0.000	0.73	388.8	OK	
S10.005	161	62.036	-0.132	0.000	0.81	467.7	OK	
S11.000	162	73.821	-0.254	0.000	0.23	98.8	OK	
S11.001	163	71.585	-0.169	0.000	0.58	190.6	OK	
S11.002	164	70.012	-0.210	0.000	0.55	292.3	OK	
S11.003	165	67.777	-0.240	0.000	0.55	434.5	OK	
S11.004	166	64.732	-0.295	0.000	0.49	556.1	OK	
S11.005	167	61.843	-0.321	0.000	0.52	648.4	OK	
S11.006	168	60.821	-0.393	0.000	0.40	650.8	OK	
S11.007	169	60.777	0.286	0.000	1.17	689.7	SURCHARGED	
S10.006	170	60.723	0.307	0.000	0.81	1225.8	SURCHARGED	
S10.007	171	60.479	0.510	0.000	1.49	1237.4	SURCHARGED	
S10.008	HW172	60.121	0.000	0.000	1.00	1154.3	OK	
S12.000	177	59.657	-1.500	0.000	0.00	0.0	OK	


.	Milton Keynes East	
.	HIF 8 None pumped section	
.	Pump inflow excluded	

Date 26/05/2021	Designed by DSF	
File HIF 1 P0.3.MDX	Checked by PB	

XP Solutions	Network 2018.1.1
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Hif - 1

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S10.009	POND 1	59.631	0.440	0.000	0.09	10.0	SURCHARGED	

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Milton Keynes East		
HIF 8 None pumped section Pump inflow excluded		
Date 26/05/2021		Designed by DSF
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Hif - 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S10.010	FC179	2880	Summer	100	+40%				58.662
S10.011	180	960	Winter	100	+40%				58.218
S6.018	181	4320	Summer	100	+40%				57.650
S6.019	182	4320	Summer	100	+40%				57.364
S6.020	183	4320	Summer	100	+40%				57.030
S6.021	184	4320	Summer	100	+40%				56.694
S1.003	185	2160	Summer	100	+40%				56.160
S1.004	186	2160	Summer	100	+40%				56.130
S1.005	187	2160	Summer	100	+40%				56.036
S1.006	188	2160	Summer	100	+40%				55.810
S1.007	189	2160	Summer	100	+40%				55.561
S1.008	190	2160	Summer	100	+40%				55.376
S1.009	191	2160	Summer	100	+40%				55.207
S1.010	92	2160	Summer	100	+40%				55.096


PN	US/MH Name	Surcharged		Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status	
S10.010	FC179	-2.199	0.000	0.00	0.00	10.0	OK	
S10.011	180	-2.315	0.000	0.00	0.00	10.0	OK	
S6.018	181	-2.361	0.000	0.00	0.00	17.5	OK	
S6.019	182	-1.730	0.000	0.00	0.00	17.5	OK	
S6.020	183	-1.607	0.000	0.00	0.00	17.5	OK	
S6.021	184	-1.445	0.000	0.00	0.00	17.5	OK	
S1.003	185	-2.018	0.000	0.00	0.00	23.7	OK	
S1.004	186	-0.572	0.000	0.06	0.00	23.7	OK	
S1.005	187	-0.500	0.000	0.07	0.00	23.7	OK	
S1.006	188	-0.499	0.000	0.07	0.00	23.7	OK	
S1.007	189	-1.639	0.000	0.00	0.00	23.7	OK	
S1.008	190	-1.824	0.000	0.00	0.00	23.7	OK	
S1.009	191	-2.062	0.000	0.00	0.00	23.7	OK	
S1.010	92	-1.905	0.000	0.00	0.00	23.7	OK	



Drainage Technical Addendum

DATE:	20 July 2021	CONFIDENTIALITY:	Public
SUBJECT:	Drainage Technical Addendum		
PROJECT:	Milton Keynes East	AUTHOR:	DSF
CHECKED:	BU	APPROVED:	SP

HIF 1 – Surcharged

WSP Group Ltd		Page 1
.	Milton Keynes East	
.	HIF 8 None pumped section	
.	Pump inflow excluded	
Date 26/05/2021	Designed by DSF	
File HIF 1 P0.3.MDX	Checked by PB	
XP Solutions	Network 2018.1.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Hif - 1

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	30
FEH Rainfall Version	2013
Site Location GB 489026 242081 SP 89026 42081	
Data Type	Point
Maximum Rainfall (mm/hr)	550
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.900
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Hif - 1


Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.000	4-8	0.000	8-12	0.529	12-16	1.506	16-20	1.855	20-24	0.550

Total Area Contributing (ha) = 4.440

Total Pipe Volume (m³) = 12080.875

Network Design Table for Hif - 1

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	27.849	0.118	236.5	0.000	5.00	0.0	0.600		o	675	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 (l/s)	Flow (l/s)
S1.000	142.10	5.27	56.814	0.000	0.0	0.0	0.0	1.70	608.3	0.0

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Milton Keynes East
HIF 8 None pumped section
Pump inflow excluded



Date 26/05/2021
File HIF 1 P0.3.MDX

Designed by DSF
Checked by PB

XP Solutions

Network 2018.1.1

Network Design Table for Hif - 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S2.000	66.102	0.916	72.2	0.124	5.00	0.0	0.600		o	225	Pipe/Conduit	🔒
S2.001	67.013	0.916	73.2	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	🔒
S2.002	55.530	0.194	286.2	0.026	0.00	0.0	0.600		o	300	Pipe/Conduit	🔒
S2.003	35.592	0.334	106.6	0.089	0.00	0.0	0.600		o	300	Pipe/Conduit	🔒
S3.000	68.968	0.493	139.9	0.074	5.00	0.0	0.600		o	225	Pipe/Conduit	🔒
S3.001	32.847	0.232	141.6	0.064	0.00	0.0	0.600		o	300	Pipe/Conduit	🔒
S3.002	35.144	0.211	166.6	0.035	0.00	0.0	0.600		o	300	Pipe/Conduit	🔒
S4.000	37.335	0.409	91.3	0.041	5.00	0.0	0.600		o	225	Pipe/Conduit	🔒
S4.001	52.565	0.205	256.4	0.091	0.00	0.0	0.600		o	300	Pipe/Conduit	🔒
S4.002	46.328	0.185	250.0	0.054	0.00	0.0	0.600		o	375	Pipe/Conduit	🔒
S5.000	67.665	0.677	99.9	0.121	5.00	0.0	3.000		o	300	Pipe/Conduit	🔒
S5.001	48.487	0.932	52.0	0.000	0.00	0.0	3.000		o	300	Pipe/Conduit	🔒
S5.002	55.768	0.755	73.9	0.067	0.00	0.0	3.000		o	300	Pipe/Conduit	🔒
S5.003	27.217	0.143	190.3	0.060	0.00	0.0	0.600		o	375	Pipe/Conduit	🔒
S5.004	28.366	0.192	147.7	0.033	0.00	0.0	0.600		o	375	Pipe/Conduit	🔒
S4.003	14.176	0.047	300.0	0.000	0.00	0.0	0.600		o	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 (l/s)	Flow (l/s)
S2.000	137.16	5.71	59.860	0.124	0.0	0.0	0.0	1.54	61.3	55.4
S2.001	129.93	6.44	58.944	0.124	0.0	0.0	0.0	1.53	60.9	55.4
S2.002	121.36	7.45	57.953	0.150	0.0	0.0	0.0	0.92	65.3	59.2
S2.003	118.36	7.84	57.498	0.239	0.0	0.0	0.0	1.52	107.6	92.1
S3.000	133.80	6.04	58.175	0.074	0.0	0.0	0.0	1.10	43.9	32.2
S3.001	129.82	6.46	57.607	0.139	0.0	0.0	0.0	1.32	93.3	58.5
S3.002	125.53	6.94	57.375	0.173	0.0	0.0	0.0	1.22	85.9	70.8
S4.000	140.00	5.45	58.389	0.041	0.0	0.0	0.0	1.37	54.4	18.7
S4.001	130.80	6.35	57.905	0.132	0.0	0.0	0.0	0.98	69.1	56.3
S4.002	124.77	7.03	57.321	0.186	0.0	0.0	0.0	1.14	126.1	75.5
S5.000	135.16	5.91	59.910	0.121	0.0	0.0	0.0	1.24	87.9	53.1
S5.001	130.57	6.38	59.233	0.121	0.0	0.0	0.0	1.73	121.9	53.1
S5.002	124.86	7.02	58.301	0.188	0.0	0.0	0.0	1.45	102.3	76.3
S5.003	122.01	7.36	57.471	0.248	0.0	0.0	0.0	1.31	144.7	98.2
S5.004	119.53	7.68	57.328	0.281	0.0	0.0	0.0	1.49	164.4	109.1
S4.003	118.00	7.88	57.061	0.467	0.0	0.0	0.0	1.17	185.8	179.2



Network Design Table for Hif - 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S2.004	6.304	0.016	403.4	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
S2.005	23.037	0.055	420.2	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
S2.006	20.878	0.077	271.1	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
S1.001	9.812	0.070	140.2	0.000	0.00	0.0		0.045	o	225	Pipe/Conduit	
S1.002	10.520	0.070	150.3	0.000	0.00	0.0		0.045	o	225	Pipe/Conduit	
S6.000	73.388	0.198	370.6	0.112	5.00	0.0	0.600		o	300	Pipe/Conduit	
S6.001	59.614	0.831	71.7	0.062	0.00	0.0	0.600		o	375	Pipe/Conduit	
S6.002	65.026	0.528	123.2	0.242	0.00	0.0	0.600		o	450	Pipe/Conduit	
S6.003	22.839	0.528	43.3	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
S7.000	70.667	0.353	200.2	0.130	5.00	0.0	0.600		o	300	Pipe/Conduit	
S7.001	62.954	0.751	83.8	0.132	0.00	0.0	0.600		o	375	Pipe/Conduit	
S7.002	88.256	0.256	344.8	0.178	0.00	0.0	0.600		o	600	Pipe/Conduit	
S7.003	17.486	0.880	19.9	0.195	0.00	0.0	0.600		o	600	Pipe/Conduit	
S6.004	22.586	0.194	116.7	0.130	0.00	0.0	0.600		o	750	Pipe/Conduit	
S6.005	36.440	0.634	57.4	0.199	0.00	0.0	0.600		o	750	Pipe/Conduit	
S6.006	11.710	0.514	22.8	0.000	0.00	0.0	0.600		o	750	Pipe/Conduit	
S6.007	17.779	0.664	26.8	0.179	0.00	0.0	0.600		o	750	Pipe/Conduit	
S6.008	25.942	0.684	37.9	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S2.004	117.36	7.97	56.864	0.880	0.0	0.0	0.0	1.21	341.1	335.7
S2.005	115.03	8.30	56.848	0.880	0.0	0.0	0.0	1.18	334.1<	335.7
S2.006	113.41	8.53	56.773	0.880	0.0	0.0	0.0	1.47	416.8	335.7
S1.001	109.54	9.13	56.696	0.880	0.0	0.0	0.0	0.28	11.0<	335.7
S1.002	105.59	9.78	56.532	0.880	0.0	0.0	0.0	0.27	10.6<	335.7
S6.000	129.34	6.51	77.400	0.112	0.0	0.0	0.0	0.81	57.3	47.1
S6.001	125.24	6.97	77.127	0.174	0.0	0.0	0.0	2.14	236.5	70.7
S6.002	120.42	7.56	76.296	0.416	0.0	0.0	0.0	1.83	291.2	162.7
S6.003	119.48	7.69	75.769	0.416	0.0	0.0	0.0	3.10	492.7	162.7
S7.000	133.58	6.06	77.325	0.130	0.0	0.0	0.0	1.11	78.3	56.5
S7.001	128.56	6.59	76.972	0.262	0.0	0.0	0.0	1.98	218.7	109.4
S7.002	119.23	7.72	76.146	0.440	0.0	0.0	0.0	1.31	369.2	170.4
S7.003	118.83	7.77	75.890	0.634	0.0	0.0	0.0	5.48	1549.3	245.0
S6.004	117.75	7.92	75.050	1.180	0.0	0.0	0.0	2.59	1144.1	451.7
S6.005	116.55	8.08	74.856	1.380	0.0	0.0	0.0	3.70	1633.2	522.5
S6.006	116.31	8.12	74.222	1.380	0.0	0.0	0.0	5.88	2596.7	522.5
S6.007	115.92	8.17	73.708	1.559	0.0	0.0	0.0	5.42	2394.8	587.3
S6.008	114.49	8.37	73.044	1.559	0.0	0.0	0.0	2.13	84.7<	587.3



Network Design Table for Hif - 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S6.009	28.539	1.350	21.1	0.071	0.00	0.0	0.600		o	375	Pipe/Conduit	
S6.010	77.177	1.350	57.2	0.152	0.00	0.0	0.600		o	675	Pipe/Conduit	
S6.011	58.812	1.752	33.6	0.119	0.00	0.0	0.600		o	375	Pipe/Conduit	
S6.012	67.121	0.361	185.9	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
S6.013	71.903	1.444	49.8	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
S8.000	138.967	2.276	61.1	0.000	5.00	0.0	0.600		o	450	Pipe/Conduit	
S9.000	105.000	1.817	57.8	0.000	5.00	0.0	0.600		o	450	Pipe/Conduit	
S6.014	48.752	0.140	348.2	0.000	0.00	0.0	0.600		o	375	Pipe/Conduit	
S6.015	78.285	3.262	24.0	0.000	0.00	0.0	0.600	2 _ /		500	1:2 Ditch	
S6.016	85.833	1.717	50.0	0.000	0.00	0.0	0.600	2 _ /		500	1:2 Ditch	
S6.017	123.053	2.564	48.0	0.000	0.00	0.0	0.600	2 _ /		500	1:2 Ditch	
S10.000	44.624	2.230	20.0	0.058	5.00	0.0	0.600		o	375	Pipe/Conduit	
S10.001	58.458	1.627	35.9	0.065	0.00	0.0	0.600		o	375	Pipe/Conduit	
S10.002	66.499	2.163	30.7	0.086	0.00	0.0	0.600		o	375	Pipe/Conduit	
S10.003	97.480	2.928	33.3	0.105	0.00	0.0	0.600		o	450	Pipe/Conduit	
S10.004	101.171	3.035	33.3	0.138	0.00	0.0	0.600		o	450	Pipe/Conduit	
S10.005	44.955	1.752	25.7	0.095	0.00	0.0	0.600		o	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 (l/s)	Flow (l/s)
S6.009	113.67	8.49	70.706	1.630	0.0	0.0	0.0	3.96	436.9	602.2
S6.010	111.21	8.86	69.056	1.783	0.0	0.0	0.0	3.47	1242.0	644.2
S6.011	109.22	9.18	68.132	1.902	0.0	0.0	0.0	3.14	346.4	675.1
S6.012	104.77	9.93	66.305	1.902	0.0	0.0	0.0	1.49	236.6	675.1
S6.013	102.48	10.34	65.944	1.902	0.0	0.0	0.0	2.89	459.1	675.1
S8.000	135.34	5.89	67.561	0.000	0.0	0.0	0.0	2.61	414.4	0.0
S9.000	137.81	5.65	67.102	0.000	0.0	0.0	0.0	2.68	426.0	0.0
S6.014	98.17	11.19	64.500	1.902	0.0	0.0	0.0	0.97	106.6	675.1
S6.015	97.05	11.42	65.145	1.902	0.0	0.0	0.0	5.57	1837.3	675.1
S6.016	95.32	11.79	61.883	1.902	0.0	0.0	0.0	3.85	1271.6	675.1
S6.017	93.01	12.31	60.166	1.902	0.0	0.0	0.0	3.93	1298.0	675.1
S10.000	143.18	5.18	73.700	0.058	0.0	0.0	0.0	4.07	449.1	27.0
S10.001	139.44	5.50	71.470	0.123	0.0	0.0	0.0	3.03	334.8	55.8
S10.002	135.82	5.84	69.844	0.209	0.0	0.0	0.0	3.28	362.1	92.2
S10.003	131.26	6.30	67.681	0.314	0.0	0.0	0.0	3.53	561.9	133.9
S10.004	126.90	6.78	64.753	0.452	0.0	0.0	0.0	3.53	561.6	186.5
S10.005	125.29	6.97	61.718	0.547	0.0	0.0	0.0	4.03	640.4	222.8




Network Design Table for Hif - 1










PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S11.000	41.248	2.321	17.8	0.119	5.00	0.0	0.600		o	375	Pipe/Conduit	
S11.001	51.352	1.607	32.0	0.100	0.00	0.0	0.600		o	375	Pipe/Conduit	
S11.002	70.547	2.205	32.0	0.113	0.00	0.0	0.600		o	450	Pipe/Conduit	
S11.003	101.664	2.990	34.0	0.167	0.00	0.0	0.600		o	525	Pipe/Conduit	
S11.004	91.631	2.863	32.0	0.148	0.00	0.0	0.600		o	600	Pipe/Conduit	
S11.005	27.731	0.975	28.4	0.109	0.00	0.0	0.600		o	675	Pipe/Conduit	
S11.006	25.615	0.723	35.4	0.000	0.00	0.0	0.600		o	825	Pipe/Conduit	
S11.007	24.603	0.075	328.0	0.105	0.00	0.0	0.600		o	900	Pipe/Conduit	
S10.006	11.359	0.447	25.4	0.127	0.00	0.0	0.600		o	900	Pipe/Conduit	
S10.007	59.216	0.148	400.1	0.123	0.00	0.0	0.600		o	900	Pipe/Conduit	
S10.008	113.920	0.105	1085.0	0.000	0.00	0.0	0.600		o	1200	Pipe/Conduit	
S12.000	32.318	0.966	33.5	0.000	5.00	0.0	0.600		o	1500	Pipe/Conduit	
S10.009	28.952	0.113	256.2	0.000	0.00	0.0	0.600		o	375	Pipe/Conduit	
S10.010	177.396	0.443	400.0	0.000	0.00	0.0	0.600	2 \ \ /		500	1:2 Ditch	
S10.011	229.708	0.588	390.7	0.000	0.00	0.0	0.600	2 \ \ /		500	1:2 Ditch	
S6.018	114.495	0.286	400.0	0.000	0.00	0.0	0.600	2 \ \ /		500	1:2 Ditch	
S6.019	94.333	0.314	300.4	0.000	0.00	0.0	0.600	2 \ \ /		500	1:2 Ditch	
S6.020	25.174	0.325	77.5	0.000	0.00	0.0	0.600	2 \ \ /		500	1:2 Ditch	

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 (l/s)	Flow (l/s)
S11.000	143.47	5.16	73.700	0.119	0.0	0.0	0.0	4.32	476.7	55.7
S11.001	140.33	5.43	71.379	0.219	0.0	0.0	0.0	3.22	355.1	100.0
S11.002	136.77	5.75	69.772	0.332	0.0	0.0	0.0	3.60	573.2	147.7
S11.003	132.32	6.19	67.492	0.499	0.0	0.0	0.0	3.85	833.6	214.6
S11.004	129.00	6.55	64.427	0.647	0.0	0.0	0.0	4.32	1220.1	271.2
S11.005	128.15	6.64	61.489	0.756	0.0	0.0	0.0	4.93	1762.8	314.7
S11.006	127.39	6.72	60.389	0.756	0.0	0.0	0.0	5.00	2671.4	314.7
S11.007	125.32	6.96	59.591	0.860	0.0	0.0	0.0	1.72	1097.0	350.4
S10.006	125.04	7.00	59.516	1.534	0.0	0.0	0.0	6.23	3962.8	623.5
S10.007	119.93	7.63	59.069	1.658	0.0	0.0	0.0	1.56	992.6	646.1
S10.008	108.38	9.31	58.921	1.658	0.0	0.0	0.0	1.13	1274.8	646.1
S12.000	144.56	5.07	59.657	0.000	0.0	0.0	0.0	7.43	13123.6	0.0
S10.009	105.84	9.74	58.816	1.658	0.0	0.0	0.0	1.13	124.5	646.1
S10.010	94.72	11.92	58.633	1.658	0.0	0.0	0.0	1.35	446.9	646.1
S10.011	83.82	14.72	58.190	1.658	0.0	0.0	0.0	1.37	452.2	646.1
S6.018	79.33	16.13	57.602	3.559	0.0	0.0	0.0	1.35	446.9	917.7
S6.019	76.45	17.13	57.316	3.559	0.0	0.0	0.0	1.56	516.3	917.7
S6.020	76.08	17.27	57.002	3.559	0.0	0.0	0.0	3.09	1020.8	917.7


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Milton Keynes East		
HIF 8 None pumped section Pump inflow excluded		
Date 26/05/2021		Designed by DSF
File HIF 1 P0.3.MDX		Checked by PB
XP Solutions		Network 2018.1.1

Network Design Table for Hif - 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S6.021	15.706	0.590	26.6	0.000	0.00	0.0	0.600	2	_/\	500	1:2 Ditch	
S1.003	17.870	0.060	300.0	0.000	0.00	0.0	0.600	2	_/\	500	1:2 Ditch	
S1.004	27.388	0.091	300.0	0.000	0.00	0.0	0.600		o	675	Pipe/Conduit	
S1.005	68.216	0.227	300.0	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
S1.006	64.793	0.216	300.0	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
S1.007	93.565	0.187	500.0	0.000	0.00	0.0	0.600	2	_/\	500	1:2 Ditch	
S1.008	88.864	0.178	500.0	0.000	0.00	0.0	0.600	2	_/\	500	1:2 Ditch	
S1.009	88.864	0.178	500.0	0.000	0.00	0.0	0.600	2	_/\	500	1:2 Ditch	
S1.010	12.148	0.060	202.5	0.000	0.00	0.0	0.600	2	_/\	1200	1:2 Ditch	

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 (l/s)	Flow (l/s)
S6.021	75.95	17.32	56.677	3.559	0.0	0.0	0.0	5.29	1744.3	917.7
S1.003	75.44	17.51	56.087	4.440	0.0	0.0	0.0	1.57	516.6	1088.4
S1.004	74.64	17.81	56.027	4.440	0.0	0.0	0.0	1.51	539.6	1088.4
S1.005	72.59	18.62	55.936	4.440	0.0	0.0	0.0	1.40	396.0	1088.4
S1.006	70.76	19.39	55.709	4.440	0.0	0.0	0.0	1.40	396.0	1088.4
S1.007	67.92	20.68	55.493	4.440	0.0	0.0	0.0	1.21	399.3	1088.4
S1.008	65.45	21.91	55.306	4.440	0.0	0.0	0.0	1.21	399.3	1088.4
S1.009	63.18	23.13	55.128	4.440	0.0	0.0	0.0	1.21	399.3	1088.4
S1.010	63.01	23.23	54.950	4.440	0.0	0.0	0.0	2.12	1145.7	1088.4

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Milton Keynes East HIF 8 None pumped section Pump inflow excluded		
Date 26/05/2021 File HIF 1 P0.3.MDX		Designed by DSF Checked by PB
XP Solutions		Network 2018.1.1

Manhole Schedules for Hif - 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
HW108	58.286	1.472	Open Manhole	1500	S1.000	56.814	675				
109	62.778	2.918	Open Manhole	1050	S2.000	59.860	225				
110	61.155	2.211	Open Manhole	1200	S2.001	58.944	225	S2.000	58.944	225	
111	59.453	1.500	Open Manhole	1200	S2.002	57.953	300	S2.001	58.028	225	
112	58.998	1.500	Open Manhole	1200	S2.003	57.498	300	S2.002	57.759	300	263
113	59.600	1.425	Open Manhole	1200	S3.000	58.175	225				
114	59.107	1.500	Open Manhole	1200	S3.001	57.607	300	S3.000	57.682	225	
115	58.875	1.500	Open Manhole	1200	S3.002	57.375	300	S3.001	57.375	300	
116	59.814	1.425	Open Manhole	1200	S4.000	58.389	225				
117	59.405	1.500	Open Manhole	1200	S4.001	57.905	300	S4.000	57.980	225	
118	58.996	1.675	Open Manhole	1350	S4.002	57.321	375	S4.001	57.700	300	304
119	62.441	2.531	Open Manhole	1050	S5.000	59.910	300				
120	61.153	1.920	Open Manhole	1200	S5.001	59.233	300	S5.000	59.233	300	
121	59.801	1.500	Open Manhole	1200	S5.002	58.301	300	S5.001	58.301	300	
122	59.046	1.575	Open Manhole	1500	S5.003	57.471	375	S5.002	57.546	300	
123	58.922	1.594	Open Manhole	1500	S5.004	57.328	375	S5.003	57.328	375	
124	58.813	1.752	Open Manhole	1500	S4.003	57.061	450	S4.002	57.136	375	
125	58.826	1.962	Open Manhole	1800	S2.004	56.864	600	S5.004	57.136	375	
								S2.003	57.164	300	
								S3.002	57.164	300	
								S4.003	57.014	450	
126	58.000	1.152	Open Manhole	1500	S2.005	56.848	600	S2.004	56.848	600	
HW127	58.000	1.227	Open Manhole	1200	S2.006	56.773	600	S2.005	56.793	600	20
POND 5a	58.296	1.600	Open Manhole	1050	S1.001	56.696	225	S1.000	56.696	675	
								S2.006	56.696	600	
FC129	58.200	1.668	Open Manhole	1800	S1.002	56.532	225	S1.001	56.626	225	94
130	78.259	0.859	Open Manhole	1200	S6.000	77.400	300				
131	78.000	0.873	Open Manhole	1350	S6.001	77.127	375	S6.000	77.202	300	
132	77.120	0.824	Open Manhole	1350	S6.002	76.296	450	S6.001	76.296	375	
133	78.661	2.893	Open Manhole	1350	S6.003	75.769	450	S6.002	75.768	450	
134	78.283	0.958	Open Manhole	1200	S7.000	77.325	300				
135	78.378	1.406	Open Manhole	1350	S7.001	76.972	375	S7.000	76.972	300	
136	77.483	1.337	Open Manhole	1500	S7.002	76.146	600	S7.001	76.221	375	
137	78.377	2.487	Open Manhole	1500	S7.003	75.890	600	S7.002	75.890	600	
138	77.000	1.990	Open Manhole	1800	S6.004	75.050	750	S6.003	75.241	450	
								S7.003	75.010	600	
139	76.000	1.144	Open Manhole	1800	S6.005	74.856	750	S6.004	74.856	750	
140	75.906	1.684	Open Manhole	1800	S6.006	74.222	750	S6.005	74.222	750	

Milton Keynes East
HIF 8 None pumped section
Pump inflow excluded




Date 26/05/2021
File HIF 1 PO.3.MDX
Designed by DSF
Checked by PB

XP Solutions Network 2018.1.1

Manhole Schedules for Hif - 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdr (mm)
HW141	75.629	1.921	Open Manhole	1800	S6.007	73.708	750	S6.006	73.708	750	
POND 2	75.044	2.000	Open Manhole	1800	S6.008	73.044	225	S6.007	73.044	750	
FC143	73.059	2.353	Open Manhole	1350	S6.009	70.706	375	S6.008	72.360	225	150
144	71.814	2.758	Open Manhole	1500	S6.010	69.056	675	S6.009	69.356	375	
145	69.998	2.292	Open Manhole	1500	S6.011	68.132	375	S6.010	67.706	675	
146	68.040	1.735	Open Manhole	1350	S6.012	66.305	450	S6.011	66.380	375	
HW147	68.246	2.302	Open Manhole	1350	S6.013	65.944	450	S6.012	65.944	450	
149	69.231	1.670	Open Manhole	1350	S8.000	67.561	450				
151	68.855	1.753	Open Manhole	1350	S9.000	67.102	450				
POND 3	66.500	2.000	Open Manhole	1350	S6.014	64.500	375	S6.013	64.500	450	
								S8.000	65.285	450	80
								S9.000	65.285	450	80
FC153	67.263	2.903	Open Manhole	1500	S6.015	65.145	500	S6.014	64.360	375	
154	63.088	1.205	Junction		S6.016	61.883	500	S6.015	61.883	500	
155	61.563	1.397	Junction		S6.017	60.166	500	S6.016	60.166	500	
156	76.224	2.524	Open Manhole	1350	S10.000	73.700	375				
157	73.085	1.615	Open Manhole	1350	S10.001	71.470	375	S10.000	71.470	375	
158	71.452	1.609	Open Manhole	1350	S10.002	69.844	375	S10.001	69.843	375	
159	69.418	1.737	Open Manhole	1350	S10.003	67.681	450	S10.002	67.681	375	
160	66.471	1.718	Open Manhole	1350	S10.004	64.753	450	S10.003	64.753	450	
161	63.498	1.780	Open Manhole	1350	S10.005	61.718	450	S10.004	61.718	450	
162	76.131	2.431	Open Manhole	1350	S11.000	73.700	375				
163	72.864	1.485	Open Manhole	1350	S11.001	71.379	375	S11.000	71.379	375	
164	71.462	1.690	Open Manhole	1350	S11.002	69.772	450	S11.001	69.772	375	
165	69.320	1.828	Open Manhole	1500	S11.003	67.492	525	S11.002	67.567	450	
166	66.302	1.875	Open Manhole	1500	S11.004	64.427	600	S11.003	64.502	525	
167	63.573	2.084	Open Manhole	1500	S11.005	61.489	675	S11.004	61.564	600	
168	62.504	2.115	Open Manhole	1800	S11.006	60.389	825	S11.005	60.514	675	
169	62.061	2.470	Open Manhole	1800	S11.007	59.591	900	S11.006	59.666	825	
170	61.918	2.402	Open Manhole	1800	S10.006	59.516	900	S10.005	59.966	450	
								S11.007	59.516	900	
171	62.279	3.210	Open Manhole	1800	S10.007	59.069	900	S10.006	59.069	900	
HW172	61.510	2.589	Open Manhole	2100	S10.008	58.921	1200	S10.007	58.921	900	
177	62.731	3.074	Open Manhole	2400	S12.000	59.657	1500				
POND 1	60.691	2.000	Open Manhole	2400	S10.009	58.816	375	S10.008	58.816	1200	
								S12.000	58.691	1500	
FC179	60.861	2.228	Open Manhole	1500	S10.010	58.633	500	S10.009	58.703	375	150
180	60.533	2.343	Junction		S10.011	58.190	500	S10.010	58.190	500	

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Manhole Schedules for Hif - 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
181	60.011	2.409	Junction		S6.018	57.602	500	S6.017	57.602	500	
								S10.011	57.602	500	
182	59.094	1.778	Junction		S6.019	57.316	500	S6.018	57.316	500	
183	58.637	1.635	Junction		S6.020	57.002	500	S6.019	57.002	500	
184	58.139	1.462	Junction		S6.021	56.677	500	S6.020	56.677	500	
185	58.178	2.091	Open Manhole	1500	S1.003	56.087	500	S1.002	56.462	225	300
								S6.021	56.087	500	
186	58.257	2.230	Open Manhole	1500	S1.004	56.027	675	S1.003	56.027	500	
187	58.257	2.321	Open Manhole	1500	S1.005	55.936	600	S1.004	55.936	675	
188	58.326	2.617	Open Manhole	1500	S1.006	55.709	600	S1.005	55.709	600	
189	57.200	1.707	Open Manhole	1050	S1.007	55.493	500	S1.006	55.493	600	
190	57.200	1.894	Open Manhole	1050	S1.008	55.306	500	S1.007	55.306	500	
191	57.269	2.141	Open Manhole	1050	S1.009	55.128	500	S1.008	55.128	500	
92	57.000	2.050	Junction		S1.010	54.950	1200	S1.009	54.950	500	
804	57.000	2.110	Open Manhole	1200		OUTFALL		S1.010	54.890	1200	

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Area Summary for Hif - 1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.000	0.000	0.000
2.000	User	-	100	0.073	0.073	0.073
	User	-	100	0.051	0.051	0.124
2.001	-	-	100	0.000	0.000	0.000
2.002	User	-	100	0.026	0.026	0.026
2.003	User	-	100	0.035	0.035	0.035
	User	-	100	0.054	0.054	0.089
3.000	User	-	100	0.074	0.074	0.074
3.001	User	-	100	0.064	0.064	0.064
3.002	User	-	100	0.035	0.035	0.035
4.000	User	-	100	0.041	0.041	0.041
4.001	User	-	100	0.024	0.024	0.024
	User	-	100	0.068	0.068	0.091
4.002	User	-	100	0.054	0.054	0.054
5.000	User	-	100	0.065	0.065	0.065
	User	-	100	0.056	0.056	0.121
5.001	-	-	100	0.000	0.000	0.000
5.002	User	-	100	0.067	0.067	0.067
5.003	User	-	100	0.060	0.060	0.060
5.004	User	-	100	0.033	0.033	0.033
4.003	-	-	100	0.000	0.000	0.000
2.004	-	-	100	0.000	0.000	0.000
2.005	-	-	100	0.000	0.000	0.000
2.006	-	-	100	0.000	0.000	0.000
1.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.000	0.000	0.000
6.000	User	-	100	0.112	0.112	0.112
6.001	User	-	100	0.062	0.062	0.062
6.002	User	-	100	0.242	0.242	0.242
6.003	-	-	100	0.000	0.000	0.000
7.000	User	-	100	0.130	0.130	0.130
7.001	User	-	100	0.132	0.132	0.132
7.002	User	-	100	0.178	0.178	0.178
7.003	User	-	100	0.195	0.195	0.195
6.004	User	-	100	0.130	0.130	0.130
6.005	User	-	100	0.199	0.199	0.199
6.006	-	-	100	0.000	0.000	0.000
6.007	User	-	100	0.179	0.179	0.179
6.008	-	-	100	0.000	0.000	0.000
6.009	User	-	100	0.071	0.071	0.071
6.010	User	-	100	0.152	0.152	0.152
6.011	User	-	100	0.119	0.119	0.119
6.012	-	-	100	0.000	0.000	0.000
6.013	-	-	100	0.000	0.000	0.000
8.000	-	-	100	0.000	0.000	0.000
9.000	-	-	100	0.000	0.000	0.000
6.014	-	-	100	0.000	0.000	0.000
6.015	-	-	100	0.000	0.000	0.000
6.016	-	-	100	0.000	0.000	0.000
6.017	-	-	100	0.000	0.000	0.000
10.000	User	-	100	0.058	0.058	0.058

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Area Summary for Hif - 1


Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
10.001	User	-	100	0.065	0.065	0.065
10.002	User	-	100	0.086	0.086	0.086
10.003	User	-	100	0.105	0.105	0.105
10.004	User	-	100	0.138	0.138	0.138
10.005	User	-	100	0.095	0.095	0.095
11.000	User	-	100	0.119	0.119	0.119
11.001	User	-	100	0.100	0.100	0.100
11.002	User	-	100	0.113	0.113	0.113
11.003	User	-	100	0.167	0.167	0.167
11.004	User	-	100	0.148	0.148	0.148
11.005	User	-	100	0.109	0.109	0.109
11.006	-	-	100	0.000	0.000	0.000
11.007	User	-	100	0.105	0.105	0.105
10.006	User	-	100	0.127	0.127	0.127
10.007	User	-	100	0.123	0.123	0.123
10.008	-	-	100	0.000	0.000	0.000
12.000	-	-	100	0.000	0.000	0.000
10.009	-	-	100	0.000	0.000	0.000
10.010	-	-	100	0.000	0.000	0.000
10.011	-	-	100	0.000	0.000	0.000
6.018	-	-	100	0.000	0.000	0.000
6.019	-	-	100	0.000	0.000	0.000
6.020	-	-	100	0.000	0.000	0.000
6.021	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
1.010	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				4.440	4.440	4.440

Simulation Criteria for Hif - 1

Volumetric Runoff Coeff	0.950	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	0.000
Hot Start (mins)	0	Inlet Coefficient	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)	960
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	8

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

Synthetic Rainfall Details


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Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 489026 242081 SP 89026 42081
Data Type	Point
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.950
Storm Duration (mins)	480

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Online Controls for Hif - 1

Hydro-Brake® Optimum Manhole: FC129, DS/PN: S1.002, Volume (m³): 4.6

Unit Reference	MD-SHE-0121-6000-0600-6000
Design Head (m)	0.600
Design Flow (l/s)	6.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	121
Invert Level (m)	56.532
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200


Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.600	6.0
Flush-Flo™	0.202	6.0
Kick-Flo®	0.435	5.2
Mean Flow over Head Range	-	5.0

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.3	1.200	8.3	3.000	12.8	7.000	19.2
0.200	6.0	1.400	8.9	3.500	13.8	7.500	19.9
0.300	5.9	1.600	9.5	4.000	14.7	8.000	20.5
0.400	5.5	1.800	10.0	4.500	15.5	8.500	21.1
0.500	5.5	2.000	10.6	5.000	16.3	9.000	21.8
0.600	6.0	2.200	11.0	5.500	17.1	9.500	22.4
0.800	6.9	2.400	11.5	6.000	17.8		
1.000	7.6	2.600	12.0	6.500	18.5		

Hydro-Brake® Optimum Manhole: POND 2, DS/PN: S6.008, Volume (m³): 12.1

Unit Reference	MD-SHE-0104-6200-1900-6200
Design Head (m)	1.900
Design Flow (l/s)	6.2
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	104
Invert Level (m)	73.044
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

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Hydro-Brake® Optimum Manhole: POND 2, DS/PN: S6.008, Volume (m³): 12.1

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.900	6.2
Flush-Flo™	0.455	5.6
Kick-Flo®	0.926	4.4
Mean Flow over Head Range	-	5.1

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.5	1.200	5.0	3.000	7.7	7.000	11.5
0.200	5.0	1.400	5.4	3.500	8.3	7.500	11.9
0.300	5.4	1.600	5.7	4.000	8.8	8.000	12.2
0.400	5.5	1.800	6.0	4.500	9.3	8.500	12.6
0.500	5.5	2.000	6.3	5.000	9.8	9.000	12.9
0.600	5.5	2.200	6.6	5.500	10.2	9.500	13.3
0.800	5.1	2.400	6.9	6.000	10.7		
1.000	4.6	2.600	7.2	6.500	11.1		


Hydro-Brake® Optimum Manhole: POND 3, DS/PN: S6.014, Volume (m³): 52.5

Unit Reference	MD-SHE-0131-7600-0800-7600
Design Head (m)	0.800
Design Flow (l/s)	7.6
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	131
Invert Level (m)	64.500
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	7.6
Flush-Flo™	0.251	7.6
Kick-Flo®	0.557	6.4
Mean Flow over Head Range	-	6.5

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.7	0.300	7.5	0.500	7.0	0.800	7.6
0.200	7.5	0.400	7.4	0.600	6.6	1.000	8.4

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Hydro-Brake® Optimum Manhole: POND 3, DS/PN: S6.014, Volume (m³): 52.5

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
1.200	9.2	2.400	12.7	5.000	18.1	8.000	22.7
1.400	9.9	2.600	13.2	5.500	18.9	8.500	23.3
1.600	10.5	3.000	14.2	6.000	19.7	9.000	24.0
1.800	11.1	3.500	15.2	6.500	20.5	9.500	24.6
2.000	11.7	4.000	16.2	7.000	21.3		
2.200	12.2	4.500	17.2	7.500	22.0		

Hydro-Brake® Optimum Manhole: POND 1, DS/PN: S10.009, Volume (m³): 187.6

Unit Reference	MD-SHE-0134-1000-1800-1000
Design Head (m)	1.800
Design Flow (l/s)	10.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	134
Invert Level (m)	58.816
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.800	10.0
Flush-Flo™	0.525	10.0
Kick-Flo®	1.089	7.9
Mean Flow over Head Range	-	8.7

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.8	1.200	8.3	3.000	12.7	7.000	19.1
0.200	8.6	1.400	8.9	3.500	13.7	7.500	19.7
0.300	9.5	1.600	9.5	4.000	14.6	8.000	20.3
0.400	9.8	1.800	10.0	4.500	15.4	8.500	20.9
0.500	10.0	2.000	10.5	5.000	16.2	9.000	21.5
0.600	9.9	2.200	11.0	5.500	17.0	9.500	22.1
0.800	9.6	2.400	11.5	6.000	17.7		
1.000	8.7	2.600	11.9	6.500	18.4		

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Storage Structures for Hif - 1

Tank or Pond Manhole: POND 5a, DS/PN: S1.001

Invert Level (m) 56.696

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	900.0	1.600	1100.0

Tank or Pond Manhole: POND 2, DS/PN: S6.008

Invert Level (m) 73.044

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	600.0	2.000	1200.0

Tank or Pond Manhole: POND 3, DS/PN: S6.014


Invert Level (m) 64.500

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	525.0	2.000	1000.0

Tank or Pond Manhole: POND 1, DS/PN: S10.009

Invert Level (m) 58.816

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	800.0	0.175	1550.0	1.875	1900.0

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	HW108	480 Summer	2	+0%					56.873
S2.000	109	15 Summer	2	+0%	100/15 Summer				59.963
S2.001	110	15 Summer	2	+0%	100/15 Summer				59.045
S2.002	111	15 Summer	2	+0%	100/15 Summer				58.095
S2.003	112	15 Summer	2	+0%	30/15 Summer				57.633
S3.000	113	15 Summer	2	+0%	100/15 Summer				58.268
S3.001	114	15 Summer	2	+0%	100/15 Summer				57.719
S3.002	115	15 Summer	2	+0%	30/15 Summer				57.505
S4.000	116	15 Summer	2	+0%	100/15 Summer				58.450
S4.001	117	15 Summer	2	+0%	100/15 Summer				58.031
S4.002	118	15 Summer	2	+0%	30/15 Summer				57.456
S5.000	119	15 Summer	2	+0%	100/15 Summer				60.020
S5.001	120	15 Summer	2	+0%	100/15 Summer				59.324
S5.002	121	15 Summer	2	+0%	100/15 Summer				58.423
S5.003	122	15 Summer	2	+0%	30/15 Summer				57.622
S5.004	123	15 Summer	2	+0%	30/15 Summer				57.474
S4.003	124	15 Summer	2	+0%	30/15 Summer				57.357

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Level Status	Exceeded
		Depth (m)	Volume (m ³)					
S1.000	HW108	-0.616	0.000	0.00		0.0	OK	
S2.000	109	-0.122	0.000	0.42		24.7	OK	
S2.001	110	-0.124	0.000	0.41		23.9	OK	
S2.002	111	-0.158	0.000	0.45		27.8	OK	
S2.003	112	-0.165	0.000	0.40		40.1	OK	
S3.000	113	-0.132	0.000	0.34		14.6	OK	
S3.001	114	-0.188	0.000	0.29		25.1	OK	
S3.002	115	-0.170	0.000	0.38		30.2	OK	
S4.000	116	-0.164	0.000	0.16		8.2	OK	
S4.001	117	-0.174	0.000	0.37		23.9	OK	
S4.002	118	-0.240	0.000	0.27		31.6	OK	
S5.000	119	-0.190	0.000	0.28		23.8	OK	
S5.001	120	-0.209	0.000	0.20		23.2	OK	
S5.002	121	-0.178	0.000	0.34		33.4	OK	
S5.003	122	-0.224	0.000	0.33		42.2	OK	
S5.004	123	-0.229	0.000	0.32		46.6	OK	
S4.003	124	-0.154	0.000	0.61		73.5	OK	

. Milton Keynes East
 . HIF 8 None pumped section
 . Pump inflow excluded




Date 26/05/2021 Designed by DSF
 File HIF 1 P0.3.MDX Checked by PB

XP Solutions Network 2018.1.1


2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
S2.004	125	15 Summer	2	+0%	30/15 Summer			
S2.005	126	15 Summer	2	+0%	30/15 Summer			
S2.006	HW127	15 Summer	2	+0%	100/15 Summer			
S1.001	POND 5a	480 Summer	2	+0%	5/360 Summer			
S1.002	FC129	480 Summer	2	+0%	2/120 Summer			
S6.000	130	15 Summer	2	+0%	100/15 Summer			
S6.001	131	15 Summer	2	+0%				
S6.002	132	15 Summer	2	+0%	100/15 Summer			
S6.003	133	15 Summer	2	+0%	100/15 Summer			
S7.000	134	15 Summer	2	+0%	100/15 Summer			
S7.001	135	15 Summer	2	+0%	100/15 Summer			
S7.002	136	15 Summer	2	+0%				
S7.003	137	15 Summer	2	+0%				
S6.004	138	15 Summer	2	+0%	100/15 Summer			
S6.005	139	15 Summer	2	+0%				
S6.006	140	15 Summer	2	+0%				
S6.007	HW141	15 Summer	2	+0%	100/120 Summer			
S6.008	POND 2	480 Winter	2	+0%	2/30 Summer			
S6.009	FC143	30 Summer	2	+0%				
S6.010	144	15 Summer	2	+0%				
S6.011	145	15 Summer	2	+0%				
S6.012	146	15 Summer	2	+0%	100/15 Summer			
S6.013	HW147	15 Summer	2	+0%				
S8.000	149	120 Winter	2	+0%				
S9.000	151	120 Winter	2	+0%				
S6.014	POND 3	4320 Winter	2	+0%	2/360 Summer			
S6.015	FC153	4320 Winter	2	+0%				
S6.016	154	4320 Winter	2	+0%				
S6.017	155	4320 Winter	2	+0%				
S10.000	156	15 Summer	2	+0%				
S10.001	157	15 Summer	2	+0%				
S10.002	158	15 Summer	2	+0%				
S10.003	159	15 Summer	2	+0%				
S10.004	160	15 Summer	2	+0%				
S10.005	161	15 Summer	2	+0%				
S11.000	162	15 Summer	2	+0%				
S11.001	163	15 Summer	2	+0%				
S11.002	164	15 Summer	2	+0%				
S11.003	165	15 Summer	2	+0%				
S11.004	166	15 Summer	2	+0%				
S11.005	167	15 Summer	2	+0%				
S11.006	168	15 Summer	2	+0%				
S11.007	169	15 Summer	2	+0%	100/15 Summer			
S10.006	170	15 Summer	2	+0%	100/15 Summer			
S10.007	171	15 Summer	2	+0%	100/15 Summer			
S10.008	HW172	15 Summer	2	+0%				
S12.000	177	120 Winter	2	+0%				
S10.009	POND 1	480 Summer	2	+0%	30/120 Summer			

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Milton Keynes East HIF 8 None pumped section Pump inflow excluded		
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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S2.004	125	57.327	-0.137	0.000	0.97	139.1	OK	
S2.005	126	57.162	-0.286	0.000	0.54	139.5	OK	
S2.006	HW127	57.051	-0.322	0.000	0.44	138.5	OK	
S1.001	POND 5a	56.873	-0.048	0.000	0.63	6.8	OK	
S1.002	FC129	56.847	0.090	0.000	0.57	6.0	SURCHARGED	
S6.000	130	77.535	-0.165	0.000	0.41	22.7	OK	
S6.001	131	77.223	-0.279	0.000	0.14	31.9	OK	
S6.002	132	76.453	-0.293	0.000	0.25	68.7	OK	
S6.003	133	75.894	-0.325	0.000	0.17	69.3	OK	
S7.000	134	77.448	-0.177	0.000	0.33	25.1	OK	
S7.001	135	77.093	-0.254	0.000	0.22	46.0	OK	
S7.002	136	76.337	-0.409	0.000	0.21	70.9	OK	
S7.003	137	76.025	-0.465	0.000	0.11	99.4	OK	
S6.004	138	75.318	-0.482	0.000	0.27	188.2	OK	
S6.005	139	75.068	-0.538	0.000	0.17	217.9	OK	
S6.006	140	74.446	-0.526	0.000	0.19	218.5	OK	
S6.007	HW141	73.930	-0.528	0.000	0.19	243.9	OK	
S6.008	POND 2	73.534	0.265	0.000	0.07	5.2	SURCHARGED	
S6.009	FC143	70.753	-0.328	0.000	0.04	14.2	OK	
S6.010	144	69.138	-0.593	0.000	0.03	39.0	OK	
S6.011	145	68.240	-0.267	0.000	0.18	59.1	OK	
S6.012	146	66.462	-0.293	0.000	0.26	57.4	OK	
S6.013	HW147	66.052	-0.342	0.000	0.13	57.0	OK	
S8.000	149	67.561	-0.450	0.000	0.00	0.0	OK	
S9.000	151	67.102	-0.450	0.000	0.00	0.0	OK	
S6.014	POND 3	65.268	0.393	0.000	0.05	4.9	SURCHARGED	
S6.015	FC153	65.149	-2.114	0.000	0.00	4.9	OK	
S6.016	154	61.891	-1.197	0.000	0.00	4.9	OK	
S6.017	155	60.173	-1.390	0.000	0.00	4.9	OK	
S10.000	156	73.742	-0.333	0.000	0.03	11.8	OK	
S10.001	157	71.537	-0.308	0.000	0.07	22.7	OK	
S10.002	158	69.927	-0.292	0.000	0.11	37.1	OK	
S10.003	159	67.778	-0.353	0.000	0.10	54.7	OK	
S10.004	160	64.867	-0.336	0.000	0.14	76.9	OK	
S10.005	161	61.838	-0.330	0.000	0.16	92.2	OK	
S11.000	162	73.757	-0.318	0.000	0.06	24.3	OK	
S11.001	163	71.467	-0.287	0.000	0.13	41.3	OK	
S11.002	164	69.873	-0.349	0.000	0.11	60.1	OK	
S11.003	165	67.610	-0.407	0.000	0.11	89.1	OK	
S11.004	166	64.554	-0.473	0.000	0.10	113.4	OK	
S11.005	167	61.635	-0.529	0.000	0.10	131.2	OK	
S11.006	168	60.546	-0.668	0.000	0.08	131.0	OK	
S11.007	169	59.895	-0.596	0.000	0.25	145.6	OK	
S10.006	170	59.766	-0.650	0.000	0.17	256.2	OK	
S10.007	171	59.450	-0.519	0.000	0.32	267.2	OK	
S10.008	HW172	59.306	-0.815	0.000	0.23	263.7	OK	
S12.000	177	59.657	-1.500	0.000	0.00	0.0	OK	


.	Milton Keynes East	
.	HIF 8 None pumped section	
.	Pump inflow excluded	

Date 26/05/2021	Designed by DSF
File HIF 1 P0.3.MDX	Checked by PB

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1


PN	US/MH Name	Water		Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)				
S10.009	POND 1	59.057	-0.134	0.000	0.08			9.0	OK	

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S10.010	FC179	480 Summer	2	+0%					58.659
S10.011	180	480 Summer	2	+0%					58.215
S6.018	181	4320 Winter	2	+0%					57.629
S6.019	182	4320 Winter	2	+0%					57.345
S6.020	183	4320 Winter	2	+0%					57.017
S6.021	184	4320 Winter	2	+0%					56.687
S1.003	185	480 Summer	2	+0%					56.142
S1.004	186	480 Summer	2	+0%					56.109
S1.005	187	480 Summer	2	+0%					56.014
S1.006	188	480 Summer	2	+0%					55.787
S1.007	189	480 Summer	2	+0%					55.545
S1.008	190	480 Summer	2	+0%					55.360
S1.009	191	480 Summer	2	+0%					55.191
S1.010	92	360 Summer	2	+0%					55.095

PN	US/MH Name	Surcharged		Flooded	Pipe		Level	
		Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status	Exceeded
S10.010	FC179	-2.202	0.000	0.00		9.0	OK	
S10.011	180	-2.318	0.000	0.00		9.0	OK	
S6.018	181	-2.382	0.000	0.00		9.7	OK	
S6.019	182	-1.749	0.000	0.00		9.7	OK	
S6.020	183	-1.620	0.000	0.00		9.7	OK	
S6.021	184	-1.452	0.000	0.00		9.7	OK	
S1.003	185	-2.036	0.000	0.00		14.8	OK	
S1.004	186	-0.593	0.000	0.04		14.8	OK	
S1.005	187	-0.522	0.000	0.04		14.8	OK	
S1.006	188	-0.522	0.000	0.04		14.8	OK	
S1.007	189	-1.655	0.000	0.00		14.8	OK	
S1.008	190	-1.840	0.000	0.00		14.8	OK	
S1.009	191	-2.078	0.000	0.00		14.8	OK	
S1.010	92	-1.905	0.000	0.00		14.8	OK	

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.	Milton Keynes East	
.	HIF 8 None pumped section	
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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	HW108	360 Summer	5	+0%					56.921
S2.000	109	15 Summer	5	+0%	100/15 Summer				59.983
S2.001	110	15 Summer	5	+0%	100/15 Summer				59.065
S2.002	111	15 Summer	5	+0%	100/15 Summer				58.123
S2.003	112	15 Summer	5	+0%	30/15 Summer				57.658
S3.000	113	15 Summer	5	+0%	100/15 Summer				58.285
S3.001	114	15 Summer	5	+0%	100/15 Summer				57.738
S3.002	115	15 Summer	5	+0%	30/15 Summer				57.528
S4.000	116	15 Summer	5	+0%	100/15 Summer				58.460
S4.001	117	15 Summer	5	+0%	100/15 Summer				58.055
S4.002	118	15 Summer	5	+0%	30/15 Summer				57.557
S5.000	119	15 Summer	5	+0%	100/15 Summer				60.040
S5.001	120	15 Summer	5	+0%	100/15 Summer				59.339
S5.002	121	15 Summer	5	+0%	100/15 Summer				58.445
S5.003	122	15 Summer	5	+0%	30/15 Summer				57.649
S5.004	123	15 Summer	5	+0%	30/15 Summer				57.564
S4.003	124	15 Summer	5	+0%	30/15 Summer				57.511

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.	Milton Keynes East	
.	HIF 8 None pumped section	
.	Pump inflow excluded	
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XP Solutions	Network 2018.1.1	

5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Pipe	Level Exceeded
		Depth (m)	Volume (m ³)			Flow (l/s)	
S1.000	HW108	-0.568	0.000	0.00		0.0	OK
S2.000	109	-0.102	0.000	0.56		33.1	OK
S2.001	110	-0.104	0.000	0.54		32.1	OK
S2.002	111	-0.130	0.000	0.60		37.2	OK
S2.003	112	-0.140	0.000	0.54		53.6	OK
S3.000	113	-0.115	0.000	0.45		19.3	OK
S3.001	114	-0.169	0.000	0.39		33.3	OK
S3.002	115	-0.147	0.000	0.51		40.2	OK
S4.000	116	-0.154	0.000	0.21		11.0	OK
S4.001	117	-0.150	0.000	0.49		32.1	OK
S4.002	118	-0.139	0.000	0.36		41.9	OK
S5.000	119	-0.170	0.000	0.37		31.9	OK
S5.001	120	-0.194	0.000	0.27		31.1	OK
S5.002	121	-0.156	0.000	0.45		44.8	OK
S5.003	122	-0.197	0.000	0.45		56.5	OK
S5.004	123	-0.139	0.000	0.42		60.7	OK
S4.003	124	0.000	0.000	0.74		89.2	OK

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Milton Keynes East
HIF 8 None pumped section
Pump inflow excluded



Date 26/05/2021
File HIF 1 P0.3.MDX


Designed by DSF
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Network 2018.1.1

5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
S2.004	125	15	Winter	5	+0%	30/15	Summer	
S2.005	126	15	Summer	5	+0%	30/15	Summer	
S2.006	HW127	15	Summer	5	+0%	100/15	Summer	
S1.001	POND 5a	360	Summer	5	+0%	5/360	Summer	
S1.002	FC129	360	Summer	5	+0%	2/120	Summer	
S6.000	130	15	Summer	5	+0%	100/15	Summer	
S6.001	131	15	Summer	5	+0%			
S6.002	132	15	Summer	5	+0%	100/15	Summer	
S6.003	133	15	Summer	5	+0%	100/15	Summer	
S7.000	134	15	Summer	5	+0%	100/15	Summer	
S7.001	135	15	Summer	5	+0%	100/15	Summer	
S7.002	136	15	Summer	5	+0%			
S7.003	137	15	Summer	5	+0%			
S6.004	138	15	Summer	5	+0%	100/15	Summer	
S6.005	139	15	Summer	5	+0%			
S6.006	140	15	Summer	5	+0%			
S6.007	HW141	15	Summer	5	+0%	100/120	Summer	
S6.008	POND 2	480	Winter	5	+0%	2/30	Summer	
S6.009	FC143	15	Summer	5	+0%			
S6.010	144	15	Summer	5	+0%			
S6.011	145	15	Summer	5	+0%			
S6.012	146	15	Summer	5	+0%	100/15	Summer	
S6.013	HW147	15	Summer	5	+0%			
S8.000	149	120	Winter	5	+0%			
S9.000	151	120	Winter	5	+0%			
S6.014	POND 3	4320	Winter	5	+0%	2/360	Summer	
S6.015	FC153	4320	Winter	5	+0%			
S6.016	154	4320	Winter	5	+0%			
S6.017	155	4320	Winter	5	+0%			
S10.000	156	15	Summer	5	+0%			
S10.001	157	15	Summer	5	+0%			
S10.002	158	15	Summer	5	+0%			
S10.003	159	15	Summer	5	+0%			
S10.004	160	15	Summer	5	+0%			
S10.005	161	15	Summer	5	+0%			
S11.000	162	15	Summer	5	+0%			
S11.001	163	15	Summer	5	+0%			
S11.002	164	15	Summer	5	+0%			
S11.003	165	15	Summer	5	+0%			
S11.004	166	15	Summer	5	+0%			
S11.005	167	15	Summer	5	+0%			
S11.006	168	15	Summer	5	+0%			
S11.007	169	15	Summer	5	+0%	100/15	Summer	
S10.006	170	15	Summer	5	+0%	100/15	Summer	
S10.007	171	15	Summer	5	+0%	100/15	Summer	
S10.008	HW172	15	Summer	5	+0%			
S12.000	177	120	Winter	5	+0%			
S10.009	POND 1	360	Winter	5	+0%	30/120	Summer	

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Milton Keynes East		
HIF 8 None pumped section Pump inflow excluded		
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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S2.004	125	57.464	0.000	0.000	1.07	153.2	OK	
S2.005	126	57.202	-0.246	0.000	0.65	167.4	OK	
S2.006	HW127	57.086	-0.287	0.000	0.53	167.9	OK	
S1.001	POND 5a	56.921	0.000	0.000	0.66	7.1	SURCHARGED	
S1.002	FC129	56.896	0.139	0.000	0.57	6.0	SURCHARGED	
S6.000	130	77.561	-0.139	0.000	0.54	29.9	OK	
S6.001	131	77.240	-0.262	0.000	0.19	42.2	OK	
S6.002	132	76.481	-0.265	0.000	0.34	92.3	OK	
S6.003	133	75.915	-0.304	0.000	0.23	92.9	OK	
S7.000	134	77.471	-0.154	0.000	0.45	33.6	OK	
S7.001	135	77.114	-0.233	0.000	0.30	61.8	OK	
S7.002	136	76.368	-0.378	0.000	0.28	95.3	OK	
S7.003	137	76.047	-0.443	0.000	0.15	133.3	OK	
S6.004	138	75.366	-0.434	0.000	0.37	252.4	OK	
S6.005	139	75.104	-0.503	0.000	0.23	292.1	OK	
S6.006	140	74.482	-0.490	0.000	0.26	293.0	OK	
S6.007	HW141	73.966	-0.492	0.000	0.26	327.4	OK	
S6.008	POND 2	73.656	0.387	0.000	0.08	5.4	SURCHARGED	
S6.009	FC143	70.760	-0.321	0.000	0.05	18.7	OK	
S6.010	144	69.151	-0.580	0.000	0.05	52.7	OK	
S6.011	145	68.259	-0.248	0.000	0.25	79.8	OK	
S6.012	146	66.492	-0.263	0.000	0.35	77.3	OK	
S6.013	HW147	66.072	-0.322	0.000	0.18	76.9	OK	
S8.000	149	67.561	-0.450	0.000	0.00	0.0	OK	
S9.000	151	67.102	-0.450	0.000	0.00	0.0	OK	
S6.014	POND 3	65.280	0.405	0.000	0.05	5.3	SURCHARGED	
S6.015	FC153	65.149	-2.114	0.000	0.00	5.3	OK	
S6.016	154	61.891	-1.197	0.000	0.00	5.3	OK	
S6.017	155	60.173	-1.390	0.000	0.00	5.3	OK	
S10.000	156	73.747	-0.328	0.000	0.04	15.9	OK	
S10.001	157	71.549	-0.296	0.000	0.10	30.5	OK	
S10.002	158	69.940	-0.279	0.000	0.15	49.7	OK	
S10.003	159	67.793	-0.338	0.000	0.14	73.4	OK	
S10.004	160	64.888	-0.315	0.000	0.19	103.2	OK	
S10.005	161	61.859	-0.309	0.000	0.21	123.7	OK	
S11.000	162	73.768	-0.307	0.000	0.08	32.6	OK	
S11.001	163	71.482	-0.272	0.000	0.17	55.5	OK	
S11.002	164	69.889	-0.333	0.000	0.15	80.3	OK	
S11.003	165	67.629	-0.388	0.000	0.15	118.2	OK	
S11.004	166	64.573	-0.454	0.000	0.13	150.9	OK	
S11.005	167	61.657	-0.507	0.000	0.14	174.7	OK	
S11.006	168	60.569	-0.645	0.000	0.11	174.4	OK	
S11.007	169	59.949	-0.542	0.000	0.33	194.1	OK	
S10.006	170	59.808	-0.608	0.000	0.23	342.0	OK	
S10.007	171	59.517	-0.452	0.000	0.43	357.8	OK	
S10.008	HW172	59.371	-0.750	0.000	0.30	352.6	OK	
S12.000	177	59.657	-1.500	0.000	0.00	0.0	OK	

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Milton Keynes East
HIF 8 None pumped section
Pump inflow excluded



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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1


PN	US/MH Name	Water		Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)				
S10.009	POND 1	59.109	-0.082	0.000	0.09			9.4	OK	

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Milton Keynes East		
HIF 8 None pumped section Pump inflow excluded		
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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S10.010	FC179	360 Winter	5	+0%					58.661
S10.011	180	360 Winter	5	+0%					58.216
S6.018	181	4320 Summer	5	+0%					57.636
S6.019	182	4320 Summer	5	+0%					57.352
S6.020	183	4320 Summer	5	+0%					57.021
S6.021	184	4320 Summer	5	+0%					56.689
S1.003	185	4320 Summer	5	+0%					56.144
S1.004	186	4320 Summer	5	+0%					56.112
S1.005	187	4320 Summer	5	+0%					56.018
S1.006	188	4320 Summer	5	+0%					55.791
S1.007	189	4320 Summer	5	+0%					55.548
S1.008	190	4320 Summer	5	+0%					55.362
S1.009	191	4320 Summer	5	+0%					55.194
S1.010	92	4320 Summer	5	+0%					55.096

PN	US/MH Name	Surcharged		Flooded	Pipe		Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	
S10.010	FC179	-2.200	0.000	0.00		9.4	OK
S10.011	180	-2.317	0.000	0.00		9.4	OK
S6.018	181	-2.375	0.000	0.00		12.3	OK
S6.019	182	-1.742	0.000	0.00		12.3	OK
S6.020	183	-1.616	0.000	0.00		12.3	OK
S6.021	184	-1.450	0.000	0.00		12.3	OK
S1.003	185	-2.034	0.000	0.00		16.2	OK
S1.004	186	-0.590	0.000	0.04		16.2	OK
S1.005	187	-0.518	0.000	0.05		16.2	OK
S1.006	188	-0.518	0.000	0.05		16.2	OK
S1.007	189	-1.652	0.000	0.00		16.2	OK
S1.008	190	-1.838	0.000	0.00		16.2	OK
S1.009	191	-2.075	0.000	0.00		16.2	OK
S1.010	92	-1.905	0.000	0.00		16.2	OK

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.	Pump inflow excluded	
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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF


Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	HW108	360 Summer	30	+0%					57.063
S2.000	109	15 Summer	30	+0%	100/15 Summer				60.034
S2.001	110	15 Summer	30	+0%	100/15 Summer				59.114
S2.002	111	15 Summer	30	+0%	100/15 Summer				58.213
S2.003	112	15 Summer	30	+0%	30/15 Summer				57.847
S3.000	113	15 Summer	30	+0%	100/15 Summer				58.327
S3.001	114	15 Summer	30	+0%	100/15 Summer				57.819
S3.002	115	15 Summer	30	+0%	30/15 Summer				57.717
S4.000	116	15 Summer	30	+0%	100/15 Summer				58.482
S4.001	117	15 Summer	30	+0%	100/15 Summer				58.143
S4.002	118	15 Summer	30	+0%	30/15 Summer				57.751
S5.000	119	15 Summer	30	+0%	100/15 Summer				60.085
S5.001	120	15 Summer	30	+0%	100/15 Summer				59.373
S5.002	121	15 Summer	30	+0%	100/15 Summer				58.511
S5.003	122	15 Summer	30	+0%	30/15 Summer				57.889
S5.004	123	15 Summer	30	+0%	30/15 Summer				57.779
S4.003	124	15 Summer	30	+0%	30/15 Summer				57.655

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.	HIF 8 None pumped section	
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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

PN	US/MH Name	Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)			
S1.000	HW108	-0.426	0.000	0.00		0.0	OK	
S2.000	109	-0.051	0.000	0.92		54.6	OK	
S2.001	110	-0.055	0.000	0.90		53.0	OK	
S2.002	111	-0.040	0.000	0.98		60.6	OK	
S2.003	112	0.049	0.000	0.92		91.5	SURCHARGED	
S3.000	113	-0.073	0.000	0.75		31.8	OK	
S3.001	114	-0.088	0.000	0.70		59.7	OK	
S3.002	115	0.042	0.000	0.86		67.9	SURCHARGED	
S4.000	116	-0.132	0.000	0.35		18.1	OK	
S4.001	117	-0.062	0.000	0.95		62.3	OK	
S4.002	118	0.055	0.000	0.71		82.7	SURCHARGED	
S5.000	119	-0.125	0.000	0.62		52.6	OK	
S5.001	120	-0.160	0.000	0.44		51.4	OK	
S5.002	121	-0.090	0.000	0.79		78.1	OK	
S5.003	122	0.043	0.000	0.73		92.5	SURCHARGED	
S5.004	123	0.076	0.000	0.68		98.5	SURCHARGED	
S4.003	124	0.144	0.000	1.44		174.9	SURCHARGED	

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Date 26/05/2021		Milton Keynes East
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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
S2.004	125	15 Summer	30	+0%	30/15 Summer			
S2.005	126	15 Summer	30	+0%	30/15 Summer			
S2.006	HW127	15 Summer	30	+0%	100/15 Summer			
S1.001	POND 5a	360 Summer	30	+0%	5/360 Summer			
S1.002	FC129	360 Summer	30	+0%	2/120 Summer			
S6.000	130	15 Summer	30	+0%	100/15 Summer			
S6.001	131	15 Summer	30	+0%				
S6.002	132	15 Summer	30	+0%	100/15 Summer			
S6.003	133	15 Summer	30	+0%	100/15 Summer			
S7.000	134	15 Summer	30	+0%	100/15 Summer			
S7.001	135	15 Summer	30	+0%	100/15 Summer			
S7.002	136	15 Summer	30	+0%				
S7.003	137	15 Summer	30	+0%				
S6.004	138	15 Summer	30	+0%	100/15 Summer			
S6.005	139	15 Summer	30	+0%				
S6.006	140	15 Summer	30	+0%				
S6.007	HW141	15 Summer	30	+0%	100/120 Summer			
S6.008	POND 2	480 Winter	30	+0%	2/30 Summer			
S6.009	FC143	15 Summer	30	+0%				
S6.010	144	15 Summer	30	+0%				
S6.011	145	15 Summer	30	+0%				
S6.012	146	15 Summer	30	+0%	100/15 Summer			
S6.013	HW147	15 Summer	30	+0%				
S8.000	149	120 Winter	30	+0%				
S9.000	151	120 Winter	30	+0%				
S6.014	POND 3	4320 Winter	30	+0%	2/360 Summer			
S6.015	FC153	4320 Winter	30	+0%				
S6.016	154	4320 Winter	30	+0%				
S6.017	155	4320 Winter	30	+0%				
S10.000	156	15 Summer	30	+0%				
S10.001	157	15 Summer	30	+0%				
S10.002	158	15 Summer	30	+0%				
S10.003	159	15 Summer	30	+0%				
S10.004	160	15 Summer	30	+0%				
S10.005	161	15 Summer	30	+0%				
S11.000	162	15 Summer	30	+0%				
S11.001	163	15 Summer	30	+0%				
S11.002	164	15 Summer	30	+0%				
S11.003	165	15 Summer	30	+0%				
S11.004	166	15 Summer	30	+0%				
S11.005	167	15 Summer	30	+0%				
S11.006	168	15 Summer	30	+0%				
S11.007	169	15 Summer	30	+0%	100/15 Summer			
S10.006	170	15 Summer	30	+0%	100/15 Summer			
S10.007	171	15 Summer	30	+0%	100/15 Summer			
S10.008	HW172	15 Summer	30	+0%				
S12.000	177	120 Winter	30	+0%				
S10.009	POND 1	360 Winter	30	+0%	30/120 Summer			

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S2.004	125	57.553	0.089	0.000	2.31	331.6	SURCHARGED	
S2.005	126	57.453	0.005	0.000	1.27	328.2	SURCHARGED	
S2.006	HW127	57.333	-0.040	0.000	1.00	317.0	OK	
S1.001	POND 5a	57.063	0.142	0.000	0.68	7.4	SURCHARGED	
S1.002	FC129	57.038	0.281	0.000	0.57	6.0	SURCHARGED	
S6.000	130	77.627	-0.073	0.000	0.83	45.5	OK	
S6.001	131	77.277	-0.225	0.000	0.32	71.8	OK	
S6.002	132	76.578	-0.168	0.000	0.67	181.8	OK	
S6.003	133	75.982	-0.237	0.000	0.45	183.6	OK	
S7.000	134	77.527	-0.098	0.000	0.74	55.5	OK	
S7.001	135	77.178	-0.169	0.000	0.56	114.6	OK	
S7.002	136	76.481	-0.265	0.000	0.54	182.8	OK	
S7.003	137	76.116	-0.374	0.000	0.30	265.4	OK	
S6.004	138	75.531	-0.269	0.000	0.73	504.3	OK	
S6.005	139	75.222	-0.385	0.000	0.47	588.7	OK	
S6.006	140	74.608	-0.364	0.000	0.52	586.6	OK	
S6.007	HW141	74.093	-0.365	0.000	0.52	660.0	OK	
S6.008	POND 2	73.980	0.711	0.000	0.08	5.4	SURCHARGED	
S6.009	FC143	70.787	-0.294	0.000	0.11	40.3	OK	
S6.010	144	69.201	-0.530	0.000	0.10	116.5	OK	
S6.011	145	68.330	-0.177	0.000	0.53	172.1	OK	
S6.012	146	66.611	-0.144	0.000	0.75	166.0	OK	
S6.013	HW147	66.138	-0.256	0.000	0.38	164.2	OK	
S8.000	149	67.561	-0.450	0.000	0.00	0.0	OK	
S9.000	151	67.102	-0.450	0.000	0.00	0.0	OK	
S6.014	POND 3	65.313	0.438	0.000	0.06	6.3	SURCHARGED	
S6.015	FC153	65.150	-2.113	0.000	0.00	6.3	OK	
S6.016	154	61.893	-1.195	0.000	0.00	6.3	OK	
S6.017	155	60.175	-1.388	0.000	0.00	6.3	OK	
S10.000	156	73.761	-0.314	0.000	0.06	26.2	OK	
S10.001	157	71.580	-0.265	0.000	0.19	58.5	OK	
S10.002	158	69.984	-0.235	0.000	0.30	100.6	OK	
S10.003	159	67.846	-0.285	0.000	0.28	148.3	OK	
S10.004	160	64.955	-0.248	0.000	0.40	211.6	OK	
S10.005	161	61.932	-0.236	0.000	0.44	254.4	OK	
S11.000	162	73.788	-0.287	0.000	0.12	53.8	OK	
S11.001	163	71.524	-0.230	0.000	0.32	103.8	OK	
S11.002	164	69.941	-0.281	0.000	0.30	159.2	OK	
S11.003	165	67.693	-0.324	0.000	0.30	236.8	OK	
S11.004	166	64.643	-0.384	0.000	0.27	302.9	OK	
S11.005	167	61.738	-0.426	0.000	0.28	353.1	OK	
S11.006	168	60.654	-0.560	0.000	0.22	356.5	OK	
S11.007	169	60.142	-0.349	0.000	0.68	400.9	OK	
S10.006	170	59.952	-0.464	0.000	0.47	709.4	OK	
S10.007	171	59.766	-0.203	0.000	0.87	723.7	OK	
S10.008	HW172	59.603	-0.518	0.000	0.58	675.4	OK	
S12.000	177	59.657	-1.500	0.000	0.00	0.0	OK	

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Milton Keynes East
HIF 8 None pumped section
Pump inflow excluded



Date 26/05/2021
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Designed by DSF
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Network 2018.1.1

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1


PN	US/MH Name	Water Surcharged			Flooded		Pipe		Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status	
S10.009	POND 1	59.257	0.066	0.000	0.09		9.9	SURCHARGED	

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.	Pump inflow excluded	
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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S10.010	FC179	360 Winter	30	+0%					58.662
S10.011	180	360 Winter	30	+0%					58.218
S6.018	181	4320 Summer	30	+0%					57.644
S6.019	182	4320 Summer	30	+0%					57.361
S6.020	183	4320 Summer	30	+0%					57.026
S6.021	184	4320 Summer	30	+0%					56.692
S1.003	185	4320 Summer	30	+0%					56.155
S1.004	186	4320 Summer	30	+0%					56.124
S1.005	187	4320 Summer	30	+0%					56.030
S1.006	188	4320 Summer	30	+0%					55.803
S1.007	189	4320 Summer	30	+0%					55.557
S1.008	190	4320 Summer	30	+0%					55.371
S1.009	191	4320 Summer	30	+0%					55.202
S1.010	92	4320 Summer	30	+0%					55.096

PN	US/MH Name	Surcharged		Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Flow (l/s)	Status	
S10.010	FC179	-2.199	0.000	0.00	0.00	9.9	OK	
S10.011	180	-2.315	0.000	0.00	0.00	9.9	OK	
S6.018	181	-2.367	0.000	0.00	0.00	15.2	OK	
S6.019	182	-1.733	0.000	0.00	0.00	15.2	OK	
S6.020	183	-1.611	0.000	0.00	0.00	15.2	OK	
S6.021	184	-1.447	0.000	0.00	0.00	15.2	OK	
S1.003	185	-2.023	0.000	0.00	0.00	21.1	OK	
S1.004	186	-0.578	0.000	0.05	0.00	21.1	OK	
S1.005	187	-0.506	0.000	0.06	0.00	21.1	OK	
S1.006	188	-0.506	0.000	0.06	0.00	21.1	OK	
S1.007	189	-1.643	0.000	0.00	0.00	21.1	OK	
S1.008	190	-1.829	0.000	0.00	0.00	21.1	OK	
S1.009	191	-2.067	0.000	0.00	0.00	21.1	OK	
S1.010	92	-1.905	0.000	0.00	0.00	21.1	OK	

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.	Pump inflow excluded	
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Hif - 1

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40


PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	HW108	480 Winter	100	+40%					57.400
S2.000	109	15 Summer	100	+40%	100/15 Summer				62.338
S2.001	110	15 Summer	100	+40%	100/15 Summer				60.672
S2.002	111	15 Summer	100	+40%	100/15 Summer				58.838
S2.003	112	15 Summer	100	+40%	30/15 Summer				58.565
S3.000	113	15 Summer	100	+40%	100/15 Summer				59.532
S3.001	114	15 Summer	100	+40%	100/15 Summer				58.755
S3.002	115	15 Summer	100	+40%	30/15 Summer				58.459
S4.000	116	15 Summer	100	+40%	100/15 Summer				59.038
S4.001	117	15 Summer	100	+40%	100/15 Summer				58.908
S4.002	118	15 Summer	100	+40%	30/15 Summer				58.477
S5.000	119	15 Summer	100	+40%	100/15 Summer				60.564
S5.001	120	15 Summer	100	+40%	100/15 Summer				59.884
S5.002	121	15 Summer	100	+40%	100/15 Summer				59.494
S5.003	122	15 Summer	100	+40%	30/15 Summer				58.633
S5.004	123	15 Summer	100	+40%	30/15 Summer				58.457
S4.003	124	15 Summer	100	+40%	30/15 Summer				58.247

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. . .		Milton Keynes East HIF 8 None pumped section Pump inflow excluded
Date 26/05/2021 File HIF 1 P0.3.MDX		Designed by DSF Checked by PB
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Hif - 1

PN	US/MH Name	Surcharged Flooded		Flow / Overflow Cap. (l/s)	Pipe	Status	Level Exceeded
		Depth (m)	Volume (m ³)		Flow (l/s)		
S1.000	HW108	-0.089	0.000	0.00	0.0	OK	
S2.000	109	2.253	0.000	1.56	92.3	SURCHARGED	
S2.001	110	1.503	0.000	1.36	80.4	SURCHARGED	
S2.002	111	0.585	0.000	1.44	89.4	SURCHARGED	
S2.003	112	0.767	0.000	1.26	125.2	SURCHARGED	
S3.000	113	1.132	0.000	1.23	52.5	FLOOD RISK	
S3.001	114	0.848	0.000	1.09	92.8	SURCHARGED	
S3.002	115	0.784	0.000	1.42	112.0	SURCHARGED	
S4.000	116	0.424	0.000	0.60	31.1	SURCHARGED	
S4.001	117	0.703	0.000	1.55	100.8	SURCHARGED	
S4.002	118	0.781	0.000	1.08	124.9	SURCHARGED	
S5.000	119	0.354	0.000	1.11	95.1	SURCHARGED	
S5.001	120	0.351	0.000	0.71	83.4	SURCHARGED	
S5.002	121	0.893	0.000	1.08	106.4	SURCHARGED	
S5.003	122	0.787	0.000	1.07	135.3	SURCHARGED	
S5.004	123	0.754	0.000	1.04	150.7	SURCHARGED	
S4.003	124	0.736	0.000	2.25	272.9	SURCHARGED	

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.	Milton Keynes East	
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Date 26/05/2021	Designed by DSF	
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XP Solutions	Network 2018.1.1	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Hif - 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
S2.004	125	15 Summer	100	+40%	30/15 Summer			
S2.005	126	15 Summer	100	+40%	30/15 Summer			
S2.006	HW127	15 Summer	100	+40%	100/15 Summer			
S1.001	POND 5a	480 Winter	100	+40%	5/360 Summer			
S1.002	FC129	480 Winter	100	+40%	2/120 Summer			
S6.000	130	15 Summer	100	+40%	100/15 Summer			
S6.001	131	15 Summer	100	+40%				
S6.002	132	15 Summer	100	+40%	100/15 Summer			
S6.003	133	15 Summer	100	+40%	100/15 Summer			
S7.000	134	15 Summer	100	+40%	100/15 Summer			
S7.001	135	15 Summer	100	+40%	100/15 Summer			
S7.002	136	15 Summer	100	+40%				
S7.003	137	15 Summer	100	+40%				
S6.004	138	15 Summer	100	+40%	100/15 Summer			
S6.005	139	15 Summer	100	+40%				
S6.006	140	15 Summer	100	+40%				
S6.007	HW141	360 Winter	100	+40%	100/120 Summer			
S6.008	POND 2	960 Winter	100	+40%	2/30 Summer			
S6.009	FC143	15 Summer	100	+40%				
S6.010	144	15 Summer	100	+40%				
S6.011	145	15 Summer	100	+40%				
S6.012	146	15 Summer	100	+40%	100/15 Summer			
S6.013	HW147	15 Summer	100	+40%				
S8.000	149	120 Winter	100	+40%				
S9.000	151	120 Winter	100	+40%				
S6.014	POND 3	4320 Summer	100	+40%	2/360 Summer			
S6.015	FC153	4320 Summer	100	+40%				
S6.016	154	4320 Summer	100	+40%				
S6.017	155	4320 Summer	100	+40%				
S10.000	156	15 Summer	100	+40%				
S10.001	157	15 Summer	100	+40%				
S10.002	158	15 Summer	100	+40%				
S10.003	159	15 Summer	100	+40%				
S10.004	160	15 Summer	100	+40%				
S10.005	161	15 Summer	100	+40%				
S11.000	162	15 Summer	100	+40%				
S11.001	163	15 Summer	100	+40%				
S11.002	164	15 Summer	100	+40%				
S11.003	165	15 Summer	100	+40%				
S11.004	166	15 Summer	100	+40%				
S11.005	167	15 Summer	100	+40%				
S11.006	168	15 Summer	100	+40%				
S11.007	169	15 Summer	100	+40%	100/15 Summer			
S10.006	170	15 Summer	100	+40%	100/15 Summer			
S10.007	171	15 Summer	100	+40%	100/15 Summer			
S10.008	HW172	15 Summer	100	+40%				
S12.000	177	120 Winter	100	+40%				
S10.009	POND 1	480 Winter	100	+40%	30/120 Summer			

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.	Milton Keynes East	
.	HIF 8 None pumped section	
.	Pump inflow excluded	
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Hif - 1

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S2.004	125	58.011	0.547	0.000	3.51	504.2	SURCHARGED	
S2.005	126	57.766	0.318	0.000	1.91	496.3	FLOOD RISK	
S2.006	HW127	57.517	0.144	0.000	1.57	498.7	SURCHARGED	
S1.001	POND 5a	57.400	0.479	0.000	0.65	7.0	SURCHARGED	
S1.002	FC129	57.369	0.612	0.000	0.67	7.0	SURCHARGED	
S6.000	130	78.056	0.356	0.000	1.52	83.5	FLOOD RISK	
S6.001	131	77.337	-0.165	0.000	0.58	129.1	OK	
S6.002	132	77.010	0.264	0.000	1.19	322.6	FLOOD RISK	
S6.003	133	76.221	0.002	0.000	0.80	327.1	SURCHARGED	
S7.000	134	78.056	0.431	0.000	1.33	99.8	FLOOD RISK	
S7.001	135	77.365	0.018	0.000	0.97	199.6	SURCHARGED	
S7.002	136	76.684	-0.062	0.000	0.94	320.2	OK	
S7.003	137	76.206	-0.284	0.000	0.53	471.0	OK	
S6.004	138	75.891	0.091	0.000	1.26	864.7	SURCHARGED	
S6.005	139	75.381	-0.225	0.000	0.82	1018.5	OK	
S6.006	140	74.780	-0.192	0.000	0.90	1012.8	OK	
S6.007	HW141	74.697	0.239	0.000	0.13	164.1	SURCHARGED	
S6.008	POND 2	74.663	1.394	0.000	0.08	5.8	SURCHARGED	
S6.009	FC143	70.814	-0.267	0.000	0.18	70.8	OK	
S6.010	144	69.254	-0.477	0.000	0.19	211.4	OK	
S6.011	145	68.504	-0.003	0.000	0.92	296.9	OK	
S6.012	146	67.028	0.273	0.000	1.33	291.4	SURCHARGED	
S6.013	HW147	66.216	-0.178	0.000	0.67	287.4	OK	
S8.000	149	67.561	-0.450	0.000	0.00	0.0	OK	
S9.000	151	67.102	-0.450	0.000	0.00	0.0	OK	
S6.014	POND 3	65.403	0.528	0.000	0.08	7.5	SURCHARGED	
S6.015	FC153	65.151	-2.112	0.000	0.00	7.5	OK	
S6.016	154	61.895	-1.193	0.000	0.00	7.5	OK	
S6.017	155	60.176	-1.387	0.000	0.00	7.5	OK	
S10.000	156	73.785	-0.290	0.000	0.12	48.0	OK	
S10.001	157	71.622	-0.223	0.000	0.34	107.5	OK	
S10.002	158	70.043	-0.176	0.000	0.54	184.8	OK	
S10.003	159	67.915	-0.216	0.000	0.51	272.4	OK	
S10.004	160	65.049	-0.154	0.000	0.73	388.8	OK	
S10.005	161	62.036	-0.132	0.000	0.81	467.7	OK	
S11.000	162	73.821	-0.254	0.000	0.23	98.8	OK	
S11.001	163	71.585	-0.169	0.000	0.58	190.6	OK	
S11.002	164	70.012	-0.210	0.000	0.55	292.3	OK	
S11.003	165	67.777	-0.240	0.000	0.55	434.5	OK	
S11.004	166	64.732	-0.295	0.000	0.49	556.1	OK	
S11.005	167	61.843	-0.321	0.000	0.52	648.4	OK	
S11.006	168	60.821	-0.393	0.000	0.40	650.8	OK	
S11.007	169	60.777	0.286	0.000	1.17	689.7	SURCHARGED	
S10.006	170	60.723	0.307	0.000	0.81	1225.8	SURCHARGED	
S10.007	171	60.479	0.510	0.000	1.49	1237.4	SURCHARGED	
S10.008	HW172	60.121	0.000	0.000	1.00	1154.3	OK	
S12.000	177	59.657	-1.500	0.000	0.00	0.0	OK	

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Milton Keynes East
HIF 8 None pumped section
Pump inflow excluded



Date 26/05/2021
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Hif - 1

PN	US/MH Name	Water		Surcharged		Flooded		Pipe	
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Flow / Cap.	Flow (l/s)	Status	Level Exceeded
S10.009	POND 1	59.631	0.440	0.000	0.09			10.0	SURCHARGED

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Milton Keynes East		
HIF 8 None pumped section Pump inflow excluded		
Date 26/05/2021		Designed by DSF
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Hif - 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S10.010	FC179	2880 Summer	100	+40%					58.662
S10.011	180 960	Winter	100	+40%					58.218
S6.018	181 4320	Summer	100	+40%					57.650
S6.019	182 4320	Summer	100	+40%					57.364
S6.020	183 4320	Summer	100	+40%					57.030
S6.021	184 4320	Summer	100	+40%					56.694
S1.003	185 2160	Summer	100	+40%					56.160
S1.004	186 2160	Summer	100	+40%					56.130
S1.005	187 2160	Summer	100	+40%					56.036
S1.006	188 2160	Summer	100	+40%					55.810
S1.007	189 2160	Summer	100	+40%					55.561
S1.008	190 2160	Summer	100	+40%					55.376
S1.009	191 2160	Summer	100	+40%					55.207
S1.010	92 2160	Summer	100	+40%					55.096

PN	US/MH Name	Surcharged		Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Flow (l/s)	Status	
S10.010	FC179	-2.199	0.000	0.00	0.00	10.0	OK	
S10.011	180	-2.315	0.000	0.00	0.00	10.0	OK	
S6.018	181	-2.361	0.000	0.00	0.00	17.5	OK	
S6.019	182	-1.730	0.000	0.00	0.00	17.5	OK	
S6.020	183	-1.607	0.000	0.00	0.00	17.5	OK	
S6.021	184	-1.445	0.000	0.00	0.00	17.5	OK	
S1.003	185	-2.018	0.000	0.00	0.00	23.7	OK	
S1.004	186	-0.572	0.000	0.06	0.00	23.7	OK	
S1.005	187	-0.500	0.000	0.07	0.00	23.7	OK	
S1.006	188	-0.499	0.000	0.07	0.00	23.7	OK	
S1.007	189	-1.639	0.000	0.00	0.00	23.7	OK	
S1.008	190	-1.824	0.000	0.00	0.00	23.7	OK	
S1.009	191	-2.062	0.000	0.00	0.00	23.7	OK	
S1.010	92	-1.905	0.000	0.00	0.00	23.7	OK	



Drainage Technical Addendum

DATE:	20 July 2021	CONFIDENTIALITY:	Public
SUBJECT:	Drainage Technical Addendum		
PROJECT:	Milton Keynes East	AUTHOR:	DSF
CHECKED:	BU	APPROVED:	SP

HIF 2

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for HIf - 2

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model	
Return Period (years)	5
FEH Rainfall Version	2013
Site Location	GB 489026 242081 SP 89026 42081
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for HIf - 2


Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.000	4-8	1.228	8-12	2.619	12-16	0.101

Total Area Contributing (ha) = 3.948

Total Pipe Volume (m³) = 493.225

Network Design Table for HIf - 2

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section	Type	Auto Design
1.000	24.454	0.296	82.6	0.169	5.00	0.0	0.600	o	375	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 (l/s)	Flow (l/s)
1.000	50.00	5.20	57.805	0.169	0.0	0.0	0.0	1.99	220.3	22.9

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Network Design Table for HIF - 2

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.001	31.970	0.128	250.0	0.134	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.002	15.243	0.051	300.0	0.072	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.003	36.061	0.285	126.4	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.004	115.982	0.703	165.0	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
2.000	85.664	1.071	80.0	0.629	5.00	0.0	0.600	o	525	Pipe/Conduit	
2.001	37.992	0.422	90.0	0.075	0.00	0.0	0.600	o	525	Pipe/Conduit	
2.002	44.195	0.419	105.5	0.075	0.00	0.0	0.600	o	600	Pipe/Conduit	
2.003	10.882	0.189	57.6	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit	
3.000	33.111	0.412	80.4	0.082	5.00	0.0	0.600	o	375	Pipe/Conduit	
3.001	51.476	0.412	124.9	0.083	0.00	0.0	0.600	o	375	Pipe/Conduit	
3.002	55.675	2.042	27.3	0.110	0.00	0.0	0.600	o	375	Pipe/Conduit	
2.004	15.660	0.144	108.8	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
4.000	26.415	0.984	26.8	0.085	5.00	0.0	0.600	o	375	Pipe/Conduit	
4.001	40.798	0.417	97.8	0.082	0.00	0.0	0.600	o	375	Pipe/Conduit	
4.002	58.784	1.886	31.2	0.114	0.00	0.0	0.600	o	375	Pipe/Conduit	
5.000	78.044	0.833	93.7	0.449	5.00	0.0	0.600	o	525	Pipe/Conduit	
5.001	26.183	0.249	105.2	0.082	0.00	0.0	0.600	o	525	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 (l/s)	Flow (l/s)
1.001	50.00	5.62	57.434	0.303	0.0	0.0	0.0	1.28	203.8	41.0
1.002	50.00	5.84	57.306	0.375	0.0	0.0	0.0	1.17	185.8	50.8
1.003	50.00	6.17	57.255	0.375	0.0	0.0	0.0	1.81	287.4	50.8
1.004	50.00	6.96	56.745	0.375	0.0	0.0	0.0	2.44	1550.2	50.8
2.000	50.00	5.57	58.833	0.629	0.0	0.0	0.0	2.51	542.5	85.2
2.001	50.00	5.84	57.762	0.704	0.0	0.0	0.0	2.36	511.3	95.4
2.002	50.00	6.15	57.265	0.779	0.0	0.0	0.0	2.37	670.4	105.4
2.003	50.00	6.20	56.846	0.779	0.0	0.0	0.0	3.46	1237.6	105.4
3.000	50.00	5.27	59.748	0.082	0.0	0.0	0.0	2.02	223.4	11.1
3.001	50.00	5.80	59.336	0.165	0.0	0.0	0.0	1.62	178.9	22.3
3.002	50.00	6.07	58.924	0.274	0.0	0.0	0.0	3.48	384.6	37.2
2.004	50.00	6.30	56.582	1.053	0.0	0.0	0.0	2.68	1185.4	142.6
4.000	50.00	5.13	60.025	0.085	0.0	0.0	0.0	3.51	387.6	11.5
4.001	50.00	5.50	59.041	0.167	0.0	0.0	0.0	1.83	202.3	22.6
4.002	50.00	5.80	58.624	0.281	0.0	0.0	0.0	3.26	359.6	38.0
5.000	50.00	5.56	58.809	0.449	0.0	0.0	0.0	2.31	501.1	60.8
5.001	50.00	5.76	57.976	0.531	0.0	0.0	0.0	2.18	472.8	71.9

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Network Design Table for Hif - 2

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
5.002	22.031	0.115	192.4	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
5.003	25.764	0.580	44.5	0.069	0.00	0.0	0.600	o	525	Pipe/Conduit	
5.004	11.762	0.445	26.4	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
2.005	24.664	0.224	110.1	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
2.006	22.570	0.172	131.2	0.000	0.00	0.0	0.600	o	825	Pipe/Conduit	
6.000	59.212	0.562	105.4	0.140	5.00	0.0	0.600	o	375	Pipe/Conduit	
6.001	53.954	1.083	49.8	0.090	0.00	0.0	0.600	o	375	Pipe/Conduit	
6.002	56.785	1.655	34.3	0.099	0.00	0.0	0.600	o	375	Pipe/Conduit	
6.003	83.472	2.574	32.4	0.140	0.00	0.0	0.600	o	375	Pipe/Conduit	
6.004	38.404	0.764	50.3	0.079	0.00	0.0	0.600	o	450	Pipe/Conduit	
6.005	33.667	1.154	29.2	0.090	0.00	0.0	0.600	o	450	Pipe/Conduit	
7.000	57.351	0.553	103.7	0.169	5.00	0.0	0.600	o	375	Pipe/Conduit	
7.001	54.617	1.028	53.1	0.106	0.00	0.0	0.600	o	375	Pipe/Conduit	
7.002	63.199	1.791	35.3	0.117	0.00	0.0	0.600	o	375	Pipe/Conduit	
7.003	77.547	2.325	33.4	0.182	0.00	0.0	0.600	o	450	Pipe/Conduit	
7.004	49.203	0.984	50.0	0.115	0.00	0.0	0.600	o	525	Pipe/Conduit	
7.005	24.241	0.743	32.6	0.075	0.00	0.0	0.600	o	525	Pipe/Conduit	
7.006	17.636	0.176	100.2	0.000	0.00	0.0	0.600	o	675	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 (l/s)	Flow (l/s)
5.002	50.00	5.99	57.727	0.531	0.0	0.0	0.0	1.61	348.8	71.9
5.003	50.00	6.12	57.613	0.600	0.0	0.0	0.0	3.37	728.7	81.3
5.004	50.00	6.16	57.033	0.600	0.0	0.0	0.0	4.37	945.8	81.3
2.005	50.00	6.45	56.438	1.935	0.0	0.0	0.0	2.67	1178.0	262.0
2.006	50.00	6.60	56.214	1.935	0.0	0.0	0.0	2.59	1384.7	262.0
6.000	50.00	5.56	68.094	0.140	0.0	0.0	0.0	1.76	194.9	19.0
6.001	50.00	5.91	67.532	0.231	0.0	0.0	0.0	2.57	284.1	31.2
6.002	50.00	6.21	66.449	0.330	0.0	0.0	0.0	3.10	342.6	44.6
6.003	50.00	6.65	64.794	0.470	0.0	0.0	0.0	3.19	352.5	63.6
6.004	50.00	6.87	62.145	0.549	0.0	0.0	0.0	2.87	456.9	74.3
6.005	50.00	7.02	61.381	0.639	0.0	0.0	0.0	3.78	600.4	86.5
7.000	50.00	5.54	67.902	0.169	0.0	0.0	0.0	1.78	196.5	22.9
7.001	50.00	5.90	67.349	0.275	0.0	0.0	0.0	2.49	275.1	37.3
7.002	50.00	6.25	66.321	0.392	0.0	0.0	0.0	3.06	337.9	53.1
7.003	50.00	6.61	64.455	0.575	0.0	0.0	0.0	3.53	561.4	77.8
7.004	50.00	6.87	62.055	0.689	0.0	0.0	0.0	3.17	686.9	93.4
7.005	50.00	6.97	61.071	0.765	0.0	0.0	0.0	3.93	851.1	103.6
7.006	50.00	7.09	60.253	0.765	0.0	0.0	0.0	2.62	937.0	103.6

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Network Design Table for HIF - 2

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
6.006	14.845	0.228	65.1	0.132	0.00	0.0	0.600	o	675	Pipe/Conduit	
6.007	14.966	0.426	35.1	0.054	0.00	0.0	0.600	o	675	Pipe/Conduit	
6.008	22.309	2.629	8.5	0.049	0.00	0.0	0.600	o	675	Pipe/Conduit	
6.009	39.362	0.394	99.9	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
6.010	113.060	0.282	400.9	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
8.000	81.643	0.255	320.2	0.000	5.00	0.0	0.600	o	750	Pipe/Conduit	
1.005	13.886	0.071	195.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.006	252.829	0.471	536.8	0.000	0.00	0.0	0.600	o	500	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 (l/s)	Flow (l/s)
6.006	50.00	7.16	60.077	1.535	0.0	0.0	0.0	3.25	1163.5	207.9
6.007	50.00	7.22	59.848	1.589	0.0	0.0	0.0	4.43	1585.7	215.1
6.008	50.00	7.26	59.422	1.638	0.0	0.0	0.0	9.03	3231.3	221.8
6.009	50.00	7.49	56.718	1.638	0.0	0.0	0.0	2.80	1237.0	221.8
6.010	50.00	8.85	56.324	1.638	0.0	0.0	0.0	1.39	614.7	221.8
8.000	50.00	5.87	56.503	0.000	0.0	0.0	0.0	1.56	688.5	0.0
1.005	50.00	9.10	56.042	3.948	0.0	0.0	0.0	0.93	37.0	534.6
1.006	50.00	13.63	55.971	3.948	0.0	0.0	0.0	0.93	182.7	534.6

Manhole Schedules for Hif - 2

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	Pipe Out		Pipes In			Backdrop (mm)
					PN	Invert Level (m)	Diameter (mm)	PN	Invert Level (m)	
201	59.380	1.575	Open Manhole	1350	1.000	57.805	375			
202	59.084	1.650	Open Manhole	1350	1.001	57.434	450	1.000	57.509	375
203	59.172	1.866	Open Manhole	1350	1.002	57.306	450	1.001	57.306	450
204	61.633	4.378	Open Manhole	1350	1.003	57.255	450	1.002	57.255	450
HW205	58.845	2.100	Open Manhole	1800	1.004	56.745	900	1.003	56.970	450
206	60.558	1.725	Open Manhole	1500	2.000	58.833	525			
207	59.694	1.932	Open Manhole	1500	2.001	57.762	525	2.000	57.762	525
208	59.783	2.518	Open Manhole	1500	2.002	57.265	600	2.001	57.340	525
209	60.139	3.293	Open Manhole	1500	2.003	56.846	675	2.002	56.846	600
210	61.323	1.575	Open Manhole	1350	3.000	59.748	375			
211	60.911	1.575	Open Manhole	1350	3.001	59.336	375	3.000	59.336	375
212	60.499	1.575	Open Manhole	1350	3.002	58.924	375	3.001	58.924	375
213	59.856	3.274	Open Manhole	1800	2.004	56.582	750	2.003	56.657	675
								3.002	56.882	375
214	61.600	1.575	Open Manhole	1350	4.000	60.025	375			
215	60.616	1.575	Open Manhole	1350	4.001	59.041	375	4.000	59.041	375
216	60.199	1.575	Open Manhole	1350	4.002	58.624	375	4.001	58.624	375
217	60.534	1.725	Open Manhole	1500	5.000	58.809	525			
218	59.701	1.725	Open Manhole	1500	5.001	57.976	525	5.000	57.976	525
219	59.472	1.745	Open Manhole	1500	5.002	57.727	525	5.001	57.727	525
220	59.472	1.860	Open Manhole	1500	5.003	57.613	525	5.002	57.613	525
221	59.574	2.541	Open Manhole	1500	5.004	57.033	525	5.003	57.033	525
222	59.574	3.136	Open Manhole	1800	2.005	56.438	750	2.004	56.438	750
								4.002	56.738	375
								5.004	56.588	525
HW223	58.933	2.719	Open Manhole	1800	2.006	56.214	825	2.005	56.214	750
224	69.669	1.575	Open Manhole	1350	6.000	68.094	375			
225	69.107	1.575	Open Manhole	1350	6.001	67.532	375	6.000	67.532	375
226	68.024	1.575	Open Manhole	1350	6.002	66.449	375	6.001	66.449	375
227	66.369	1.575	Open Manhole	1350	6.003	64.794	375	6.002	64.794	375
228	63.795	1.650	Open Manhole	1350	6.004	62.145	450	6.003	62.220	375
229	63.031	1.650	Open Manhole	1350	6.005	61.381	450	6.004	61.381	450
230	69.477	1.575	Open Manhole	1350	7.000	67.902	375			
231	68.924	1.575	Open Manhole	1350	7.001	67.349	375	7.000	67.349	375
232	67.896	1.575	Open Manhole	1350	7.002	66.321	375	7.001	66.321	375
233	66.105	1.650	Open Manhole	1350	7.003	64.455	450	7.002	64.530	375
234	63.780	1.725	Open Manhole	1500	7.004	62.055	525	7.003	62.130	450
235	63.036	1.965	Open Manhole	1500	7.005	61.071	525	7.004	61.071	525

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Manhole Schedules for Hif - 2

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
236	62.293	2.040	Open Manhole	1500	7.006	60.253	675	7.005	60.328	525	
237	62.267	2.190	Open Manhole	1500	6.006	60.077	675	6.005	60.227	450	
								7.006	60.077	675	
238	62.036	2.188	Open Manhole	1500	6.007	59.848	675	6.006	59.849	675	1
239	61.610	2.188	Open Manhole	1500	6.008	59.422	675	6.007	59.422	675	
240	59.056	2.338	Open Manhole	1800	6.009	56.718	750	6.008	56.793	675	
HW241	58.674	2.350	Open Manhole	1800	6.010	56.324	750	6.009	56.324	750	
244	58.564	2.061	Open Manhole	1800	8.000	56.503	750				
POND 22	58.292	2.250	Open Manhole	1800	1.005	56.042	225	1.004	56.042	900	
								2.006	56.042	825	
								6.010	56.042	750	
								8.000	56.248	750	731
FC246	57.396	1.425	Open Manhole	1500	1.006	55.971	500	1.005	55.971	225	
	56.500	1.000	Open Manhole	0		OUTFALL		1.006	55.500	500	

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Area Summary for Hif - 2

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.169	0.169	0.169
1.001	User	-	100	0.134	0.134	0.134
1.002	User	-	100	0.072	0.072	0.072
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
2.000	User	-	100	0.629	0.629	0.629
2.001	User	-	100	0.075	0.075	0.075
2.002	User	-	100	0.075	0.075	0.075
2.003	-	-	100	0.000	0.000	0.000
3.000	User	-	100	0.082	0.082	0.082
3.001	User	-	100	0.083	0.083	0.083
3.002	User	-	100	0.110	0.110	0.110
2.004	-	-	100	0.000	0.000	0.000
4.000	User	-	100	0.085	0.085	0.085
4.001	User	-	100	0.082	0.082	0.082
4.002	User	-	100	0.114	0.114	0.114
5.000	User	-	100	0.449	0.449	0.449
5.001	User	-	100	0.082	0.082	0.082
5.002	-	-	100	0.000	0.000	0.000
5.003	User	-	100	0.069	0.069	0.069
5.004	-	-	100	0.000	0.000	0.000
2.005	-	-	100	0.000	0.000	0.000
2.006	-	-	100	0.000	0.000	0.000
6.000	User	-	100	0.140	0.140	0.140
6.001	User	-	100	0.090	0.090	0.090
6.002	User	-	100	0.099	0.099	0.099
6.003	User	-	100	0.140	0.140	0.140
6.004	User	-	100	0.079	0.079	0.079
6.005	User	-	100	0.090	0.090	0.090
7.000	User	-	100	0.169	0.169	0.169
7.001	User	-	100	0.106	0.106	0.106
7.002	User	-	100	0.117	0.117	0.117
7.003	User	-	100	0.182	0.182	0.182
7.004	User	-	100	0.115	0.115	0.115
7.005	User	-	100	0.075	0.075	0.075
7.006	-	-	100	0.000	0.000	0.000
6.006	User	-	100	0.132	0.132	0.132
6.007	User	-	100	0.054	0.054	0.054
6.008	User	-	100	0.049	0.049	0.049
6.009	-	-	100	0.000	0.000	0.000
6.010	-	-	100	0.000	0.000	0.000
8.000	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				3.948	3.948	3.948

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Free Flowing Outfall Details for HIF - 2

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
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1.006		56.500	55.500	0.000	0	0
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Simulation Criteria for HIF - 2

Volumetric Runoff Coeff	0.950	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	0.000
Hot Start (mins)	0	Inlet Coefficient	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 Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	2
FEH Rainfall Version	2013
Site Location	GB 489026 242081 SP 89026 42081
Data Type	Point
Summer Storms	Yes
Winter Storms	No
Cv (Summer)	0.950
Cv (Winter)	0.840
Storm Duration (mins)	30

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Online Controls for HIF - 2

Hydro-Brake® Optimum Manhole: POND 22, DS/PN: 1.005, Volume (m³): 173.9

Unit Reference	MD-SHE-0167-1580-1800-1580
Design Head (m)	1.800
Design Flow (l/s)	15.8
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	167
Invert Level (m)	56.042
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.800	15.8
Flush-Flo™	0.528	15.7
Kick-Flo®	1.114	12.6
Mean Flow over Head Range	-	13.7

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	6.0	1.200	13.0	3.000	20.1	7.000	30.2
0.200	13.6	1.400	14.0	3.500	21.7	7.500	31.3
0.300	14.9	1.600	14.9	4.000	23.1	8.000	32.2
0.400	15.5	1.800	15.8	4.500	24.4	8.500	33.2
0.500	15.7	2.000	16.6	5.000	25.7	9.000	34.1
0.600	15.7	2.200	17.4	5.500	26.9	9.500	35.0
0.800	15.2	2.400	18.1	6.000	28.1		
1.000	14.0	2.600	18.8	6.500	29.2		

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Storage Structures for HIF - 2

Tank or Pond Manhole: POND 22, DS/PN: 1.005

Invert Level (m) 56.042

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	2800.0	2.250	3572.0

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 2

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	201	15 Summer	2	+0%	100/15 Summer				57.913
1.001	202	15 Summer	2	+0%	100/15 Summer				57.614
1.002	203	15 Summer	2	+0%	30/15 Summer				57.525
1.003	204	15 Summer	2	+0%	100/15 Summer				57.414
1.004	HW205	15 Summer	2	+0%					56.872
2.000	206	15 Summer	2	+0%	100/15 Summer				59.012
2.001	207	15 Summer	2	+0%	100/15 Summer				57.964
2.002	208	15 Summer	2	+0%	100/15 Summer				57.471
2.003	209	15 Summer	2	+0%	100/15 Summer				57.085
3.000	210	15 Summer	2	+0%					59.821
3.001	211	15 Summer	2	+0%					59.445
3.002	212	15 Summer	2	+0%					59.016
2.004	213	15 Summer	2	+0%	100/15 Summer				56.876
4.000	214	15 Summer	2	+0%					60.080
4.001	215	15 Summer	2	+0%					59.145
4.002	216	15 Summer	2	+0%					58.721
5.000	217	15 Summer	2	+0%	100/15 Summer				58.967

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 2

PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (1/s)	Pipe	Level Exceeded
		Depth (m)	Volume (m³)			Flow (1/s)	
1.000	201	-0.267	0.000	0.18		34.4	OK
1.001	202	-0.270	0.000	0.32		56.4	OK
1.002	203	-0.231	0.000	0.48		68.0	OK
1.003	204	-0.292	0.000	0.27		67.9	OK
1.004	HW205	-0.773	0.000	0.05		67.7	OK
2.000	206	-0.346	0.000	0.25		125.5	OK
2.001	207	-0.323	0.000	0.31		138.3	OK
2.002	208	-0.394	0.000	0.26		149.0	OK
2.003	209	-0.436	0.000	0.27		148.9	OK
3.000	210	-0.302	0.000	0.08		16.5	OK
3.001	211	-0.266	0.000	0.18		30.3	OK
3.002	212	-0.283	0.000	0.14		48.7	OK
2.004	213	-0.456	0.000	0.32		196.3	OK
4.000	214	-0.320	0.000	0.05		17.3	OK
4.001	215	-0.271	0.000	0.17		30.9	OK
4.002	216	-0.278	0.000	0.15		50.2	OK
5.000	217	-0.367	0.000	0.19		89.6	OK

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 2

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
5.001	218	15 Summer	2	+0%	100/15 Summer				58.162
5.002	219	15 Summer	2	+0%	100/15 Summer				57.956
5.003	220	15 Summer	2	+0%	100/15 Summer				57.770
5.004	221	15 Summer	2	+0%	100/15 Summer				57.201
2.005	222	15 Summer	2	+0%	30/15 Summer				56.807
2.006	HW223	15 Summer	2	+0%	100/15 Summer				56.604
6.000	224	15 Summer	2	+0%					68.193
6.001	225	15 Summer	2	+0%					67.634
6.002	226	15 Summer	2	+0%	100/15 Summer				66.559
6.003	227	15 Summer	2	+0%	100/15 Summer				64.920
6.004	228	15 Summer	2	+0%	100/15 Summer				62.292
6.005	229	15 Summer	2	+0%	100/15 Summer				61.520
7.000	230	15 Summer	2	+0%					68.012
7.001	231	15 Summer	2	+0%					67.464
7.002	232	15 Summer	2	+0%	100/15 Summer				66.441
7.003	233	15 Summer	2	+0%					64.589
7.004	234	15 Summer	2	+0%	100/15 Summer				62.212
7.005	235	15 Summer	2	+0%	100/15 Summer				61.229
7.006	236	15 Summer	2	+0%	30/15 Summer				60.480
6.006	237	15 Summer	2	+0%	30/15 Summer				60.387
6.007	238	15 Summer	2	+0%	100/15 Summer				60.113
6.008	239	15 Summer	2	+0%					59.586
6.009	240	15 Summer	2	+0%	100/15 Summer				56.987
6.010	HW241	15 Summer	2	+0%	30/15 Summer				56.692
8.000	244	120 Winter	2	+0%					56.503
1.005	POND 22	480 Winter	2	+0%	2/120 Summer				56.338
1.006	FC246	480 Winter	2	+0%					56.065

PN	US/MH Name	Surcharged		Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Status		
5.001	218	-0.339	0.000	0.27	103.6	OK		
5.002	219	-0.296	0.000	0.40	102.7	OK		
5.003	220	-0.367	0.000	0.19	112.8	OK		
5.004	221	-0.357	0.000	0.22	113.6	OK		
2.005	222	-0.381	0.000	0.48	359.0	OK		
2.006	HW223	-0.435	0.000	0.46	358.8	OK		
6.000	224	-0.276	0.000	0.15	28.0	OK		
6.001	225	-0.273	0.000	0.16	43.2	OK		
6.002	226	-0.265	0.000	0.19	59.5	OK		
6.003	227	-0.249	0.000	0.24	82.1	OK		
6.004	228	-0.303	0.000	0.23	94.7	OK		
6.005	229	-0.311	0.000	0.21	109.1	OK		
7.000	230	-0.265	0.000	0.18	33.8	OK		
7.001	231	-0.260	0.000	0.20	51.6	OK		
7.002	232	-0.255	0.000	0.22	70.8	OK		

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 2

PN	US/MH Name	Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)			
7.003	233	-0.316	0.000	0.19		100.4	OK	
7.004	234	-0.368	0.000	0.19		118.5	OK	
7.005	235	-0.367	0.000	0.20		130.3	OK	
7.006	236	-0.448	0.000	0.24		129.3	OK	
6.006	237	-0.365	0.000	0.43		257.5	OK	
6.007	238	-0.410	0.000	0.32		267.3	OK	
6.008	239	-0.511	0.000	0.13		275.2	OK	
6.009	240	-0.481	0.000	0.28		274.7	OK	
6.010	HW241	-0.382	0.000	0.48		271.0	OK	
8.000	244	-0.750	0.000	0.00		0.0	OK	
1.005	POND 22	0.071	0.000	0.45		14.4	SURCHARGED	
1.006	FC246	-0.406	0.000	0.08		14.4	OK	

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 2

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	201	15 Summer	5	+0%	100/15 Summer				57.930
1.001	202	15 Summer	5	+0%	100/15 Summer				57.650
1.002	203	15 Summer	5	+0%	30/15 Summer				57.568
1.003	204	15 Summer	5	+0%	100/15 Summer				57.442
1.004	HW205	15 Summer	5	+0%					56.894
2.000	206	15 Summer	5	+0%	100/15 Summer				59.045
2.001	207	15 Summer	5	+0%	100/15 Summer				58.000
2.002	208	15 Summer	5	+0%	100/15 Summer				57.509
2.003	209	15 Summer	5	+0%	100/15 Summer				57.128
3.000	210	15 Summer	5	+0%					59.831
3.001	211	15 Summer	5	+0%					59.463
3.002	212	15 Summer	5	+0%					59.032
2.004	213	15 Summer	5	+0%	100/15 Summer				56.931
4.000	214	15 Summer	5	+0%					60.089
4.001	215	15 Summer	5	+0%					59.163
4.002	216	15 Summer	5	+0%					58.739
5.000	217	15 Summer	5	+0%	100/15 Summer				58.992

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 2

PN	US/MH Name	Surcharged		Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status	
1.000	201	-0.250	0.000	0.24		46.2	OK	
1.001	202	-0.234	0.000	0.43		75.5	OK	
1.002	203	-0.189	0.000	0.64		91.0	OK	
1.003	204	-0.263	0.000	0.36		90.9	OK	
1.004	HW205	-0.751	0.000	0.06		90.6	OK	
2.000	206	-0.313	0.000	0.33		168.3	OK	
2.001	207	-0.287	0.000	0.42		185.5	OK	
2.002	208	-0.356	0.000	0.35		199.6	OK	
2.003	209	-0.393	0.000	0.36		199.7	OK	
3.000	210	-0.292	0.000	0.11		22.2	OK	
3.001	211	-0.248	0.000	0.25		40.7	OK	
3.002	212	-0.267	0.000	0.18		65.3	OK	
2.004	213	-0.401	0.000	0.43		263.2	OK	
4.000	214	-0.311	0.000	0.07		23.3	OK	
4.001	215	-0.253	0.000	0.23		41.5	OK	
4.002	216	-0.260	0.000	0.20		67.3	OK	
5.000	217	-0.342	0.000	0.26		120.2	OK	

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 2

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
5.001	218	15 Summer	5	+0%	100/15 Summer				58.196
5.002	219	15 Summer	5	+0%	100/15 Summer				57.999
5.003	220	15 Summer	5	+0%	100/15 Summer				57.795
5.004	221	15 Summer	5	+0%	100/15 Summer				57.230
2.005	222	15 Summer	5	+0%	30/15 Summer				56.881
2.006	HW223	15 Summer	5	+0%	100/15 Summer				56.679
6.000	224	15 Summer	5	+0%					68.210
6.001	225	15 Summer	5	+0%					67.652
6.002	226	15 Summer	5	+0%	100/15 Summer				66.577
6.003	227	15 Summer	5	+0%	100/15 Summer				64.943
6.004	228	15 Summer	5	+0%	100/15 Summer				62.318
6.005	229	15 Summer	5	+0%	100/15 Summer				61.543
7.000	230	15 Summer	5	+0%					68.030
7.001	231	15 Summer	5	+0%					67.482
7.002	232	15 Summer	5	+0%	100/15 Summer				66.462
7.003	233	15 Summer	5	+0%					64.610
7.004	234	15 Summer	5	+0%	100/15 Summer				62.237
7.005	235	15 Summer	5	+0%	100/15 Summer				61.255
7.006	236	15 Summer	5	+0%	30/15 Summer				60.520
6.006	237	15 Summer	5	+0%	30/15 Summer				60.447
6.007	238	15 Summer	5	+0%	100/15 Summer				60.160
6.008	239	15 Summer	5	+0%					59.615
6.009	240	15 Summer	5	+0%	100/15 Summer				57.035
6.010	HW241	15 Summer	5	+0%	30/15 Summer				56.765
8.000	244	120 Winter	5	+0%					56.503
1.005	POND 22	480 Winter	5	+0%	2/120 Summer				56.413
1.006	FC246	480 Winter	5	+0%					56.068

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Pipe Flow / Cap. (l/s)	Overflow Flow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
5.001	218	-0.305	0.000	0.36		139.1	OK	
5.002	219	-0.253	0.000	0.53		137.6	OK	
5.003	220	-0.342	0.000	0.26		151.3	OK	
5.004	221	-0.328	0.000	0.30		152.4	OK	
2.005	222	-0.307	0.000	0.65		481.5	OK	
2.006	HW223	-0.360	0.000	0.61		480.3	OK	
6.000	224	-0.259	0.000	0.21		37.5	OK	
6.001	225	-0.255	0.000	0.22		57.9	OK	
6.002	226	-0.247	0.000	0.25		79.9	OK	
6.003	227	-0.226	0.000	0.33		110.0	OK	
6.004	228	-0.277	0.000	0.31		126.9	OK	
6.005	229	-0.288	0.000	0.28		146.2	OK	
7.000	230	-0.247	0.000	0.25		45.3	OK	
7.001	231	-0.242	0.000	0.27		69.3	OK	
7.002	232	-0.234	0.000	0.30		95.1	OK	

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 2

PN	US/MH Name	Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)			
7.003	233	-0.295	0.000	0.26		134.7	OK	
7.004	234	-0.343	0.000	0.26		159.0	OK	
7.005	235	-0.341	0.000	0.26		174.8	OK	
7.006	236	-0.408	0.000	0.33		173.5	OK	
6.006	237	-0.305	0.000	0.57		345.5	OK	
6.007	238	-0.363	0.000	0.43		358.8	OK	
6.008	239	-0.482	0.000	0.18		369.3	OK	
6.009	240	-0.433	0.000	0.37		368.4	OK	
6.010	HW241	-0.309	0.000	0.63		356.8	OK	
8.000	244	-0.750	0.000	0.00		0.0	OK	
1.005	POND 22	0.146	0.000	0.47		15.1	SURCHARGED	
1.006	FC246	-0.403	0.000	0.08		15.1	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 2

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	201	15 Summer	30	+0%	100/15 Summer				57.970
1.001	202	15 Summer	30	+0%	100/15 Summer				57.860
1.002	203	15 Summer	30	+0%	30/15 Summer				57.771
1.003	204	15 Summer	30	+0%	100/15 Summer				57.522
1.004	HW205	15 Summer	30	+0%					56.951
2.000	206	15 Summer	30	+0%	100/15 Summer				59.116
2.001	207	15 Summer	30	+0%	100/15 Summer				58.092
2.002	208	15 Summer	30	+0%	100/15 Summer				57.600
2.003	209	15 Summer	30	+0%	100/15 Summer				57.326
3.000	210	15 Summer	30	+0%					59.857
3.001	211	15 Summer	30	+0%					59.518
3.002	212	15 Summer	30	+0%					59.082
2.004	213	15 Summer	30	+0%	100/15 Summer				57.286
4.000	214	15 Summer	30	+0%					60.109
4.001	215	15 Summer	30	+0%					59.213
4.002	216	15 Summer	30	+0%					58.790
5.000	217	15 Summer	30	+0%	100/15 Summer				59.052

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 2

PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)					
1.000	201	-0.210	0.000	0.40		76.2	OK	
1.001	202	-0.024	0.000	0.76		134.4	OK	
1.002	203	0.015	0.000	1.17		166.7	SURCHARGED	
1.003	204	-0.183	0.000	0.64		161.3	OK	
1.004	HW205	-0.694	0.000	0.12		161.9	OK	
2.000	206	-0.242	0.000	0.55		277.5	OK	
2.001	207	-0.195	0.000	0.71		312.1	OK	
2.002	208	-0.265	0.000	0.59		342.5	OK	
2.003	209	-0.195	0.000	0.60		329.3	OK	
3.000	210	-0.266	0.000	0.18		36.6	OK	
3.001	211	-0.193	0.000	0.45		75.2	OK	
3.002	212	-0.217	0.000	0.36		128.0	OK	
2.004	213	-0.046	0.000	0.71		432.1	OK	
4.000	214	-0.291	0.000	0.11		38.4	OK	
4.001	215	-0.203	0.000	0.43		78.8	OK	
4.002	216	-0.209	0.000	0.40		134.3	OK	
5.000	217	-0.282	0.000	0.43		198.2	OK	

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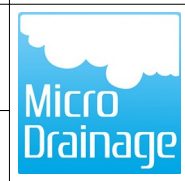
30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 2

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
5.001	218	15 Summer	30	+0%	100/15 Summer				58.279
5.002	219	15 Summer	30	+0%	100/15 Summer				58.117
5.003	220	15 Summer	30	+0%	100/15 Summer				57.860
5.004	221	15 Summer	30	+0%	100/15 Summer				57.317
2.005	222	15 Summer	30	+0%	30/15 Summer				57.198
2.006	HW223	15 Summer	30	+0%	100/15 Summer				56.942
6.000	224	15 Summer	30	+0%					68.247
6.001	225	15 Summer	30	+0%					67.699
6.002	226	15 Summer	30	+0%	100/15 Summer				66.634
6.003	227	15 Summer	30	+0%	100/15 Summer				65.019
6.004	228	15 Summer	30	+0%	100/15 Summer				62.408
6.005	229	15 Summer	30	+0%	100/15 Summer				61.627
7.000	230	15 Summer	30	+0%					68.071
7.001	231	15 Summer	30	+0%					67.538
7.002	232	15 Summer	30	+0%	100/15 Summer				66.528
7.003	233	15 Summer	30	+0%					64.686
7.004	234	15 Summer	30	+0%	100/15 Summer				62.329
7.005	235	15 Summer	30	+0%	100/15 Summer				61.348
7.006	236	15 Summer	30	+0%	30/15 Summer				60.931
6.006	237	15 Summer	30	+0%	30/15 Summer				60.803
6.007	238	15 Summer	30	+0%	100/15 Summer				60.333
6.008	239	15 Summer	30	+0%					59.700
6.009	240	15 Summer	30	+0%	100/15 Summer				57.377
6.010	HW241	15 Summer	30	+0%	30/15 Summer				57.199
8.000	244	480 Winter	30	+0%					56.616
1.005	POND 22	480 Winter	30	+0%	2/120 Summer				56.616
1.006	FC246	480 Winter	30	+0%					56.071

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Pipe Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
5.001	218	-0.222	0.000	0.62		235.7	OK	
5.002	219	-0.135	0.000	0.90		234.9	OK	
5.003	220	-0.277	0.000	0.45		262.9	OK	
5.004	221	-0.241	0.000	0.51		259.0	OK	
2.005	222	0.010	0.000	1.08		799.4	SURCHARGED	
2.006	HW223	-0.097	0.000	1.00		785.1	OK	
6.000	224	-0.222	0.000	0.34		61.9	OK	
6.001	225	-0.208	0.000	0.39		103.8	OK	
6.002	226	-0.190	0.000	0.47		149.8	OK	
6.003	227	-0.150	0.000	0.64		214.6	OK	
6.004	228	-0.187	0.000	0.62		250.4	OK	
6.005	229	-0.204	0.000	0.56		291.8	OK	
7.000	230	-0.206	0.000	0.41		74.7	OK	
7.001	231	-0.186	0.000	0.48		123.8	OK	
7.002	232	-0.168	0.000	0.56		177.5	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 2

PN	US/MH Name	Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)			
7.003	233	-0.219	0.000	0.50		261.5	OK	
7.004	234	-0.251	0.000	0.52		315.5	OK	
7.005	235	-0.248	0.000	0.53		351.0	OK	
7.006	236	0.003	0.000	0.64		339.8	SURCHARGED	
6.006	237	0.051	0.000	1.13		684.0	SURCHARGED	
6.007	238	-0.190	0.000	0.84		693.9	OK	
6.008	239	-0.397	0.000	0.35		712.1	OK	
6.009	240	-0.091	0.000	0.73		714.5	OK	
6.010	HW241	0.125	0.000	1.15		651.0	SURCHARGED	
8.000	244	-0.637	0.000	0.00		0.0	OK	
1.005	POND 22	0.349	0.000	0.49		15.7	SURCHARGED	
1.006	FC246	-0.400	0.000	0.09		15.7	OK	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for HIF - 2

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
 Number of Online Controls 1 Number of Time/Area Diagrams 0
 Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
 FEH Rainfall Version 2013
 Site Location GB 489026 242081 SP 89026 42081
 Data Type Point
 Cv (Summer) 0.950
 Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
 Analysis Timestep Fine Inertia Status ON
 DTS Status OFF

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
 2160, 2880, 4320
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	201	15 Summer	100	+40%	100/15 Summer				58.599
1.001	202	15 Summer	100	+40%	100/15 Summer				58.424
1.002	203	15 Summer	100	+40%	30/15 Summer				58.151
1.003	204	15 Summer	100	+40%	100/15 Summer				57.834
1.004	HW205	960 Winter	100	+40%					57.132
2.000	206	15 Summer	100	+40%	100/15 Summer				60.166
2.001	207	15 Summer	100	+40%	100/15 Summer				59.256
2.002	208	15 Summer	100	+40%	100/15 Summer				58.689
2.003	209	15 Summer	100	+40%	100/15 Summer				58.351
3.000	210	15 Summer	100	+40%					59.899
3.001	211	15 Summer	100	+40%					59.607
3.002	212	15 Summer	100	+40%					59.151
2.004	213	15 Summer	100	+40%	100/15 Summer				58.188
4.000	214	15 Summer	100	+40%					60.141
4.001	215	15 Summer	100	+40%					59.295
4.002	216	15 Summer	100	+40%					58.867
5.000	217	15 Summer	100	+40%	100/15 Summer				59.422

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100 year Return Period Summary of Critical Results by Maximum Level (Rank
1) for HIF - 2

PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Pipe	Status	Level Exceeded
		Depth (m)	Volume (m ³)			Flow (l/s)		
1.000	201	0.419	0.000	0.73		138.4	SURCHARGED	
1.001	202	0.540	0.000	1.40		248.1	SURCHARGED	
1.002	203	0.395	0.000	2.16		308.2	SURCHARGED	
1.003	204	0.128	0.000	1.22		308.2	SURCHARGED	
1.004	HW205	-0.513	0.000	0.01		17.0	OK	
2.000	206	0.808	0.000	0.96		486.5	SURCHARGED	
2.001	207	0.969	0.000	1.11		492.6	SURCHARGED	
2.002	208	0.824	0.000	0.90		519.6	SURCHARGED	
2.003	209	0.830	0.000	0.96		528.0	SURCHARGED	
3.000	210	-0.224	0.000	0.34		67.2	OK	
3.001	211	-0.104	0.000	0.83		137.9	OK	
3.002	212	-0.148	0.000	0.65		233.3	OK	
2.004	213	0.856	0.000	1.15		699.7	SURCHARGED	
4.000	214	-0.259	0.000	0.21		70.5	OK	
4.001	215	-0.121	0.000	0.78		144.5	OK	
4.002	216	-0.132	0.000	0.73		245.9	OK	
5.000	217	0.088	0.000	0.77		357.1	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for HIF - 2

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) SurchARGE	First (Y) Flood	First (Z) Overflow	Overflow Act.
5.001	218	15 Summer	100	+40%	100/15 Summer			
5.002	219	15 Summer	100	+40%	100/15 Summer			
5.003	220	15 Summer	100	+40%	100/15 Summer			
5.004	221	15 Summer	100	+40%	100/15 Summer			
2.005	222	15 Summer	100	+40%	30/15 Summer			
2.006	HW223	15 Summer	100	+40%	100/15 Summer			
6.000	224	15 Summer	100	+40%				
6.001	225	15 Summer	100	+40%				
6.002	226	15 Summer	100	+40%	100/15 Summer			
6.003	227	15 Summer	100	+40%	100/15 Summer			
6.004	228	15 Summer	100	+40%	100/15 Summer			
6.005	229	15 Summer	100	+40%	100/15 Summer			
7.000	230	15 Summer	100	+40%				
7.001	231	15 Summer	100	+40%				
7.002	232	15 Summer	100	+40%	100/15 Summer			
7.003	233	15 Summer	100	+40%				
7.004	234	15 Summer	100	+40%	100/15 Summer			
7.005	235	15 Summer	100	+40%	100/15 Summer			
7.006	236	15 Summer	100	+40%	30/15 Summer			
6.006	237	15 Summer	100	+40%	30/15 Summer			
6.007	238	15 Summer	100	+40%	100/15 Summer			
6.008	239	15 Summer	100	+40%				
6.009	240	15 Summer	100	+40%	100/15 Summer			
6.010	HW241	15 Summer	100	+40%	30/15 Summer			
8.000	244	960 Winter	100	+40%				
1.005	POND 22	960 Winter	100	+40%	2/120 Summer			
1.006	FC246	2880 Summer	100	+40%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
5.001	218	58.953	0.452	0.000	0.98		373.8	SURCHARGED	
5.002	219	58.717	0.465	0.000	1.41		366.9	SURCHARGED	
5.003	220	58.493	0.355	0.000	0.68		395.7	SURCHARGED	
5.004	221	58.221	0.663	0.000	0.79		402.3	SURCHARGED	
2.005	222	57.980	0.792	0.000	1.73		1281.9	SURCHARGED	
2.006	HW223	57.294	0.255	0.000	1.63		1282.0	SURCHARGED	
6.000	224	68.312	-0.157	0.000	0.62		113.6	OK	
6.001	225	67.776	-0.131	0.000	0.72		189.8	OK	
6.002	226	66.984	0.160	0.000	0.83		266.0	SURCHARGED	
6.003	227	65.970	0.801	0.000	1.04		350.7	SURCHARGED	
6.004	228	63.230	0.635	0.000	0.98		396.2	SURCHARGED	
6.005	229	62.515	0.684	0.000	0.85		447.4	SURCHARGED	
7.000	230	68.150	-0.127	0.000	0.75		137.1	OK	
7.001	231	67.632	-0.092	0.000	0.89		226.7	OK	
7.002	232	66.755	0.059	0.000	1.02		322.3	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for HIF - 2

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
7.003	233	64.856	-0.049	0.000	0.89		469.5	OK	
7.004	234	63.146	0.566	0.000	0.87		532.9	SURCHARGED	
7.005	235	62.414	0.818	0.000	0.87		573.5	SURCHARGED	
7.006	236	61.853	0.925	0.000	1.08		576.2	SURCHARGED	
6.006	237	61.648	0.896	0.000	1.81		1094.0	SURCHARGED	
6.007	238	60.876	0.353	0.000	1.36		1122.0	SURCHARGED	
6.008	239	59.785	-0.312	0.000	0.56		1147.0	OK	
6.009	240	58.430	0.962	0.000	1.15		1132.3	SURCHARGED	
6.010	HW241	57.900	0.826	0.000	1.91		1080.0	SURCHARGED	
8.000	244	57.132	-0.121	0.000	0.00		0.0	OK	
1.005	POND 22	57.132	0.865	0.000	0.49		15.7	SURCHARGED	
1.006	FC246	56.071	-0.400	0.000	0.09		15.7	OK	



Drainage Technical Addendum

DATE:	20 July 2021	CONFIDENTIALITY:	Public
SUBJECT:	Drainage Technical Addendum		
PROJECT:	Milton Keynes East	AUTHOR:	DSF
CHECKED:	BU	APPROVED:	SP

HIF 2 – Surcharged

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for HIf - 2

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model	
Return Period (years)	5
FEH Rainfall Version	2013
Site Location	GB 489026 242081 SP 89026 42081
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for HIf - 2


Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.000	4-8	1.228	8-12	2.619	12-16	0.101

Total Area Contributing (ha) = 3.948

Total Pipe Volume (m³) = 493.225

Network Design Table for HIf - 2

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section	Type	Auto Design
1.000	24.454	0.296	82.6	0.169	5.00	0.0	0.600	o	375	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 (l/s)	Flow (l/s)
1.000	50.00	5.20	57.805	0.169	0.0	0.0	0.0	1.99	220.3	22.9

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Network Design Table for HIF - 2

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.001	31.970	0.128	250.0	0.134	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.002	15.243	0.051	300.0	0.072	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.003	36.061	0.285	126.4	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.004	115.982	0.703	165.0	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
2.000	85.664	1.071	80.0	0.629	5.00	0.0	0.600	o	525	Pipe/Conduit	
2.001	37.992	0.422	90.0	0.075	0.00	0.0	0.600	o	525	Pipe/Conduit	
2.002	44.195	0.419	105.5	0.075	0.00	0.0	0.600	o	600	Pipe/Conduit	
2.003	10.882	0.189	57.6	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit	
3.000	33.111	0.412	80.4	0.082	5.00	0.0	0.600	o	375	Pipe/Conduit	
3.001	51.476	0.412	124.9	0.083	0.00	0.0	0.600	o	375	Pipe/Conduit	
3.002	55.675	2.042	27.3	0.110	0.00	0.0	0.600	o	375	Pipe/Conduit	
2.004	15.660	0.144	108.8	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
4.000	26.415	0.984	26.8	0.085	5.00	0.0	0.600	o	375	Pipe/Conduit	
4.001	40.798	0.417	97.8	0.082	0.00	0.0	0.600	o	375	Pipe/Conduit	
4.002	58.784	1.886	31.2	0.114	0.00	0.0	0.600	o	375	Pipe/Conduit	
5.000	78.044	0.833	93.7	0.449	5.00	0.0	0.600	o	525	Pipe/Conduit	
5.001	26.183	0.249	105.2	0.082	0.00	0.0	0.600	o	525	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 (l/s)	Flow (l/s)
1.001	50.00	5.62	57.434	0.303	0.0	0.0	0.0	1.28	203.8	41.0
1.002	50.00	5.84	57.306	0.375	0.0	0.0	0.0	1.17	185.8	50.8
1.003	50.00	6.17	57.255	0.375	0.0	0.0	0.0	1.81	287.4	50.8
1.004	50.00	6.96	56.745	0.375	0.0	0.0	0.0	2.44	1550.2	50.8
2.000	50.00	5.57	58.833	0.629	0.0	0.0	0.0	2.51	542.5	85.2
2.001	50.00	5.84	57.762	0.704	0.0	0.0	0.0	2.36	511.3	95.4
2.002	50.00	6.15	57.265	0.779	0.0	0.0	0.0	2.37	670.4	105.4
2.003	50.00	6.20	56.846	0.779	0.0	0.0	0.0	3.46	1237.6	105.4
3.000	50.00	5.27	59.748	0.082	0.0	0.0	0.0	2.02	223.4	11.1
3.001	50.00	5.80	59.336	0.165	0.0	0.0	0.0	1.62	178.9	22.3
3.002	50.00	6.07	58.924	0.274	0.0	0.0	0.0	3.48	384.6	37.2
2.004	50.00	6.30	56.582	1.053	0.0	0.0	0.0	2.68	1185.4	142.6
4.000	50.00	5.13	60.025	0.085	0.0	0.0	0.0	3.51	387.6	11.5
4.001	50.00	5.50	59.041	0.167	0.0	0.0	0.0	1.83	202.3	22.6
4.002	50.00	5.80	58.624	0.281	0.0	0.0	0.0	3.26	359.6	38.0
5.000	50.00	5.56	58.809	0.449	0.0	0.0	0.0	2.31	501.1	60.8
5.001	50.00	5.76	57.976	0.531	0.0	0.0	0.0	2.18	472.8	71.9

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Network Design Table for Hif - 2

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
5.002	22.031	0.115	192.4	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	🔴
5.003	25.764	0.580	44.5	0.069	0.00	0.0	0.600	o	525	Pipe/Conduit	🔴
5.004	11.762	0.445	26.4	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	🔴
2.005	24.664	0.224	110.1	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	🔴
2.006	22.570	0.172	131.2	0.000	0.00	0.0	0.600	o	825	Pipe/Conduit	🔴
6.000	59.212	0.562	105.4	0.140	5.00	0.0	0.600	o	375	Pipe/Conduit	🔴
6.001	53.954	1.083	49.8	0.090	0.00	0.0	0.600	o	375	Pipe/Conduit	🔴
6.002	56.785	1.655	34.3	0.099	0.00	0.0	0.600	o	375	Pipe/Conduit	🔴
6.003	83.472	2.574	32.4	0.140	0.00	0.0	0.600	o	375	Pipe/Conduit	🔴
6.004	38.404	0.764	50.3	0.079	0.00	0.0	0.600	o	450	Pipe/Conduit	🔴
6.005	33.667	1.154	29.2	0.090	0.00	0.0	0.600	o	450	Pipe/Conduit	🔴
7.000	57.351	0.553	103.7	0.169	5.00	0.0	0.600	o	375	Pipe/Conduit	🔴
7.001	54.617	1.028	53.1	0.106	0.00	0.0	0.600	o	375	Pipe/Conduit	🔴
7.002	63.199	1.791	35.3	0.117	0.00	0.0	0.600	o	375	Pipe/Conduit	🔴
7.003	77.547	2.325	33.4	0.182	0.00	0.0	0.600	o	450	Pipe/Conduit	🔴
7.004	49.203	0.984	50.0	0.115	0.00	0.0	0.600	o	525	Pipe/Conduit	🔴
7.005	24.241	0.743	32.6	0.075	0.00	0.0	0.600	o	525	Pipe/Conduit	🔴
7.006	17.636	0.176	100.2	0.000	0.00	0.0	0.600	o	675	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 (l/s)	Flow (l/s)
5.002	50.00	5.99	57.727	0.531	0.0	0.0	0.0	1.61	348.8	71.9
5.003	50.00	6.12	57.613	0.600	0.0	0.0	0.0	3.37	728.7	81.3
5.004	50.00	6.16	57.033	0.600	0.0	0.0	0.0	4.37	945.8	81.3
2.005	50.00	6.45	56.438	1.935	0.0	0.0	0.0	2.67	1178.0	262.0
2.006	50.00	6.60	56.214	1.935	0.0	0.0	0.0	2.59	1384.7	262.0
6.000	50.00	5.56	68.094	0.140	0.0	0.0	0.0	1.76	194.9	19.0
6.001	50.00	5.91	67.532	0.231	0.0	0.0	0.0	2.57	284.1	31.2
6.002	50.00	6.21	66.449	0.330	0.0	0.0	0.0	3.10	342.6	44.6
6.003	50.00	6.65	64.794	0.470	0.0	0.0	0.0	3.19	352.5	63.6
6.004	50.00	6.87	62.145	0.549	0.0	0.0	0.0	2.87	456.9	74.3
6.005	50.00	7.02	61.381	0.639	0.0	0.0	0.0	3.78	600.4	86.5
7.000	50.00	5.54	67.902	0.169	0.0	0.0	0.0	1.78	196.5	22.9
7.001	50.00	5.90	67.349	0.275	0.0	0.0	0.0	2.49	275.1	37.3
7.002	50.00	6.25	66.321	0.392	0.0	0.0	0.0	3.06	337.9	53.1
7.003	50.00	6.61	64.455	0.575	0.0	0.0	0.0	3.53	561.4	77.8
7.004	50.00	6.87	62.055	0.689	0.0	0.0	0.0	3.17	686.9	93.4
7.005	50.00	6.97	61.071	0.765	0.0	0.0	0.0	3.93	851.1	103.6
7.006	50.00	7.09	60.253	0.765	0.0	0.0	0.0	2.62	937.0	103.6

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Network Design Table for HIF - 2

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
6.006	14.845	0.228	65.1	0.132	0.00	0.0	0.600	o	675	Pipe/Conduit	
6.007	14.966	0.426	35.1	0.054	0.00	0.0	0.600	o	675	Pipe/Conduit	
6.008	22.309	2.629	8.5	0.049	0.00	0.0	0.600	o	675	Pipe/Conduit	
6.009	39.362	0.394	99.9	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
6.010	113.060	0.282	400.9	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
8.000	81.643	0.255	320.2	0.000	5.00	0.0	0.600	o	750	Pipe/Conduit	
1.005	13.886	0.071	195.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.006	252.829	0.471	536.8	0.000	0.00	0.0	0.600	o	500	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 (l/s)	Flow (l/s)
6.006	50.00	7.16	60.077	1.535	0.0	0.0	0.0	3.25	1163.5	207.9
6.007	50.00	7.22	59.848	1.589	0.0	0.0	0.0	4.43	1585.7	215.1
6.008	50.00	7.26	59.422	1.638	0.0	0.0	0.0	9.03	3231.3	221.8
6.009	50.00	7.49	56.718	1.638	0.0	0.0	0.0	2.80	1237.0	221.8
6.010	50.00	8.85	56.324	1.638	0.0	0.0	0.0	1.39	614.7	221.8
8.000	50.00	5.87	56.503	0.000	0.0	0.0	0.0	1.56	688.5	0.0
1.005	50.00	9.10	56.042	3.948	0.0	0.0	0.0	0.93	37.0	534.6
1.006	50.00	13.63	55.971	3.948	0.0	0.0	0.0	0.93	182.7	534.6

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Manhole Schedules for Hif - 2

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
201	59.380	1.575	Open Manhole	1350	1.000	57.805	375				
202	59.084	1.650	Open Manhole	1350	1.001	57.434	450	1.000	57.509	375	
203	59.172	1.866	Open Manhole	1350	1.002	57.306	450	1.001	57.306	450	
204	61.633	4.378	Open Manhole	1350	1.003	57.255	450	1.002	57.255	450	
HW205	58.845	2.100	Open Manhole	1800	1.004	56.745	900	1.003	56.970	450	
206	60.558	1.725	Open Manhole	1500	2.000	58.833	525				
207	59.694	1.932	Open Manhole	1500	2.001	57.762	525	2.000	57.762	525	
208	59.783	2.518	Open Manhole	1500	2.002	57.265	600	2.001	57.340	525	
209	60.139	3.293	Open Manhole	1500	2.003	56.846	675	2.002	56.846	600	
210	61.323	1.575	Open Manhole	1350	3.000	59.748	375				
211	60.911	1.575	Open Manhole	1350	3.001	59.336	375	3.000	59.336	375	
212	60.499	1.575	Open Manhole	1350	3.002	58.924	375	3.001	58.924	375	
213	59.856	3.274	Open Manhole	1800	2.004	56.582	750	2.003	56.657	675	
								3.002	56.882	375	
214	61.600	1.575	Open Manhole	1350	4.000	60.025	375				
215	60.616	1.575	Open Manhole	1350	4.001	59.041	375	4.000	59.041	375	
216	60.199	1.575	Open Manhole	1350	4.002	58.624	375	4.001	58.624	375	
217	60.534	1.725	Open Manhole	1500	5.000	58.809	525				
218	59.701	1.725	Open Manhole	1500	5.001	57.976	525	5.000	57.976	525	
219	59.472	1.745	Open Manhole	1500	5.002	57.727	525	5.001	57.727	525	
220	59.472	1.860	Open Manhole	1500	5.003	57.613	525	5.002	57.613	525	
221	59.574	2.541	Open Manhole	1500	5.004	57.033	525	5.003	57.033	525	
222	59.574	3.136	Open Manhole	1800	2.005	56.438	750	2.004	56.438	750	
								4.002	56.738	375	
								5.004	56.588	525	
HW223	58.933	2.719	Open Manhole	1800	2.006	56.214	825	2.005	56.214	750	
224	69.669	1.575	Open Manhole	1350	6.000	68.094	375				
225	69.107	1.575	Open Manhole	1350	6.001	67.532	375	6.000	67.532	375	
226	68.024	1.575	Open Manhole	1350	6.002	66.449	375	6.001	66.449	375	
227	66.369	1.575	Open Manhole	1350	6.003	64.794	375	6.002	64.794	375	
228	63.795	1.650	Open Manhole	1350	6.004	62.145	450	6.003	62.220	375	
229	63.031	1.650	Open Manhole	1350	6.005	61.381	450	6.004	61.381	450	
230	69.477	1.575	Open Manhole	1350	7.000	67.902	375				
231	68.924	1.575	Open Manhole	1350	7.001	67.349	375	7.000	67.349	375	
232	67.896	1.575	Open Manhole	1350	7.002	66.321	375	7.001	66.321	375	
233	66.105	1.650	Open Manhole	1350	7.003	64.455	450	7.002	64.530	375	
234	63.780	1.725	Open Manhole	1500	7.004	62.055	525	7.003	62.130	450	
235	63.036	1.965	Open Manhole	1500	7.005	61.071	525	7.004	61.071	525	

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Manhole Schedules for Hif - 2

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
236	62.293	2.040	Open Manhole	1500	7.006	60.253	675	7.005	60.328	525	
237	62.267	2.190	Open Manhole	1500	6.006	60.077	675	6.005	60.227	450	
								7.006	60.077	675	
238	62.036	2.188	Open Manhole	1500	6.007	59.848	675	6.006	59.849	675	1
239	61.610	2.188	Open Manhole	1500	6.008	59.422	675	6.007	59.422	675	
240	59.056	2.338	Open Manhole	1800	6.009	56.718	750	6.008	56.793	675	
HW241	58.674	2.350	Open Manhole	1800	6.010	56.324	750	6.009	56.324	750	
244	58.564	2.061	Open Manhole	1800	8.000	56.503	750				
POND 22	58.292	2.250	Open Manhole	1800	1.005	56.042	225	1.004	56.042	900	
								2.006	56.042	825	
								6.010	56.042	750	
								8.000	56.248	750	731
FC246	58.000	2.029	Open Manhole	1500	1.006	55.971	500	1.005	55.971	225	
	56.500	1.000	Open Manhole	0		OUTFALL		1.006	55.500	500	

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Area Summary for Hif - 2

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.169	0.169	0.169
1.001	User	-	100	0.134	0.134	0.134
1.002	User	-	100	0.072	0.072	0.072
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
2.000	User	-	100	0.629	0.629	0.629
2.001	User	-	100	0.075	0.075	0.075
2.002	User	-	100	0.075	0.075	0.075
2.003	-	-	100	0.000	0.000	0.000
3.000	User	-	100	0.082	0.082	0.082
3.001	User	-	100	0.083	0.083	0.083
3.002	User	-	100	0.110	0.110	0.110
2.004	-	-	100	0.000	0.000	0.000
4.000	User	-	100	0.085	0.085	0.085
4.001	User	-	100	0.082	0.082	0.082
4.002	User	-	100	0.114	0.114	0.114
5.000	User	-	100	0.449	0.449	0.449
5.001	User	-	100	0.082	0.082	0.082
5.002	-	-	100	0.000	0.000	0.000
5.003	User	-	100	0.069	0.069	0.069
5.004	-	-	100	0.000	0.000	0.000
2.005	-	-	100	0.000	0.000	0.000
2.006	-	-	100	0.000	0.000	0.000
6.000	User	-	100	0.140	0.140	0.140
6.001	User	-	100	0.090	0.090	0.090
6.002	User	-	100	0.099	0.099	0.099
6.003	User	-	100	0.140	0.140	0.140
6.004	User	-	100	0.079	0.079	0.079
6.005	User	-	100	0.090	0.090	0.090
7.000	User	-	100	0.169	0.169	0.169
7.001	User	-	100	0.106	0.106	0.106
7.002	User	-	100	0.117	0.117	0.117
7.003	User	-	100	0.182	0.182	0.182
7.004	User	-	100	0.115	0.115	0.115
7.005	User	-	100	0.075	0.075	0.075
7.006	-	-	100	0.000	0.000	0.000
6.006	User	-	100	0.132	0.132	0.132
6.007	User	-	100	0.054	0.054	0.054
6.008	User	-	100	0.049	0.049	0.049
6.009	-	-	100	0.000	0.000	0.000
6.010	-	-	100	0.000	0.000	0.000
8.000	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				3.948	3.948	3.948

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Online Controls for HIF - 2

Hydro-Brake® Optimum Manhole: POND 22, DS/PN: 1.005, Volume (m³): 173.9

Unit Reference	MD-SHE-0167-1580-1800-1580
Design Head (m)	1.800
Design Flow (l/s)	15.8
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	167
Invert Level (m)	56.042
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.800	15.8
Flush-Flo™	0.528	15.7
Kick-Flo®	1.114	12.6
Mean Flow over Head Range	-	13.7

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	6.0	1.200	13.0	3.000	20.1	7.000	30.2
0.200	13.6	1.400	14.0	3.500	21.7	7.500	31.3
0.300	14.9	1.600	14.9	4.000	23.1	8.000	32.2
0.400	15.5	1.800	15.8	4.500	24.4	8.500	33.2
0.500	15.7	2.000	16.6	5.000	25.7	9.000	34.1
0.600	15.7	2.200	17.4	5.500	26.9	9.500	35.0
0.800	15.2	2.400	18.1	6.000	28.1		
1.000	14.0	2.600	18.8	6.500	29.2		

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Storage Structures for HIF - 2

Tank or Pond Manhole: POND 22, DS/PN: 1.005

Invert Level (m) 56.042

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	2800.0	2.250	3572.0

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 2

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	201	15 Summer	2	+0%	100/15 Summer				57.913
1.001	202	15 Summer	2	+0%	100/15 Summer				57.614
1.002	203	15 Summer	2	+0%	30/15 Summer				57.525
1.003	204	15 Summer	2	+0%	100/15 Summer				57.414
1.004	HW205	15 Summer	2	+0%					56.872
2.000	206	15 Summer	2	+0%	100/15 Summer				59.012
2.001	207	15 Summer	2	+0%	100/15 Summer				57.964
2.002	208	15 Summer	2	+0%	100/15 Summer				57.471
2.003	209	15 Summer	2	+0%	100/15 Summer				57.085
3.000	210	15 Summer	2	+0%					59.821
3.001	211	15 Summer	2	+0%					59.445
3.002	212	15 Summer	2	+0%					59.016
2.004	213	15 Summer	2	+0%	100/15 Summer				56.876
4.000	214	15 Summer	2	+0%					60.080
4.001	215	15 Summer	2	+0%					59.145
4.002	216	15 Summer	2	+0%					58.721
5.000	217	15 Summer	2	+0%	100/15 Summer				58.967

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 2

PN	US/MH Name	Surcharged		Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status	
1.000	201	-0.267	0.000	0.18		34.4	OK	
1.001	202	-0.270	0.000	0.32		56.4	OK	
1.002	203	-0.231	0.000	0.48		68.0	OK	
1.003	204	-0.292	0.000	0.27		67.9	OK	
1.004	HW205	-0.773	0.000	0.05		67.7	OK	
2.000	206	-0.346	0.000	0.25		125.5	OK	
2.001	207	-0.323	0.000	0.31		138.3	OK	
2.002	208	-0.394	0.000	0.26		149.0	OK	
2.003	209	-0.436	0.000	0.27		148.9	OK	
3.000	210	-0.302	0.000	0.08		16.5	OK	
3.001	211	-0.266	0.000	0.18		30.3	OK	
3.002	212	-0.283	0.000	0.14		48.7	OK	
2.004	213	-0.456	0.000	0.32		196.3	OK	
4.000	214	-0.320	0.000	0.05		17.3	OK	
4.001	215	-0.271	0.000	0.17		30.9	OK	
4.002	216	-0.278	0.000	0.15		50.2	OK	
5.000	217	-0.367	0.000	0.19		89.6	OK	

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 2

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
5.001	218	15 Summer	2	+0%	100/15 Summer			
5.002	219	15 Summer	2	+0%	100/15 Summer			
5.003	220	15 Summer	2	+0%	100/15 Summer			
5.004	221	15 Summer	2	+0%	100/15 Summer			
2.005	222	15 Summer	2	+0%	30/15 Summer			
2.006	HW223	4320 Summer	2	+0%	100/15 Summer			
6.000	224	15 Summer	2	+0%				
6.001	225	15 Summer	2	+0%				
6.002	226	15 Summer	2	+0%	100/15 Summer			
6.003	227	15 Summer	2	+0%	100/15 Summer			
6.004	228	15 Summer	2	+0%	100/15 Summer			
6.005	229	15 Summer	2	+0%	100/15 Summer			
7.000	230	15 Summer	2	+0%				
7.001	231	15 Summer	2	+0%				
7.002	232	15 Summer	2	+0%	100/15 Summer			
7.003	233	15 Summer	2	+0%				
7.004	234	15 Summer	2	+0%	100/15 Summer			
7.005	235	15 Summer	2	+0%	100/15 Summer			
7.006	236	15 Summer	2	+0%	30/15 Summer			
6.006	237	15 Summer	2	+0%	30/15 Summer			
6.007	238	15 Summer	2	+0%	100/15 Summer			
6.008	239	15 Summer	2	+0%				
6.009	240	15 Summer	2	+0%	100/15 Summer			
6.010	HW241	15 Summer	2	+0%	30/15 Summer			
8.000	244	4320 Summer	2	+0%	100/960 Summer			
1.005	POND 22	4320 Summer	2	+0%	2/120 Summer			
1.006	FC246	4320 Summer	2	+0%	2/1440 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Pipe Flow / Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
5.001	218	58.162	-0.339	0.000	0.27	103.6	OK	
5.002	219	57.956	-0.296	0.000	0.40	102.7	OK	
5.003	220	57.770	-0.367	0.000	0.19	112.8	OK	
5.004	221	57.201	-0.357	0.000	0.22	113.6	OK	
2.005	222	56.807	-0.381	0.000	0.48	359.0	OK	
2.006	HW223	56.608	-0.431	0.000	0.02	12.6	OK	
6.000	224	68.193	-0.276	0.000	0.15	28.0	OK	
6.001	225	67.634	-0.273	0.000	0.16	43.2	OK	
6.002	226	66.559	-0.265	0.000	0.19	59.5	OK	
6.003	227	64.920	-0.249	0.000	0.24	82.1	OK	
6.004	228	62.292	-0.303	0.000	0.23	94.7	OK	
6.005	229	61.520	-0.311	0.000	0.21	109.1	OK	
7.000	230	68.012	-0.265	0.000	0.18	33.8	OK	
7.001	231	67.464	-0.260	0.000	0.20	51.6	OK	
7.002	232	66.441	-0.255	0.000	0.22	70.8	OK	

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 2

PN	US/MH Name	Water	Surcharged	Flooded	Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)		
7.003	233	64.589	-0.316	0.000	0.19	100.4	OK	
7.004	234	62.212	-0.368	0.000	0.19	118.5	OK	
7.005	235	61.229	-0.367	0.000	0.20	130.3	OK	
7.006	236	60.480	-0.448	0.000	0.24	129.3	OK	
6.006	237	60.387	-0.365	0.000	0.43	257.5	OK	
6.007	238	60.113	-0.410	0.000	0.32	267.3	OK	
6.008	239	59.586	-0.511	0.000	0.13	275.2	OK	
6.009	240	56.987	-0.481	0.000	0.28	274.7	OK	
6.010	HW241	56.692	-0.382	0.000	0.48	271.0	OK	
8.000	244	56.608	-0.645	0.000	0.00	0.0	OK	
1.005	POND 22	56.608	0.341	0.000	0.00	0.1	SURCHARGED	
1.006	FC246	56.609	0.138	0.000	0.00	0.0	SURCHARGED	

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 2

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
 Number of Online Controls 1 Number of Time/Area Diagrams 0
 Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
 FEH Rainfall Version 2013
 Site Location GB 489026 242081 SP 89026 42081
 Data Type Point
 Cv (Summer) 0.950
 Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
 Analysis Timestep Fine Inertia Status ON
 DTS Status OFF

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
 2160, 2880, 4320
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	201	15 Summer	5	+0%	100/15 Summer				57.930
1.001	202	15 Summer	5	+0%	100/15 Summer				57.650
1.002	203	15 Summer	5	+0%	30/15 Summer				57.568
1.003	204	15 Summer	5	+0%	100/15 Summer				57.442
1.004	HW205	15 Summer	5	+0%					56.894
2.000	206	15 Summer	5	+0%	100/15 Summer				59.045
2.001	207	15 Summer	5	+0%	100/15 Summer				58.000
2.002	208	15 Summer	5	+0%	100/15 Summer				57.509
2.003	209	15 Summer	5	+0%	100/15 Summer				57.128
3.000	210	15 Summer	5	+0%					59.831
3.001	211	15 Summer	5	+0%					59.463
3.002	212	15 Summer	5	+0%					59.032
2.004	213	15 Summer	5	+0%	100/15 Summer				56.931
4.000	214	15 Summer	5	+0%					60.089
4.001	215	15 Summer	5	+0%					59.163
4.002	216	15 Summer	5	+0%					58.739
5.000	217	15 Summer	5	+0%	100/15 Summer				58.992

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 2

PN	US/MH Name	Surcharged		Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status	
1.000	201	-0.250	0.000	0.24		46.2	OK	
1.001	202	-0.234	0.000	0.43		75.5	OK	
1.002	203	-0.189	0.000	0.64		91.0	OK	
1.003	204	-0.263	0.000	0.36		90.9	OK	
1.004	HW205	-0.751	0.000	0.06		90.6	OK	
2.000	206	-0.313	0.000	0.33		168.3	OK	
2.001	207	-0.287	0.000	0.42		185.5	OK	
2.002	208	-0.356	0.000	0.35		199.6	OK	
2.003	209	-0.393	0.000	0.36		199.7	OK	
3.000	210	-0.292	0.000	0.11		22.2	OK	
3.001	211	-0.248	0.000	0.25		40.7	OK	
3.002	212	-0.267	0.000	0.18		65.3	OK	
2.004	213	-0.401	0.000	0.43		263.2	OK	
4.000	214	-0.311	0.000	0.07		23.3	OK	
4.001	215	-0.253	0.000	0.23		41.5	OK	
4.002	216	-0.260	0.000	0.20		67.3	OK	
5.000	217	-0.342	0.000	0.26		120.2	OK	

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 2

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) SurchARGE	First (Y) Flood	First (Z) Overflow	Overflow Act.
5.001	218	15 Summer	5	+0%	100/15 Summer			
5.002	219	15 Summer	5	+0%	100/15 Summer			
5.003	220	15 Summer	5	+0%	100/15 Summer			
5.004	221	15 Summer	5	+0%	100/15 Summer			
2.005	222	15 Summer	5	+0%	30/15 Summer			
2.006	HW223	4320 Summer	5	+0%	100/15 Summer			
6.000	224	15 Summer	5	+0%				
6.001	225	15 Summer	5	+0%				
6.002	226	15 Summer	5	+0%	100/15 Summer			
6.003	227	15 Summer	5	+0%	100/15 Summer			
6.004	228	15 Summer	5	+0%	100/15 Summer			
6.005	229	15 Summer	5	+0%	100/15 Summer			
7.000	230	15 Summer	5	+0%				
7.001	231	15 Summer	5	+0%				
7.002	232	15 Summer	5	+0%	100/15 Summer			
7.003	233	15 Summer	5	+0%				
7.004	234	15 Summer	5	+0%	100/15 Summer			
7.005	235	15 Summer	5	+0%	100/15 Summer			
7.006	236	15 Summer	5	+0%	30/15 Summer			
6.006	237	15 Summer	5	+0%	30/15 Summer			
6.007	238	15 Summer	5	+0%	100/15 Summer			
6.008	239	15 Summer	5	+0%				
6.009	240	15 Summer	5	+0%	100/15 Summer			
6.010	HW241	15 Summer	5	+0%	30/15 Summer			
8.000	244	4320 Summer	5	+0%	100/960 Summer			
1.005	POND 22	4320 Summer	5	+0%	2/120 Summer			
1.006	FC246	4320 Winter	5	+0%	2/1440 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Pipe Flow / Cap. (l/s)	Overflow Flow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
5.001	218	58.196	-0.305	0.000	0.36		139.1	OK	
5.002	219	57.999	-0.253	0.000	0.53		137.6	OK	
5.003	220	57.795	-0.342	0.000	0.26		151.3	OK	
5.004	221	57.230	-0.328	0.000	0.30		152.4	OK	
2.005	222	56.881	-0.307	0.000	0.65		481.5	OK	
2.006	HW223	56.709	-0.330	0.000	0.02		15.0	OK	
6.000	224	68.210	-0.259	0.000	0.21		37.5	OK	
6.001	225	67.652	-0.255	0.000	0.22		57.9	OK	
6.002	226	66.577	-0.247	0.000	0.25		79.9	OK	
6.003	227	64.943	-0.226	0.000	0.33		110.0	OK	
6.004	228	62.318	-0.277	0.000	0.31		126.9	OK	
6.005	229	61.543	-0.288	0.000	0.28		146.2	OK	
7.000	230	68.030	-0.247	0.000	0.25		45.3	OK	
7.001	231	67.482	-0.242	0.000	0.27		69.3	OK	
7.002	232	66.462	-0.234	0.000	0.30		95.1	OK	

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 2

PN	US/MH Name	Water	Surcharged	Flooded	Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)		
7.003	233	64.610	-0.295	0.000	0.26	134.7	OK	
7.004	234	62.237	-0.343	0.000	0.26	159.0	OK	
7.005	235	61.255	-0.341	0.000	0.26	174.8	OK	
7.006	236	60.520	-0.408	0.000	0.33	173.5	OK	
6.006	237	60.447	-0.305	0.000	0.57	345.5	OK	
6.007	238	60.160	-0.363	0.000	0.43	358.8	OK	
6.008	239	59.615	-0.482	0.000	0.18	369.3	OK	
6.009	240	57.035	-0.433	0.000	0.37	368.4	OK	
6.010	HW241	56.765	-0.309	0.000	0.63	356.8	OK	
8.000	244	56.709	-0.544	0.000	0.00	0.0	OK	
1.005	POND 22	56.709	0.442	0.000	0.00	0.1	SURCHARGED	
1.006	FC246	56.709	0.238	0.000	0.00	0.0	SURCHARGED	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Hif - 2

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
 Number of Online Controls 1 Number of Time/Area Diagrams 0
 Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
 FEH Rainfall Version 2013
 Site Location GB 489026 242081 SP 89026 42081
 Data Type Point
 Cv (Summer) 0.950
 Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
 Analysis Timestep Fine Inertia Status ON
 DTS Status OFF

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
 2160, 2880, 4320
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	201	15 Summer	30	+0%	100/15 Summer				57.970
1.001	202	15 Summer	30	+0%	100/15 Summer				57.860
1.002	203	15 Summer	30	+0%	30/15 Summer				57.771
1.003	204	15 Summer	30	+0%	100/15 Summer				57.522
1.004	HW205	4320 Winter	30	+0%					56.952
2.000	206	15 Summer	30	+0%	100/15 Summer				59.116
2.001	207	15 Summer	30	+0%	100/15 Summer				58.092
2.002	208	15 Summer	30	+0%	100/15 Summer				57.600
2.003	209	15 Summer	30	+0%	100/15 Summer				57.326
3.000	210	15 Summer	30	+0%					59.857
3.001	211	15 Summer	30	+0%					59.518
3.002	212	15 Summer	30	+0%					59.082
2.004	213	15 Summer	30	+0%	100/15 Summer				57.286
4.000	214	15 Summer	30	+0%					60.109
4.001	215	15 Summer	30	+0%					59.213
4.002	216	15 Summer	30	+0%					58.790
5.000	217	15 Summer	30	+0%	100/15 Summer				59.052

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 2

PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)					
1.000	201	-0.210	0.000	0.40		76.2	OK	
1.001	202	-0.024	0.000	0.76		134.4	OK	
1.002	203	0.015	0.000	1.17		166.7	SURCHARGED	
1.003	204	-0.183	0.000	0.64		161.3	OK	
1.004	HW205	-0.693	0.000	0.00		2.6	OK	
2.000	206	-0.242	0.000	0.55		277.5	OK	
2.001	207	-0.195	0.000	0.71		312.1	OK	
2.002	208	-0.265	0.000	0.59		342.5	OK	
2.003	209	-0.195	0.000	0.60		329.3	OK	
3.000	210	-0.266	0.000	0.18		36.6	OK	
3.001	211	-0.193	0.000	0.45		75.2	OK	
3.002	212	-0.217	0.000	0.36		128.0	OK	
2.004	213	-0.046	0.000	0.71		432.1	OK	
4.000	214	-0.291	0.000	0.11		38.4	OK	
4.001	215	-0.203	0.000	0.43		78.8	OK	
4.002	216	-0.209	0.000	0.40		134.3	OK	
5.000	217	-0.282	0.000	0.43		198.2	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 2

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) SurchARGE	First (Y) Flood	First (Z) Overflow	Overflow Act.
5.001	218	15 Summer	30	+0%	100/15 Summer			
5.002	219	15 Summer	30	+0%	100/15 Summer			
5.003	220	15 Summer	30	+0%	100/15 Summer			
5.004	221	15 Summer	30	+0%	100/15 Summer			
2.005	222	15 Summer	30	+0%	30/15 Summer			
2.006	HW223	4320 Winter	30	+0%	100/15 Summer			
6.000	224	15 Summer	30	+0%				
6.001	225	15 Summer	30	+0%				
6.002	226	15 Summer	30	+0%	100/15 Summer			
6.003	227	15 Summer	30	+0%	100/15 Summer			
6.004	228	15 Summer	30	+0%	100/15 Summer			
6.005	229	15 Summer	30	+0%	100/15 Summer			
7.000	230	15 Summer	30	+0%				
7.001	231	15 Summer	30	+0%				
7.002	232	15 Summer	30	+0%	100/15 Summer			
7.003	233	15 Summer	30	+0%				
7.004	234	15 Summer	30	+0%	100/15 Summer			
7.005	235	15 Summer	30	+0%	100/15 Summer			
7.006	236	15 Summer	30	+0%	30/15 Summer			
6.006	237	15 Summer	30	+0%	30/15 Summer			
6.007	238	15 Summer	30	+0%	100/15 Summer			
6.008	239	15 Summer	30	+0%				
6.009	240	15 Summer	30	+0%	100/15 Summer			
6.010	HW241	15 Summer	30	+0%	30/15 Summer			
8.000	244	4320 Winter	30	+0%	100/960 Summer			
1.005	POND 22	4320 Winter	30	+0%	2/120 Summer			
1.006	FC246	4320 Winter	30	+0%	2/1440 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
5.001	218	58.279	-0.222	0.000	0.62		235.7	OK	
5.002	219	58.117	-0.135	0.000	0.90		234.9	OK	
5.003	220	57.860	-0.277	0.000	0.45		262.9	OK	
5.004	221	57.317	-0.241	0.000	0.51		259.0	OK	
2.005	222	57.198	0.010	0.000	1.08		799.4	SURCHARGED	
2.006	HW223	56.952	-0.087	0.000	0.02		13.5	OK	
6.000	224	68.247	-0.222	0.000	0.34		61.9	OK	
6.001	225	67.699	-0.208	0.000	0.39		103.8	OK	
6.002	226	66.634	-0.190	0.000	0.47		149.8	OK	
6.003	227	65.019	-0.150	0.000	0.64		214.6	OK	
6.004	228	62.408	-0.187	0.000	0.62		250.4	OK	
6.005	229	61.627	-0.204	0.000	0.56		291.8	OK	
7.000	230	68.071	-0.206	0.000	0.41		74.7	OK	
7.001	231	67.538	-0.186	0.000	0.48		123.8	OK	
7.002	232	66.528	-0.168	0.000	0.56		177.5	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 2

PN	US/MH Name	Water	Surcharged	Flooded	Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)		
7.003	233	64.686	-0.219	0.000	0.50	261.5	OK	
7.004	234	62.329	-0.251	0.000	0.52	315.5	OK	
7.005	235	61.348	-0.248	0.000	0.53	351.0	OK	
7.006	236	60.931	0.003	0.000	0.64	339.8	SURCHARGED	
6.006	237	60.803	0.051	0.000	1.13	684.0	SURCHARGED	
6.007	238	60.333	-0.190	0.000	0.84	693.9	OK	
6.008	239	59.700	-0.397	0.000	0.35	712.1	OK	
6.009	240	57.377	-0.091	0.000	0.73	714.5	OK	
6.010	HW241	57.199	0.125	0.000	1.15	651.0	SURCHARGED	
8.000	244	56.952	-0.301	0.000	0.00	0.0	OK	
1.005	POND 22	56.952	0.685	0.000	0.00	0.1	SURCHARGED	
1.006	FC246	56.953	0.482	0.000	0.00	0.0	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for HIF - 2

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
 Number of Online Controls 1 Number of Time/Area Diagrams 0
 Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
 FEH Rainfall Version 2013
 Site Location GB 489026 242081 SP 89026 42081
 Data Type Point
 Cv (Summer) 0.950
 Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
 Analysis Timestep Fine Inertia Status ON
 DTS Status OFF

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
 2160, 2880, 4320
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	201	15 Summer	100	+40%	100/15 Summer				58.599
1.001	202	15 Summer	100	+40%	100/15 Summer				58.424
1.002	203	15 Summer	100	+40%	30/15 Summer				58.151
1.003	204	15 Summer	100	+40%	100/15 Summer				57.834
1.004	HW205	4320 Winter	100	+40%					57.559
2.000	206	15 Summer	100	+40%	100/15 Summer				60.166
2.001	207	15 Summer	100	+40%	100/15 Summer				59.256
2.002	208	15 Summer	100	+40%	100/15 Summer				58.689
2.003	209	15 Summer	100	+40%	100/15 Summer				58.351
3.000	210	15 Summer	100	+40%					59.899
3.001	211	15 Summer	100	+40%					59.607
3.002	212	15 Summer	100	+40%					59.151
2.004	213	15 Summer	100	+40%	100/15 Summer				58.188
4.000	214	15 Summer	100	+40%					60.141
4.001	215	15 Summer	100	+40%					59.295
4.002	216	15 Summer	100	+40%					58.867
5.000	217	15 Summer	100	+40%	100/15 Summer				59.422

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100 year Return Period Summary of Critical Results by Maximum Level (Rank
1) for HIF - 2

PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Pipe	Status	Level Exceeded
		Depth (m)	Volume (m ³)			Flow (l/s)		
1.000	201	0.419	0.000	0.73		138.4	SURCHARGED	
1.001	202	0.540	0.000	1.40		248.1	SURCHARGED	
1.002	203	0.395	0.000	2.16		308.2	SURCHARGED	
1.003	204	0.128	0.000	1.22		308.2	SURCHARGED	
1.004	HW205	-0.086	0.000	0.00		4.5	OK	
2.000	206	0.808	0.000	0.96		486.5	SURCHARGED	
2.001	207	0.969	0.000	1.11		492.6	SURCHARGED	
2.002	208	0.824	0.000	0.90		519.6	SURCHARGED	
2.003	209	0.830	0.000	0.96		528.0	SURCHARGED	
3.000	210	-0.224	0.000	0.34		67.2	OK	
3.001	211	-0.104	0.000	0.83		137.9	OK	
3.002	212	-0.148	0.000	0.65		233.3	OK	
2.004	213	0.856	0.000	1.15		699.7	SURCHARGED	
4.000	214	-0.259	0.000	0.21		70.5	OK	
4.001	215	-0.121	0.000	0.78		144.5	OK	
4.002	216	-0.132	0.000	0.73		245.9	OK	
5.000	217	0.088	0.000	0.77		357.1	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for HIF - 2

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
5.001	218	15 Summer	100	+40%	100/15 Summer			
5.002	219	15 Summer	100	+40%	100/15 Summer			
5.003	220	15 Summer	100	+40%	100/15 Summer			
5.004	221	15 Summer	100	+40%	100/15 Summer			
2.005	222	15 Summer	100	+40%	30/15 Summer			
2.006	HW223	4320 Winter	100	+40%	100/15 Summer			
6.000	224	15 Summer	100	+40%				
6.001	225	15 Summer	100	+40%				
6.002	226	15 Summer	100	+40%	100/15 Summer			
6.003	227	15 Summer	100	+40%	100/15 Summer			
6.004	228	15 Summer	100	+40%	100/15 Summer			
6.005	229	15 Summer	100	+40%	100/15 Summer			
7.000	230	15 Summer	100	+40%				
7.001	231	15 Summer	100	+40%				
7.002	232	15 Summer	100	+40%	100/15 Summer			
7.003	233	15 Summer	100	+40%				
7.004	234	15 Summer	100	+40%	100/15 Summer			
7.005	235	15 Summer	100	+40%	100/15 Summer			
7.006	236	15 Summer	100	+40%	30/15 Summer			
6.006	237	15 Summer	100	+40%	30/15 Summer			
6.007	238	15 Summer	100	+40%	100/15 Summer			
6.008	239	15 Summer	100	+40%				
6.009	240	15 Summer	100	+40%	100/15 Summer			
6.010	HW241	15 Summer	100	+40%	30/15 Summer			
8.000	244	4320 Winter	100	+40%	100/960 Summer			
1.005	POND 22	4320 Winter	100	+40%	2/120 Summer			
1.006	FC246	4320 Winter	100	+40%	2/1440 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
5.001	218	58.953	0.452	0.000	0.98		373.8	SURCHARGED	
5.002	219	58.717	0.465	0.000	1.41		366.9	SURCHARGED	
5.003	220	58.493	0.355	0.000	0.68		395.7	SURCHARGED	
5.004	221	58.221	0.663	0.000	0.79		402.3	SURCHARGED	
2.005	222	57.980	0.792	0.000	1.73		1281.9	SURCHARGED	
2.006	HW223	57.559	0.520	0.000	0.03		22.8	SURCHARGED	
6.000	224	68.312	-0.157	0.000	0.62		113.6	OK	
6.001	225	67.776	-0.131	0.000	0.72		189.8	OK	
6.002	226	66.984	0.160	0.000	0.83		266.0	SURCHARGED	
6.003	227	65.970	0.801	0.000	1.04		350.7	SURCHARGED	
6.004	228	63.230	0.635	0.000	0.98		396.2	SURCHARGED	
6.005	229	62.515	0.684	0.000	0.85		447.4	SURCHARGED	
7.000	230	68.150	-0.127	0.000	0.75		137.1	OK	
7.001	231	67.632	-0.092	0.000	0.89		226.7	OK	
7.002	232	66.755	0.059	0.000	1.02		322.3	SURCHARGED	

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Date 20/07/2021 17:00

Designed by UKDSF001

File HIF 2 P0.2.MDX

Checked by



XP Solutions

Network 2018.1.1

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for HIF - 2


PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
7.003	233	64.856	-0.049	0.000	0.89		469.5	OK	
7.004	234	63.146	0.566	0.000	0.87		532.9	SURCHARGED	
7.005	235	62.414	0.818	0.000	0.87		573.5	SURCHARGED	
7.006	236	61.853	0.925	0.000	1.08		576.2	SURCHARGED	
6.006	237	61.648	0.896	0.000	1.81		1094.0	SURCHARGED	
6.007	238	60.876	0.353	0.000	1.36		1122.0	SURCHARGED	
6.008	239	59.785	-0.312	0.000	0.56		1147.0	OK	
6.009	240	58.430	0.962	0.000	1.15		1132.3	SURCHARGED	
6.010	HW241	57.900	0.826	0.000	1.91		1080.0	SURCHARGED	
8.000	244	57.559	0.306	0.000	0.00		0.0	SURCHARGED	
1.005	POND 22	57.559	1.292	0.000	0.00		0.1	SURCHARGED	
1.006	FC246	57.560	1.089	0.000	0.00		0.0	SURCHARGED	



Drainage Technical Addendum

DATE:	20 July 2021	CONFIDENTIALITY:	Public
SUBJECT:	Drainage Technical Addendum		
PROJECT:	Milton Keynes East	AUTHOR:	DSF
CHECKED:	BU	APPROVED:	SP

HIF 3

WSP Group Ltd		Page 1
.	Milton Keynes East	
.	HIF 8 None pumped section	
.	Pump inflow excluded	
Date 26/05/2021	Designed by DSF	
File HIF Infrastructure 3.MDX	Checked by PB	
XP Solutions	Network 2018.1.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for HIF - 3

Pipe Sizes STANDARD Manhole Sizes STANDARD








FEH Rainfall Model

Return Period (years)	5
FEH Rainfall Version	2013
Site Location	GB 489026 242081 SP 89026 42081
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for HIF - 3

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S3.000	47.433	0.569	83.3	0.549	5.00	0.0	0.600	o	450	Pipe/Conduit	
S3.001	42.319	0.569	74.3	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S3.002	77.805	1.695	45.9	0.444	0.00	0.0	0.600	o	525	Pipe/Conduit	
S3.003	87.534	1.699	51.5	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit	
S3.004	8.814	0.060	146.7	0.288	0.00	0.0	0.600	o	750	Pipe/Conduit	
S3.005	55.896	0.075	745.3	0.000	0.00	0.0	0.600	o	825	Pipe/Conduit	
S3.006	25.250	0.100	252.5	0.000	0.00	0.0	0.600	o	675	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 (l/s)	Flow (l/s)
S3.000	50.00	5.35	75.950	0.549	0.0	0.0	0.0	2.23	354.4	74.4
S3.001	50.00	5.63	75.306	0.549	0.0	0.0	0.0	2.60	562.9	74.4
S3.002	50.00	6.02	74.736	0.993	0.0	0.0	0.0	3.31	717.0	134.5
S3.003	50.00	6.42	72.967	0.993	0.0	0.0	0.0	3.66	1308.6	134.5
S3.004	50.00	6.48	71.268	1.281	0.0	0.0	0.0	2.31	1019.9	173.4
S3.005	50.00	7.34	71.208	1.281	0.0	0.0	0.0	1.08	577.2	173.4
S3.006	50.00	7.60	71.133	1.281	0.0	0.0	0.0	1.64	588.6	173.4

WSP Group Ltd		Page 2
. . .		Milton Keynes East HIF 8 None pumped section Pump inflow excluded
Date 26/05/2021 File HIF Infrastructure 3.MDX		Designed by DSF Checked by PB
XP Solutions		Network 2018.1.1



Network Design Table for HIF - 3

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S4.000	52.830	0.692	76.4	0.169	5.00	0.0	0.600	o	375	Pipe/Conduit	
S4.001	24.104	0.497	48.5	0.085	0.00	0.0	0.600	o	450	Pipe/Conduit	
S4.002	11.866	0.038	315.2	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S3.007	25.250	0.100	252.5	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit	
S3.008	45.581	0.150	303.9	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit	
S5.000	41.323	0.459	90.0	0.154	5.00	0.0	0.600	o	375	Pipe/Conduit	
S5.001	21.834	0.198	110.0	0.083	0.00	0.0	0.600	o	375	Pipe/Conduit	
S5.002	13.691	0.049	280.6	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S3.009	45.581	0.150	303.9	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit	
S3.010	78.543	0.300	261.8	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit	
S6.000	56.195	0.388	145.0	0.140	5.00	0.0	0.600	o	375	Pipe/Conduit	
S6.001	62.170	0.592	105.0	0.256	0.00	0.0	0.600	o	525	Pipe/Conduit	
S6.002	13.151	0.033	400.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S3.011	54.971	0.050	1099.4	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S3.012	38.796	1.200	32.3	0.000	0.00	0.0	0.600	o	750	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 (l/s)	Flow (l/s)
S4.000	50.00	5.42	71.000	0.169	0.0	0.0	0.0	2.08	229.2	22.9
S4.001	50.00	5.56	70.223	0.255	0.0	0.0	0.0	2.92	465.1	34.5
S4.002	50.00	5.71	69.726	0.255	0.0	0.0	0.0	1.37	386.3	34.5
S3.007	50.00	7.85	69.613	1.536	0.0	0.0	0.0	1.64	588.6	207.9
S3.008	50.00	8.36	69.438	1.536	0.0	0.0	0.0	1.50	536.1	207.9
S5.000	50.00	5.36	69.600	0.154	0.0	0.0	0.0	1.91	211.0	20.9
S5.001	50.00	5.57	69.141	0.237	0.0	0.0	0.0	1.73	190.7	32.2
S5.002	50.00	5.76	68.942	0.237	0.0	0.0	0.0	1.21	192.2	32.2
S3.009	50.00	8.87	68.800	1.773	0.0	0.0	0.0	1.50	536.1	240.1
S3.010	50.00	9.68	68.650	1.773	0.0	0.0	0.0	1.62	577.9	240.1
S6.000	50.00	5.62	68.900	0.140	0.0	0.0	0.0	1.50	166.0	18.9
S6.001	50.00	6.10	68.362	0.396	0.0	0.0	0.0	2.19	473.2	53.6
S6.002	50.00	6.28	67.920	0.396	0.0	0.0	0.0	1.21	342.5	53.6
S3.011	50.00	10.66	67.887	2.169	0.0	0.0	0.0	0.94	595.7	293.7
S3.012	50.00	10.79	67.837	2.169	0.0	0.0	0.0	4.93	2178.9	293.7

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Milton Keynes East
HIF 8 None pumped section
Pump inflow excluded



Date 26/05/2021
File HIF Infrastructure 3.MDX

Designed by DSF
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Network 2018.1.1

Network Design Table for HIF - 3





PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section	Type	Auto Design
S7.000	41.531	0.446	93.1	0.288	5.00	0.0	0.600	o	375	Pipe/Conduit		
S7.001	34.823	0.446	78.1	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit		
S8.000	45.886	0.918	50.0	0.191	5.00	0.0	0.600	o	375	Pipe/Conduit		
S8.001	42.341	0.882	48.0	0.115	0.00	0.0	0.600	o	375	Pipe/Conduit		
S8.002	47.176	1.048	45.0	0.188	0.00	0.0	0.600	o	450	Pipe/Conduit		
S8.003	47.047	0.941	50.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		
S8.004	53.817	0.598	90.0	0.402	0.00	0.0	0.600	o	600	Pipe/Conduit		
S8.005	52.697	0.527	100.1	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit		
S8.006	14.232	0.668	21.3	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit		
S8.007	165.621	0.544	304.7	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit		
S9.000	39.184	0.431	90.9	0.280	5.00	0.0	0.600	o	375	Pipe/Conduit		
S9.001	39.612	0.431	91.9	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit		
S9.002	17.420	0.078	224.5	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit		
S10.000	70.122	0.560	125.3	0.449	5.00	0.0	0.600	o	450	Pipe/Conduit		
S10.001	70.122	0.560	125.3	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		
S10.002	21.423	0.071	300.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		
S8.008	27.360	0.154	178.2	0.000	0.00	0.0	0.600	o	300	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 (l/s)	Flow (l/s)
S7.000	50.00	5.37	68.200	0.288	0.0	0.0	0.0	1.88	207.4	39.0
S7.001	50.00	5.65	67.754	0.288	0.0	0.0	0.0	2.05	226.7	39.0
S8.000	50.00	5.30	73.300	0.191	0.0	0.0	0.0	2.57	283.6	25.9
S8.001	50.00	5.57	72.382	0.306	0.0	0.0	0.0	2.62	289.5	41.5
S8.002	50.00	5.83	71.425	0.495	0.0	0.0	0.0	3.04	483.0	67.0
S8.003	50.00	6.10	70.377	0.495	0.0	0.0	0.0	2.88	458.2	67.0
S8.004	50.00	6.45	69.285	0.897	0.0	0.0	0.0	2.57	726.0	121.4
S8.005	50.00	6.81	68.687	0.897	0.0	0.0	0.0	2.43	688.4	121.4
S8.006	50.00	6.85	68.089	0.897	0.0	0.0	0.0	5.29	1495.9	121.4
S8.007	50.00	8.40	67.200	0.897	0.0	0.0	0.0	1.79	1138.6	121.4
S9.000	50.00	5.34	67.800	0.280	0.0	0.0	0.0	1.90	210.0	37.9
S9.001	50.00	5.69	67.369	0.280	0.0	0.0	0.0	1.89	208.8	37.9
S9.002	50.00	5.93	66.938	0.280	0.0	0.0	0.0	1.21	133.1	37.9
S10.000	50.00	5.64	68.100	0.449	0.0	0.0	0.0	1.82	288.7	60.7
S10.001	50.00	6.29	67.540	0.449	0.0	0.0	0.0	1.82	288.7	60.7
S10.002	50.00	6.59	66.980	0.449	0.0	0.0	0.0	1.17	185.8	60.7
S8.008	50.00	8.78	66.656	1.625	0.0	0.0	0.0	1.17	83.0<<	220.0


WSP Group Ltd		Page 4
.	Milton Keynes East	
.	HIF 8 None pumped section	
.	Pump inflow excluded	
Date 26/05/2021	Designed by DSF	
File HIF Infrastructure 3.MDX	Checked by PB	
XP Solutions	Network 2018.1.1	

Network Design Table for HIF - 3

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S11.000	57.818	0.503	115.0	0.176	5.00	0.0	0.600	o	375	Pipe/Conduit	
S11.001	33.400	0.105	319.2	0.083	0.00	0.0	0.600	o	375	Pipe/Conduit	
S7.002	14.514	0.024	613.2	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S3.013	86.797	2.449	35.4	0.000	0.00	0.0	0.600	o	375	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 (l/s)	Flow (l/s)
S11.000	50.00	5.57	67.900	0.176	0.0	0.0	0.0	1.69	186.5	23.8
S11.001	50.00	6.12	67.397	0.259	0.0	0.0	0.0	1.01	111.4	35.1
S7.002	50.00	8.98	66.202	2.172	0.0	0.0	0.0	1.26	800.2	294.1
S3.013	50.00	11.26	66.178	4.340	0.0	0.0	0.0	3.05	337.1	587.8

.	Milton Keynes East	
.	HIF 8 None pumped section	
.	Pump inflow excluded	

Date 26/05/2021	Designed by DSF
File HIF Infrastructure 3.MDX	Checked by PB

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Manhole Schedules for HIF - 3

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S300	77.536	1.586	Open Manhole	1350	S3.000	75.950	450				
S301	77.135	1.830	Open Manhole	1500	S3.001	75.306	525	S3.000	75.381	450	
S302	76.419	1.682	Open Manhole	1500	S3.002	74.736	525	S3.001	74.736	525	
S303	74.756	1.790	Open Manhole	1500	S3.003	72.967	675	S3.002	73.042	525	
S304	73.200	1.932	Open Manhole	1800	S3.004	71.268	750	S3.003	71.268	675	
S305	74.433	3.225	Open Manhole	1800	S3.005	71.208	825	S3.004	71.208	750	
S306	73.500	2.367	Open Manhole	1800	S3.006	71.133	675	S3.005	71.133	825	
S307	72.632	1.632	Open Manhole	1350	S4.000	71.000	375				
S308	71.552	1.329	Open Manhole	1350	S4.001	70.223	450	S4.000	70.308	375	10
S309	71.200	1.474	Open Manhole	1500	S4.002	69.726	600	S4.001	69.726	450	
S310	72.840	3.227	Open Manhole	1500	S3.007	69.613	675	S3.006	71.033	675	1420
								S4.002	69.688	600	
S311	72.500	3.062	Open Manhole	1500	S3.008	69.438	675	S3.007	69.513	675	75
S312	71.000	1.400	Open Manhole	1350	S5.000	69.600	375				
S313	70.374	1.233	Open Manhole	1350	S5.001	69.141	375	S5.000	69.141	375	
S314	70.168	1.225	Open Manhole	1350	S5.002	68.942	450	S5.001	68.942	375	
S315	71.626	2.826	Open Manhole	1500	S3.009	68.800	675	S3.008	69.288	675	488
								S5.002	68.894	450	
S316	71.600	2.950	Open Manhole	1500	S3.010	68.650	675	S3.009	68.650	675	
S317	70.121	1.221	Open Manhole	1350	S6.000	68.900	375				
S318	69.760	1.398	Open Manhole	1500	S6.001	68.362	525	S6.000	68.512	375	
S319	69.174	1.404	Open Manhole	1500	S6.002	67.920	600	S6.001	67.770	525	
S320	70.362	2.475	Open Manhole	1800	S3.011	67.887	900	S3.010	68.350	675	238
								S6.002	67.887	600	
S321	70.500	2.663	Open Manhole	1800	S3.012	67.837	750	S3.011	67.837	900	
S322	69.794	1.594	Open Manhole	1350	S7.000	68.200	375				
S323	69.397	1.643	Open Manhole	1350	S7.001	67.754	375	S7.000	67.754	375	
S324	74.648	1.348	Open Manhole	1350	S8.000	73.300	375				
S325	73.672	1.290	Open Manhole	1350	S8.001	72.382	375	S8.000	72.382	375	
S326	72.748	1.323	Open Manhole	1350	S8.002	71.425	450	S8.001	71.500	375	
S327	71.748	1.371	Open Manhole	1350	S8.003	70.377	450	S8.002	70.377	450	
S328	70.784	1.499	Open Manhole	1500	S8.004	69.285	600	S8.003	69.435	450	
S329	70.188	1.500	Open Manhole	1500	S8.005	68.687	600	S8.004	68.687	600	
S330	69.959	1.870	Open Manhole	1500	S8.006	68.089	600	S8.005	68.161	600	72
S331	69.500	2.300	Open Manhole	1800	S8.007	67.200	900	S8.006	67.421	600	
S332	69.538	1.738	Open Manhole	1350	S9.000	67.800	375				
S333	69.113	1.744	Open Manhole	1350	S9.001	67.369	375	S9.000	67.369	375	
S334	68.765	1.828	Open Manhole	1350	S9.002	66.938	375	S9.001	66.938	375	

. Milton Keynes East
 . HIF 8 None pumped section
 . Pump inflow excluded



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Manhole Schedules for HIF - 3

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S335	69.727	1.627	Open Manhole	1350	S10.000	68.100	450				
S336	69.082	1.541	Open Manhole	1350	S10.001	67.540	450	S10.000	67.540	450	
S337	68.650	1.669	Open Manhole	1350	S10.002	66.980	450	S10.001	66.980	450	
S338	68.029	1.373	Open Manhole	1800	S8.008	66.656	300	S8.007	66.656	900	
								S9.002	66.860	375	279
								S10.002	66.909	450	403
S339	69.142	1.242	Open Manhole	1350	S11.000	67.900	375				
S340	68.686	1.289	Open Manhole	1350	S11.001	67.397	375	S11.000	67.397	375	
S341	69.000	2.798	Open Manhole	1800	S7.002	66.202	900	S7.001	67.308	375	581
								S8.008	66.502	300	
								S11.001	67.293	375	566
S342	68.913	2.735	Open Manhole	1800	S3.013	66.178	375	S3.012	66.637	750	834
								S7.002	66.178	900	
S	64.883	1.154	Open Manhole	0		OUTFALL		S3.013	63.729	375	

.
.
.Milton Keynes East
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Pump inflow excluded

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Area Summary for HIF - 3

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
3.000	User	-	100	0.549	0.549	0.549
3.001	-	-	100	0.000	0.000	0.000
3.002	User	-	100	0.444	0.444	0.444
3.003	-	-	100	0.000	0.000	0.000
3.004	User	-	100	0.288	0.288	0.288
3.005	-	-	100	0.000	0.000	0.000
3.006	-	-	100	0.000	0.000	0.000
4.000	User	-	100	0.169	0.169	0.169
4.001	User	-	100	0.085	0.085	0.085
4.002	-	-	100	0.000	0.000	0.000
3.007	-	-	100	0.000	0.000	0.000
3.008	-	-	100	0.000	0.000	0.000
5.000	User	-	100	0.154	0.154	0.154
5.001	User	-	100	0.083	0.083	0.083
5.002	-	-	100	0.000	0.000	0.000
3.009	-	-	100	0.000	0.000	0.000
3.010	-	-	100	0.000	0.000	0.000
6.000	User	-	100	0.140	0.140	0.140
6.001	User	-	100	0.256	0.256	0.256
6.002	-	-	100	0.000	0.000	0.000
3.011	-	-	100	0.000	0.000	0.000
3.012	-	-	100	0.000	0.000	0.000
7.000	User	-	100	0.288	0.288	0.288
7.001	-	-	100	0.000	0.000	0.000
8.000	User	-	100	0.191	0.191	0.191
8.001	User	-	100	0.115	0.115	0.115
8.002	User	-	100	0.188	0.188	0.188
8.003	-	-	100	0.000	0.000	0.000
8.004	User	-	100	0.239	0.239	0.239
	User	-	100	0.163	0.163	0.402
8.005	-	-	100	0.000	0.000	0.000
8.006	-	-	100	0.000	0.000	0.000
8.007	-	-	100	0.000	0.000	0.000
9.000	User	-	100	0.280	0.280	0.280
9.001	-	-	100	0.000	0.000	0.000
9.002	-	-	100	0.000	0.000	0.000
10.000	User	-	100	0.449	0.449	0.449
10.001	-	-	100	0.000	0.000	0.000
10.002	-	-	100	0.000	0.000	0.000
8.008	-	-	100	0.000	0.000	0.000
11.000	User	-	100	0.176	0.176	0.176
11.001	User	-	100	0.083	0.083	0.083
7.002	-	-	100	0.000	0.000	0.000
3.013	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				4.340	4.340	4.340

. Milton Keynes East
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 . Pump inflow excluded



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Free Flowing Outfall Details for HIF - 3

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
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S3.013	S	64.883	63.729	0.000	0	0
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Simulation Criteria for HIF - 3

Volumetric Runoff Coeff	0.950	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	0.000
Hot Start (mins)	0	Inlet Coefficient	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)	960
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	8

Number of Input Hydrographs	0	Number of Storage Structures	6
Number of Online Controls	6	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 489026 242081 SP 89026 42081
Data Type	Point
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.950
Storm Duration (mins)	480

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Online Controls for HIF - 3

Complex Manhole: S306, DS/PN: S3.006, Volume (m³): 34.9

Orifice

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 71.133

Weir

Discharge Coef 0.544 Width (m) 0.500 Invert Level (m) 73.083

Complex Manhole: S311, DS/PN: S3.008, Volume (m³): 13.9

Orifice

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 69.438

Weir

Discharge Coef 0.544 Width (m) 0.500 Invert Level (m) 71.388

Complex Manhole: S316, DS/PN: S3.010, Volume (m³): 21.0

Orifice

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 68.650

Weir

Discharge Coef 0.544 Width (m) 0.500 Invert Level (m) 70.600


Complex Manhole: S321, DS/PN: S3.012, Volume (m³): 40.6

Orifice

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 67.837

Weir

Discharge Coef 0.544 Width (m) 0.500 Invert Level (m) 69.800

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Hydro-Brake® Optimum Manhole: S338, DS/PN: S8.008, Volume (m³): 112.6

Unit Reference	MD-SHE-0240-3000-0700-3000
Design Head (m)	0.700
Design Flow (l/s)	30.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	240
Invert Level (m)	66.656
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.700	30.0
Flush-Flo™	0.350	30.0
Kick-Flo®	0.572	27.2
Mean Flow over Head Range	-	23.4


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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	7.9	1.200	38.8	3.000	60.5	7.000	91.4
0.200	24.4	1.400	41.8	3.500	65.2	7.500	93.8
0.300	29.8	1.600	44.6	4.000	69.6	8.000	96.9
0.400	29.8	1.800	47.2	4.500	73.7	8.500	100.0
0.500	28.8	2.000	49.7	5.000	77.5	9.000	102.9
0.600	27.9	2.200	52.0	5.500	81.2	9.500	105.8
0.800	32.0	2.400	54.3	6.000	84.7		
1.000	35.6	2.600	56.4	6.500	88.1		

Hydro-Brake® Optimum Manhole: S342, DS/PN: S3.013, Volume (m³): 31.4

Unit Reference	MD-SHE-0173-1600-1500-1600
Design Head (m)	1.500
Design Flow (l/s)	16.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	173
Invert Level (m)	66.178
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	16.0
Flush-Flo™	0.442	16.0


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Hydro-Brake® Optimum Manhole: S342, DS/PN: S3.013, Volume (m³): 31.4

Control Points	Head (m)	Flow (l/s)
Kick-Flo®	0.961	13.0
Mean Flow over Head Range	-	13.9

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	6.1	1.200	14.4	3.000	22.3	7.000	33.5
0.200	14.4	1.400	15.5	3.500	24.0	7.500	34.6
0.300	15.6	1.600	16.5	4.000	25.6	8.000	35.7
0.400	16.0	1.800	17.4	4.500	27.0	8.500	36.7
0.500	15.9	2.000	18.3	5.000	28.4	9.000	37.8
0.600	15.7	2.200	19.2	5.500	29.8	9.500	38.8
0.800	14.9	2.400	20.0	6.000	31.1		
1.000	13.2	2.600	20.8	6.500	32.3		

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Storage Structures for HIF - 3

Tank or Pond Manhole: S306, DS/PN: S3.006

Invert Level (m) 71.133

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	150.0	1.000	445.6	2.000	898.3	2.300	1064.8

Tank or Pond Manhole: S311, DS/PN: S3.008

Invert Level (m) 69.438

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	130.0	2.000	485.6	3.000	748.2

Tank or Pond Manhole: S316, DS/PN: S3.010

Invert Level (m) 68.650

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	130.0	2.000	485.6	2.950	733.8

Tank or Pond Manhole: S321, DS/PN: S3.012

Invert Level (m) 67.837

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	120.0	2.000	466.1	2.663	630.7

Tank or Pond Manhole: S338, DS/PN: S8.008


Invert Level (m) 66.656

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	1250.0	1.000	1654.3	1.300	1786.6

Tank or Pond Manhole: S342, DS/PN: S3.013

Invert Level (m) 66.178

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	120.0	2.000	466.1	2.700	640.7

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 3

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 6
Number of Online Controls 6 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status OFF
DVD Status ON
Inertia Status ON


Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320, 5760
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S3.000	S300	15 Summer	2	+0%	100/15 Summer			
S3.001	S301	15 Summer	2	+0%	100/15 Summer			
S3.002	S302	15 Summer	2	+0%	100/15 Summer			
S3.003	S303	15 Summer	2	+0%				
S3.004	S304	360 Summer	2	+0%	5/120 Summer			
S3.005	S305	360 Winter	2	+0%	5/240 Summer			
S3.006	S306	360 Winter	2	+0%	2/120 Summer			
S4.000	S307	15 Summer	2	+0%				
S4.001	S308	15 Summer	2	+0%	100/360 Summer			
S4.002	S309	1440 Winter	2	+0%	30/480 Summer			
S3.007	S310	1440 Winter	2	+0%	30/360 Summer			
S3.008	S311	1440 Winter	2	+0%	5/480 Summer			
S5.000	S312	15 Summer	2	+0%	100/1440 Summer			
S5.001	S313	15 Summer	2	+0%	30/1440 Summer			
S5.002	S314	2160 Winter	2	+0%	30/960 Summer			

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 3


PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S3.000	S300	76.134	-0.266	0.000	0.34	110.5	OK	
S3.001	S301	75.475	-0.356	0.000	0.22	110.7	OK	
S3.002	S302	74.926	-0.335	0.000	0.28	184.5	OK	
S3.003	S303	73.143	-0.499	0.000	0.15	182.6	OK	
S3.004	S304	72.018	0.000	0.000	0.10	56.9	OK	
S3.005	S305	71.995	-0.038	0.000	0.07	36.1	OK	
S3.006	S306	71.978	0.170	0.000	0.01	4.7	SURCHARGED	
S4.000	S307	71.101	-0.274	0.000	0.16	34.0	OK	
S4.001	S308	70.330	-0.343	0.000	0.13	48.4	OK	
S4.002	S309	70.075	-0.251	0.000	0.01	2.5	OK	
S3.007	S310	70.075	-0.213	0.000	0.01	6.2	OK	
S3.008	S311	70.074	-0.039	0.000	0.01	4.1	OK	
S5.000	S312	69.701	-0.274	0.000	0.16	31.0	OK	
S5.001	S313	69.277	-0.239	0.000	0.28	45.0	OK	
S5.002	S314	69.226	-0.166	0.000	0.01	1.7	OK	

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 3


PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
S3.009	S315	2160	Winter	2	+0%	30/960	Summer	
S3.010	S316	2160	Winter	2	+0%	30/480	Summer	
S6.000	S317	15	Summer	2	+0%			
S6.001	S318	15	Summer	2	+0%	100/15	Summer	
S6.002	S319	2880	Winter	2	+0%	5/2160	Winter	
S3.011	S320	2880	Winter	2	+0%	100/120	Summer	
S3.012	S321	2880	Winter	2	+0%	30/360	Summer	
S7.000	S322	15	Summer	2	+0%	100/15	Summer	
S7.001	S323	15	Summer	2	+0%	100/15	Summer	
S8.000	S324	15	Summer	2	+0%			
S8.001	S325	15	Summer	2	+0%			
S8.002	S326	15	Summer	2	+0%	100/15	Summer	
S8.003	S327	15	Summer	2	+0%	100/15	Summer	
S8.004	S328	15	Summer	2	+0%	100/15	Summer	
S8.005	S329	15	Summer	2	+0%	100/15	Summer	
S8.006	S330	15	Summer	2	+0%			
S8.007	S331	15	Summer	2	+0%			
S9.000	S332	15	Summer	2	+0%	100/15	Summer	
S9.001	S333	15	Summer	2	+0%	100/15	Summer	
S9.002	S334	15	Summer	2	+0%	30/15	Summer	
S10.000	S335	15	Summer	2	+0%	100/15	Summer	
S10.001	S336	15	Summer	2	+0%	100/15	Summer	
S10.002	S337	15	Summer	2	+0%	30/15	Summer	
S8.008	S338	360	Summer	2	+0%	30/30	Summer	
S11.000	S339	15	Summer	2	+0%	100/15	Summer	
S11.001	S340	15	Summer	2	+0%	30/15	Summer	
S7.002	S341	360	Summer	2	+0%	100/30	Summer	
S3.013	S342	360	Summer	2	+0%	2/60	Summer	

PN	US/MH Name	Water Surcharged Flooded			Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)		
S3.009	S315	69.226	-0.249	0.000	0.01	4.8	OK	
S3.010	S316	69.225	-0.100	0.000	0.01	3.9	OK	
S6.000	S317	69.008	-0.267	0.000	0.18	28.3	OK	
S6.001	S318	68.507	-0.380	0.000	0.17	71.1	OK	
S6.002	S319	68.444	-0.076	0.000	0.01	2.1	OK	
S3.011	S320	68.444	-0.343	0.000	0.01	4.9	OK	
S3.012	S321	68.443	-0.144	0.000	0.00	4.0	OK	
S7.000	S322	68.343	-0.232	0.000	0.30	57.6	OK	
S7.001	S323	67.891	-0.238	0.000	0.29	58.1	OK	
S8.000	S324	73.396	-0.279	0.000	0.15	38.5	OK	
S8.001	S325	72.502	-0.255	0.000	0.22	57.7	OK	
S8.002	S326	71.564	-0.311	0.000	0.21	89.5	OK	
S8.003	S327	70.519	-0.308	0.000	0.22	89.9	OK	
S8.004	S328	69.487	-0.398	0.000	0.24	156.2	OK	

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 3

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S8.005	S329	68.893	-0.395	0.000	0.25	153.9	OK	
S8.006	S330	68.265	-0.424	0.000	0.19	154.0	OK	
S8.007	S331	67.428	-0.672	0.000	0.15	154.7	OK	
S9.000	S332	67.940	-0.235	0.000	0.30	56.2	OK	
S9.001	S333	67.509	-0.235	0.000	0.30	56.3	OK	
S9.002	S334	67.128	-0.185	0.000	0.51	56.0	OK	
S10.000	S335	68.281	-0.269	0.000	0.33	89.2	OK	
S10.001	S336	67.718	-0.272	0.000	0.32	86.7	OK	
S10.002	S337	67.224	-0.206	0.000	0.57	86.9	OK	
S8.008	S338	66.876	-0.080	0.000	0.27	20.3	OK	
S11.000	S339	68.015	-0.260	0.000	0.20	35.1	OK	
S11.001	S340	67.584	-0.188	0.000	0.49	49.0	OK	
S7.002	S341	66.768	-0.334	0.000	0.12	39.2	OK	
S3.013	S342	66.766	0.213	0.000	0.05	16.0	SURCHARGED	

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 3

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 6
Number of Online Controls 6 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status OFF
DVD Status ON
Inertia Status ON


Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320, 5760
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S3.000	S300	15 Summer	5	+0%	100/15 Summer			
S3.001	S301	15 Summer	5	+0%	100/15 Summer			
S3.002	S302	15 Summer	5	+0%	100/15 Summer			
S3.003	S303	15 Summer	5	+0%				
S3.004	S304	360 Winter	5	+0%	5/120 Summer			
S3.005	S305	360 Winter	5	+0%	5/240 Summer			
S3.006	S306	360 Winter	5	+0%	2/120 Summer			
S4.000	S307	15 Summer	5	+0%				
S4.001	S308	15 Summer	5	+0%	100/360 Summer			
S4.002	S309	1440 Winter	5	+0%	30/480 Summer			
S3.007	S310	1440 Winter	5	+0%	30/360 Summer			
S3.008	S311	1440 Winter	5	+0%	5/480 Summer			
S5.000	S312	15 Summer	5	+0%	100/1440 Summer			
S5.001	S313	2880 Winter	5	+0%	30/1440 Summer			
S5.002	S314	2880 Winter	5	+0%	30/960 Summer			

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 3


PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S3.000	S300	76.167	-0.233	0.000	0.46	148.2	OK	
S3.001	S301	75.504	-0.327	0.000	0.30	148.5	OK	
S3.002	S302	74.960	-0.301	0.000	0.37	247.5	OK	
S3.003	S303	73.174	-0.468	0.000	0.20	244.6	OK	
S3.004	S304	72.139	0.121	0.000	0.08	45.3	SURCHARGED	
S3.005	S305	72.139	0.106	0.000	0.09	44.3	SURCHARGED	
S3.006	S306	72.139	0.331	0.000	0.01	5.2	SURCHARGED	
S4.000	S307	71.118	-0.257	0.000	0.21	45.6	OK	
S4.001	S308	70.348	-0.325	0.000	0.17	65.0	OK	
S4.002	S309	70.180	-0.146	0.000	0.01	3.0	OK	
S3.007	S310	70.180	-0.108	0.000	0.02	7.0	OK	
S3.008	S311	70.179	0.066	0.000	0.01	4.4	SURCHARGED	
S5.000	S312	69.719	-0.256	0.000	0.22	41.6	OK	
S5.001	S313	69.325	-0.191	0.000	0.01	1.6	OK	
S5.002	S314	69.325	-0.068	0.000	0.01	1.6	OK	

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 3


PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
S3.009	S315	2880	Winter	5	+0%	30/960	Summer	
S3.010	S316	2880	Winter	5	+0%	30/480	Summer	
S6.000	S317	15	Summer	5	+0%			
S6.001	S318	4320	Winter	5	+0%	100/15	Summer	
S6.002	S319	4320	Winter	5	+0%	5/2160	Winter	
S3.011	S320	4320	Winter	5	+0%	100/120	Summer	
S3.012	S321	4320	Winter	5	+0%	30/360	Summer	
S7.000	S322	15	Summer	5	+0%	100/15	Summer	
S7.001	S323	15	Summer	5	+0%	100/15	Summer	
S8.000	S324	15	Summer	5	+0%			
S8.001	S325	15	Summer	5	+0%			
S8.002	S326	15	Summer	5	+0%	100/15	Summer	
S8.003	S327	15	Summer	5	+0%	100/15	Summer	
S8.004	S328	15	Summer	5	+0%	100/15	Summer	
S8.005	S329	15	Summer	5	+0%	100/15	Summer	
S8.006	S330	15	Summer	5	+0%			
S8.007	S331	15	Summer	5	+0%			
S9.000	S332	15	Summer	5	+0%	100/15	Summer	
S9.001	S333	15	Summer	5	+0%	100/15	Summer	
S9.002	S334	15	Summer	5	+0%	30/15	Summer	
S10.000	S335	15	Summer	5	+0%	100/15	Summer	
S10.001	S336	15	Summer	5	+0%	100/15	Summer	
S10.002	S337	15	Summer	5	+0%	30/15	Summer	
S8.008	S338	360	Summer	5	+0%	30/30	Summer	
S11.000	S339	15	Summer	5	+0%	100/15	Summer	
S11.001	S340	15	Summer	5	+0%	30/15	Summer	
S7.002	S341	360	Winter	5	+0%	100/30	Summer	
S3.013	S342	360	Winter	5	+0%	2/60	Summer	

PN	US/MH Name	Water Surcharged Flooded			Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (l/s)	Flow (l/s)		
S3.009	S315	69.325	-0.150	0.000	0.01	5.0	OK	
S3.010	S316	69.323	-0.002	0.000	0.01	4.2	OK	
S6.000	S317	69.026	-0.249	0.000	0.25	38.0	OK	
S6.001	S318	68.551	-0.337	0.000	0.00	2.0	OK	
S6.002	S319	68.551	0.030	0.000	0.01	1.8	SURCHARGED	
S3.011	S320	68.551	-0.236	0.000	0.01	5.1	OK	
S3.012	S321	68.549	-0.038	0.000	0.00	4.3	OK	
S7.000	S322	68.369	-0.206	0.000	0.41	77.3	OK	
S7.001	S323	67.915	-0.214	0.000	0.38	78.0	OK	
S8.000	S324	73.414	-0.261	0.000	0.20	51.7	OK	
S8.001	S325	72.522	-0.235	0.000	0.29	77.4	OK	
S8.002	S326	71.587	-0.288	0.000	0.28	120.1	OK	
S8.003	S327	70.543	-0.284	0.000	0.29	120.6	OK	
S8.004	S328	69.523	-0.362	0.000	0.33	209.5	OK	

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 3

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S8.005	S329	68.930	-0.358	0.000	0.34	205.8	OK	
S8.006	S330	68.294	-0.395	0.000	0.25	206.7	OK	
S8.007	S331	67.469	-0.631	0.000	0.20	207.2	OK	
S9.000	S332	67.965	-0.210	0.000	0.40	75.4	OK	
S9.001	S333	67.534	-0.210	0.000	0.40	75.6	OK	
S9.002	S334	67.167	-0.146	0.000	0.69	74.8	OK	
S10.000	S335	68.314	-0.236	0.000	0.45	119.7	OK	
S10.001	S336	67.750	-0.241	0.000	0.43	116.5	OK	
S10.002	S337	67.276	-0.154	0.000	0.77	116.4	OK	
S8.008	S338	66.951	-0.005	0.000	0.28	20.8	OK	
S11.000	S339	68.034	-0.241	0.000	0.27	47.1	OK	
S11.001	S340	67.620	-0.152	0.000	0.65	65.2	OK	
S7.002	S341	66.849	-0.253	0.000	0.12	39.0	OK	
S3.013	S342	66.847	0.294	0.000	0.05	16.0	SURCHARGED	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 3

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 6
Number of Online Controls 6 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status OFF
DVD Status ON
Inertia Status ON


Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320, 5760
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S3.000	S300	15 Summer	30	+0%	100/15	Summer		
S3.001	S301	15 Summer	30	+0%	100/15	Summer		
S3.002	S302	15 Summer	30	+0%	100/15	Summer		
S3.003	S303	15 Summer	30	+0%				
S3.004	S304	480 Winter	30	+0%	5/120	Summer		
S3.005	S305	480 Winter	30	+0%	5/240	Summer		
S3.006	S306	480 Winter	30	+0%	2/120	Summer		
S4.000	S307	15 Summer	30	+0%				
S4.001	S308	2160 Winter	30	+0%	100/360	Summer		
S4.002	S309	2160 Winter	30	+0%	30/480	Summer		
S3.007	S310	2160 Winter	30	+0%	30/360	Summer		
S3.008	S311	2160 Winter	30	+0%	5/480	Summer		
S5.000	S312	15 Summer	30	+0%	100/1440	Summer		
S5.001	S313	4320 Winter	30	+0%	30/1440	Summer		
S5.002	S314	4320 Winter	30	+0%	30/960	Summer		

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 3


PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S3.000	S300	76.250	-0.150	0.000	0.76	244.4	OK	
S3.001	S301	75.570	-0.261	0.000	0.50	244.9	OK	
S3.002	S302	75.063	-0.198	0.000	0.67	446.5	OK	
S3.003	S303	73.256	-0.385	0.000	0.38	449.9	OK	
S3.004	S304	72.510	0.493	0.000	0.10	57.7	SURCHARGED	
S3.005	S305	72.510	0.477	0.000	0.12	57.7	SURCHARGED	
S3.006	S306	72.510	0.702	0.000	0.01	6.1	SURCHARGED	
S4.000	S307	71.155	-0.220	0.000	0.35	74.8	OK	
S4.001	S308	70.448	-0.225	0.000	0.01	3.1	OK	
S4.002	S309	70.448	0.122	0.000	0.01	3.0	SURCHARGED	
S3.007	S310	70.448	0.160	0.000	0.02	7.7	SURCHARGED	
S3.008	S311	70.448	0.335	0.000	0.01	5.0	SURCHARGED	
S5.000	S312	69.756	-0.219	0.000	0.36	68.6	OK	
S5.001	S313	69.561	0.045	0.000	0.01	1.7	SURCHARGED	
S5.002	S314	69.561	0.168	0.000	0.01	1.6	SURCHARGED	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 3


PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
S3.009	S315	4320 Winter	30	+0%	30/960	Summer		
S3.010	S316	4320 Winter	30	+0%	30/480	Summer		
S6.000	S317	15 Summer	30	+0%				
S6.001	S318	4320 Winter	30	+0%	100/15	Summer		
S6.002	S319	4320 Winter	30	+0%	5/2160	Winter		
S3.011	S320	4320 Winter	30	+0%	100/120	Summer		
S3.012	S321	4320 Winter	30	+0%	30/360	Summer		
S7.000	S322	15 Summer	30	+0%	100/15	Summer		
S7.001	S323	15 Summer	30	+0%	100/15	Summer		
S8.000	S324	15 Summer	30	+0%				
S8.001	S325	15 Summer	30	+0%				
S8.002	S326	15 Summer	30	+0%	100/15	Summer		
S8.003	S327	15 Summer	30	+0%	100/15	Summer		
S8.004	S328	15 Summer	30	+0%	100/15	Summer		
S8.005	S329	15 Summer	30	+0%	100/15	Summer		
S8.006	S330	15 Summer	30	+0%				
S8.007	S331	15 Summer	30	+0%				
S9.000	S332	15 Summer	30	+0%	100/15	Summer		
S9.001	S333	15 Summer	30	+0%	100/15	Summer		
S9.002	S334	15 Summer	30	+0%	30/15	Summer		
S10.000	S335	15 Summer	30	+0%	100/15	Summer		
S10.001	S336	15 Summer	30	+0%	100/15	Summer		
S10.002	S337	15 Summer	30	+0%	30/15	Summer		
S8.008	S338	360 Summer	30	+0%	30/30	Summer		
S11.000	S339	15 Summer	30	+0%	100/15	Summer		
S11.001	S340	15 Summer	30	+0%	30/15	Summer		
S7.002	S341	240 Winter	30	+0%	100/30	Summer		
S3.013	S342	360 Winter	30	+0%	2/60	Summer		

PN	US/MH Name	Water			Surcharged		Flooded		Pipe		Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status			
S3.009	S315	69.561	0.086	0.000	0.01		5.7	SURCHARGED			
S3.010	S316	69.561	0.236	0.000	0.01		4.6	SURCHARGED			
S6.000	S317	69.067	-0.208	0.000	0.40		61.6	OK			
S6.001	S318	68.758	-0.130	0.000	0.01		2.8	OK			
S6.002	S319	68.758	0.238	0.000	0.01		2.6	SURCHARGED			
S3.011	S320	68.758	-0.029	0.000	0.01		6.3	OK			
S3.012	S321	68.745	0.158	0.000	0.00		4.9	SURCHARGED			
S7.000	S322	68.430	-0.145	0.000	0.67		127.5	OK			
S7.001	S323	67.972	-0.157	0.000	0.63		128.7	OK			
S8.000	S324	73.449	-0.226	0.000	0.33		85.3	OK			
S8.001	S325	72.580	-0.177	0.000	0.54		141.6	OK			
S8.002	S326	71.663	-0.212	0.000	0.54		233.9	OK			
S8.003	S327	70.621	-0.205	0.000	0.56		229.9	OK			
S8.004	S328	69.650	-0.235	0.000	0.65		417.9	OK			

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 3

PN	US/MH Name	Water	Surcharged	Flooded	Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)		
S8.005	S329	69.061	-0.227	0.000	0.69	420.0	OK	
S8.006	S330	68.391	-0.298	0.000	0.51	418.3	OK	
S8.007	S331	67.592	-0.508	0.000	0.38	405.4	OK	
S9.000	S332	68.024	-0.151	0.000	0.65	124.4	OK	
S9.001	S333	67.593	-0.151	0.000	0.66	124.7	OK	
S9.002	S334	67.317	0.005	0.000	1.12	122.0	SURCHARGED	
S10.000	S335	68.394	-0.156	0.000	0.73	197.4	OK	
S10.001	S336	67.827	-0.163	0.000	0.71	192.3	OK	
S10.002	S337	67.452	0.022	0.000	1.25	189.4	SURCHARGED	
S8.008	S338	67.156	0.200	0.000	0.28	20.9	SURCHARGED	
S11.000	S339	68.078	-0.197	0.000	0.45	77.6	OK	
S11.001	S340	67.790	0.018	0.000	1.11	110.6	SURCHARGED	
S7.002	S341	67.087	-0.015	0.000	0.17	57.5	OK	
S3.013	S342	67.077	0.524	0.000	0.05	16.0	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for HIF - 3

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m ³ /ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	6
Number of Online Controls	6	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0


Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 489026 242081 SP 89026 42081
Data Type	Point
Cv (Summer)	0.950
Cv (Winter)	0.950

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON


Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 5, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S3.000	S300	15 Summer	100	+40%	100/15 Summer			
S3.001	S301	15 Summer	100	+40%	100/15 Summer			
S3.002	S302	15 Summer	100	+40%	100/15 Summer			
S3.003	S303	15 Summer	100	+40%				
S3.004	S304	360 Winter	100	+40%	5/120 Summer			
S3.005	S305	360 Winter	100	+40%	5/240 Summer			
S3.006	S306	360 Winter	100	+40%	2/120 Summer			
S4.000	S307	15 Summer	100	+40%				
S4.001	S308	2880 Winter	100	+40%	100/360 Summer			
S4.002	S309	2880 Winter	100	+40%	30/480 Summer			
S3.007	S310	2880 Winter	100	+40%	30/360 Summer			
S3.008	S311	2880 Winter	100	+40%	5/480 Summer			
S5.000	S312	5760 Winter	100	+40%	100/1440 Summer			
S5.001	S313	5760 Winter	100	+40%	30/1440 Summer			
S5.002	S314	5760 Winter	100	+40%	30/960 Summer			

WSP Group Ltd		Page 26
.	Milton Keynes East	
.	HIF 8 None pumped section	
.	Pump inflow excluded	
Date 26/05/2021	Designed by DSF	
File HIF Infrastructure 3.MDX	Checked by PB	
XP Solutions	Network 2018.1.1	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for HIF - 3

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S3.000	S300	77.183	0.783	0.000	1.37	438.5	SURCHARGED	
S3.001	S301	76.142	0.311	0.000	0.92	455.3	SURCHARGED	
S3.002	S302	75.741	0.479	0.000	1.12	742.2	SURCHARGED	
S3.003	S303	73.354	-0.288	0.000	0.62	740.1	OK	
S3.004	S304	73.141	1.123	0.000	0.23	132.1	FLOOD RISK	
S3.005	S305	73.140	1.107	0.000	0.27	131.5	SURCHARGED	
S3.006	S306	73.137	1.329	0.000	0.04	18.2	SURCHARGED	
S4.000	S307	71.223	-0.152	0.000	0.65	137.4	OK	
S4.001	S308	71.154	0.481	0.000	0.01	4.3	SURCHARGED	
S4.002	S309	71.154	0.828	0.000	0.02	4.3	FLOOD RISK	
S3.007	S310	71.154	0.865	0.000	0.02	10.1	SURCHARGED	
S3.008	S311	71.153	1.040	0.000	0.01	5.4	SURCHARGED	
S5.000	S312	70.097	0.122	0.000	0.01	1.5	SURCHARGED	
S5.001	S313	70.097	0.581	0.000	0.01	2.3	FLOOD RISK	
S5.002	S314	70.097	0.704	0.000	0.02	2.3	FLOOD RISK	

WSP Group Ltd		Page 27
.	Milton Keynes East	
.	HIF 8 None pumped section	
.	Pump inflow excluded	
Date 26/05/2021	Designed by DSF	
File HIF Infrastructure 3.MDX	Checked by PB	
XP Solutions	Network 2018.1.1	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for HIF - 3

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
S3.009	S315	5760 Winter	100	+40%	30/960	Summer		
S3.010	S316	5760 Winter	100	+40%	30/480	Summer		
S6.000	S317	15 Summer	100	+40%				
S6.001	S318	960 Winter	100	+40%	100/15	Summer		
S6.002	S319	960 Winter	100	+40%	5/2160	Winter		
S3.011	S320	960 Winter	100	+40%	100/120	Summer		
S3.012	S321	960 Winter	100	+40%	30/360	Summer		
S7.000	S322	15 Summer	100	+40%	100/15	Summer		
S7.001	S323	15 Summer	100	+40%	100/15	Summer		
S8.000	S324	15 Summer	100	+40%				
S8.001	S325	15 Summer	100	+40%				
S8.002	S326	15 Summer	100	+40%	100/15	Summer		
S8.003	S327	15 Summer	100	+40%	100/15	Summer		
S8.004	S328	15 Summer	100	+40%	100/15	Summer		
S8.005	S329	15 Summer	100	+40%	100/15	Summer		
S8.006	S330	15 Summer	100	+40%				
S8.007	S331	15 Summer	100	+40%				
S9.000	S332	15 Summer	100	+40%	100/15	Summer		
S9.001	S333	15 Summer	100	+40%	100/15	Summer		
S9.002	S334	480 Winter	100	+40%	30/15	Summer		
S10.000	S335	15 Summer	100	+40%	100/15	Summer		
S10.001	S336	15 Summer	100	+40%	100/15	Summer		
S10.002	S337	15 Summer	100	+40%	30/15	Summer		
S8.008	S338	480 Winter	100	+40%	30/30	Summer		
S11.000	S339	15 Summer	100	+40%	100/15	Summer		
S11.001	S340	15 Summer	100	+40%	30/15	Summer		
S7.002	S341	360 Winter	100	+40%	100/30	Summer		
S3.013	S342	360 Winter	100	+40%	2/60	Summer		

PN	US/MH Name	Water			Surcharged		Flooded		Pipe		Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Flow (l/s)	Status			
S3.009	S315	70.097	0.622	0.000	0.02			7.1	SURCHARGED		
S3.010	S316	70.096	0.771	0.000	0.01			5.3	SURCHARGED		
S6.000	S317	69.144	-0.131	0.000	0.73			113.0	OK		
S6.001	S318	69.117	0.230	0.000	0.04			17.6	SURCHARGED		
S6.002	S319	69.117	0.597	0.000	0.09			17.2	FLOOD RISK		
S3.011	S320	69.117	0.330	0.000	0.04			21.0	SURCHARGED		
S3.012	S321	69.117	0.530	0.000	0.00			5.8	SURCHARGED		
S7.000	S322	68.891	0.316	0.000	1.23			231.9	SURCHARGED		
S7.001	S323	68.227	0.098	0.000	1.12			227.1	SURCHARGED		
S8.000	S324	73.512	-0.163	0.000	0.60			156.6	OK		
S8.001	S325	72.735	-0.022	0.000	0.97			256.5	OK		
S8.002	S326	71.938	0.063	0.000	0.95			414.2	SURCHARGED		
S8.003	S327	71.041	0.215	0.000	0.99			408.3	SURCHARGED		
S8.004	S328	70.179	0.293	0.000	1.11			714.6	SURCHARGED		

. Milton Keynes East
 . HIF 8 None pumped section
 . Pump inflow excluded



Date 26/05/2021
 File HIF Infrastructure 3.MDX

Designed by DSF
 Checked by PB

XP Solutions

Network 2018.1.1

100 year Return Period Summary of Critical Results by Maximum Level (Rank
 1) for HIF - 3


PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S8.005	S329	69.444	0.157	0.000	1.15		700.2	SURCHARGED	
S8.006	S330	68.517	-0.172	0.000	0.86		700.5	OK	
S8.007	S331	67.735	-0.365	0.000	0.62		654.9	OK	
S9.000	S332	68.650	0.475	0.000	1.17		222.4	SURCHARGED	
S9.001	S333	68.071	0.328	0.000	1.13		213.9	SURCHARGED	
S9.002	S334	67.614	0.302	0.000	0.21		22.6	SURCHARGED	
S10.000	S335	69.363	0.813	0.000	1.32		354.3	SURCHARGED	
S10.001	S336	68.439	0.449	0.000	1.19		319.9	SURCHARGED	
S10.002	S337	67.654	0.224	0.000	2.09		317.2	SURCHARGED	
S8.008	S338	67.614	0.658	0.000	0.27		20.0	SURCHARGED	
S11.000	S339	68.448	0.173	0.000	0.81		140.9	SURCHARGED	
S11.001	S340	68.105	0.333	0.000	2.05		204.4	SURCHARGED	
S7.002	S341	67.557	0.455	0.000	0.16		54.5	SURCHARGED	
S3.013	S342	67.556	1.003	0.000	0.05		16.0	SURCHARGED	



Drainage Technical Addendum

DATE:	20 July 2021	CONFIDENTIALITY:	Public
SUBJECT:	Drainage Technical Addendum		
PROJECT:	Milton Keynes East	AUTHOR:	DSF
CHECKED:	BU	APPROVED:	SP

HIF 4

WSP Group Ltd		Page 1
.	Milton Keynes East	
.	HIF 8 None pumped section	
.	Pump inflow excluded	
Date 26/05/2021	Designed by DSF	
File HIF INFRASTRUCTURE 4.MDX	Checked by PB	
XP Solutions	Network 2018.1.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for HIF - 4

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	5
FEH Rainfall Version	2013
Site Location GB 489026 242081 SP 89026 42081	
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for HIF - 4


Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.859	4-8	1.347	8-12	0.080

Total Area Contributing (ha) = 2.285

Total Pipe Volume (m³) = 155.804


Network Design Table for HIF - 4

« - Indicates pipe capacity < flow














PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	62.892	0.898	70.0	0.228	5.00	0.0	0.600	o	375	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 (l/s)	Flow (l/s)
S1.000	50.00	5.48	76.100	0.228	0.0	0.0	0.0	2.17	239.5	30.8

WSP Group Ltd		Page 2
.	Milton Keynes East	
.	HIF 8 None pumped section	
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Date 26/05/2021	Designed by DSF	
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XP Solutions	Network 2018.1.1	

Network Design Table for HIF - 4

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section	Type	Auto Design
S2.000	62.067	0.887	70.0	0.232	5.00	0.0	0.600	o	375	Pipe/Conduit		
S2.001	10.903	0.044	247.4	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		
S1.001	14.234	0.142	100.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		
S1.002	69.265	0.150	461.8	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		
S3.000	59.592	1.490	40.0	0.194	5.00	0.0	0.600	o	375	Pipe/Conduit		
S4.000	59.573	1.489	40.0	0.197	5.00	0.0	0.600	o	375	Pipe/Conduit		
S4.001	10.390	0.033	319.2	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		
S3.001	14.865	0.169	88.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit		
S1.003	63.334	0.317	200.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		
S5.000	59.454	1.321	45.0	0.201	5.00	0.0	0.600	o	375	Pipe/Conduit		
S6.000	59.291	1.318	45.0	0.192	5.00	0.0	0.600	o	375	Pipe/Conduit		
S6.001	10.454	0.135	77.2	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit		
S5.001	15.402	0.048	320.9	0.000	0.00	0.0	0.600	o	375	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 (l/s)	Flow (l/s)
S2.000	50.00	5.48	76.100	0.232	0.0	0.0	0.0	2.17	239.5	31.5
S2.001	50.00	5.62	75.138	0.232	0.0	0.0	0.0	1.29	204.9	31.5
S1.001	50.00	5.73	75.094	0.460	0.0	0.0	0.0	2.03	323.4	62.3
S1.002	50.00	6.96	72.900	0.460	0.0	0.0	0.0	0.94	149.4	62.3
S3.000	50.00	5.35	74.900	0.194	0.0	0.0	0.0	2.87	317.2	26.3
S4.000	50.00	5.35	74.900	0.197	0.0	0.0	0.0	2.87	317.2	26.6
S4.001	50.00	5.50	73.336	0.197	0.0	0.0	0.0	1.13	180.1	26.6
S3.001	50.00	5.60	73.228	0.391	0.0	0.0	0.0	2.39	517.0	52.9
S1.003	50.00	7.70	72.000	0.850	0.0	0.0	0.0	1.43	228.1	115.2
S5.000	50.00	5.37	73.200	0.201	0.0	0.0	0.0	2.71	299.0	27.2
S6.000	50.00	5.37	73.200	0.192	0.0	0.0	0.0	2.71	299.0	26.1
S6.001	50.00	5.45	71.882	0.192	0.0	0.0	0.0	2.06	227.9	26.1
S5.001	50.00	5.70	71.747	0.393	0.0	0.0	0.0	1.01	111.1	53.3



Network Design Table for HIF - 4

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.004	20.628	0.183	112.7	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.005	21.785	0.145	150.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S7.000	34.920	0.499	70.0	0.118	5.00	0.0	0.600	o	375	Pipe/Conduit	
S8.000	34.378	0.688	50.0	0.109	5.00	0.0	0.600	o	375	Pipe/Conduit	
S8.001	10.699	0.126	85.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S7.001	15.580	0.049	319.2	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.006	14.160	0.100	141.6	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.007	14.722	0.147	100.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S9.000	27.135	0.388	70.0	0.096	5.00	0.0	0.600	o	375	Pipe/Conduit	
S10.000	27.511	0.393	70.0	0.098	5.00	0.0	0.600	o	375	Pipe/Conduit	
S10.001	10.244	0.032	319.2	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S9.001	15.917	0.318	50.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.008	15.403	0.100	154.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.004	50.00	7.88	71.683	1.244	0.0	0.0	0.0	1.91	304.4	168.4
S1.005	50.00	8.10	71.500	1.244	0.0	0.0	0.0	1.66	263.6	168.4
S7.000	50.00	5.27	71.400	0.118	0.0	0.0	0.0	2.17	239.5	16.0
S8.000	50.00	5.22	71.600	0.109	0.0	0.0	0.0	2.57	283.6	14.8
S8.001	50.00	5.31	70.912	0.109	0.0	0.0	0.0	1.97	217.2	14.8
S7.001	50.00	5.57	70.787	0.227	0.0	0.0	0.0	1.01	111.4	30.8
S1.006	50.00	8.24	70.600	1.471	0.0	0.0	0.0	1.71	271.4	199.2
S1.007	50.00	8.36	70.500	1.471	0.0	0.0	0.0	2.03	323.4	199.2
S9.000	50.00	5.21	70.500	0.096	0.0	0.0	0.0	2.17	239.5	13.0
S10.000	50.00	5.21	70.500	0.098	0.0	0.0	0.0	2.17	239.5	13.2
S10.001	50.00	5.38	70.107	0.098	0.0	0.0	0.0	1.01	111.4	13.2
S9.001	50.00	5.48	70.075	0.194	0.0	0.0	0.0	2.57	283.6	26.3
S1.008	50.00	8.51	68.900	1.665	0.0	0.0	0.0	1.64	260.2	225.5



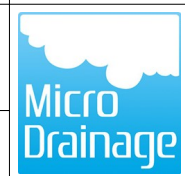
Network Design Table for HIF - 4

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.009	15.385	1.200	12.8	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	🔒
S11.000	75.955	0.259	293.2	0.229	5.00	0.0	0.600	o	450	Pipe/Conduit	🔒
S12.000	71.859	0.225	319.2	0.213	5.00	0.0	0.600	o	450	Pipe/Conduit	🔒
S13.000	24.055	0.267	90.0	0.085	5.00	0.0	0.600	o	375	Pipe/Conduit	🔒
S12.001	10.821	0.072	150.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	🔒
S14.000	23.326	0.259	90.1	0.093	5.00	0.0	0.600	o	375	Pipe/Conduit	🔒
S11.001	15.204	0.152	100.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	🔒
S1.010	14.414	0.100	144.1	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	🔒
S1.011	45.292	1.354	33.4	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	🔒
S1.012	13.029	1.338	9.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	🔒

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.009	50.00	8.56	68.800	1.665	0.0	0.0	0.0	5.70	906.8	225.5
S11.000	50.00	6.07	68.400	0.229	0.0	0.0	0.0	1.18	188.0	31.0
S12.000	50.00	6.06	68.100	0.213	0.0	0.0	0.0	1.13	180.1	28.9
S13.000	50.00	5.21	69.600	0.085	0.0	0.0	0.0	1.91	211.0	11.6
S12.001	50.00	6.17	67.875	0.299	0.0	0.0	0.0	1.66	263.6	40.5
S14.000	50.00	5.20	69.600	0.093	0.0	0.0	0.0	1.91	211.0	12.6
S11.001	50.00	6.28	67.803	0.620	0.0	0.0	0.0	2.24	484.9	84.0
S1.010	50.00	8.69	65.350	2.285	0.0	0.0	0.0	1.86	403.4	309.5
S1.011	50.00	8.88	65.250	2.285	0.0	0.0	0.0	3.88	840.5	309.5
S1.012	50.00	8.93	65.258	2.285	0.0	0.0	0.0	4.22	167.7«	309.5

Milton Keynes East
 HIF 8 None pumped section
 Pump inflow excluded



Date 26/05/2021
 File HIF INFRASTRUCTURE 4.MDX
 Designed by DSF
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Manhole Schedules for HIF - 4

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S400	77.500	1.400	Open Manhole	1350	S1.000	76.100	375				
S401	77.500	1.400	Open Manhole	1350	S2.000	76.100	375				
S402	77.450	2.312	Open Manhole	1350	S2.001	75.138	450	S2.000	75.213	375	
S403	77.450	2.356	Open Manhole	1350	S1.001	75.094	450	S1.000	75.202	375	33
								S2.001	75.094	450	
S404	77.450	4.550	Open Manhole	1350	S1.002	72.900	450	S1.001	74.952	450	2052
S405	77.000	2.100	Open Manhole	1350	S3.000	74.900	375				
S406	77.000	2.100	Open Manhole	1350	S4.000	74.900	375				
S407	75.000	1.664	Open Manhole	1350	S4.001	73.336	450	S4.000	73.411	375	
S408	75.000	1.772	Open Manhole	1500	S3.001	73.228	525	S3.000	73.410	375	32
								S4.001	73.303	450	
S409	74.750	2.750	Open Manhole	1500	S1.003	72.000	450	S1.002	72.750	450	750
								S3.001	73.059	525	1134
S410	74.500	1.300	Open Manhole	1350	S5.000	73.200	375				
S411	74.500	1.300	Open Manhole	1350	S6.000	73.200	375				
S412	73.100	1.218	Open Manhole	1350	S6.001	71.882	375	S6.000	71.882	375	
S413	73.000	1.253	Open Manhole	1350	S5.001	71.747	375	S5.000	71.879	375	132
								S6.001	71.747	375	
S414	73.000	1.317	Open Manhole	1350	S1.004	71.683	450	S1.003	71.683	450	
								S5.001	71.699	375	
S415	73.500	2.000	Open Manhole	1350	S1.005	71.500	450	S1.004	71.500	450	
S416	73.000	1.600	Open Manhole	1350	S7.000	71.400	375				
S417	73.100	1.500	Open Manhole	1350	S8.000	71.600	375				
S418	72.500	1.588	Open Manhole	1350	S8.001	70.912	375	S8.000	70.912	375	
S419	72.500	1.713	Open Manhole	1350	S7.001	70.787	375	S7.000	70.901	375	115
								S8.001	70.787	375	
S420	72.500	1.900	Open Manhole	1350	S1.006	70.600	450	S1.005	71.355	450	755
								S7.001	70.738	375	63
S421	72.000	1.500	Open Manhole	1350	S1.007	70.500	450	S1.006	70.500	450	
S422	72.500	2.000	Open Manhole	1350	S9.000	70.500	375				
S423	72.500	2.000	Open Manhole	1350	S10.000	70.500	375				
S424	71.500	1.393	Open Manhole	1350	S10.001	70.107	375	S10.000	70.107	375	
S425	71.500	1.425	Open Manhole	1350	S9.001	70.075	375	S9.000	70.112	375	37
								S10.001	70.075	375	
S426	71.500	2.600	Open Manhole	1350	S1.008	68.900	450	S1.007	70.353	450	1453
								S9.001	69.757	375	782
S427	70.500	1.700	Open Manhole	1350	S1.009	68.800	450	S1.008	68.800	450	
S428	70.000	1.600	Open Manhole	1350	S11.000	68.400	450				



Manhole Schedules for HIF - 4

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S429	70.000	1.900	Open Manhole	1350	S12.000	68.100	450				
S430	71.500	1.900	Open Manhole	1350	S13.000	69.600	375				
S431	70.000	2.125	Open Manhole	1350	S12.001	67.875	450	S12.000	67.875	450	
								S13.000	69.333	375	1383
S432	71.500	1.900	Open Manhole	1350	S14.000	69.600	375				
S433	70.000	2.197	Open Manhole	1500	S11.001	67.803	525	S11.000	68.141	450	263
								S12.001	67.803	450	
								S14.000	69.341	375	1388
S434	70.000	4.650	Open Manhole	1500	S1.010	65.350	525	S1.009	67.600	450	2175
								S11.001	67.651	525	2301
S435	67.500	2.250	Open Manhole	1500	S1.011	65.250	525	S1.010	65.250	525	
S436	70.000	6.104	Open Manhole	1500	S1.012	65.258	225	S1.011	63.896	525	
S	70.000	6.080	Open Manhole	0		OUTFALL		S1.012	63.920	225	

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Area Summary for HIF - 4

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.228	0.228	0.228
2.000	User	-	100	0.232	0.232	0.232
2.001	-	-	100	0.000	0.000	0.000
1.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.000	0.000	0.000
3.000	User	-	100	0.194	0.194	0.194
4.000	User	-	100	0.197	0.197	0.197
4.001	-	-	100	0.000	0.000	0.000
3.001	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
5.000	User	-	100	0.201	0.201	0.201
6.000	User	-	100	0.192	0.192	0.192
6.001	-	-	100	0.000	0.000	0.000
5.001	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
7.000	User	-	100	0.118	0.118	0.118
8.000	User	-	100	0.109	0.109	0.109
8.001	-	-	100	0.000	0.000	0.000
7.001	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
9.000	User	-	100	0.096	0.096	0.096
10.000	User	-	100	0.098	0.098	0.098
10.001	-	-	100	0.000	0.000	0.000
9.001	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
11.000	User	-	100	0.229	0.229	0.229
12.000	User	-	100	0.213	0.213	0.213
13.000	User	-	100	0.085	0.085	0.085
12.001	-	-	100	0.000	0.000	0.000
14.000	User	-	100	0.093	0.093	0.093
11.001	-	-	100	0.000	0.000	0.000
1.010	-	-	100	0.000	0.000	0.000
1.011	-	-	100	0.000	0.000	0.000
1.012	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				2.285	2.285	2.285

Free Flowing Outfall Details for HIF - 4

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
S1.012	S	70.000	63.920	0.000	0	0


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Simulation Criteria for HIF - 4

Volumetric Runoff Coeff	0.950	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	0.000
Hot Start (mins)	0	Inlet Coefficient	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)	960
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	8
Number of Input Hydrographs	0	Number of Storage Structures	5
Number of Online Controls	5	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 489026 242081 SP 89026 42081
Data Type	Point
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.950
Storm Duration (mins)	480

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Online Controls for HIF - 4

Complex Manhole: S409, DS/PN: S1.003, Volume (m³): 18.5

Orifice

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 72.000

Weir

Discharge Coef 0.544 Width (m) 0.500 Invert Level (m) 74.150

Complex Manhole: S415, DS/PN: S1.005, Volume (m³): 5.9

Orifice

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 71.500

Weir

Discharge Coef 0.544 Width (m) 0.500 Invert Level (m) 72.650

Complex Manhole: S421, DS/PN: S1.007, Volume (m³): 4.2

Orifice

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 70.500

Weir

Discharge Coef 0.544 Width (m) 0.500 Invert Level (m) 71.650


Complex Manhole: S427, DS/PN: S1.009, Volume (m³): 4.7

Orifice

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 68.800

Weir

Discharge Coef 0.544 Width (m) 0.500 Invert Level (m) 70.150

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Hydro-Brake® Optimum Manhole: S435, DS/PN: S1.011, Volume (m³): 6.8

Unit Reference	MD-SHE-0132-8400-1200-8400
Design Head (m)	1.200
Design Flow (l/s)	8.4
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	132
Invert Level (m)	65.250
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	8.4
Flush-Flo™	0.357	8.4
Kick-Flo®	0.768	6.8
Mean Flow over Head Range	-	7.3

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.7	1.200	8.4	3.000	12.9	7.000	19.4
0.200	7.9	1.400	9.0	3.500	13.9	7.500	20.1
0.300	8.3	1.600	9.6	4.000	14.8	8.000	20.7
0.400	8.4	1.800	10.2	4.500	15.7	8.500	21.3
0.500	8.2	2.000	10.7	5.000	16.5	9.000	21.9
0.600	8.0	2.200	11.2	5.500	17.3	9.500	22.5
0.800	6.9	2.400	11.6	6.000	18.0		
1.000	7.7	2.600	12.1	6.500	18.7		

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Storage Structures for HIF - 4

Tank or Pond Manhole: S409, DS/PN: S1.003

Invert Level (m) 72.750

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	500.0	1.700	500.0	2.000	500.0

Tank or Pond Manhole: S415, DS/PN: S1.005

Invert Level (m) 71.500

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	500.0	1.700	500.0	2.000	500.0

Tank or Pond Manhole: S421, DS/PN: S1.007

Invert Level (m) 70.500

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	350.0	1.200	350.0	1.500	350.0

Tank or Pond Manhole: S427, DS/PN: S1.009


Invert Level (m) 68.800

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	400.0	1.400	400.0	1.700	400.0

Tank or Pond Manhole: S435, DS/PN: S1.011

Invert Level (m) 65.250

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	400.0	1.950	400.0	2.250	400.0

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 4

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF


Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S400	15 Summer	2	+0%				
S2.000	S401	15 Summer	2	+0%	100/15 Summer			
S2.001	S402	15 Summer	2	+0%	100/15 Summer			
S1.001	S403	15 Summer	2	+0%	100/15 Summer			
S1.002	S404	15 Summer	2	+0%	30/15 Summer			
S3.000	S405	15 Summer	2	+0%				
S4.000	S406	15 Summer	2	+0%				
S4.001	S407	15 Summer	2	+0%	100/15 Summer			
S3.001	S408	15 Summer	2	+0%	100/120 Summer			
S1.003	S409	240 Winter	2	+0%	2/15 Summer			
S5.000	S410	15 Summer	2	+0%				
S6.000	S411	15 Summer	2	+0%				
S6.001	S412	15 Summer	2	+0%	30/15 Summer			
S5.001	S413	15 Summer	2	+0%	5/15 Summer			
S1.004	S414	1440 Winter	2	+0%	30/960 Summer			
S1.005	S415	1440 Winter	2	+0%	2/960 Summer			
S7.000	S416	15 Summer	2	+0%				

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 4


PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S400	76.215	-0.260	0.000	0.20	45.5	OK	
S2.000	S401	76.217	-0.258	0.000	0.21	46.4	OK	
S2.001	S402	75.329	-0.259	0.000	0.32	46.7	OK	
S1.001	S403	75.302	-0.242	0.000	0.44	92.7	OK	
S1.002	S404	73.167	-0.183	0.000	0.64	89.8	OK	
S3.000	S405	74.991	-0.284	0.000	0.13	39.1	OK	
S4.000	S406	74.991	-0.284	0.000	0.13	39.5	OK	
S4.001	S407	73.513	-0.273	0.000	0.32	39.6	OK	
S3.001	S408	73.407	-0.346	0.000	0.25	79.0	OK	
S1.003	S409	73.003	0.553	0.000	0.02	5.2	SURCHARGED	
S5.000	S410	73.295	-0.280	0.000	0.14	40.4	OK	
S6.000	S411	73.293	-0.282	0.000	0.14	38.7	OK	
S6.001	S412	72.044	-0.213	0.000	0.27	38.6	OK	
S5.001	S413	72.025	-0.097	0.000	0.90	78.7	OK	
S1.004	S414	71.980	-0.153	0.000	0.03	8.4	OK	
S1.005	S415	71.979	0.029	0.000	0.02	3.5	SURCHARGED	
S7.000	S416	71.483	-0.292	0.000	0.11	23.8	OK	

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 4

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S8.000	S417	15	Summer	2	+0%			
S8.001	S418	15	Summer	2	+0%	100/15	Summer	
S7.001	S419	15	Summer	2	+0%	100/15	Summer	
S1.006	S420	2160	Winter	2	+0%	30/1440	Summer	
S1.007	S421	2160	Winter	2	+0%	30/960	Summer	
S9.000	S422	15	Summer	2	+0%			
S10.000	S423	15	Summer	2	+0%			
S10.001	S424	15	Summer	2	+0%			
S9.001	S425	15	Summer	2	+0%			
S1.008	S426	4320	Summer	2	+0%	30/4320	Winter	
S1.009	S427	4320	Summer	2	+0%	30/1440	Summer	
S11.000	S428	15	Summer	2	+0%	100/15	Summer	
S12.000	S429	15	Summer	2	+0%	100/15	Summer	
S13.000	S430	15	Summer	2	+0%			
S12.001	S431	15	Summer	2	+0%	100/15	Summer	
S14.000	S432	15	Summer	2	+0%			
S11.001	S433	15	Summer	2	+0%	100/15	Summer	
S1.010	S434	15	Summer	2	+0%	100/15	Summer	
S1.011	S435	360	Summer	2	+0%	30/240	Summer	
S1.012	S436	360	Summer	2	+0%			

PN	US/MH Name	Water			Flooded		Pipe		Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap. (1/s)	Overflow (1/s)	Flow (1/s)	Status	
S8.000	S417	71.675	-0.300	0.000	0.09		22.3	OK	
S8.001	S418	71.014	-0.274	0.000	0.16		22.0	OK	
S7.001	S419	70.979	-0.182	0.000	0.52		46.1	OK	
S1.006	S420	70.870	-0.180	0.000	0.02		4.4	OK	
S1.007	S421	70.869	-0.081	0.000	0.01		3.1	OK	
S9.000	S422	70.577	-0.298	0.000	0.09		19.6	OK	
S10.000	S423	70.578	-0.297	0.000	0.10		19.9	OK	
S10.001	S424	70.234	-0.248	0.000	0.25		19.7	OK	
S9.001	S425	70.182	-0.268	0.000	0.18		39.2	OK	
S1.008	S426	69.127	-0.223	0.000	0.02		3.4	OK	
S1.009	S427	69.126	-0.124	0.000	0.00		2.9	OK	
S11.000	S428	68.557	-0.293	0.000	0.26		46.6	OK	
S12.000	S429	68.255	-0.295	0.000	0.24		41.1	OK	
S13.000	S430	69.678	-0.297	0.000	0.10		17.4	OK	
S12.001	S431	68.066	-0.259	0.000	0.34		57.1	OK	
S14.000	S432	69.681	-0.294	0.000	0.10		18.9	OK	
S11.001	S433	68.036	-0.291	0.000	0.40		120.2	OK	
S1.010	S434	65.611	-0.264	0.000	0.49		121.2	OK	
S1.011	S435	65.498	-0.277	0.000	0.01		8.0	OK	
S1.012	S436	65.292	-0.191	0.000	0.05		8.0	OK	

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 4

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF


Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S400	15 Summer	5	+0%				
S2.000	S401	15 Summer	5	+0%	100/15 Summer			
S2.001	S402	15 Summer	5	+0%	100/15 Summer			
S1.001	S403	15 Summer	5	+0%	100/15 Summer			
S1.002	S404	15 Summer	5	+0%	30/15 Summer			
S3.000	S405	15 Summer	5	+0%				
S4.000	S406	15 Summer	5	+0%				
S4.001	S407	15 Summer	5	+0%	100/15 Summer			
S3.001	S408	15 Summer	5	+0%	100/120 Summer			
S1.003	S409	240 Winter	5	+0%	2/15 Summer			
S5.000	S410	15 Summer	5	+0%				
S6.000	S411	15 Summer	5	+0%				
S6.001	S412	15 Summer	5	+0%	30/15 Summer			
S5.001	S413	15 Summer	5	+0%	5/15 Summer			
S1.004	S414	1440 Winter	5	+0%	30/960 Summer			
S1.005	S415	1440 Winter	5	+0%	2/960 Summer			
S7.000	S416	15 Summer	5	+0%				

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.	Pump inflow excluded	
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XP Solutions	Network 2018.1.1	

5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 4


PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S400	76.234	-0.241	0.000	0.27		61.0	OK	
S2.000	S401	76.236	-0.239	0.000	0.28		62.3	OK	
S2.001	S402	75.367	-0.221	0.000	0.43		62.7	OK	
S1.001	S403	75.342	-0.202	0.000	0.58		124.2	OK	
S1.002	S404	73.229	-0.121	0.000	0.85		118.1	OK	
S3.000	S405	75.007	-0.268	0.000	0.18		52.5	OK	
S4.000	S406	75.007	-0.268	0.000	0.18		53.1	OK	
S4.001	S407	73.544	-0.241	0.000	0.43		53.2	OK	
S3.001	S408	73.439	-0.314	0.000	0.34		106.1	OK	
S1.003	S409	73.093	0.643	0.000	0.03		5.4	SURCHARGED	
S5.000	S410	73.313	-0.262	0.000	0.19		54.2	OK	
S6.000	S411	73.310	-0.265	0.000	0.19		51.9	OK	
S6.001	S412	72.191	-0.067	0.000	0.35		50.4	OK	
S5.001	S413	72.137	0.015	0.000	1.17		102.8	SURCHARGED	
S1.004	S414	72.058	-0.075	0.000	0.04		9.2	OK	
S1.005	S415	72.057	0.107	0.000	0.02		3.8	SURCHARGED	
S7.000	S416	71.497	-0.278	0.000	0.15		32.0	OK	

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.	Milton Keynes East	
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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 4

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S8.000	S417	15 Summer	5	+0%				
S8.001	S418	15 Summer	5	+0%	100/15 Summer			
S7.001	S419	15 Summer	5	+0%	100/15 Summer			
S1.006	S420	2880 Winter	5	+0%	30/1440 Summer			
S1.007	S421	2880 Winter	5	+0%	30/960 Summer			
S9.000	S422	15 Summer	5	+0%				
S10.000	S423	15 Summer	5	+0%				
S10.001	S424	15 Summer	5	+0%				
S9.001	S425	15 Summer	5	+0%				
S1.008	S426	4320 Summer	5	+0%	30/4320 Winter			
S1.009	S427	4320 Summer	5	+0%	30/1440 Summer			
S11.000	S428	15 Summer	5	+0%	100/15 Summer			
S12.000	S429	15 Summer	5	+0%	100/15 Summer			
S13.000	S430	15 Summer	5	+0%				
S12.001	S431	15 Summer	5	+0%	100/15 Summer			
S14.000	S432	15 Summer	5	+0%				
S11.001	S433	15 Summer	5	+0%	100/15 Summer			
S1.010	S434	15 Summer	5	+0%	100/15 Summer			
S1.011	S435	360 Summer	5	+0%	30/240 Summer			
S1.012	S436	360 Summer	5	+0%				

PN	US/MH Name	Water			Surcharged		Flooded		Pipe		Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Flow (l/s)	Status			
S8.000	S417	71.685	-0.290	0.000	0.12		29.9	OK			
S8.001	S418	71.042	-0.245	0.000	0.21		29.4	OK			
S7.001	S419	71.018	-0.144	0.000	0.69		61.4	OK			
S1.006	S420	70.943	-0.107	0.000	0.03		4.6	OK			
S1.007	S421	70.942	-0.008	0.000	0.02		3.4	OK			
S9.000	S422	70.588	-0.287	0.000	0.13		26.2	OK			
S10.000	S423	70.589	-0.286	0.000	0.13		26.7	OK			
S10.001	S424	70.257	-0.225	0.000	0.33		26.5	OK			
S9.001	S425	70.199	-0.250	0.000	0.24		52.6	OK			
S1.008	S426	69.193	-0.157	0.000	0.02		3.9	OK			
S1.009	S427	69.192	-0.058	0.000	0.01		3.2	OK			
S11.000	S428	68.585	-0.265	0.000	0.35		62.5	OK			
S12.000	S429	68.283	-0.267	0.000	0.33		55.2	OK			
S13.000	S430	69.689	-0.286	0.000	0.13		23.3	OK			
S12.001	S431	68.107	-0.218	0.000	0.45		76.9	OK			
S14.000	S432	69.693	-0.282	0.000	0.14		25.4	OK			
S11.001	S433	68.080	-0.248	0.000	0.54		160.4	OK			
S1.010	S434	65.661	-0.214	0.000	0.65		161.6	OK			
S1.011	S435	65.567	-0.208	0.000	0.01		8.2	OK			
S1.012	S436	65.292	-0.191	0.000	0.06		8.2	OK			

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 4

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF


Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S400	15 Summer	30	+0%				
S2.000	S401	15 Summer	30	+0%	100/15 Summer			
S2.001	S402	15 Summer	30	+0%	100/15 Summer			
S1.001	S403	15 Summer	30	+0%	100/15 Summer			
S1.002	S404	15 Summer	30	+0%	30/15 Summer			
S3.000	S405	15 Summer	30	+0%				
S4.000	S406	15 Summer	30	+0%				
S4.001	S407	15 Summer	30	+0%	100/15 Summer			
S3.001	S408	15 Summer	30	+0%	100/120 Summer			
S1.003	S409	240 Winter	30	+0%	2/15 Summer			
S5.000	S410	15 Summer	30	+0%				
S6.000	S411	15 Summer	30	+0%				
S6.001	S412	15 Summer	30	+0%	30/15 Summer			
S5.001	S413	15 Summer	30	+0%	5/15 Summer			
S1.004	S414	2160 Winter	30	+0%	30/960 Summer			
S1.005	S415	2160 Winter	30	+0%	2/960 Summer			
S7.000	S416	15 Summer	30	+0%				

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 4


PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S400	76.278	-0.197	0.000	0.45		100.6	OK	
S2.000	S401	76.281	-0.194	0.000	0.46		102.6	OK	
S2.001	S402	75.472	-0.116	0.000	0.71		103.2	OK	
S1.001	S403	75.443	-0.101	0.000	0.96		203.9	OK	
S1.002	S404	73.499	0.149	0.000	1.37		190.6	SURCHARGED	
S3.000	S405	75.039	-0.236	0.000	0.29		86.4	OK	
S4.000	S406	75.040	-0.235	0.000	0.29		87.5	OK	
S4.001	S407	73.621	-0.164	0.000	0.71		87.7	OK	
S3.001	S408	73.510	-0.244	0.000	0.55		174.6	OK	
S1.003	S409	73.340	0.890	0.000	0.03		6.0	SURCHARGED	
S5.000	S410	73.347	-0.228	0.000	0.32		89.5	OK	
S6.000	S411	73.343	-0.232	0.000	0.31		85.7	OK	
S6.001	S412	72.378	0.121	0.000	0.59		85.1	SURCHARGED	
S5.001	S413	72.253	0.131	0.000	1.97		172.8	SURCHARGED	
S1.004	S414	72.220	0.087	0.000	0.04		9.4	SURCHARGED	
S1.005	S415	72.218	0.268	0.000	0.02		4.3	SURCHARGED	
S7.000	S416	71.526	-0.249	0.000	0.25		52.8	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 4

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
S8.000	S417	15 Summer	30	+0%				
S8.001	S418	15 Summer	30	+0%	100/15 Summer			
S7.001	S419	15 Summer	30	+0%	100/15 Summer			
S1.006	S420	2880 Winter	30	+0%	30/1440 Summer			
S1.007	S421	2880 Winter	30	+0%	30/960 Summer			
S9.000	S422	15 Summer	30	+0%				
S10.000	S423	15 Summer	30	+0%				
S10.001	S424	15 Summer	30	+0%				
S9.001	S425	15 Summer	30	+0%				
S1.008	S426	4320 Winter	30	+0%	30/4320 Winter			
S1.009	S427	4320 Winter	30	+0%	30/1440 Summer			
S11.000	S428	15 Summer	30	+0%	100/15 Summer			
S12.000	S429	15 Summer	30	+0%	100/15 Summer			
S13.000	S430	15 Summer	30	+0%				
S12.001	S431	15 Summer	30	+0%	100/15 Summer			
S14.000	S432	15 Summer	30	+0%				
S11.001	S433	15 Summer	30	+0%	100/15 Summer			
S1.010	S434	15 Summer	30	+0%	100/15 Summer			
S1.011	S435	240 Summer	30	+0%	30/240 Summer			
S1.012	S436	30 Winter	30	+0%				

PN	US/MH Name	Water			Flooded		Pipe		Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap. (l/s)	Flow (l/s)	Status		
S8.000	S417	71.712	-0.263	0.000	0.19	49.3		OK	
S8.001	S418	71.196	-0.091	0.000	0.33	46.2		OK	
S7.001	S419	71.162	0.000	0.000	1.06	94.2		OK	
S1.006	S420	71.121	0.071	0.000	0.03	5.6	SURCHARGED		
S1.007	S421	71.120	0.170	0.000	0.02	4.0	SURCHARGED		
S9.000	S422	70.616	-0.259	0.000	0.21	43.3		OK	
S10.000	S423	70.617	-0.258	0.000	0.21	44.1		OK	
S10.001	S424	70.307	-0.175	0.000	0.54	43.6		OK	
S9.001	S425	70.239	-0.211	0.000	0.39	86.6		OK	
S1.008	S426	69.353	0.003	0.000	0.02	4.5	SURCHARGED		
S1.009	S427	69.351	0.101	0.000	0.01	3.8	SURCHARGED		
S11.000	S428	68.649	-0.201	0.000	0.58	102.3		OK	
S12.000	S429	68.345	-0.205	0.000	0.54	91.0		OK	
S13.000	S430	69.717	-0.258	0.000	0.21	38.5		OK	
S12.001	S431	68.223	-0.102	0.000	0.75	127.2		OK	
S14.000	S432	69.722	-0.253	0.000	0.23	41.9		OK	
S11.001	S433	68.187	-0.141	0.000	0.88	262.4		OK	
S1.010	S434	65.875	0.000	0.000	1.06	263.7		OK	
S1.011	S435	65.781	0.006	0.000	0.01	8.4	SURCHARGED		
S1.012	S436	65.293	-0.190	0.000	0.06	8.4		OK	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for HIF - 4

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S400	15 Summer	100	+40%				
S2.000	S401	15 Summer	100	+40%	100/15	Summer		
S2.001	S402	15 Summer	100	+40%	100/15	Summer		
S1.001	S403	15 Summer	100	+40%	100/15	Summer		
S1.002	S404	15 Summer	100	+40%	30/15	Summer		
S3.000	S405	15 Summer	100	+40%				
S4.000	S406	15 Summer	100	+40%				
S4.001	S407	360 Winter	100	+40%	100/15	Summer		
S3.001	S408	360 Winter	100	+40%	100/120	Summer		
S1.003	S409	360 Winter	100	+40%	2/15	Summer		
S5.000	S410	15 Summer	100	+40%				
S6.000	S411	15 Summer	100	+40%				
S6.001	S412	15 Summer	100	+40%	30/15	Summer		
S5.001	S413	15 Summer	100	+40%	5/15	Summer		
S1.004	S414	2160 Winter	100	+40%	30/960	Summer		
S1.005	S415	2160 Winter	100	+40%	2/960	Summer		
S7.000	S416	15 Summer	100	+40%				

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.	Milton Keynes East	
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for HIF - 4

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S400	76.416	-0.059	0.000	0.82	184.4	OK	
S2.000	S401	76.537	0.062	0.000	0.83	186.9	SURCHARGED	
S2.001	S402	75.919	0.331	0.000	1.27	185.9	SURCHARGED	
S1.001	S403	75.809	0.265	0.000	1.71	363.8	SURCHARGED	
S1.002	S404	74.222	0.872	0.000	2.47	344.2	SURCHARGED	
S3.000	S405	75.097	-0.178	0.000	0.53	158.5	OK	
S4.000	S406	75.099	-0.176	0.000	0.54	160.7	OK	
S4.001	S407	74.004	0.218	0.000	0.17	20.8	SURCHARGED	
S3.001	S408	74.003	0.250	0.000	0.13	40.9	SURCHARGED	
S1.003	S409	74.003	1.553	0.000	0.03	6.8	SURCHARGED	
S5.000	S410	73.409	-0.166	0.000	0.59	164.2	OK	
S6.000	S411	73.404	-0.171	0.000	0.56	157.3	OK	
S6.001	S412	72.937	0.680	0.000	1.01	145.1	FLOOD RISK	
S5.001	S413	72.798	0.676	0.000	3.38	295.9	FLOOD RISK	
S1.004	S414	72.587	0.454	0.000	0.06	13.7	SURCHARGED	
S1.005	S415	72.585	0.635	0.000	0.03	5.4	SURCHARGED	
S7.000	S416	71.578	-0.197	0.000	0.45	96.9	OK	

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Milton Keynes East
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Pump inflow excluded



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XP Solutions

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for HIF - 4

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
S8.000	S417	15 Summer	100	+40%				
S8.001	S418	4320 Winter	100	+40%	100/15 Summer			
S7.001	S419	4320 Winter	100	+40%	100/15 Summer			
S1.006	S420	4320 Winter	100	+40%	30/1440 Summer			
S1.007	S421	4320 Winter	100	+40%	30/960 Summer			
S9.000	S422	15 Summer	100	+40%				
S10.000	S423	15 Summer	100	+40%				
S10.001	S424	15 Summer	100	+40%				
S9.001	S425	15 Summer	100	+40%				
S1.008	S426	4320 Winter	100	+40%	30/4320 Winter			
S1.009	S427	4320 Winter	100	+40%	30/1440 Summer			
S11.000	S428	15 Summer	100	+40%	100/15 Summer			
S12.000	S429	15 Summer	100	+40%	100/15 Summer			
S13.000	S430	15 Summer	100	+40%				
S12.001	S431	15 Summer	100	+40%	100/15 Summer			
S14.000	S432	15 Summer	100	+40%				
S11.001	S433	15 Summer	100	+40%	100/15 Summer			
S1.010	S434	360 Summer	100	+40%	100/15 Summer			
S1.011	S435	480 Summer	100	+40%	30/240 Summer			
S1.012	S436	15 Summer	100	+40%				

PN	US/MH Name	Water Surcharged Flooded			Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (1/s)	Flow (1/s)		
S8.000	S417	71.755	-0.220	0.000	0.36	90.5	OK	
S8.001	S418	71.503	0.215	0.000	0.01	1.3	SURCHARGED	
S7.001	S419	71.503	0.341	0.000	0.03	2.7	SURCHARGED	
S1.006	S420	71.503	0.453	0.000	0.04	7.0	SURCHARGED	
S1.007	S421	71.501	0.551	0.000	0.02	5.2	SURCHARGED	
S9.000	S422	70.660	-0.215	0.000	0.38	79.5	OK	
S10.000	S423	70.662	-0.213	0.000	0.39	80.9	OK	
S10.001	S424	70.416	-0.066	0.000	1.00	80.0	OK	
S9.001	S425	70.313	-0.137	0.000	0.72	158.2	OK	
S1.008	S426	69.702	0.352	0.000	0.03	6.2	SURCHARGED	
S1.009	S427	69.700	0.450	0.000	0.01	4.9	SURCHARGED	
S11.000	S428	68.872	0.022	0.000	1.03	181.1	SURCHARGED	
S12.000	S429	68.943	0.393	0.000	0.97	162.6	SURCHARGED	
S13.000	S430	69.763	-0.212	0.000	0.39	70.6	OK	
S12.001	S431	68.716	0.391	0.000	1.35	228.8	SURCHARGED	
S14.000	S432	69.771	-0.204	0.000	0.43	76.9	OK	
S11.001	S433	68.545	0.217	0.000	1.60	477.1	SURCHARGED	
S1.010	S434	66.417	0.542	0.000	0.41	100.9	SURCHARGED	
S1.011	S435	66.415	0.640	0.000	0.01	8.4	SURCHARGED	
S1.012	S436	65.293	-0.190	0.000	0.06	8.4	OK	



Drainage Technical Addendum

DATE:	20 July 2021	CONFIDENTIALITY:	Public
SUBJECT:	Drainage Technical Addendum		
PROJECT:	Milton Keynes East	AUTHOR:	DSF
CHECKED:	BU	APPROVED:	SP

HIF 5

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for HIF - 5

Pipe Sizes BS Manhole Sizes SFA7

FEH Rainfall Model

Return Period (years)	5
FEH Rainfall Version	2013
Site Location GB 489026 242081 SP 89026 42081	
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for HIF - 5

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.000	4-8	0.289	8-12	0.576	12-16	0.008

Total Area Contributing (ha) = 0.873

Total Pipe Volume (m³) = 3248.979

Network Design Table for HIF - 5

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	45.921	0.247	185.9	0.079	5.00	0.0	0.600	o	300	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 (l/s)	Flow (l/s)
S1.000	50.00	5.67	66.902	0.079	0.0	0.0	0.0	1.15	81.3	10.7

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Network Design Table for HIF - 5

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section	Type	Auto Design
S1.001	45.225	0.460	98.3	0.072	0.00	0.0	0.600	o	300	Pipe/Conduit		
S1.002	67.732	1.915	35.4	0.122	0.00	0.0	0.600	o	300	Pipe/Conduit		
S2.000	42.730	0.393	108.7	0.131	5.00	0.0	0.600	o	375	Pipe/Conduit		
S2.001	19.064	0.038	500.0	0.034	0.00	0.0	0.600	o	375	Pipe/Conduit		
S3.000	45.921	0.455	100.9	0.087	5.00	0.0	0.600	o	375	Pipe/Conduit		
S3.001	45.225	0.448	100.9	0.085	0.00	0.0	0.600	o	375	Pipe/Conduit		
S3.002	67.732	1.822	37.2	0.121	0.00	0.0	0.600	o	375	Pipe/Conduit		
S4.000	27.306	0.060	455.0	0.084	5.00	0.0	0.600	o	375	Pipe/Conduit		
S4.001	12.403	0.027	455.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit		
S4.002	33.815	0.074	455.0	0.058	0.00	0.0	0.600	o	375	Pipe/Conduit		
S3.003	12.270	0.236	52.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		
S1.003	26.202	1.645	15.9	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		
S1.004	35.337	0.071	500.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit		
S1.005	12.014	0.031	387.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit		
S1.006	111.298	0.288	387.0	0.000	0.00	0.0	0.600	2 \ \ /	500	1:2 Ditch		
S1.007	278.524	0.720	386.8	0.000	0.00	0.0	0.600	2 \ \ /	500	1:2 Ditch		

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 (l/s)	Flow (l/s)
S1.001	50.00	6.14	66.655	0.151	0.0	0.0	0.0	1.59	112.1	20.4
S1.002	50.00	6.57	66.195	0.273	0.0	0.0	0.0	2.65	187.5	37.0
S2.000	50.00	5.41	64.636	0.131	0.0	0.0	0.0	1.74	191.9	17.7
S2.001	50.00	5.81	64.243	0.165	0.0	0.0	0.0	0.80	88.7	22.3
S3.000	50.00	5.42	67.241	0.087	0.0	0.0	0.0	1.80	199.2	11.8
S3.001	50.00	5.84	66.786	0.172	0.0	0.0	0.0	1.80	199.2	23.2
S3.002	50.00	6.22	66.338	0.293	0.0	0.0	0.0	2.98	329.1	39.6
S4.000	50.00	5.54	64.603	0.084	0.0	0.0	0.0	0.84	93.1	11.4
S4.001	50.00	5.79	64.543	0.084	0.0	0.0	0.0	0.84	93.1	11.4
S4.002	50.00	6.45	64.516	0.142	0.0	0.0	0.0	0.84	93.1	19.2
S3.003	50.00	6.53	64.441	0.435	0.0	0.0	0.0	2.82	449.2	58.9
S1.003	50.00	6.65	64.130	0.873	0.0	0.0	0.0	5.11	813.3	118.2
S1.004	50.00	7.24	62.410	0.873	0.0	0.0	0.0	0.99	215.4	118.2
S1.005	50.00	7.55	62.339	0.873	0.0	0.0	0.0	0.66	26.2«	118.2
S1.006	50.00	8.90	62.308	0.873	0.0	0.0	0.0	1.38	454.4	118.2
S1.007	50.00	12.27	62.020	0.873	0.0	0.0	0.0	1.38	454.5	118.2

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Manhole Schedules for HIF - 5

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdr (mm)
S500	68.402	1.500	Open Manhole	1200	S1.000	66.902	300				
S501	68.155	1.500	Open Manhole	1200	S1.001	66.655	300	S1.000	66.655	300	
S502	67.695	1.500	Open Manhole	1200	S1.002	66.195	300	S1.001	66.195	300	
S503	66.211	1.575	Open Manhole	1350	S2.000	64.636	375				
S504	66.939	2.696	Open Manhole	1350	S2.001	64.243	375	S2.000	64.243	375	
S505	68.741	1.500	Open Manhole	1350	S3.000	67.241	375				
S506	68.483	1.697	Open Manhole	1350	S3.001	66.786	375	S3.000	66.786	375	
S507	68.038	1.700	Open Manhole	1350	S3.002	66.338	375	S3.001	66.338	375	
S508	66.178	1.575	Open Manhole	1350	S4.000	64.603	375				
S509	67.201	2.658	Open Manhole	1350	S4.001	64.543	375	S4.000	64.543	375	
S510	67.044	2.528	Open Manhole	1350	S4.002	64.516	375	S4.001	64.516	375	
S511	67.362	2.921	Open Manhole	1350	S3.003	64.441	450	S3.002	64.516	375	
								S4.002	64.441	375	
S512	67.020	2.890	Open Manhole	1350	S1.003	64.130	450	S1.002	64.280	300	
								S2.001	64.205	375	
								S3.003	64.205	450	
S513	64.135	1.725	Open Manhole	1500	S1.004	62.410	525	S1.003	62.485	450	
SPOND 25	64.135	1.796	Open Manhole	1500	S1.005	62.339	225	S1.004	62.339	525	
S515	64.000	1.692	Open Manhole	1800	S1.006	62.308	500	S1.005	62.308	225	
S516	64.000	1.980	Junction		S1.007	62.020	500	S1.006	62.020	500	
S	63.798	2.498	Open Manhole	0		OUTFALL		S1.007	61.300	500	

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Online Controls for HIF - 5

Hydro-Brake® Optimum Manhole: SPOND 25, DS/PN: S1.005, Volume (m³): 10.5

Unit Reference	MD-SHE-0090-4000-1300-4000
Design Head (m)	1.300
Design Flow (l/s)	4.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	90
Invert Level (m)	62.339
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.300	4.0
Flush-Flo™	0.388	4.0
Kick-Flo®	0.796	3.2
Mean Flow over Head Range	-	3.5

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.8	1.200	3.9	3.000	5.9	7.000	8.8
0.200	3.7	1.400	4.1	3.500	6.3	7.500	9.1
0.300	3.9	1.600	4.4	4.000	6.8	8.000	9.4
0.400	4.0	1.800	4.7	4.500	7.1	8.500	9.7
0.500	3.9	2.000	4.9	5.000	7.5	9.000	9.9
0.600	3.8	2.200	5.1	5.500	7.9	9.500	10.2
0.800	3.2	2.400	5.3	6.000	8.2		
1.000	3.5	2.600	5.5	6.500	8.5		

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Storage Structures for HIF - 5

Tank or Pond Manhole: SPOND 25, DS/PN: S1.005

Invert Level (m) 62.354

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	290.0	1.796	1085.4

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 5

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
 Number of Online Controls 1 Number of Time/Area Diagrams 0
 Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
 FEH Rainfall Version 2013
 Site Location GB 489026 242081 SP 89026 42081
 Data Type Point
 Cv (Summer) 0.950
 Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
 Analysis Timestep Fine Inertia Status ON
 DTS Status OFF

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
 2880, 4320
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S500	15 Summer	2	+0%	100/15	Summer		
S1.001	S501	15 Summer	2	+0%	100/15	Summer		
S1.002	S502	15 Summer	2	+0%	100/15	Summer		
S2.000	S503	15 Summer	2	+0%	100/15	Summer		
S2.001	S504	15 Summer	2	+0%	100/15	Summer		
S3.000	S505	15 Summer	2	+0%				
S3.001	S506	15 Summer	2	+0%				
S3.002	S507	15 Summer	2	+0%				
S4.000	S508	15 Summer	2	+0%	100/15	Summer		
S4.001	S509	15 Summer	2	+0%	100/15	Summer		
S4.002	S510	15 Summer	2	+0%	100/15	Summer		
S3.003	S511	15 Summer	2	+0%	100/15	Summer		
S1.003	S512	15 Summer	2	+0%	100/15	Summer		
S1.004	S513	360 Winter	2	+0%	30/15	Summer		
S1.005	SPOND 25	360 Winter	2	+0%	2/15	Summer		
S1.006	S515	960 Summer	2	+0%				
S1.007	S516	960 Winter	2	+0%				

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 5

PN	US/MH Name	Water Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (l/s)			
S1.000	S500	66.995	-0.207	0.000	0.21	15.6	OK	
S1.001	S501	66.760	-0.195	0.000	0.26	27.5	OK	
S1.002	S502	66.301	-0.194	0.000	0.27	47.9	OK	
S2.000	S503	64.733	-0.278	0.000	0.15	26.1	OK	
S2.001	S504	64.430	-0.188	0.000	0.49	31.8	OK	
S3.000	S505	67.319	-0.297	0.000	0.09	17.4	OK	
S3.001	S506	66.892	-0.269	0.000	0.17	31.7	OK	
S3.002	S507	66.441	-0.272	0.000	0.17	51.7	OK	
S4.000	S508	64.736	-0.242	0.000	0.20	16.7	OK	
S4.001	S509	64.694	-0.224	0.000	0.28	16.2	OK	
S4.002	S510	64.666	-0.224	0.000	0.29	24.5	OK	
S3.003	S511	64.601	-0.290	0.000	0.27	74.6	OK	
S1.003	S512	64.274	-0.306	0.000	0.22	152.5	OK	
S1.004	S513	62.787	-0.148	0.000	0.14	26.1	OK	
S1.005	SPOND 25	62.785	0.221	0.000	0.20	4.0	SURCHARGED	
S1.006	S515	62.322	-1.678	0.000	0.00	4.0	OK	
S1.007	S516	62.032	-1.968	0.000	0.00	4.0	OK	

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 5

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S500	15 Summer	5	+0%	100/15 Summer			
S1.001	S501	15 Summer	5	+0%	100/15 Summer			
S1.002	S502	15 Summer	5	+0%	100/15 Summer			
S2.000	S503	15 Summer	5	+0%	100/15 Summer			
S2.001	S504	15 Summer	5	+0%	100/15 Summer			
S3.000	S505	15 Summer	5	+0%				
S3.001	S506	15 Summer	5	+0%				
S3.002	S507	15 Summer	5	+0%				
S4.000	S508	15 Summer	5	+0%	100/15 Summer			
S4.001	S509	15 Summer	5	+0%	100/15 Summer			
S4.002	S510	15 Summer	5	+0%	100/15 Summer			
S3.003	S511	15 Summer	5	+0%	100/15 Summer			
S1.003	S512	15 Summer	5	+0%	100/15 Summer			
S1.004	S513	15 Winter	5	+0%	30/15 Summer			
S1.005	SPOND 25	360 Winter	5	+0%	2/15 Summer			
S1.006	S515	360 Summer	5	+0%				
S1.007	S516	1440 Winter	5	+0%				

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 5

PN	US/MH Name	Water		Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)				
S1.000	S500	67.011	-0.191	0.000	0.28		21.0	OK		
S1.001	S501	66.779	-0.176	0.000	0.35		36.9	OK		
S1.002	S502	66.319	-0.176	0.000	0.36		63.8	OK		
S2.000	S503	64.751	-0.260	0.000	0.20		35.0	OK		
S2.001	S504	64.466	-0.152	0.000	0.66		42.3	OK		
S3.000	S505	67.331	-0.285	0.000	0.13		23.3	OK		
S3.001	S506	66.909	-0.252	0.000	0.23		42.5	OK		
S3.002	S507	66.459	-0.254	0.000	0.22		69.4	OK		
S4.000	S508	64.762	-0.216	0.000	0.27		22.4	OK		
S4.001	S509	64.722	-0.196	0.000	0.37		21.8	OK		
S4.002	S510	64.695	-0.196	0.000	0.40		33.0	OK		
S3.003	S511	64.630	-0.261	0.000	0.37		100.4	OK		
S1.003	S512	64.299	-0.281	0.000	0.30		205.3	OK		
S1.004	S513	62.935	0.000	0.000	1.03		189.5	OK		
S1.005	SPOND 25	62.895	0.331	0.000	0.20		4.0	SURCHARGED		
S1.006	S515	62.322	-1.678	0.000	0.00		4.0	OK		
S1.007	S516	62.032	-1.968	0.000	0.00		4.0	OK		

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 5

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
 Number of Online Controls 1 Number of Time/Area Diagrams 0
 Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
 FEH Rainfall Version 2013
 Site Location GB 489026 242081 SP 89026 42081
 Data Type Point
 Cv (Summer) 0.950
 Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
 Analysis Timestep Fine Inertia Status ON
 DTS Status OFF

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
 2880, 4320
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S500	15 Summer	30	+0%	100/15 Summer			
S1.001	S501	15 Summer	30	+0%	100/15 Summer			
S1.002	S502	15 Summer	30	+0%	100/15 Summer			
S2.000	S503	15 Summer	30	+0%	100/15 Summer			
S2.001	S504	15 Summer	30	+0%	100/15 Summer			
S3.000	S505	15 Summer	30	+0%				
S3.001	S506	15 Summer	30	+0%				
S3.002	S507	15 Summer	30	+0%				
S4.000	S508	15 Summer	30	+0%	100/15 Summer			
S4.001	S509	15 Summer	30	+0%	100/15 Summer			
S4.002	S510	15 Summer	30	+0%	100/15 Summer			
S3.003	S511	15 Summer	30	+0%	100/15 Summer			
S1.003	S512	15 Summer	30	+0%	100/15 Summer			
S1.004	S513	480 Winter	30	+0%	30/15 Summer			
S1.005	SPOND 25	480 Winter	30	+0%	2/15 Summer			
S1.006	S515	1440 Winter	30	+0%				
S1.007	S516	2880 Summer	30	+0%				

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 5

PN	US/MH Name	Water Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Overflow Cap. (l/s)			
S1.000	S500	67.046	-0.156	0.000	0.45	34.6	OK	
S1.001	S501	66.836	-0.119	0.000	0.65	67.8	OK	
S1.002	S502	66.386	-0.109	0.000	0.69	123.7	OK	
S2.000	S503	64.786	-0.225	0.000	0.33	57.7	OK	
S2.001	S504	64.618	0.000	0.000	1.03	66.8	OK	
S3.000	S505	67.359	-0.257	0.000	0.21	38.4	OK	
S3.001	S506	66.962	-0.199	0.000	0.43	78.6	OK	
S3.002	S507	66.516	-0.197	0.000	0.44	135.2	OK	
S4.000	S508	64.836	-0.142	0.000	0.45	36.8	OK	
S4.001	S509	64.804	-0.114	0.000	0.65	38.2	OK	
S4.002	S510	64.780	-0.111	0.000	0.69	57.8	OK	
S3.003	S511	64.719	-0.172	0.000	0.70	191.8	OK	
S1.003	S512	64.369	-0.210	0.000	0.56	380.8	OK	
S1.004	S513	63.169	0.234	0.000	0.21	38.8	SURCHARGED	
S1.005	SPOND 25	63.168	0.604	0.000	0.20	4.0	SURCHARGED	
S1.006	S515	62.322	-1.678	0.000	0.00	4.0	OK	
S1.007	S516	62.032	-1.968	0.000	0.00	4.0	OK	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for HIF - 5

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440, 2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S500	15 Summer	100	+40%	100/15 Summer			
S1.001	S501	15 Summer	100	+40%	100/15 Summer			
S1.002	S502	15 Summer	100	+40%	100/15 Summer			
S2.000	S503	15 Summer	100	+40%	100/15 Summer			
S2.001	S504	15 Summer	100	+40%	100/15 Summer			
S3.000	S505	15 Summer	100	+40%				
S3.001	S506	15 Summer	100	+40%				
S3.002	S507	15 Summer	100	+40%				
S4.000	S508	15 Summer	100	+40%	100/15 Summer			
S4.001	S509	15 Summer	100	+40%	100/15 Summer			
S4.002	S510	15 Summer	100	+40%	100/15 Summer			
S3.003	S511	15 Summer	100	+40%	100/15 Summer			
S1.003	S512	15 Summer	100	+40%	100/15 Summer			
S1.004	S513	480 Winter	100	+40%	30/15 Summer			
S1.005	SPOND 25	480 Winter	100	+40%	2/15 Summer			
S1.006	S515	480 Winter	100	+40%				
S1.007	S516	480 Winter	100	+40%				

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100 year Return Period Summary of Critical Results by Maximum Level (Rank
1) for HIF - 5

PN	US/MH Name	Water		Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Overflow Cap. (l/s)					
S1.000	S500	67.729	0.527	0.000	0.78	59.3	SURCHARGED			
S1.001	S501	67.606	0.651	0.000	1.01	106.3	SURCHARGED			
S1.002	S502	67.154	0.659	0.000	1.04	186.4	SURCHARGED			
S2.000	S503	65.212	0.201	0.000	0.60	105.6	SURCHARGED			
S2.001	S504	65.057	0.439	0.000	1.90	122.6	SURCHARGED			
S3.000	S505	67.405	-0.211	0.000	0.39	70.6	OK			
S3.001	S506	67.046	-0.115	0.000	0.79	143.6	OK			
S3.002	S507	66.601	-0.112	0.000	0.80	246.8	OK			
S4.000	S508	65.454	0.476	0.000	0.77	62.5	SURCHARGED			
S4.001	S509	65.412	0.494	0.000	1.06	62.0	SURCHARGED			
S4.002	S510	65.384	0.494	0.000	1.16	96.7	SURCHARGED			
S3.003	S511	65.279	0.388	0.000	1.19	326.3	SURCHARGED			
S1.003	S512	64.958	0.378	0.000	0.90	617.4	SURCHARGED			
S1.004	S513	63.691	0.757	0.000	0.39	72.3	SURCHARGED			
S1.005	SPOND 25	63.690	1.126	0.000	0.21	4.1	SURCHARGED			
S1.006	S515	62.322	-1.678	0.000	0.00	4.1	OK			
S1.007	S516	62.033	-1.967	0.000	0.00	4.1	OK			



Drainage Technical Addendum

DATE:	20 July 2021	CONFIDENTIALITY:	Public
SUBJECT:	Drainage Technical Addendum		
PROJECT:	Milton Keynes East	AUTHOR:	DSF
CHECKED:	BU	APPROVED:	SP

HIF 6

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for HIF - 6

Pipe Sizes BS Manhole Sizes SFA7

FEH Rainfall Model

Return Period (years)	5
FEH Rainfall Version	2013
Site Location GB 489026 242081 SP 89026 42081	
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for HIF - 6


Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.000	4-8	0.037	8-12	1.657	12-16	1.118	16-20	0.377	20-24	0.011

Total Area Contributing (ha) = 3.200

Total Pipe Volume (m³) = 6039.499

Network Design Table for HIF - 6

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section	Type	Auto Design
S1.000	58.316	1.924	30.3	0.212	5.00	0.0	0.600	o	375	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 (l/s)	Flow (l/s)
S1.000	50.00	5.29	74.053	0.212	0.0	0.0	0.0	3.30	364.7	28.7

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Network Design Table for HIF - 6

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.001	25.663	0.962	26.7	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.002	69.334	0.286	242.4	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.003	69.334	0.286	242.4	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S2.000	49.528	0.697	71.1	0.124	5.00	0.0	0.600	o	300	Pipe/Conduit	
S2.001	67.692	0.527	128.6	0.190	0.00	0.0	0.600	o	375	Pipe/Conduit	
S2.002	33.068	0.137	242.2	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.004	29.378	0.226	130.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.005	83.282	0.278	299.6	0.176	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.006	60.571	0.185	327.3	0.177	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.007	49.956	0.125	400.0	0.058	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.008	52.324	0.681	76.8	0.140	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.009	50.902	0.817	62.3	0.119	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.010	19.452	0.551	35.3	0.078	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.011	31.898	0.248	128.6	0.082	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.012	25.364	0.649	39.1	0.119	0.00	0.0	0.600	o	525	Pipe/Conduit	
S3.000	26.733	0.401	66.7	0.084	5.00	0.0	0.600	o	300	Pipe/Conduit	
S3.001	33.304	0.398	83.7	0.089	0.00	0.0	0.600	o	375	Pipe/Conduit	
S4.000	31.841	0.803	39.7	0.053	5.00	0.0	0.600	o	225	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 (l/s)	Flow (l/s)
S1.001	50.00	5.42	72.129	0.212	0.0	0.0	0.0	3.52	388.8	28.7
S1.002	50.00	6.41	71.167	0.212	0.0	0.0	0.0	1.16	128.0	28.7
S1.003	50.00	7.41	70.881	0.212	0.0	0.0	0.0	1.16	128.0	28.7
S2.000	50.00	5.44	72.400	0.124	0.0	0.0	0.0	1.87	132.0	16.7
S2.001	50.00	6.15	71.628	0.314	0.0	0.0	0.0	1.60	176.3	42.5
S2.002	50.00	6.62	71.102	0.314	0.0	0.0	0.0	1.16	128.1	42.5
S1.004	50.00	7.72	70.595	0.526	0.0	0.0	0.0	1.59	175.4	71.2
S1.005	50.00	8.79	70.219	0.701	0.0	0.0	0.0	1.29	279.0	95.0
S1.006	50.00	9.61	69.941	0.879	0.0	0.0	0.0	1.23	266.8	119.0
S1.007	50.00	10.36	69.756	0.937	0.0	0.0	0.0	1.11	241.1	126.8
S1.008	50.00	10.70	69.631	1.076	0.0	0.0	0.0	2.56	553.6	145.7
S1.009	50.00	11.00	68.950	1.195	0.0	0.0	0.0	2.84	615.1	161.8
S1.010	50.00	11.09	68.133	1.272	0.0	0.0	0.0	3.78	818.0	172.3
S1.011	50.00	11.36	67.582	1.354	0.0	0.0	0.0	1.97	427.2	183.4
S1.012	50.00	11.47	67.334	1.473	0.0	0.0	0.0	3.59	777.3	199.5
S3.000	50.00	5.23	67.756	0.084	0.0	0.0	0.0	1.93	136.3	11.4
S3.001	50.00	5.51	67.280	0.173	0.0	0.0	0.0	1.98	218.9	23.4
S4.000	50.00	5.25	67.835	0.053	0.0	0.0	0.0	2.08	82.9	7.2

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Network Design Table for HIF - 6

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S3.002	21.272	0.047	450.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.013	53.188	1.773	30.0	0.284	0.00	0.0	0.600	o	525	Pipe/Conduit	
S5.000	19.803	0.626	31.6	0.000	5.00	0.0	0.600	o	225	Pipe/Conduit	
S5.001	15.797	0.079	200.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.014	48.014	0.676	71.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S6.000	27.452	0.376	73.0	0.286	5.00	0.0	0.600	o	300	Pipe/Conduit	
S6.001	18.015	0.232	77.7	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.015	48.014	0.526	91.3	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S7.000	38.908	0.468	83.1	0.272	5.00	0.0	0.600	o	300	Pipe/Conduit	
S7.001	12.951	0.150	86.3	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.016	96.028	0.514	186.8	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S8.000	61.487	0.471	130.5	0.533	5.00	0.0	0.600	o	450	Pipe/Conduit	
S8.001	21.751	0.138	157.6	0.126	0.00	0.0	0.600	o	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 (l/s)	Flow (l/s)
S3.002	50.00	5.85	66.732	0.226	0.0	0.0	0.0	1.05	227.2	30.7
S1.013	50.00	11.69	66.685	1.983	0.0	0.0	0.0	4.10	887.6	268.6
S5.000	50.00	5.14	65.761	0.000	0.0	0.0	0.0	2.33	92.8	0.0
S5.001	50.00	5.43	65.135	0.000	0.0	0.0	0.0	0.92	36.6	0.0
S1.014	50.00	11.99	64.912	1.983	0.0	0.0	0.0	2.66	575.9	268.6
S6.000	50.00	5.25	64.934	0.286	0.0	0.0	0.0	1.84	130.2	38.7
S6.001	50.00	5.39	64.483	0.286	0.0	0.0	0.0	2.06	227.3	38.7
S1.015	50.00	12.30	64.026	2.269	0.0	0.0	0.0	2.55	720.9	307.3
S7.000	50.00	5.38	64.334	0.272	0.0	0.0	0.0	1.73	122.0	36.8
S7.001	50.00	5.49	63.791	0.272	0.0	0.0	0.0	1.95	215.5	36.8
S1.016	50.00	13.20	63.416	2.541	0.0	0.0	0.0	1.78	502.8	344.1
S8.000	50.00	5.58	63.661	0.533	0.0	0.0	0.0	1.78	282.8	72.2
S8.001	50.00	5.80	63.190	0.659	0.0	0.0	0.0	1.62	257.1	89.3

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Network Design Table for HIF - 6

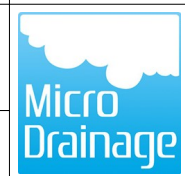
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.017	7.579	0.016	473.7	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.018	173.552	0.347	500.0	0.000	0.00	0.0	0.600	2 _/_	500	1:2 Ditch	
S1.019	133.658	0.267	500.0	0.000	0.00	0.0	0.600	2 _/_	500	1:2 Ditch	
S1.020	100.471	0.201	500.0	0.000	0.00	0.0	0.600	2 _/_	300	1:2 Ditch	
S1.021	95.646	0.210	455.5	0.000	0.00	0.0	0.600	2 _/_	500	1:2 Ditch	

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 (l/s)	Flow (l/s)
S1.017	50.00	13.32	63.052	3.200	0.0	0.0	0.0	1.11	314.5<	433.4
S1.018	48.82	15.71	63.036	3.200	0.0	0.0	0.0	1.21	399.3<	433.4
S1.019	45.47	17.55	62.689	3.200	0.0	0.0	0.0	1.21	399.3<	433.4
S1.020	43.16	19.01	62.422	3.200	0.0	0.0	0.0	1.15	309.6<	433.4
S1.021	41.38	20.27	62.221	3.200	0.0	0.0	0.0	1.27	418.5<	433.4

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Manhole Schedules for HIF - 6

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S600	75.628	1.575	Open Manhole	1350	S1.000	74.053	375				
S601	73.704	1.575	Open Manhole	1350	S1.001	72.129	375	S1.000	72.129	375	
S602	72.742	1.575	Open Manhole	1350	S1.002	71.167	375	S1.001	71.167	375	
S4	72.456	1.575	Open Manhole	1350	S1.003	70.881	375	S1.002	70.881	375	
S5	73.600	1.200	Open Manhole	1200	S2.000	72.400	300				
S604	72.903	1.275	Open Manhole	1350	S2.001	71.628	375	S2.000	71.703	300	
S7	72.424	1.322	Open Manhole	1350	S2.002	71.102	375	S2.001	71.102	375	
S603	72.170	1.575	Open Manhole	1350	S1.004	70.595	375	S1.003	70.595	375	
								S2.002	70.965	375	370
S605	71.944	1.725	Open Manhole	1500	S1.005	70.219	525	S1.004	70.369	375	
S606	72.138	2.197	Open Manhole	1500	S1.006	69.941	525	S1.005	69.941	525	
S607	71.983	2.227	Open Manhole	1500	S1.007	69.756	525	S1.006	69.756	525	
S608	71.619	1.988	Open Manhole	1500	S1.008	69.631	525	S1.007	69.631	525	
S610	70.675	1.725	Open Manhole	1500	S1.009	68.950	525	S1.008	68.950	525	
S611	69.858	1.725	Open Manhole	1500	S1.010	68.133	525	S1.009	68.133	525	
S612	69.307	1.725	Open Manhole	1500	S1.011	67.582	525	S1.010	67.582	525	
S613	69.059	1.725	Open Manhole	1500	S1.012	67.334	525	S1.011	67.334	525	
S614	69.256	1.500	Open Manhole	1200	S3.000	67.756	300				
S615	68.855	1.575	Open Manhole	1350	S3.001	67.280	375	S3.000	67.355	300	
S19	69.260	1.425	Open Manhole	1200	S4.000	67.835	225				
S616	68.457	1.725	Open Manhole	1500	S3.002	66.732	525	S3.001	66.882	375	
								S4.000	67.032	225	
S617	68.476	1.791	Open Manhole	1500	S1.013	66.685	525	S1.012	66.685	525	
								S3.002	66.685	525	
S618	67.186	1.425	Open Manhole	1200	S5.000	65.761	225				
S619	66.560	1.425	Open Manhole	1200	S5.001	65.135	225	S5.000	65.135	225	
S620	66.694	1.782	Open Manhole	1500	S1.014	64.912	525	S1.013	64.912	525	
								S5.001	65.056	225	
S621	66.434	1.500	Open Manhole	1200	S6.000	64.934	300				
S622	66.058	1.575	Open Manhole	1350	S6.001	64.483	375	S6.000	64.558	300	
S623	66.026	2.000	Open Manhole	1500	S1.015	64.026	600	S1.014	64.236	525	135
								S6.001	64.251	375	
S624	65.834	1.500	Open Manhole	1200	S7.000	64.334	300				
S625	65.366	1.575	Open Manhole	1350	S7.001	63.791	375	S7.000	63.866	300	
S626	65.445	2.029	Open Manhole	1500	S1.016	63.416	600	S1.015	63.500	600	84
								S7.001	63.641	375	
S627	65.311	1.650	Open Manhole	1350	S8.000	63.661	450				
S628	64.840	1.650	Open Manhole	1350	S8.001	63.190	450	S8.000	63.190	450	

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Manhole Schedules for HIF - 6

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S629	64.952	2.050	Open Manhole	1500	S1.017	63.052	600	S1.016	62.902	600	
								S8.001	63.052	450	
S630	64.980	1.944	Open Manhole	1500	S1.018	63.036	500	S1.017	63.036	600	
S631	65.177	2.488	Junction		S1.019	62.689	500	S1.018	62.689	500	
S632	65.000	2.578	Junction		S1.020	62.422	300	S1.019	62.422	500	
S633	64.500	2.279	Junction		S1.021	62.221	500	S1.020	62.221	300	
S	64.500	2.489	Open Manhole	0		OUTFALL		S1.021	62.011	500	

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Area Summary for HIF - 6

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.136	0.136	0.136
	User	-	100	0.076	0.076	0.212
1.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
2.000	User	-	100	0.124	0.124	0.124
2.001	User	-	100	0.190	0.190	0.190
2.002	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
1.005	User	-	100	0.176	0.176	0.176
1.006	User	-	100	0.177	0.177	0.177
1.007	User	-	100	0.058	0.058	0.058
1.008	User	-	100	0.052	0.052	0.052
	User	-	100	0.088	0.088	0.140
1.009	User	-	100	0.119	0.119	0.119
1.010	User	-	100	0.078	0.078	0.078
1.011	User	-	100	0.082	0.082	0.082
1.012	User	-	100	0.119	0.119	0.119
3.000	User	-	100	0.084	0.084	0.084
3.001	User	-	100	0.089	0.089	0.089
4.000	User	-	100	0.053	0.053	0.053
3.002	-	-	100	0.000	0.000	0.000
1.013	User	-	100	0.284	0.284	0.284
5.000	-	-	100	0.000	0.000	0.000
5.001	-	-	100	0.000	0.000	0.000
1.014	-	-	100	0.000	0.000	0.000
6.000	User	-	100	0.286	0.286	0.286
6.001	-	-	100	0.000	0.000	0.000
1.015	-	-	100	0.000	0.000	0.000
7.000	User	-	100	0.272	0.272	0.272
7.001	-	-	100	0.000	0.000	0.000
1.016	-	-	100	0.000	0.000	0.000
8.000	User	-	100	0.533	0.533	0.533
8.001	User	-	100	0.126	0.126	0.126
1.017	-	-	100	0.000	0.000	0.000
1.018	-	-	100	0.000	0.000	0.000
1.019	-	-	100	0.000	0.000	0.000
1.020	-	-	100	0.000	0.000	0.000
1.021	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				3.200	3.200	3.200

Free Flowing Outfall Details for HIF - 6

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.021	S	64.500	62.011	0.000	0	0

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Online Controls for HIF - 6

Complex Manhole: S602, DS/PN: S1.002, Volume (m³): 4.9

Orifice

Diameter (m) 0.150 Discharge Coefficient 0.600 Invert Level (m) 71.167

Weir

Discharge Coef 0.544 Width (m) 0.500 Invert Level (m) 72.167

Hydro-Brake® Optimum Manhole: S603, DS/PN: S1.004, Volume (m³): 13.3

Unit Reference	MD-SHE-0143-1000-1200-1000
Design Head (m)	1.200
Design Flow (l/s)	10.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	143
Invert Level (m)	70.595
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	10.0
Flush-Flo™	0.357	10.0
Kick-Flo®	0.778	8.2
Mean Flow over Head Range	-	8.7

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.1	1.200	10.0	3.000	15.4	7.000	23.2
0.200	9.4	1.400	10.8	3.500	16.6	7.500	23.9
0.300	9.9	1.600	11.5	4.000	17.7	8.000	24.7
0.400	10.0	1.800	12.1	4.500	18.7	8.500	25.4
0.500	9.8	2.000	12.7	5.000	19.7	9.000	26.1
0.600	9.5	2.200	13.3	5.500	20.6	9.500	26.8
0.800	8.3	2.400	13.9	6.000	21.5		
1.000	9.2	2.600	14.4	6.500	22.3		

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Complex Manhole: S623, DS/PN: S1.015, Volume (m³): 15.4

Orifice

Diameter (m) 0.225 Discharge Coefficient 0.600 Invert Level (m) 64.026

Weir

Discharge Coef 0.544 Width (m) 1.000 Invert Level (m) 66.026

Hydro-Brake® Optimum Manhole: S629, DS/PN: S1.017, Volume (m³): 33.3

Unit Reference MD-SHE-0150-1260-1800-1260
 Design Head (m) 1.800
 Design Flow (l/s) 12.6
 Flush-Flo™ Calculated
 Objective Minimise upstream storage
 Application Surface
 Sump Available Yes
 Diameter (mm) 150
 Invert Level (m) 63.052
 Minimum Outlet Pipe Diameter (mm) 225
 Suggested Manhole Diameter (mm) 1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.800	12.6
Flush-Flo™	0.532	12.6
Kick-Flo®	1.109	10.0
Mean Flow over Head Range	-	11.0

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.4	1.200	10.4	3.000	16.1	7.000	24.1
0.200	10.8	1.400	11.2	3.500	17.3	7.500	24.9
0.300	11.9	1.600	11.9	4.000	18.4	8.000	25.7
0.400	12.4	1.800	12.6	4.500	19.5	8.500	26.5
0.500	12.6	2.000	13.2	5.000	20.5	9.000	27.2
0.600	12.6	2.200	13.9	5.500	21.5	9.500	27.9
0.800	12.2	2.400	14.4	6.000	22.4		
1.000	11.2	2.600	15.0	6.500	23.2		

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Storage Structures for HIF - 6

Tank or Pond Manhole: S602, DS/PN: S1.002

Invert Level (m) 71.167

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	5.0	1.575	262.3

Tank or Pond Manhole: S603, DS/PN: S1.004

Invert Level (m) 70.595

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	55.0	1.575	456.9

Tank or Pond Manhole: S623, DS/PN: S1.015

Invert Level (m) 64.026

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	200.0	2.000	1015.5

Tank or Pond Manhole: S628, DS/PN: S8.001

Invert Level (m) 63.190

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	500.0	1.650	1367.8

Tank or Pond Manhole: S629, DS/PN: S1.017

Invert Level (m) 63.052

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	400.0	1.280	982.4	1.900	1357.1

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 6

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 5
Number of Online Controls 4 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S600	15 Summer	2	+0%				
S1.001	S601	15 Summer	2	+0%				
S1.002	S602	15 Summer	2	+0%	5/15 Summer			
S1.003	S4	120 Summer	2	+0%	30/15 Summer			
S2.000	S5	15 Summer	2	+0%	100/15 Summer			
S2.001	S604	15 Summer	2	+0%	100/15 Summer	100/15 Summer		
S2.002	S7	15 Summer	2	+0%	30/15 Summer			
S1.004	S603	120 Summer	2	+0%	2/15 Summer			
S1.005	S605	15 Summer	2	+0%				
S1.006	S606	15 Summer	2	+0%	100/15 Summer			
S1.007	S607	15 Summer	2	+0%	100/15 Summer			
S1.008	S608	30 Summer	2	+0%				
S1.009	S610	30 Summer	2	+0%	100/15 Summer			
S1.010	S611	30 Summer	2	+0%	100/15 Summer			
S1.011	S612	30 Summer	2	+0%	100/15 Summer			
S1.012	S613	30 Summer	2	+0%	100/15 Summer			
S3.000	S614	15 Summer	2	+0%	100/15 Summer			

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 6

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S600	74.142	-0.286	0.000	0.13		42.8	OK	
S1.001	S601	72.218	-0.286	0.000	0.13		42.6	OK	
S1.002	S602	71.539	-0.003	0.000	0.21		25.2	OK	
S1.003	S4	71.075	-0.181	0.000	0.14		17.0	OK	
S2.000	S5	72.492	-0.208	0.000	0.20		24.7	OK	
S2.001	S604	71.781	-0.222	0.000	0.34		56.0	OK	1
S2.002	S7	71.286	-0.190	0.000	0.49		55.8	OK	
S1.004	S603	71.072	0.102	0.000	0.06		10.0	SURCHARGED	
S1.005	S605	70.351	-0.393	0.000	0.13		34.7	OK	
S1.006	S606	70.122	-0.344	0.000	0.25		59.8	OK	
S1.007	S607	69.957	-0.324	0.000	0.31		65.6	OK	
S1.008	S608	69.774	-0.382	0.000	0.17		82.3	OK	
S1.009	S610	69.098	-0.377	0.000	0.17		96.1	OK	
S1.010	S611	68.285	-0.373	0.000	0.18		105.2	OK	
S1.011	S612	67.786	-0.321	0.000	0.32		114.9	OK	
S1.012	S613	67.497	-0.362	0.000	0.21		129.1	OK	
S3.000	S614	67.831	-0.225	0.000	0.14		17.1	OK	

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 6

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S3.001	S615	15 Summer	2	+0%	100/15 Summer			
S4.000	S19	15 Summer	2	+0%	100/15 Summer			
S3.002	S616	15 Summer	2	+0%	100/15 Summer			
S1.013	S617	15 Summer	2	+0%	100/15 Summer			
S5.000	S618	120 Winter	2	+0%	100/15 Summer			
S5.001	S619	15 Summer	2	+0%	30/15 Summer			
S1.014	S620	15 Summer	2	+0%	30/15 Summer			
S6.000	S621	15 Summer	2	+0%	30/15 Summer	100/15 Summer		
S6.001	S622	15 Summer	2	+0%	30/15 Summer			
S1.015	S623	120 Summer	2	+0%	5/30 Summer			
S7.000	S624	15 Summer	2	+0%	30/15 Summer	100/15 Summer		
S7.001	S625	15 Summer	2	+0%	100/15 Summer			
S1.016	S626	360 Summer	2	+0%	30/240 Summer			
S8.000	S627	15 Summer	2	+0%	100/15 Summer			
S8.001	S628	480 Winter	2	+0%	2/360 Summer			
S1.017	S629	360 Winter	2	+0%	5/240 Summer			
S1.018	S630	480 Summer	2	+0%				
S1.019	S631	240 Winter	2	+0%				
S1.020	S632	240 Summer	2	+0%				
S1.021	S633	240 Summer	2	+0%				

PN	US/MH Name	Water			Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)			
S3.001	S615	67.382	-0.273	0.000	0.16	32.1	OK		
S4.000	S19	67.891	-0.169	0.000	0.14	10.8	OK		
S3.002	S616	66.921	-0.336	0.000	0.25	42.8	OK		
S1.013	S617	66.868	-0.341	0.000	0.26	207.8	OK		
S5.000	S618	65.761	-0.225	0.000	0.00	0.0	OK		
S5.001	S619	65.137	-0.223	0.000	0.00	0.0	OK		
S1.014	S620	65.146	-0.291	0.000	0.41	209.0	OK		
S6.000	S621	65.084	-0.150	0.000	0.49	57.8	OK	1	
S6.001	S622	64.626	-0.232	0.000	0.31	57.4	OK		
S1.015	S623	64.578	-0.048	0.000	0.11	70.2	OK		
S7.000	S624	64.483	-0.151	0.000	0.48	54.4	OK	2	
S7.001	S625	63.948	-0.218	0.000	0.36	54.7	OK		
S1.016	S626	63.665	-0.351	0.000	0.15	69.7	OK		
S8.000	S627	63.864	-0.247	0.000	0.41	107.0	OK		
S8.001	S628	63.648	0.008	0.000	0.03	6.4	SURCHARGED		
S1.017	S629	63.648	-0.004	0.000	0.07	12.6	OK		
S1.018	S630	63.082	-1.898	0.000	0.00	12.6	OK		
S1.019	S631	62.727	-2.450	0.000	0.00	12.6	OK		
S1.020	S632	62.480	-2.520	0.000	0.00	12.6	OK		
S1.021	S633	62.288	-2.212	0.000	0.00	12.6	OK		

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 6

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 5
Number of Online Controls 4 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S600	15 Summer	5	+0%				
S1.001	S601	15 Summer	5	+0%				
S1.002	S602	15 Summer	5	+0%	5/15 Summer			
S1.003	S4	120 Summer	5	+0%	30/15 Summer			
S2.000	S5	15 Summer	5	+0%	100/15 Summer			
S2.001	S604	15 Summer	5	+0%	100/15 Summer	100/15 Summer		
S2.002	S7	15 Summer	5	+0%	30/15 Summer			
S1.004	S603	120 Summer	5	+0%	2/15 Summer			
S1.005	S605	15 Summer	5	+0%				
S1.006	S606	15 Summer	5	+0%	100/15 Summer			
S1.007	S607	15 Summer	5	+0%	100/15 Summer			
S1.008	S608	15 Summer	5	+0%				
S1.009	S610	15 Summer	5	+0%	100/15 Summer			
S1.010	S611	30 Summer	5	+0%	100/15 Summer			
S1.011	S612	30 Summer	5	+0%	100/15 Summer			
S1.012	S613	30 Summer	5	+0%	100/15 Summer			
S3.000	S614	15 Summer	5	+0%	100/15 Summer			

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File HIF 6 P0.1.MDX

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 6

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S600	74.157	-0.271	0.000	0.17		57.5	OK	
S1.001	S601	72.233	-0.271	0.000	0.17		57.1	OK	
S1.002	S602	71.633	0.091	0.000	0.24		29.0	SURCHARGED	
S1.003	S4	71.195	-0.061	0.000	0.15		18.6	OK	
S2.000	S5	72.506	-0.194	0.000	0.27		33.1	OK	
S2.001	S604	71.808	-0.195	0.000	0.45		75.2	OK	1
S2.002	S7	71.323	-0.153	0.000	0.65		74.7	OK	
S1.004	S603	71.191	0.221	0.000	0.06		10.0	SURCHARGED	
S1.005	S605	70.373	-0.371	0.000	0.17		45.2	OK	
S1.006	S606	70.153	-0.313	0.000	0.33		79.8	OK	
S1.007	S607	69.991	-0.290	0.000	0.41		87.5	OK	
S1.008	S608	69.798	-0.358	0.000	0.22		109.2	OK	
S1.009	S610	69.121	-0.354	0.000	0.23		127.3	OK	
S1.010	S611	68.309	-0.349	0.000	0.24		139.5	OK	
S1.011	S612	67.821	-0.286	0.000	0.42		152.9	OK	
S1.012	S613	67.523	-0.336	0.000	0.28		172.3	OK	
S3.000	S614	67.844	-0.212	0.000	0.19		23.0	OK	

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 6

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S3.001	S615	15 Summer	5	+0%	100/15 Summer			
S4.000	S19	15 Summer	5	+0%	100/15 Summer			
S3.002	S616	15 Summer	5	+0%	100/15 Summer			
S1.013	S617	15 Summer	5	+0%	100/15 Summer			
S5.000	S618	120 Winter	5	+0%	100/15 Summer			
S5.001	S619	15 Summer	5	+0%	30/15 Summer			
S1.014	S620	15 Summer	5	+0%	30/15 Summer			
S6.000	S621	15 Summer	5	+0%	30/15 Summer	100/15 Summer		
S6.001	S622	120 Summer	5	+0%	30/15 Summer			
S1.015	S623	120 Summer	5	+0%	5/30 Summer			
S7.000	S624	15 Summer	5	+0%	30/15 Summer	100/15 Summer		
S7.001	S625	15 Summer	5	+0%	100/15 Summer			
S1.016	S626	480 Winter	5	+0%	30/240 Summer			
S8.000	S627	15 Summer	5	+0%	100/15 Summer			
S8.001	S628	480 Winter	5	+0%	2/360 Summer			
S1.017	S629	480 Winter	5	+0%	5/240 Summer			
S1.018	S630	1440 Summer	5	+0%				
S1.019	S631	1440 Summer	5	+0%				
S1.020	S632	960 Winter	5	+0%				
S1.021	S633	480 Summer	5	+0%				

PN	US/MH Name	Water		Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)				
S3.001	S615	67.400	-0.255	0.000	0.22		42.9	OK		
S4.000	S19	67.901	-0.159	0.000	0.19		14.5	OK		
S3.002	S616	66.954	-0.303	0.000	0.33		57.3	OK		
S1.013	S617	66.901	-0.308	0.000	0.35		279.1	OK		
S5.000	S618	65.761	-0.225	0.000	0.00		0.0	OK		
S5.001	S619	65.183	-0.177	0.000	0.01		0.2	OK		
S1.014	S620	65.190	-0.247	0.000	0.55		279.6	OK		
S6.000	S621	65.114	-0.120	0.000	0.66		77.6	OK	1	
S6.001	S622	64.712	-0.146	0.000	0.18		32.9	OK		
S1.015	S623	64.707	0.081	0.000	0.13		79.6	SURCHARGED		
S7.000	S624	64.513	-0.121	0.000	0.65		73.0	OK	2	
S7.001	S625	63.977	-0.189	0.000	0.48		73.4	OK		
S1.016	S626	63.788	-0.228	0.000	0.13		62.3	OK		
S8.000	S627	63.903	-0.208	0.000	0.55		143.3	OK		
S8.001	S628	63.776	0.136	0.000	0.03		7.2	SURCHARGED		
S1.017	S629	63.776	0.124	0.000	0.07		12.6	SURCHARGED		
S1.018	S630	63.082	-1.898	0.000	0.00		12.6	OK		
S1.019	S631	62.727	-2.450	0.000	0.00		12.6	OK		
S1.020	S632	62.480	-2.520	0.000	0.00		12.6	OK		
S1.021	S633	62.288	-2.212	0.000	0.00		12.6	OK		

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 6

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 5
Number of Online Controls 4 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S600	15 Summer	30	+0%				
S1.001	S601	15 Summer	30	+0%				
S1.002	S602	15 Summer	30	+0%	5/15 Summer			
S1.003	S4	120 Winter	30	+0%	30/15 Summer			
S2.000	S5	15 Summer	30	+0%	100/15 Summer			
S2.001	S604	15 Summer	30	+0%	100/15 Summer	100/15 Summer		
S2.002	S7	15 Summer	30	+0%	30/15 Summer			
S1.004	S603	120 Winter	30	+0%	2/15 Summer			
S1.005	S605	15 Summer	30	+0%				
S1.006	S606	15 Summer	30	+0%	100/15 Summer			
S1.007	S607	15 Summer	30	+0%	100/15 Summer			
S1.008	S608	15 Summer	30	+0%				
S1.009	S610	15 Summer	30	+0%	100/15 Summer			
S1.010	S611	15 Summer	30	+0%	100/15 Summer			
S1.011	S612	15 Summer	30	+0%	100/15 Summer			
S1.012	S613	15 Summer	30	+0%	100/15 Summer			
S3.000	S614	15 Summer	30	+0%	100/15 Summer			

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 6

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S600	74.188	-0.240	0.000	0.28		94.8	OK	
S1.001	S601	72.265	-0.239	0.000	0.28		94.2	OK	
S1.002	S602	71.825	0.283	0.000	0.29		35.6	SURCHARGED	
S1.003	S4	71.463	0.207	0.000	0.14		17.3	SURCHARGED	
S2.000	S5	72.541	-0.159	0.000	0.44		54.6	OK	
S2.001	S604	71.920	-0.083	0.000	0.86		142.7	OK	1
S2.002	S7	71.526	0.049	0.000	1.22		139.2	SURCHARGED	
S1.004	S603	71.459	0.489	0.000	0.06		10.0	SURCHARGED	
S1.005	S605	70.442	-0.302	0.000	0.35		90.2	OK	
S1.006	S606	70.266	-0.200	0.000	0.66		158.9	OK	
S1.007	S607	70.118	-0.163	0.000	0.79		169.0	OK	
S1.008	S608	69.868	-0.288	0.000	0.41		202.6	OK	
S1.009	S610	69.197	-0.278	0.000	0.43		237.3	OK	
S1.010	S611	68.390	-0.268	0.000	0.46		263.8	OK	
S1.011	S612	67.951	-0.156	0.000	0.81		293.6	OK	
S1.012	S613	67.616	-0.243	0.000	0.55		341.6	OK	
S3.000	S614	67.870	-0.186	0.000	0.31		37.9	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 6

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S3.001	S615	15 Summer	30	+0%	100/15 Summer			
S4.000	S19	15 Summer	30	+0%	100/15 Summer			
S3.002	S616	15 Summer	30	+0%	100/15 Summer			
S1.013	S617	15 Summer	30	+0%	100/15 Summer			
S5.000	S618	120 Winter	30	+0%	100/15 Summer			
S5.001	S619	15 Summer	30	+0%	30/15 Summer			
S1.014	S620	15 Summer	30	+0%	30/15 Summer			
S6.000	S621	15 Summer	30	+0%	30/15 Summer	100/15 Summer		
S6.001	S622	60 Summer	30	+0%	30/15 Summer			
S1.015	S623	120 Summer	30	+0%	5/30 Summer			
S7.000	S624	15 Summer	30	+0%	30/15 Summer	100/15 Summer		
S7.001	S625	360 Winter	30	+0%	100/15 Summer			
S1.016	S626	360 Winter	30	+0%	30/240 Summer			
S8.000	S627	480 Winter	30	+0%	100/15 Summer			
S8.001	S628	480 Winter	30	+0%	2/360 Summer			
S1.017	S629	480 Winter	30	+0%	5/240 Summer			
S1.018	S630	240 Summer	30	+0%				
S1.019	S631	1440 Summer	30	+0%				
S1.020	S632	1440 Summer	30	+0%				
S1.021	S633	1440 Summer	30	+0%				

PN	US/MH Name	Water		Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)				
S3.001	S615	67.450	-0.205	0.000	0.42		82.0	OK		
S4.000	S19	67.921	-0.139	0.000	0.31		23.9	OK		
S3.002	S616	67.068	-0.189	0.000	0.60		103.9	OK		
S1.013	S617	67.019	-0.191	0.000	0.71		567.5	OK		
S5.000	S618	65.761	-0.225	0.000	0.00		0.0	OK		
S5.001	S619	65.548	0.188	0.000	0.20		6.4	SURCHARGED		
S1.014	S620	65.549	0.112	0.000	1.08		551.8	SURCHARGED		
S6.000	S621	65.305	0.071	0.000	1.08		126.9	SURCHARGED	1	
S6.001	S622	65.057	0.199	0.000	0.41		77.7	SURCHARGED		
S1.015	S623	65.016	0.390	0.000	0.16		99.0	SURCHARGED		
S7.000	S624	64.708	0.074	0.000	1.07		120.9	SURCHARGED	2	
S7.001	S625	64.122	-0.044	0.000	0.10		15.5	OK		
S1.016	S626	64.121	0.105	0.000	0.20		91.3	SURCHARGED		
S8.000	S627	64.057	-0.054	0.000	0.09		23.9	OK		
S8.001	S628	64.057	0.417	0.000	0.03		6.4	SURCHARGED		
S1.017	S629	64.058	0.406	0.000	0.07		12.6	SURCHARGED		
S1.018	S630	63.082	-1.898	0.000	0.00		12.6	OK		
S1.019	S631	62.727	-2.450	0.000	0.00		12.6	OK		
S1.020	S632	62.480	-2.520	0.000	0.00		12.6	OK		
S1.021	S633	62.288	-2.212	0.000	0.00		12.6	OK		

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for HIF - 6

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 5
 Number of Online Controls 4 Number of Time/Area Diagrams 0
 Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
 FEH Rainfall Version 2013
 Site Location GB 489026 242081 SP 89026 42081
 Data Type Point
 Cv (Summer) 0.950
 Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
 Analysis Timestep Fine Inertia Status ON
 DTS Status OFF

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440, 2880, 4320
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S600	15 Summer	100	+40%				
S1.001	S601	15 Summer	100	+40%				
S1.002	S602	30 Summer	100	+40%	5/15 Summer			
S1.003	S4	240 Winter	100	+40%	30/15 Summer			
S2.000	S5	15 Summer	100	+40%	100/15 Summer			
S2.001	S604	15 Summer	100	+40%	100/15 Summer	100/15 Summer		
S2.002	S7	240 Winter	100	+40%	30/15 Summer			
S1.004	S603	240 Winter	100	+40%	2/15 Summer			
S1.005	S605	15 Summer	100	+40%				
S1.006	S606	15 Summer	100	+40%	100/15 Summer			
S1.007	S607	15 Summer	100	+40%	100/15 Summer			
S1.008	S608	15 Summer	100	+40%				
S1.009	S610	15 Summer	100	+40%	100/15 Summer			
S1.010	S611	15 Summer	100	+40%	100/15 Summer			
S1.011	S612	15 Summer	100	+40%	100/15 Summer			
S1.012	S613	15 Summer	100	+40%	100/15 Summer			
S3.000	S614	15 Summer	100	+40%	100/15 Summer			

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for HIF - 6

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S600	74.245	-0.183	0.000	0.51	174.0	OK	
S1.001	S601	72.322	-0.182	0.000	0.51	172.8	OK	
S1.002	S602	72.154	0.612	0.000	0.32	39.1	SURCHARGED	
S1.003	S4	71.918	0.662	0.000	0.15	18.4	SURCHARGED	
S2.000	S5	73.381	0.681	0.000	0.79	98.5	FLOOD RISK	
S2.001	S604	72.904	0.901	1.117	1.43	237.1	FLOOD	1
S2.002	S7	71.918	0.441	0.000	0.37	42.5	SURCHARGED	
S1.004	S603	71.913	0.943	0.000	0.07	10.5	FLOOD RISK	
S1.005	S605	70.659	-0.085	0.000	0.59	152.7	OK	
S1.006	S606	70.577	0.111	0.000	1.04	251.9	SURCHARGED	
S1.007	S607	70.354	0.073	0.000	1.27	272.4	SURCHARGED	
S1.008	S608	69.957	-0.199	0.000	0.68	336.1	OK	
S1.009	S610	69.633	0.158	0.000	0.73	400.2	SURCHARGED	
S1.010	S611	69.268	0.610	0.000	0.81	462.7	SURCHARGED	
S1.011	S612	69.102	0.995	0.000	1.34	484.8	FLOOD RISK	
S1.012	S613	68.807	0.948	0.000	0.84	521.0	FLOOD RISK	
S3.000	S614	68.598	0.542	0.000	0.53	64.7	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for HIF - 6

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) SurchARGE	First (Y) Flood	First (Z) Overflow	Overflow Act.
S3.001	S615	15 Summer	100	+40%	100/15 Summer			
S4.000	S19	15 Summer	100	+40%	100/15 Summer			
S3.002	S616	15 Summer	100	+40%	100/15 Summer			
S1.013	S617	15 Summer	100	+40%	100/15 Summer			
S5.000	S618	30 Summer	100	+40%	100/15 Summer			
S5.001	S619	30 Summer	100	+40%	30/15 Summer			
S1.014	S620	30 Summer	100	+40%	30/15 Summer			
S6.000	S621	15 Summer	100	+40%	30/15 Summer	100/15 Summer		
S6.001	S622	120 Summer	100	+40%	30/15 Summer			
S1.015	S623	120 Summer	100	+40%	5/30 Summer			
S7.000	S624	15 Summer	100	+40%	30/15 Summer	100/15 Summer		
S7.001	S625	480 Winter	100	+40%	100/15 Summer			
S1.016	S626	480 Winter	100	+40%	30/240 Summer			
S8.000	S627	15 Summer	100	+40%	100/15 Summer			
S8.001	S628	960 Winter	100	+40%	2/360 Summer			
S1.017	S629	960 Winter	100	+40%	5/240 Summer			
S1.018	S630	60 Summer	100	+40%				
S1.019	S631	2880 Winter	100	+40%				
S1.020	S632	2880 Winter	100	+40%				
S1.021	S633	2880 Summer	100	+40%				

PN	US/MH Name	Water		Surcharged		Flooded		Pipe		Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap. (l/s)	Flow (l/s)	Status			
S3.001	S615	68.561	0.906	0.000	0.67	131.7	FLOOD RISK			
S4.000	S19	68.523	0.463	0.000	0.52	40.1	SURCHARGED			
S3.002	S616	68.423	1.166	0.000	0.91	159.0	FLOOD RISK			
S1.013	S617	68.384	1.174	0.000	1.02	809.5	FLOOD RISK			
S5.000	S618	66.480	0.494	0.000	0.10	8.2	SURCHARGED			
S5.001	S619	66.479	1.119	0.000	0.54	17.3	FLOOD RISK			
S1.014	S620	66.480	1.043	0.000	1.46	744.6	FLOOD RISK			
S6.000	S621	66.434	1.200	0.265	1.94	228.1	FLOOD		1	
S6.001	S622	65.684	0.826	0.000	0.51	95.0	SURCHARGED			
S1.015	S623	65.592	0.966	0.000	0.20	127.4	SURCHARGED			
S7.000	S624	65.836	1.202	1.815	1.83	206.5	FLOOD		2	
S7.001	S625	64.660	0.494	0.000	0.15	22.1	SURCHARGED			
S1.016	S626	64.658	0.642	0.000	0.24	113.9	SURCHARGED			
S8.000	S627	64.982	0.871	0.000	1.66	433.0	SURCHARGED			
S8.001	S628	64.599	0.959	0.000	0.02	5.2	FLOOD RISK			
S1.017	S629	64.599	0.947	0.000	0.07	12.6	SURCHARGED			
S1.018	S630	63.082	-1.898	0.000	0.00	12.6	OK			
S1.019	S631	62.727	-2.450	0.000	0.00	12.6	OK			
S1.020	S632	62.480	-2.520	0.000	0.00	12.6	OK			
S1.021	S633	62.288	-2.212	0.000	0.00	12.6	OK			



Drainage Technical Addendum

DATE:	20 July 2021	CONFIDENTIALITY:	Public
SUBJECT:	Drainage Technical Addendum		
PROJECT:	Milton Keynes East	AUTHOR:	DSF
CHECKED:	BU	APPROVED:	SP

HIF 7

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Date 20/07/2021 18:23

Designed by UKDSF001

File HIF 7 P0.2.MDX

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for HIF - 7

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	10
FEH Rainfall Version	2013
Site Location GB 489026 242081 SP 89026 42081	
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for HIF - 7

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.000	4-8	0.034	8-12	1.120	12-16	3.645	16-20	0.778

Total Area Contributing (ha) = 5.576

Total Pipe Volume (m³) = 12335.824

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Manhole Schedules for HIF - 7

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S701	75.415	1.500	Open Manhole	1200	S1.000	73.915	300				
S702	74.416	1.575	Open Manhole	1350	S1.001	72.841	375	S1.000	72.916	300	
S703	72.979	1.620	Open Manhole	1350	S1.002	71.359	375	S1.001	71.359	375	
S704	71.928	1.654	Open Manhole	1350	S1.003	70.274	450	S1.002	70.349	375	
S705	71.800	1.726	Open Manhole	1350	S1.004	70.074	450	S1.003	70.074	450	
S706	70.856	1.682	Open Manhole	1350	S1.005	69.174	450	S1.004	69.174	450	
S707	69.964	1.690	Open Manhole	1350	S1.006	68.274	450	S1.005	68.274	450	
S708	68.442	1.668	Open Manhole	1350	S1.007	66.774	450	S1.006	66.774	450	
S709	75.863	1.575	Open Manhole	1350	S2.000	74.288	375				
S710	75.242	1.671	Open Manhole	1350	S2.001	73.571	375	S2.000	73.571	375	
S711	75.004	1.733	Open Manhole	1350	S2.002	73.271	375	S2.001	73.271	375	
S712	73.253	1.682	Open Manhole	1350	S2.003	71.571	375	S2.002	71.571	375	
S713	73.360	2.129	Open Manhole	1350	S2.004	71.231	450	S2.003	71.306	375	
S714	71.082	1.651	Open Manhole	1350	S2.005	69.431	450	S2.004	69.431	450	
S715	69.641	1.710	Open Manhole	1350	S2.006	67.931	450	S2.005	67.931	450	
S716	68.211	1.802	Open Manhole	1500	S2.007	66.409	525	S2.006	66.484	450	
S717	67.595	1.877	Open Manhole	1500	S2.008	65.718	600	S2.007	65.793	525	
S718	68.044	1.500	Open Manhole	1200	S3.000	66.544	300				
S719	67.495	1.575	Open Manhole	1350	S3.001	65.920	375	S3.000	65.995	300	
S720	67.344	1.575	Open Manhole	1350	S3.002	65.769	375	S3.001	65.769	375	
S721	67.273	1.952	Open Manhole	1500	S2.009	65.321	600	S2.008	65.321	600	
								S3.002	65.546	375	
S722	67.420	2.136	Open Manhole	1500	S1.008	65.284	600	S1.007	65.434	450	
								S2.009	65.284	600	
S723	68.600	1.500	Open Manhole	1200	S4.000	67.100	300				
S724	68.036	1.650	Open Manhole	1350	S5.000	66.386	450				
S725	67.463	1.650	Open Manhole	1350	S5.001	65.813	450	S5.000	65.813	450	
S726	67.189	1.725	Open Manhole	1500	S5.002	65.464	525	S5.001	65.539	450	
S727	68.392	1.500	Open Manhole	1200	S6.000	66.892	300				
S728	68.005	1.575	Open Manhole	1350	S6.001	66.430	375	S6.000	66.505	300	
S729	67.579	1.575	Open Manhole	1350	S6.002	66.004	375	S6.001	66.004	375	
S730	67.286	2.136	Open Manhole	1500	S5.003	65.150	600	S5.002	65.225	525	
								S6.002	65.375	375	
S731	68.748	1.500	Open Manhole	1200	S7.000	67.248	300				
S732	68.441	1.500	Open Manhole	1200	S7.001	66.941	300	S7.000	66.941	300	
S733	68.176	1.500	Open Manhole	1200	S7.002	66.676	300	S7.001	66.676	300	
S734	68.540	2.053	Open Manhole	1350	S7.003	66.487	375	S7.002	66.562	300	
S735	68.378	2.207	Open Manhole	1350	S7.004	66.171	375	S7.003	66.171	375	

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Manhole Schedules for HIF - 7

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Back (mm)
S736	67.334	2.351	Open Manhole	1500	S5.004	64.983	600	S5.003	64.983	600	
								S7.004	65.208	375	
S737	66.979	2.139	Open Manhole	1500	S5.005	64.840	600	S5.004	64.840	600	
S738	66.892	2.154	Open Manhole	1500	S5.006	64.738	675	S5.005	64.813	600	
S739	66.761	2.161	Open Manhole	1500	S5.007	64.600	675	S5.006	64.600	675	
S740	66.711	2.250	Open Manhole	1500	S5.008	64.461	675	S5.007	64.461	675	
S741	66.838	2.489	Open Manhole	1500	S5.009	64.349	675	S5.008	64.349	675	
S742	66.998	2.714	Open Manhole	1500	S5.010	64.284	675	S5.009	64.284	675	
S743	67.242	3.016	Open Manhole	1500	S1.009	64.226	675	S1.008	64.301	600	
								S4.000	64.601	300	
								S5.010	64.226	675	
S744	64.813	1.994	Open Manhole	1800	S1.010	62.819	825	S1.009	62.969	675	
S747	65.782	3.353	Open Manhole	1800	S8.000	62.429	750				
S748	64.795	4.610	Open Manhole	1800	S1.011	60.185	900	S1.010	60.260	825	
								S8.000	60.336	750	
S749	64.671	4.799	Open Manhole	1800	S1.012	59.872	900	S1.011	59.872	900	
S750	64.202	5.153	Open Manhole	1800	S1.013	59.049	900	S1.012	59.049	900	
S751	61.786	3.121	Open Manhole	1800	S1.014	58.665	900	S1.013	58.665	900	
SHW752	60.915	2.526	Open Manhole	1800	S1.015	58.389	900	S1.014	58.389	900	
S754	62.298	1.575	Open Manhole	1500	S9.000	60.723	600				
S755	76.143	1.425	Open Manhole	1200	S10.000	74.718	225				
S756	76.209	1.425	Open Manhole	1200	S11.000	74.784	225				
S757	75.118	1.425	Open Manhole	1200	S11.001	73.693	225	S11.000	73.693	225	
S758	75.433	2.015	Open Manhole	1200	S10.001	73.418	300	S10.000	73.493	225	
								S11.001	73.493	225	
S759	74.898	1.705	Open Manhole	1350	S10.002	73.193	375	S10.001	73.268	300	
S760	71.690	1.780	Open Manhole	1500	S10.003	69.910	525	S10.002	69.985	375	
S761	71.087	2.312	Open Manhole	1800	S10.004	68.775	900	S10.003	69.225	525	
S762	68.695	2.141	Open Manhole	1800	S10.005	66.554	900	S10.004	66.554	900	
S763	65.491	2.141	Open Manhole	1800	S10.006	63.350	900	S10.005	63.350	900	
SPOND 15	60.044	2.530	Open Manhole	1800	S1.016	57.514	450	S1.015	58.113	900	
								S9.000	58.469	600	
								S10.006	58.054	900	
SFC765	59.768	2.414	Open Manhole	1350	S1.017	57.354	450	S1.016	57.354	450	
S766	76.323	2.050	Open Manhole	1500	S12.000	74.273	525				
S767	76.536	2.308	Open Manhole	1500	S12.001	74.228	525	S12.000	74.228	525	
S768	76.630	2.560	Open Manhole	1500	S12.002	74.070	525	S12.001	74.070	525	
S769	76.762	2.733	Open Manhole	1500	S12.003	74.029	525	S12.002	74.029	525	

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Manhole Schedules for HIF - 7

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Back (mm)
S770	77.233	3.294	Open Manhole	1500	S12.004	73.939	525	S12.003	73.939	525	
S771	77.257	1.575	Open Manhole	1350	S13.000	75.682	375				
S772	77.699	2.461	Open Manhole	1350	S13.001	75.238	375	S13.000	75.238	375	
S773	77.393	2.310	Open Manhole	1350	S13.002	75.083	375	S13.001	75.083	375	
S774	77.623	3.242	Open Manhole	1350	S13.003	74.381	375	S13.002	74.381	375	
S775	77.480	3.765	Open Manhole	1500	S12.005	73.715	525	S12.004	73.715	525	
								S13.003	73.790	375	
S776	73.989	1.725	Open Manhole	1800	S12.006	72.264	825	S12.005	72.264	525	
S777	73.324	1.725	Open Manhole	1800	S12.007	71.599	825	S12.006	71.599	825	
S778	72.767	1.725	Open Manhole	1800	S12.008	71.042	825	S12.007	71.042	825	
SHW779	72.463	1.725	Open Manhole	1800	S12.009	70.738	825	S12.008	70.738	825	
S782	73.032	1.650	Open Manhole	1800	S14.000	71.382	750				
SPOND 14	72.158	2.300	Open Manhole	1800	S12.010	69.858	300	S12.009	70.433	825	
								S14.000	70.508	750	
SFC784	72.200	2.585	Open Manhole	1350	S12.011	69.615	375	S12.010	69.690	300	
S785	72.200	2.952	Open Manhole	1500	S12.012	69.248	500	S12.011	69.248	375	
S786	61.832	1.211	Junction		S12.013	60.621	500	S12.012	60.621	500	
S787	59.664	2.470	Open Manhole	1050	S1.018	57.194	500	S1.017	57.194	450	
								S12.013	57.194	500	
S788	59.437	2.490	Open Manhole	1500	S1.019	56.947	525	S1.018	56.947	500	
SHW789	58.719	2.251	Open Manhole	1500	S1.020	56.468	450	S1.019	56.820	525	
S790	66.301	1.425	Open Manhole	1200	S15.000	64.876	225				
S791	65.759	1.425	Open Manhole	1200	S15.001	64.334	225	S15.000	64.334	225	
S792	65.217	1.425	Open Manhole	1200	S15.002	63.792	225	S15.001	63.792	225	
S793	64.639	1.425	Open Manhole	1200	S15.003	63.214	225	S15.002	63.214	225	
S794	63.979	1.425	Open Manhole	1200	S15.004	62.554	225	S15.003	62.554	225	
S795	63.594	1.575	Open Manhole	1350	S15.005	62.019	375	S15.004	62.169	225	
S796	62.643	1.575	Open Manhole	1350	S15.006	61.068	375	S15.005	61.068	375	
S797	61.950	1.575	Open Manhole	1350	S15.007	60.375	375	S15.006	60.375	375	
S798	61.550	1.650	Open Manhole	1350	S15.008	59.900	450	S15.007	59.975	375	
S799	61.946	2.152	Open Manhole	1350	S15.009	59.794	450	S15.008	59.794	450	
S7100	61.629	1.955	Open Manhole	1350	S15.010	59.674	450	S15.009	59.674	450	
S7101	61.604	2.014	Open Manhole	1350	S15.011	59.590	450	S15.010	59.590	450	
S7102	61.575	2.102	Open Manhole	1350	S15.012	59.473	450	S15.011	59.473	450	
S7103	61.263	1.907	Open Manhole	1350	S15.013	59.356	450	S15.012	59.356	450	
S7104	60.590	2.099	Open Manhole	1350	S15.014	58.491	450	S15.013	58.491	450	
S7105	59.500	1.765	Open Manhole	1350	S15.015	57.735	450	S15.014	57.735	450	
S7106	59.004	1.765	Open Manhole	1350	S15.016	57.239	450	S15.015	57.239	450	

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Manhole Schedules for HIF - 7

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Back (mm)
S7107	66.459	1.500	Open Manhole	1200	S16.000	64.959	300				
S7108	65.870	1.500	Open Manhole	1200	S16.001	64.370	300	S16.000	64.370	300	
S7109	65.282	1.500	Open Manhole	1200	S16.002	63.782	300	S16.001	63.782	300	
S7110	64.680	1.575	Open Manhole	1350	S16.003	63.105	375	S16.002	63.180	300	
S7111	64.104	1.575	Open Manhole	1350	S16.004	62.529	375	S16.003	62.529	375	
S7112	63.031	1.575	Open Manhole	1350	S16.005	61.456	375	S16.004	61.456	375	
S7113	62.307	1.575	Open Manhole	1350	S16.006	60.732	375	S16.005	60.732	375	
S7114	61.126	1.650	Open Manhole	1350	S16.007	59.476	450	S16.006	59.551	375	
S7115	60.623	2.149	Open Manhole	1350	S16.008	58.474	450	S16.007	58.474	450	
S7116	59.532	1.913	Open Manhole	1350	S16.009	57.619	450	S16.008	57.619	450	
S7117	59.489	2.407	Open Manhole	1350	S16.010	57.082	450	S16.009	57.082	450	
S7118	59.356	2.431	Open Manhole	1350	S16.011	56.925	450	S16.010	56.925	450	
S7119	58.973	2.226	Open Manhole	1350	S15.017	56.747	450	S15.016	56.747	450	
								S16.011	56.748	450	
SHW7120	58.487	2.218	Open Manhole	1500	S15.018	56.269	525	S15.017	56.344	450	
S7121	59.995	1.425	Open Manhole	1200	S17.000	58.570	225				
S7122	59.260	1.425	Open Manhole	1200	S17.001	57.835	225	S17.000	57.835	225	
S7123	58.427	1.500	Open Manhole	1200	S17.002	56.927	300	S17.001	57.002	225	
S7124	58.585	1.771	Open Manhole	1200	S17.003	56.814	300	S17.002	56.814	300	
S7125	58.621	2.006	Open Manhole	1200	S17.004	56.615	300	S17.003	56.615	300	
S7126	59.778	1.425	Open Manhole	1200	S18.000	58.353	225				
S7127	58.872	1.500	Open Manhole	1200	S18.001	57.372	300	S18.000	57.447	225	
S7128	58.688	1.500	Open Manhole	1200	S18.002	57.188	300	S18.001	57.188	300	
S7129	58.760	1.689	Open Manhole	1200	S18.003	57.071	300	S18.002	57.071	300	
S7130	58.811	1.930	Open Manhole	1200	S18.004	56.881	300	S18.003	56.881	300	
S7131	59.172	2.578	Open Manhole	1200	S18.005	56.594	300	S18.004	56.594	300	
S7132	58.724	2.406	Open Manhole	1350	S17.005	56.318	375	S17.004	56.393	300	
								S18.005	56.393	300	
SHW7133	58.362	2.310	Open Manhole	1500	S17.006	56.052	675	S17.005	56.052	375	
S7136	58.390	1.875	Open Manhole	1500	S19.000	56.515	675				
SPOND 16	58.000	2.100	Open Manhole	1500	S1.021	55.900	450	S1.020	56.197	450	
								S15.018	55.900	525	
								S17.006	55.900	675	
								S19.000	56.125	675	
SFC7138	58.056	2.362	Open Manhole	10000	S1.022	55.694	500	S1.021	55.694	450	
S7139	56.816	1.650	Junction		S1.023	55.166	500	S1.022	55.166	500	
S	56.835	1.796	Open Manhole	0		OUTFALL		S1.023	55.038	500	

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Area Summary for HIF - 7

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.025	0.025	0.025
	User	-	100	0.139	0.139	0.164
1.001	User	-	100	0.141	0.141	0.141
1.002	User	-	100	0.106	0.106	0.106
1.003	-	-	100	0.000	0.000	0.000
1.004	User	-	100	0.086	0.086	0.086
1.005	User	-	100	0.086	0.086	0.086
1.006	User	-	100	0.166	0.166	0.166
1.007	User	-	100	0.035	0.035	0.035
2.000	User	-	100	0.046	0.046	0.046
	User	-	100	0.101	0.101	0.148
2.001	-	-	100	0.000	0.000	0.000
2.002	User	-	100	0.158	0.158	0.158
2.003	-	-	100	0.000	0.000	0.000
2.004	User	-	100	0.178	0.178	0.178
2.005	User	-	100	0.141	0.141	0.141
2.006	User	-	100	0.134	0.134	0.134
2.007	User	-	100	0.049	0.049	0.049
2.008	User	-	100	0.034	0.034	0.034
3.000	User	-	100	0.069	0.069	0.069
3.001	User	-	100	0.035	0.035	0.035
3.002	User	-	100	0.038	0.038	0.038
2.009	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
4.000	User	-	100	0.076	0.076	0.076
5.000	User	-	100	0.068	0.068	0.068
5.001	User	-	100	0.043	0.043	0.043
5.002	User	-	100	0.056	0.056	0.056
6.000	User	-	100	0.116	0.116	0.116
6.001	User	-	100	0.094	0.094	0.094
6.002	User	-	100	0.069	0.069	0.069
5.003	-	-	100	0.000	0.000	0.000
7.000	User	-	100	0.106	0.106	0.106
7.001	User	-	100	0.047	0.047	0.047
7.002	-	-	100	0.000	0.000	0.000
7.003	User	-	100	0.059	0.059	0.059
7.004	User	-	100	0.080	0.080	0.080
5.004	User	-	100	0.075	0.075	0.075
5.005	User	-	100	0.061	0.061	0.061
5.006	User	-	100	0.048	0.048	0.048
5.007	-	-	100	0.000	0.000	0.000
5.008	User	-	100	0.056	0.056	0.056
5.009	User	-	100	0.048	0.048	0.048
5.010	User	-	100	0.025	0.025	0.025
	User	-	100	0.009	0.009	0.034
1.009	-	-	100	0.000	0.000	0.000
1.010	-	-	100	0.000	0.000	0.000
8.000	-	-	100	0.000	0.000	0.000
1.011	-	-	100	0.000	0.000	0.000
1.012	-	-	100	0.000	0.000	0.000
1.013	-	-	100	0.000	0.000	0.000

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Area Summary for HIF - 7

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.014	-	-	100	0.000	0.000	0.000
1.015	-	-	100	0.000	0.000	0.000
9.000	-	-	100	0.000	0.000	0.000
10.000	User	-	100	0.056	0.056	0.056
11.000	User	-	100	0.055	0.055	0.055
11.001	-	-	100	0.000	0.000	0.000
10.001	User	-	100	0.053	0.053	0.053
10.002	User	-	100	0.170	0.170	0.170
10.003	User	-	100	0.207	0.207	0.207
10.004	-	-	100	0.000	0.000	0.000
10.005	-	-	100	0.000	0.000	0.000
10.006	-	-	100	0.000	0.000	0.000
1.016	-	-	100	0.000	0.000	0.000
1.017	-	-	100	0.000	0.000	0.000
12.000	User	-	100	0.094	0.094	0.094
	User	-	100	0.082	0.082	0.176
12.001	User	-	100	0.043	0.043	0.043
	User	-	100	0.082	0.082	0.125
12.002	User	-	100	0.047	0.047	0.047
12.003	User	-	100	0.078	0.078	0.078
12.004	User	-	100	0.121	0.121	0.121
13.000	User	-	100	0.135	0.135	0.135
13.001	-	-	100	0.000	0.000	0.000
13.002	User	-	100	0.083	0.083	0.083
13.003	-	-	100	0.000	0.000	0.000
12.005	-	-	100	0.000	0.000	0.000
12.006	-	-	100	0.000	0.000	0.000
12.007	-	-	100	0.000	0.000	0.000
12.008	-	-	100	0.000	0.000	0.000
12.009	-	-	100	0.000	0.000	0.000
14.000	-	-	100	0.000	0.000	0.000
12.010	-	-	100	0.000	0.000	0.000
12.011	-	-	100	0.000	0.000	0.000
12.012	-	-	100	0.000	0.000	0.000
12.013	-	-	100	0.000	0.000	0.000
1.018	-	-	100	0.000	0.000	0.000
1.019	-	-	100	0.000	0.000	0.000
1.020	-	-	100	0.000	0.000	0.000
15.000	User	-	100	0.046	0.046	0.046
15.001	User	-	100	0.027	0.027	0.027
15.002	User	-	100	0.027	0.027	0.027
15.003	User	-	100	0.029	0.029	0.029
15.004	User	-	100	0.021	0.021	0.021
15.005	User	-	100	0.022	0.022	0.022
15.006	User	-	100	0.027	0.027	0.027
15.007	User	-	100	0.031	0.031	0.031
15.008	User	-	100	0.037	0.037	0.037
15.009	User	-	100	0.016	0.016	0.016
	User	-	100	0.010	0.010	0.026
15.010	User	-	100	0.049	0.049	0.049
15.011	User	-	100	0.042	0.042	0.042

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Area Summary for HIF - 7

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
15.012	User	-	100	0.031	0.031	0.031
15.013	User	-	100	0.053	0.053	0.053
15.014	User	-	100	0.063	0.063	0.063
15.015	User	-	100	0.069	0.069	0.069
15.016	User	-	100	0.024	0.024	0.024
16.000	User	-	100	0.040	0.040	0.040
16.001	User	-	100	0.028	0.028	0.028
16.002	User	-	100	0.029	0.029	0.029
16.003	User	-	100	0.032	0.032	0.032
16.004	User	-	100	0.061	0.061	0.061
16.005	User	-	100	0.049	0.049	0.049
16.006	User	-	100	0.012	0.012	0.012
	User	-	100	0.022	0.022	0.034
16.007	User	-	100	0.060	0.060	0.060
16.008	User	-	100	0.059	0.059	0.059
16.009	User	-	100	0.037	0.037	0.037
16.010	User	-	100	0.017	0.017	0.017
16.011	-	-	100	0.000	0.000	0.000
15.017	-	-	100	0.000	0.000	0.000
15.018	-	-	100	0.000	0.000	0.000
17.000	User	-	100	0.033	0.033	0.033
17.001	User	-	100	0.028	0.028	0.028
	User	-	100	0.003	0.003	0.030
17.002	User	-	100	0.011	0.011	0.011
	User	-	100	0.004	0.004	0.015
17.003	User	-	100	0.026	0.026	0.026
17.004	User	-	100	0.042	0.042	0.042
18.000	User	-	100	0.033	0.033	0.033
18.001	User	-	100	0.028	0.028	0.028
	User	-	100	0.003	0.003	0.031
18.002	User	-	100	0.011	0.011	0.011
	User	-	100	0.004	0.004	0.015
18.003	User	-	100	0.027	0.027	0.027
18.004	User	-	100	0.043	0.043	0.043
18.005	-	-	100	0.000	0.000	0.000
17.005	-	-	100	0.000	0.000	0.000
17.006	-	-	100	0.000	0.000	0.000
19.000	-	-	100	0.000	0.000	0.000
1.021	-	-	100	0.000	0.000	0.000
1.022	-	-	100	0.000	0.000	0.000
1.023	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				5.576	5.576	5.576

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Free Flowing Outfall Details for HIF - 7

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
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S1.023	S	56.835	55.038	0.000	0	0
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Simulation Criteria for HIF - 7

Volumetric Runoff Coeff	0.950	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	0.000
Hot Start (mins)	0	Inlet Coefficient	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 Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	2
FEH Rainfall Version	2013
Site Location	GB 489026 242081 SP 89026 42081
Data Type	Point
Summer Storms	Yes
Winter Storms	No
Cv (Summer)	0.950
Cv (Winter)	0.840
Storm Duration (mins)	30

Online Controls for HIF - 7

Hydro-Brake® Optimum Manhole: SPOND 15, DS/PN: S1.016, Volume (m³): 172.7

Unit Reference	MD-SHE-0154-1380-2000-1380
Design Head (m)	2.000
Design Flow (l/s)	13.8
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	154
Invert Level (m)	57.514
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	13.8
Flush-Flo™	0.584	13.7
Kick-Flo®	1.211	10.9
Mean Flow over Head Range	-	12.0

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.5	1.200	11.0	3.000	16.7	7.000	25.1
0.200	11.4	1.400	11.6	3.500	18.0	7.500	25.9
0.300	12.7	1.600	12.4	4.000	19.2	8.000	26.7
0.400	13.4	1.800	13.1	4.500	20.3	8.500	27.5
0.500	13.6	2.000	13.8	5.000	21.3	9.000	28.3
0.600	13.7	2.200	14.4	5.500	22.3	9.500	29.0
0.800	13.5	2.400	15.0	6.000	23.3		
1.000	12.7	2.600	15.6	6.500	24.2		

Hydro-Brake® Optimum Manhole: SPOND 14, DS/PN: S12.010, Volume (m³): 52.0

Unit Reference	MD-SHE-0084-4000-1800-4000
Design Head (m)	1.800
Design Flow (l/s)	4.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	84
Invert Level (m)	69.858
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

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Hydro-Brake® Optimum Manhole: SPOND 14, DS/PN: S12.010, Volume (m³): 52.0

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.800	4.0
Flush-Flo™	0.363	3.3
Kick-Flo®	0.745	2.7
Mean Flow over Head Range	-	3.2

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.5	1.200	3.3	3.000	5.1	7.000	7.6
0.200	3.1	1.400	3.6	3.500	5.4	7.500	7.8
0.300	3.3	1.600	3.8	4.000	5.8	8.000	8.0
0.400	3.3	1.800	4.0	4.500	6.1	8.500	8.3
0.500	3.3	2.000	4.2	5.000	6.4	9.000	8.5
0.600	3.1	2.200	4.4	5.500	6.7	9.500	8.7
0.800	2.8	2.400	4.6	6.000	7.0		
1.000	3.0	2.600	4.7	6.500	7.3		

Hydro-Brake® Optimum Manhole: SPOND 16, DS/PN: S1.021, Volume (m³): 100.8

Unit Reference	MD-SHE-0197-2230-1800-2230
Design Head (m)	1.800
Design Flow (l/s)	22.3
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	197
Invert Level (m)	55.900
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.800	22.3
Flush-Flo™	0.521	22.3
Kick-Flo®	1.132	17.9
Mean Flow over Head Range	-	19.3

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	6.8	0.300	21.1	0.500	22.3	0.800	21.6
0.200	18.4	0.400	22.0	0.600	22.2	1.000	20.1

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Hydro-Brake® Optimum Manhole: SPOND 16, DS/PN: S1.021, Volume (m³): 100.8

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
1.200	18.4	2.400	25.6	5.000	36.4	8.000	45.7
1.400	19.8	2.600	26.6	5.500	38.1	8.500	47.1
1.600	21.1	3.000	28.5	6.000	39.8	9.000	48.4
1.800	22.3	3.500	30.7	6.500	41.3	9.500	49.7
2.000	23.5	4.000	32.7	7.000	42.8		
2.200	24.5	4.500	34.6	7.500	44.3		

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Storage Structures for HIF - 7

Tank or Pond Manhole: SPOND 15, DS/PN: S1.016

Invert Level (m) 57.514

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	2050.0	2.500	4860.0

Tank or Pond Manhole: SPOND 14, DS/PN: S12.010

Invert Level (m) 69.858

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	90.0	2.300	840.0

Tank or Pond Manhole: SPOND 16, DS/PN: S1.021

Invert Level (m) 55.900

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	350.0	2.100	910.0

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S701	15 Summer	2	+0%	100/15 Summer				74.009
S1.001	S702	15 Summer	2	+0%	100/15 Summer				72.961
S1.002	S703	15 Summer	2	+0%	100/15 Summer				71.500
S1.003	S704	15 Summer	2	+0%	100/15 Summer				70.439
S1.004	S705	15 Summer	2	+0%	100/15 Summer				70.216
S1.005	S706	15 Summer	2	+0%	100/15 Summer				69.325
S1.006	S707	15 Summer	2	+0%	100/15 Summer				68.442
S1.007	S708	15 Summer	2	+0%	100/15 Summer				66.938
S2.000	S709	15 Summer	2	+0%					74.372
S2.001	S710	15 Summer	2	+0%					73.664
S2.002	S711	15 Summer	2	+0%	100/15 Summer				73.389
S2.003	S712	15 Summer	2	+0%	100/15 Summer				71.706
S2.004	S713	15 Summer	2	+0%	100/15 Summer				71.369
S2.005	S714	15 Summer	2	+0%	100/15 Summer				69.581
S2.006	S715	15 Summer	2	+0%	100/15 Summer				68.102
S2.007	S716	15 Summer	2	+0%	100/15 Summer				66.577
S2.008	S717	15 Summer	2	+0%	100/15 Summer				65.908

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Pipe	Level Exceeded
		Depth (m)	Volume (m ³)			Flow (l/s)	
S1.000	S701	-0.206	0.000	0.21		33.1	OK
S1.001	S702	-0.255	0.000	0.22		56.5	OK
S1.002	S703	-0.234	0.000	0.30		73.9	OK
S1.003	S704	-0.285	0.000	0.29		73.7	OK
S1.004	S705	-0.308	0.000	0.21		86.8	OK
S1.005	S706	-0.299	0.000	0.24		99.4	OK
S1.006	S707	-0.282	0.000	0.29		124.8	OK
S1.007	S708	-0.286	0.000	0.28		130.1	OK
S2.000	S709	-0.291	0.000	0.11		30.0	OK
S2.001	S710	-0.282	0.000	0.14		29.8	OK
S2.002	S711	-0.257	0.000	0.21		56.2	OK
S2.003	S712	-0.240	0.000	0.28		56.3	OK
S2.004	S713	-0.312	0.000	0.20		84.3	OK
S2.005	S714	-0.300	0.000	0.24		104.9	OK
S2.006	S715	-0.279	0.000	0.30		125.5	OK
S2.007	S716	-0.357	0.000	0.22		132.8	OK
S2.008	S717	-0.410	0.000	0.22		137.9	OK

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S3.000	S718	15 Summer	2	+0%	100/15 Summer			
S3.001	S719	15 Summer	2	+0%	100/15 Summer			
S3.002	S720	15 Summer	2	+0%	30/15 Summer			
S2.009	S721	15 Summer	2	+0%	30/15 Summer			
S1.008	S722	15 Summer	2	+0%	100/15 Summer			
S4.000	S723	15 Summer	2	+0%				
S5.000	S724	15 Summer	2	+0%	100/15 Summer			
S5.001	S725	15 Summer	2	+0%	100/15 Summer			
S5.002	S726	15 Summer	2	+0%	100/15 Summer			
S6.000	S727	15 Summer	2	+0%	100/15 Summer			
S6.001	S728	15 Summer	2	+0%	100/15 Summer			
S6.002	S729	15 Summer	2	+0%	100/15 Summer			
S5.003	S730	15 Summer	2	+0%	100/15 Summer			
S7.000	S731	15 Summer	2	+0%	100/15 Summer			
S7.001	S732	15 Summer	2	+0%	100/15 Summer			
S7.002	S733	15 Summer	2	+0%	100/15 Summer			
S7.003	S734	15 Summer	2	+0%	100/15 Summer			
S7.004	S735	15 Summer	2	+0%	100/15 Summer			
S5.004	S736	15 Summer	2	+0%	30/15 Summer			
S5.005	S737	15 Summer	2	+0%	30/15 Summer			
S5.006	S738	15 Summer	2	+0%	100/15 Summer			
S5.007	S739	15 Summer	2	+0%	100/15 Summer			
S5.008	S740	15 Summer	2	+0%	100/15 Summer			
S5.009	S741	15 Summer	2	+0%	100/15 Summer			
S5.010	S742	15 Summer	2	+0%	100/15 Summer			
S1.009	S743	15 Summer	2	+0%	100/15 Summer			
S1.010	S744	15 Summer	2	+0%				
S8.000	S747	120 Winter	2	+0%				
S1.011	S748	15 Summer	2	+0%	100/15 Summer			
S1.012	S749	15 Summer	2	+0%	100/15 Summer			
S1.013	S750	15 Summer	2	+0%	100/15 Summer			
S1.014	S751	15 Summer	2	+0%	100/15 Summer			
S1.015	SHW752	15 Summer	2	+0%	100/15 Summer			
S9.000	S754	120 Winter	2	+0%				
S10.000	S755	15 Summer	2	+0%				
S11.000	S756	15 Summer	2	+0%				
S11.001	S757	15 Summer	2	+0%	100/15 Summer			
S10.001	S758	15 Summer	2	+0%	100/15 Summer			
S10.002	S759	15 Summer	2	+0%				
S10.003	S760	15 Summer	2	+0%	100/15 Summer			
S10.004	S761	15 Summer	2	+0%				
S10.005	S762	15 Summer	2	+0%				
S10.006	S763	15 Summer	2	+0%				
S1.016	SPOND 15	480 Winter	2	+0%	30/60 Summer			
S1.017	SFC765	480 Winter	2	+0%				
S12.000	S766	15 Summer	2	+0%	100/15 Summer			
S12.001	S767	15 Summer	2	+0%	100/15 Summer			
S12.002	S768	15 Summer	2	+0%	100/15 Summer			

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

PN	US/MH Name	Water Surcharged Flooded			Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)					
S3.000	S718	66.607	-0.237	0.000	0.10	14.1	OK		
S3.001	S719	66.011	-0.284	0.000	0.13	20.1	OK		
S3.002	S720	65.864	-0.280	0.000	0.14	26.5	OK		
S2.009	S721	65.739	-0.182	0.000	0.82	159.3	OK		
S1.008	S722	65.505	-0.379	0.000	0.29	287.2	OK		
S4.000	S723	67.151	-0.249	0.000	0.07	15.4	OK		
S5.000	S724	66.439	-0.397	0.000	0.03	13.8	OK		
S5.001	S725	65.892	-0.371	0.000	0.07	21.1	OK		
S5.002	S726	65.565	-0.424	0.000	0.08	30.5	OK		
S6.000	S727	67.003	-0.189	0.000	0.28	22.9	OK		
S6.001	S728	66.554	-0.251	0.000	0.23	37.9	OK		
S6.002	S729	66.122	-0.257	0.000	0.21	48.9	OK		
S5.003	S730	65.341	-0.409	0.000	0.19	78.4	OK		
S7.000	S731	67.358	-0.190	0.000	0.28	20.8	OK		
S7.001	S732	67.050	-0.191	0.000	0.28	28.4	OK		
S7.002	S733	66.796	-0.180	0.000	0.33	28.2	OK		
S7.003	S734	66.604	-0.258	0.000	0.21	37.2	OK		
S7.004	S735	66.281	-0.264	0.000	0.19	49.7	OK		
S5.004	S736	65.280	-0.303	0.000	0.36	136.3	OK		
S5.005	S737	65.233	-0.207	0.000	0.75	142.6	OK		
S5.006	S738	65.000	-0.413	0.000	0.32	149.7	OK		
S5.007	S739	64.861	-0.414	0.000	0.32	150.2	OK		
S5.008	S740	64.731	-0.406	0.000	0.34	156.6	OK		
S5.009	S741	64.652	-0.371	0.000	0.41	161.6	OK		
S5.010	S742	64.587	-0.372	0.000	0.41	166.2	OK		
S1.009	S743	64.517	-0.384	0.000	0.39	455.9	OK		
S1.010	S744	63.068	-0.577	0.000	0.20	451.9	OK		
S8.000	S747	62.429	-0.750	0.000	0.00	0.0	OK		
S1.011	S748	60.559	-0.527	0.000	0.36	454.1	OK		
S1.012	S749	60.194	-0.578	0.000	0.27	446.3	OK		
S1.013	S750	59.398	-0.550	0.000	0.32	447.3	OK		
S1.014	S751	59.048	-0.518	0.000	0.37	443.9	OK		
S1.015	SHW752	58.798	-0.492	0.000	0.43	443.0	OK		
S9.000	S754	60.723	-0.600	0.000	0.00	0.0	OK		
S10.000	S755	74.772	-0.171	0.000	0.13	11.4	OK		
S11.000	S756	74.841	-0.168	0.000	0.14	11.1	OK		
S11.001	S757	73.759	-0.159	0.000	0.18	11.2	OK		
S10.001	S758	73.551	-0.167	0.000	0.40	31.5	OK		
S10.002	S759	73.295	-0.273	0.000	0.16	59.8	OK		
S10.003	S760	70.090	-0.345	0.000	0.25	93.9	OK		
S10.004	S761	68.897	-0.778	0.000	0.04	91.5	OK		
S10.005	S762	66.661	-0.793	0.000	0.03	90.9	OK		
S10.006	S763	63.445	-0.805	0.000	0.02	90.7	OK		
S1.016	SPOND 15	57.846	-0.118	0.000	0.06	13.0	OK		
S1.017	SFC765	57.423	-0.381	0.000	0.06	13.0	OK		
S12.000	S766	74.446	-0.352	0.000	0.22	35.1	OK		
S12.001	S767	74.381	-0.372	0.000	0.18	56.4	OK		

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

PN	US/MH Name	Water Surcharged			Flooded		Pipe		Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status	
S12.002	S768	74.303	-0.292	0.000	0.39		63.4	OK	

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S12.003	S769	15 Summer	2	+0%	100/15	Summer		
S12.004	S770	15 Summer	2	+0%	100/15	Summer		
S13.000	S771	15 Summer	2	+0%				
S13.001	S772	15 Summer	2	+0%				
S13.002	S773	15 Summer	2	+0%				
S13.003	S774	15 Summer	2	+0%				
S12.005	S775	15 Summer	2	+0%				
S12.006	S776	15 Summer	2	+0%				
S12.007	S777	15 Summer	2	+0%				
S12.008	S778	15 Summer	2	+0%				
S12.009	SHW779	15 Summer	2	+0%	100/240	Summer		
S14.000	S782	120 Winter	2	+0%				
S12.010	SPOND 14	360 Winter	2	+0%	2/15	Summer		
S12.011	SFC784	1440 Summer	2	+0%				
S12.012	S785	1440 Winter	2	+0%				
S12.013	S786	2880 Summer	2	+0%				
S1.018	S787	360 Winter	2	+0%				
S1.019	S788	360 Winter	2	+0%	100/240	Summer		
S1.020	SHW789	360 Winter	2	+0%	100/30	Summer		
S15.000	S790	15 Summer	2	+0%	100/15	Summer		
S15.001	S791	15 Summer	2	+0%	100/15	Summer		
S15.002	S792	15 Summer	2	+0%	100/15	Summer		
S15.003	S793	15 Summer	2	+0%	100/15	Summer		
S15.004	S794	15 Summer	2	+0%	30/15	Summer		
S15.005	S795	15 Summer	2	+0%				
S15.006	S796	15 Summer	2	+0%				
S15.007	S797	15 Summer	2	+0%	100/15	Summer		
S15.008	S798	15 Summer	2	+0%	100/15	Summer		
S15.009	S799	15 Summer	2	+0%	100/15	Summer		
S15.010	S7100	15 Summer	2	+0%	100/15	Summer		
S15.011	S7101	15 Summer	2	+0%	100/15	Summer		
S15.012	S7102	15 Summer	2	+0%	100/15	Summer		
S15.013	S7103	15 Summer	2	+0%	100/15	Summer		
S15.014	S7104	15 Summer	2	+0%	100/15	Summer		
S15.015	S7105	15 Summer	2	+0%	100/15	Summer		
S15.016	S7106	15 Summer	2	+0%	100/15	Summer		
S16.000	S7107	15 Summer	2	+0%				
S16.001	S7108	15 Summer	2	+0%				
S16.002	S7109	15 Summer	2	+0%				
S16.003	S7110	15 Summer	2	+0%				
S16.004	S7111	15 Summer	2	+0%				
S16.005	S7112	15 Summer	2	+0%				
S16.006	S7113	15 Summer	2	+0%				
S16.007	S7114	15 Summer	2	+0%				
S16.008	S7115	15 Summer	2	+0%	100/15	Summer		
S16.009	S7116	15 Summer	2	+0%	100/15	Summer		
S16.010	S7117	15 Summer	2	+0%	100/15	Summer		
S16.011	S7118	15 Summer	2	+0%	30/15	Summer		

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S12.003	S769	74.256	-0.298	0.000	0.36		74.2	OK	
S12.004	S770	74.157	-0.307	0.000	0.35		88.2	OK	
S13.000	S771	75.774	-0.283	0.000	0.14		27.3	OK	
S13.001	S772	75.345	-0.268	0.000	0.18		27.3	OK	
S13.002	S773	75.197	-0.261	0.000	0.20		41.1	OK	
S13.003	S774	74.473	-0.283	0.000	0.14		41.1	OK	
S12.005	S775	73.855	-0.385	0.000	0.16		124.3	OK	
S12.006	S776	72.438	-0.651	0.000	0.10		123.3	OK	
S12.007	S777	71.783	-0.641	0.000	0.11		120.7	OK	
S12.008	S778	71.228	-0.639	0.000	0.11		119.7	OK	
S12.009	SHW779	70.923	-0.640	0.000	0.11		120.2	OK	
S14.000	S782	71.382	-0.750	0.000	0.00		0.0	OK	
S12.010	SPOND 14	70.675	0.517	0.000	0.04		3.3	SURCHARGED	
S12.011	SFC784	69.654	-0.336	0.000	0.02		3.3	OK	
S12.012	S785	69.251	-2.949	0.000	0.00		3.3	OK	
S12.013	S786	60.626	-1.206	0.000	0.00		3.3	OK	
S1.018	S787	57.232	-2.432	0.000	0.00		15.7	OK	
S1.019	S788	57.042	-0.430	0.000	0.08		15.7	OK	
S1.020	SHW789	56.562	-0.356	0.000	0.10		15.7	OK	
S15.000	S790	64.930	-0.171	0.000	0.13		9.4	OK	
S15.001	S791	64.403	-0.156	0.000	0.21		13.9	OK	
S15.002	S792	63.871	-0.146	0.000	0.26		18.3	OK	
S15.003	S793	63.304	-0.135	0.000	0.33		23.3	OK	
S15.004	S794	62.654	-0.125	0.000	0.40		26.8	OK	
S15.005	S795	62.090	-0.304	0.000	0.08		30.5	OK	
S15.006	S796	61.150	-0.293	0.000	0.11		34.9	OK	
S15.007	S797	60.476	-0.274	0.000	0.16		39.9	OK	
S15.008	S798	60.052	-0.298	0.000	0.25		45.6	OK	
S15.009	S799	59.950	-0.294	0.000	0.26		49.3	OK	
S15.010	S7100	59.855	-0.270	0.000	0.34		56.8	OK	
S15.011	S7101	59.767	-0.273	0.000	0.33		62.1	OK	
S15.012	S7102	59.668	-0.255	0.000	0.39		65.9	OK	
S15.013	S7103	59.497	-0.309	0.000	0.21		71.2	OK	
S15.014	S7104	58.657	-0.285	0.000	0.28		76.6	OK	
S15.015	S7105	57.934	-0.251	0.000	0.38		80.1	OK	
S15.016	S7106	57.387	-0.302	0.000	0.24		82.2	OK	
S16.000	S7107	65.006	-0.253	0.000	0.06		8.0	OK	
S16.001	S7108	64.430	-0.240	0.000	0.09		12.7	OK	
S16.002	S7109	63.853	-0.229	0.000	0.13		17.7	OK	
S16.003	S7110	63.182	-0.298	0.000	0.09		23.0	OK	
S16.004	S7111	62.620	-0.284	0.000	0.13		33.4	OK	
S16.005	S7112	61.544	-0.287	0.000	0.12		41.5	OK	
S16.006	S7113	60.820	-0.287	0.000	0.12		47.2	OK	
S16.007	S7114	59.599	-0.327	0.000	0.16		56.0	OK	
S16.008	S7115	58.619	-0.305	0.000	0.22		63.4	OK	
S16.009	S7116	57.792	-0.277	0.000	0.29		64.1	OK	
S16.010	S7117	57.262	-0.270	0.000	0.34		66.1	OK	

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S16.011	S7118	57.086	-0.289	0.000	0.28		65.6	OK	

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S15.017	S7119	15 Summer	2	+0%	30/15 Summer			
S15.018	SHW7120	15 Summer	2	+0%	30/15 Summer			
S17.000	S7121	15 Summer	2	+0%				
S17.001	S7122	15 Summer	2	+0%	100/15 Summer			
S17.002	S7123	15 Summer	2	+0%	100/15 Summer			
S17.003	S7124	15 Summer	2	+0%	100/15 Summer			
S17.004	S7125	15 Summer	2	+0%	100/15 Summer			
S18.000	S7126	15 Summer	2	+0%				
S18.001	S7127	15 Summer	2	+0%	100/15 Summer			
S18.002	S7128	15 Summer	2	+0%	100/15 Summer			
S18.003	S7129	15 Summer	2	+0%	100/15 Summer			
S18.004	S7130	15 Summer	2	+0%	100/15 Summer			
S18.005	S7131	15 Summer	2	+0%	30/480 Summer			
S17.005	S7132	15 Summer	2	+0%	30/120 Summer			
S17.006	SHW7133	360 Summer	2	+0%	30/120 Summer			
S19.000	S7136	120 Winter	2	+0%	100/120 Summer			
S1.021	SPOND 16	360 Summer	2	+0%	2/240 Summer			
S1.022	SFC7138	480 Summer	2	+0%				
S1.023	S7139	240 Summer	2	+0%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S15.017	S7119	56.959	-0.238	0.000	0.45		146.0	OK	
S15.018	SHW7120	56.537	-0.257	0.000	0.50		142.4	OK	
S17.000	S7121	58.617	-0.178	0.000	0.10		6.6	OK	
S17.001	S7122	57.899	-0.161	0.000	0.17		11.7	OK	
S17.002	S7123	57.034	-0.193	0.000	0.26		13.7	OK	
S17.003	S7124	56.931	-0.183	0.000	0.30		16.0	OK	
S17.004	S7125	56.753	-0.162	0.000	0.41		19.5	OK	
S18.000	S7126	58.399	-0.179	0.000	0.09		6.7	OK	
S18.001	S7127	57.459	-0.213	0.000	0.18		11.7	OK	
S18.002	S7128	57.293	-0.195	0.000	0.26		13.5	OK	
S18.003	S7129	57.187	-0.184	0.000	0.30		15.9	OK	
S18.004	S7130	57.008	-0.173	0.000	0.35		18.8	OK	
S18.005	S7131	56.675	-0.218	0.000	0.17		18.8	OK	
S17.005	S7132	56.444	-0.248	0.000	0.25		38.0	OK	
S17.006	SHW7133	56.408	-0.319	0.000	0.04		12.6	OK	
S19.000	S7136	56.515	-0.675	0.000	0.00		0.0	OK	
S1.021	SPOND 16	56.408	0.058	0.000	0.09		22.2	SURCHARGED	
S1.022	SFC7138	55.758	-2.298	0.000	0.00		22.2	OK	
S1.023	S7139	55.258	-1.558	0.000	0.00		22.2	OK	

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) SurchARGE	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S701	15 Summer	5	+0%	100/15 Summer				74.025
S1.001	S702	15 Summer	5	+0%	100/15 Summer				72.981
S1.002	S703	15 Summer	5	+0%	100/15 Summer				71.526
S1.003	S704	15 Summer	5	+0%	100/15 Summer				70.469
S1.004	S705	15 Summer	5	+0%	100/15 Summer				70.239
S1.005	S706	15 Summer	5	+0%	100/15 Summer				69.352
S1.006	S707	15 Summer	5	+0%	100/15 Summer				68.472
S1.007	S708	15 Summer	5	+0%	100/15 Summer				66.967
S2.000	S709	15 Summer	5	+0%					74.386
S2.001	S710	15 Summer	5	+0%					73.681
S2.002	S711	15 Summer	5	+0%	100/15 Summer				73.408
S2.003	S712	15 Summer	5	+0%	100/15 Summer				71.730
S2.004	S713	15 Summer	5	+0%	100/15 Summer				71.392
S2.005	S714	15 Summer	5	+0%	100/15 Summer				69.608
S2.006	S715	15 Summer	5	+0%	100/15 Summer				68.132
S2.007	S716	15 Summer	5	+0%	100/15 Summer				66.606
S2.008	S717	15 Summer	5	+0%	100/15 Summer				65.960

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Pipe	Level Exceeded
		Depth (m)	Volume (m ³)			Flow (l/s)	
S1.000	S701	-0.190	0.000	0.29		44.5	OK
S1.001	S702	-0.235	0.000	0.29		75.8	OK
S1.002	S703	-0.208	0.000	0.40		99.1	OK
S1.003	S704	-0.255	0.000	0.39		98.8	OK
S1.004	S705	-0.285	0.000	0.29		116.5	OK
S1.005	S706	-0.272	0.000	0.32		133.3	OK
S1.006	S707	-0.252	0.000	0.39		167.4	OK
S1.007	S708	-0.257	0.000	0.38		174.6	OK
S2.000	S709	-0.277	0.000	0.15		40.3	OK
S2.001	S710	-0.265	0.000	0.19		39.9	OK
S2.002	S711	-0.238	0.000	0.28		75.4	OK
S2.003	S712	-0.216	0.000	0.38		75.6	OK
S2.004	S713	-0.289	0.000	0.27		113.1	OK
S2.005	S714	-0.273	0.000	0.32		140.9	OK
S2.006	S715	-0.249	0.000	0.40		168.4	OK
S2.007	S716	-0.328	0.000	0.30		178.3	OK
S2.008	S717	-0.358	0.000	0.29		183.5	OK

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S3.000	S718	15 Summer	5	+0%	100/15 Summer			
S3.001	S719	15 Summer	5	+0%	100/15 Summer			
S3.002	S720	15 Summer	5	+0%	30/15 Summer			
S2.009	S721	15 Summer	5	+0%	30/15 Summer			
S1.008	S722	15 Summer	5	+0%	100/15 Summer			
S4.000	S723	15 Summer	5	+0%				
S5.000	S724	15 Summer	5	+0%	100/15 Summer			
S5.001	S725	15 Summer	5	+0%	100/15 Summer			
S5.002	S726	15 Summer	5	+0%	100/15 Summer			
S6.000	S727	15 Summer	5	+0%	100/15 Summer			
S6.001	S728	15 Summer	5	+0%	100/15 Summer			
S6.002	S729	15 Summer	5	+0%	100/15 Summer			
S5.003	S730	15 Summer	5	+0%	100/15 Summer			
S7.000	S731	15 Summer	5	+0%	100/15 Summer			
S7.001	S732	15 Summer	5	+0%	100/15 Summer			
S7.002	S733	15 Summer	5	+0%	100/15 Summer			
S7.003	S734	15 Summer	5	+0%	100/15 Summer			
S7.004	S735	15 Summer	5	+0%	100/15 Summer			
S5.004	S736	15 Summer	5	+0%	30/15 Summer			
S5.005	S737	15 Summer	5	+0%	30/15 Summer			
S5.006	S738	15 Summer	5	+0%	100/15 Summer			
S5.007	S739	15 Summer	5	+0%	100/15 Summer			
S5.008	S740	15 Summer	5	+0%	100/15 Summer			
S5.009	S741	15 Summer	5	+0%	100/15 Summer			
S5.010	S742	15 Summer	5	+0%	100/15 Summer			
S1.009	S743	15 Summer	5	+0%	100/15 Summer			
S1.010	S744	15 Summer	5	+0%				
S8.000	S747	120 Winter	5	+0%				
S1.011	S748	15 Summer	5	+0%	100/15 Summer			
S1.012	S749	15 Summer	5	+0%	100/15 Summer			
S1.013	S750	15 Summer	5	+0%	100/15 Summer			
S1.014	S751	15 Summer	5	+0%	100/15 Summer			
S1.015	SHW752	15 Summer	5	+0%	100/15 Summer			
S9.000	S754	120 Winter	5	+0%				
S10.000	S755	15 Summer	5	+0%				
S11.000	S756	15 Summer	5	+0%				
S11.001	S757	15 Summer	5	+0%	100/15 Summer			
S10.001	S758	15 Summer	5	+0%	100/15 Summer			
S10.002	S759	15 Summer	5	+0%				
S10.003	S760	15 Summer	5	+0%	100/15 Summer			
S10.004	S761	15 Summer	5	+0%				
S10.005	S762	15 Summer	5	+0%				
S10.006	S763	15 Summer	5	+0%				
S1.016	SPOND 15	480 Winter	5	+0%	30/60 Summer			
S1.017	SFC765	480 Winter	5	+0%				
S12.000	S766	15 Summer	5	+0%	100/15 Summer			
S12.001	S767	15 Summer	5	+0%	100/15 Summer			
S12.002	S768	15 Summer	5	+0%	100/15 Summer			

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

PN	US/MH Name	Water Surcharged Flooded			Flow / Cap.	Overflow (1/s)	Pipe Flow (1/s)	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)					
S3.000	S718	66.616	-0.228	0.000	0.13	19.0	OK		
S3.001	S719	66.027	-0.268	0.000	0.18	26.9	OK		
S3.002	S720	65.938	-0.206	0.000	0.19	35.5	OK		
S2.009	S721	65.921	0.000	0.000	1.06	205.5	OK		
S1.008	S722	65.540	-0.344	0.000	0.38	375.7	OK		
S4.000	S723	67.161	-0.239	0.000	0.09	20.6	OK		
S5.000	S724	66.447	-0.389	0.000	0.04	18.5	OK		
S5.001	S725	65.907	-0.356	0.000	0.10	28.3	OK		
S5.002	S726	65.580	-0.409	0.000	0.11	41.0	OK		
S6.000	S727	67.022	-0.170	0.000	0.38	30.4	OK		
S6.001	S728	66.576	-0.229	0.000	0.31	50.4	OK		
S6.002	S729	66.141	-0.238	0.000	0.28	64.9	OK		
S5.003	S730	65.399	-0.351	0.000	0.25	102.5	OK		
S7.000	S731	67.378	-0.170	0.000	0.37	27.9	OK		
S7.001	S732	67.070	-0.171	0.000	0.38	38.1	OK		
S7.002	S733	66.817	-0.159	0.000	0.45	37.8	OK		
S7.003	S734	66.624	-0.238	0.000	0.28	49.8	OK		
S7.004	S735	66.299	-0.246	0.000	0.25	66.1	OK		
S5.004	S736	65.365	-0.218	0.000	0.47	178.3	OK		
S5.005	S737	65.319	-0.121	0.000	0.99	187.5	OK		
S5.006	S738	65.043	-0.370	0.000	0.42	196.6	OK		
S5.007	S739	64.903	-0.372	0.000	0.42	196.9	OK		
S5.008	S740	64.775	-0.362	0.000	0.44	205.5	OK		
S5.009	S741	64.706	-0.318	0.000	0.55	212.5	OK		
S5.010	S742	64.641	-0.319	0.000	0.55	218.5	OK		
S1.009	S743	64.567	-0.334	0.000	0.51	595.2	OK		
S1.010	S744	63.105	-0.540	0.000	0.26	594.1	OK		
S8.000	S747	62.429	-0.750	0.000	0.00	0.0	OK		
S1.011	S748	60.621	-0.465	0.000	0.47	596.1	OK		
S1.012	S749	60.247	-0.525	0.000	0.36	587.7	OK		
S1.013	S750	59.455	-0.494	0.000	0.42	586.4	OK		
S1.014	S751	59.113	-0.452	0.000	0.49	584.1	OK		
S1.015	SHW752	58.871	-0.418	0.000	0.56	582.2	OK		
S9.000	S754	60.723	-0.600	0.000	0.00	0.0	OK		
S10.000	S755	74.781	-0.162	0.000	0.17	15.2	OK		
S11.000	S756	74.851	-0.158	0.000	0.19	14.9	OK		
S11.001	S757	73.769	-0.149	0.000	0.25	15.0	OK		
S10.001	S758	73.577	-0.141	0.000	0.54	42.1	OK		
S10.002	S759	73.312	-0.256	0.000	0.22	80.1	OK		
S10.003	S760	70.122	-0.313	0.000	0.34	125.8	OK		
S10.004	S761	68.917	-0.758	0.000	0.06	122.4	OK		
S10.005	S762	66.677	-0.777	0.000	0.04	121.6	OK		
S10.006	S763	63.456	-0.794	0.000	0.03	121.0	OK		
S1.016	SPOND 15	57.930	-0.034	0.000	0.06	13.4	OK		
S1.017	SFC765	57.425	-0.379	0.000	0.06	13.4	OK		
S12.000	S766	74.474	-0.324	0.000	0.29	47.2	OK		
S12.001	S767	74.406	-0.347	0.000	0.25	75.6	OK		

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

PN	US/MH Name	Water Surcharged			Flooded		Pipe		Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status	
S12.002	S768	74.346	-0.249	0.000	0.52		85.4	OK	

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S12.003	S769	15 Summer	5	+0%	100/15	Summer		
S12.004	S770	15 Summer	5	+0%	100/15	Summer		
S13.000	S771	15 Summer	5	+0%				
S13.001	S772	15 Summer	5	+0%				
S13.002	S773	15 Summer	5	+0%				
S13.003	S774	15 Summer	5	+0%				
S12.005	S775	15 Summer	5	+0%				
S12.006	S776	15 Summer	5	+0%				
S12.007	S777	15 Summer	5	+0%				
S12.008	S778	15 Summer	5	+0%				
S12.009	SHW779	15 Summer	5	+0%	100/240	Summer		
S14.000	S782	120 Winter	5	+0%				
S12.010	SPOND 14	360 Winter	5	+0%	2/15	Summer		
S12.011	SFC784	1440 Winter	5	+0%				
S12.012	S785	1440 Winter	5	+0%				
S12.013	S786	960 Summer	5	+0%				
S1.018	S787	360 Winter	5	+0%				
S1.019	S788	360 Winter	5	+0%	100/240	Summer		
S1.020	SHW789	360 Summer	5	+0%	100/30	Summer		
S15.000	S790	15 Summer	5	+0%	100/15	Summer		
S15.001	S791	15 Summer	5	+0%	100/15	Summer		
S15.002	S792	15 Summer	5	+0%	100/15	Summer		
S15.003	S793	15 Summer	5	+0%	100/15	Summer		
S15.004	S794	15 Summer	5	+0%	30/15	Summer		
S15.005	S795	15 Summer	5	+0%				
S15.006	S796	15 Summer	5	+0%				
S15.007	S797	15 Summer	5	+0%	100/15	Summer		
S15.008	S798	15 Summer	5	+0%	100/15	Summer		
S15.009	S799	15 Summer	5	+0%	100/15	Summer		
S15.010	S7100	15 Summer	5	+0%	100/15	Summer		
S15.011	S7101	15 Summer	5	+0%	100/15	Summer		
S15.012	S7102	15 Summer	5	+0%	100/15	Summer		
S15.013	S7103	15 Summer	5	+0%	100/15	Summer		
S15.014	S7104	15 Summer	5	+0%	100/15	Summer		
S15.015	S7105	15 Summer	5	+0%	100/15	Summer		
S15.016	S7106	15 Summer	5	+0%	100/15	Summer		
S16.000	S7107	15 Summer	5	+0%				
S16.001	S7108	15 Summer	5	+0%				
S16.002	S7109	15 Summer	5	+0%				
S16.003	S7110	15 Summer	5	+0%				
S16.004	S7111	15 Summer	5	+0%				
S16.005	S7112	15 Summer	5	+0%				
S16.006	S7113	15 Summer	5	+0%				
S16.007	S7114	15 Summer	5	+0%				
S16.008	S7115	15 Summer	5	+0%	100/15	Summer		
S16.009	S7116	15 Summer	5	+0%	100/15	Summer		
S16.010	S7117	15 Summer	5	+0%	100/15	Summer		
S16.011	S7118	15 Summer	5	+0%	30/15	Summer		

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S12.003	S769	74.298	-0.256	0.000	0.48		99.5	OK	
S12.004	S770	74.198	-0.266	0.000	0.47		118.5	OK	
S13.000	S771	75.791	-0.266	0.000	0.18		36.6	OK	
S13.001	S772	75.363	-0.250	0.000	0.24		36.7	OK	
S13.002	S773	75.215	-0.243	0.000	0.26		55.2	OK	
S13.003	S774	74.489	-0.267	0.000	0.18		55.1	OK	
S12.005	S775	73.879	-0.361	0.000	0.21		166.9	OK	
S12.006	S776	72.465	-0.624	0.000	0.13		166.1	OK	
S12.007	S777	71.813	-0.611	0.000	0.15		162.3	OK	
S12.008	S778	71.258	-0.609	0.000	0.15		161.1	OK	
S12.009	SHW779	70.952	-0.611	0.000	0.15		160.8	OK	
S14.000	S782	71.382	-0.750	0.000	0.00		0.0	OK	
S12.010	SPOND 14	70.815	0.657	0.000	0.04		3.3	SURCHARGED	
S12.011	SFC784	69.654	-0.336	0.000	0.02		3.3	OK	
S12.012	S785	69.251	-2.949	0.000	0.00		3.3	OK	
S12.013	S786	60.626	-1.206	0.000	0.00		3.3	OK	
S1.018	S787	57.234	-2.430	0.000	0.00		16.4	OK	
S1.019	S788	57.045	-0.427	0.000	0.08		16.4	OK	
S1.020	SHW789	56.588	-0.330	0.000	0.10		16.4	OK	
S15.000	S790	64.940	-0.161	0.000	0.18		12.6	OK	
S15.001	S791	64.415	-0.144	0.000	0.28		18.6	OK	
S15.002	S792	63.885	-0.132	0.000	0.35		24.6	OK	
S15.003	S793	63.320	-0.119	0.000	0.45		31.3	OK	
S15.004	S794	62.673	-0.106	0.000	0.54		36.0	OK	
S15.005	S795	62.101	-0.293	0.000	0.11		40.9	OK	
S15.006	S796	61.163	-0.280	0.000	0.14		46.8	OK	
S15.007	S797	60.493	-0.257	0.000	0.22		53.5	OK	
S15.008	S798	60.079	-0.271	0.000	0.33		61.2	OK	
S15.009	S799	59.978	-0.266	0.000	0.35		66.1	OK	
S15.010	S7100	59.887	-0.237	0.000	0.45		76.2	OK	
S15.011	S7101	59.799	-0.241	0.000	0.44		83.6	OK	
S15.012	S7102	59.705	-0.219	0.000	0.52		88.6	OK	
S15.013	S7103	59.521	-0.286	0.000	0.28		95.7	OK	
S15.014	S7104	58.686	-0.255	0.000	0.38		103.3	OK	
S15.015	S7105	57.972	-0.213	0.000	0.52		108.0	OK	
S15.016	S7106	57.414	-0.276	0.000	0.32		110.7	OK	
S16.000	S7107	65.014	-0.245	0.000	0.08		10.8	OK	
S16.001	S7108	64.438	-0.232	0.000	0.12		17.1	OK	
S16.002	S7109	63.865	-0.217	0.000	0.17		23.8	OK	
S16.003	S7110	63.194	-0.286	0.000	0.12		30.9	OK	
S16.004	S7111	62.636	-0.268	0.000	0.18		44.8	OK	
S16.005	S7112	61.559	-0.272	0.000	0.17		55.8	OK	
S16.006	S7113	60.835	-0.272	0.000	0.17		63.3	OK	
S16.007	S7114	59.620	-0.306	0.000	0.22		75.2	OK	
S16.008	S7115	58.643	-0.281	0.000	0.29		85.1	OK	
S16.009	S7116	57.823	-0.246	0.000	0.40		86.2	OK	
S16.010	S7117	57.294	-0.238	0.000	0.45		88.7	OK	

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S16.011	S7118	57.115	-0.260	0.000	0.37	88.1	OK	

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) SurchARGE	First (Y) Flood	First (Z) Overflow	Overflow Act.
S15.017	S7119	15 Summer	5	+0%	30/15 Summer			
S15.018	SHW7120	15 Summer	5	+0%	30/15 Summer			
S17.000	S7121	15 Summer	5	+0%				
S17.001	S7122	15 Summer	5	+0%	100/15 Summer			
S17.002	S7123	15 Summer	5	+0%	100/15 Summer			
S17.003	S7124	15 Summer	5	+0%	100/15 Summer			
S17.004	S7125	15 Summer	5	+0%	100/15 Summer			
S18.000	S7126	15 Summer	5	+0%				
S18.001	S7127	15 Summer	5	+0%	100/15 Summer			
S18.002	S7128	15 Summer	5	+0%	100/15 Summer			
S18.003	S7129	15 Summer	5	+0%	100/15 Summer			
S18.004	S7130	15 Summer	5	+0%	100/15 Summer			
S18.005	S7131	15 Summer	5	+0%	30/480 Summer			
S17.005	S7132	360 Summer	5	+0%	30/120 Summer			
S17.006	SHW7133	360 Summer	5	+0%	30/120 Summer			
S19.000	S7136	360 Summer	5	+0%	100/120 Summer			
S1.021	SPOND 16	360 Summer	5	+0%	2/240 Summer			
S1.022	SFC7138	1440 Winter	5	+0%				
S1.023	S7139	1440 Winter	5	+0%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S15.017	S7119	57.001	-0.196	0.000	0.60		196.2	OK	
S15.018	SHW7120	56.592	-0.202	0.000	0.67		191.3	OK	
S17.000	S7121	58.624	-0.171	0.000	0.13		8.8	OK	
S17.001	S7122	57.909	-0.151	0.000	0.23		15.7	OK	
S17.002	S7123	57.053	-0.174	0.000	0.35		18.3	OK	
S17.003	S7124	56.952	-0.162	0.000	0.40		21.3	OK	
S17.004	S7125	56.780	-0.136	0.000	0.53		25.5	OK	
S18.000	S7126	58.406	-0.172	0.000	0.12		9.0	OK	
S18.001	S7127	57.473	-0.199	0.000	0.24		15.7	OK	
S18.002	S7128	57.312	-0.176	0.000	0.34		17.9	OK	
S18.003	S7129	57.206	-0.165	0.000	0.39		21.1	OK	
S18.004	S7130	57.031	-0.150	0.000	0.46		24.9	OK	
S18.005	S7131	56.689	-0.205	0.000	0.22		24.9	OK	
S17.005	S7132	56.536	-0.157	0.000	0.11		16.3	OK	
S17.006	SHW7133	56.535	-0.192	0.000	0.04		14.9	OK	
S19.000	S7136	56.535	-0.655	0.000	0.00		0.0	OK	
S1.021	SPOND 16	56.535	0.185	0.000	0.09		22.2	SURCHARGED	
S1.022	SFC7138	55.758	-2.298	0.000	0.00		22.2	OK	
S1.023	S7139	55.258	-1.558	0.000	0.00		22.2	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S701	15 Summer	30	+0%	100/15 Summer				74.061
S1.001	S702	15 Summer	30	+0%	100/15 Summer				73.042
S1.002	S703	15 Summer	30	+0%	100/15 Summer				71.613
S1.003	S704	15 Summer	30	+0%	100/15 Summer				70.570
S1.004	S705	15 Summer	30	+0%	100/15 Summer				70.319
S1.005	S706	15 Summer	30	+0%	100/15 Summer				69.439
S1.006	S707	15 Summer	30	+0%	100/15 Summer				68.581
S1.007	S708	15 Summer	30	+0%	100/15 Summer				67.068
S2.000	S709	15 Summer	30	+0%					74.416
S2.001	S710	15 Summer	30	+0%					73.714
S2.002	S711	15 Summer	30	+0%	100/15 Summer				73.470
S2.003	S712	15 Summer	30	+0%	100/15 Summer				71.807
S2.004	S713	15 Summer	30	+0%	100/15 Summer				71.471
S2.005	S714	15 Summer	30	+0%	100/15 Summer				69.700
S2.006	S715	15 Summer	30	+0%	100/15 Summer				68.246
S2.007	S716	15 Summer	30	+0%	100/15 Summer				66.702
S2.008	S717	15 Summer	30	+0%	100/15 Summer				66.171

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Pipe	Level Exceeded
		Depth (m)	Volume (m ³)			Flow (l/s)	
S1.000	S701	-0.154	0.000	0.47		73.3	OK
S1.001	S702	-0.174	0.000	0.54		139.1	OK
S1.002	S703	-0.121	0.000	0.77		188.1	OK
S1.003	S704	-0.154	0.000	0.75		189.9	OK
S1.004	S705	-0.205	0.000	0.56		227.5	OK
S1.005	S706	-0.185	0.000	0.64		264.0	OK
S1.006	S707	-0.143	0.000	0.78		331.7	OK
S1.007	S708	-0.156	0.000	0.74		340.1	OK
S2.000	S709	-0.247	0.000	0.25		66.5	OK
S2.001	S710	-0.232	0.000	0.31		65.9	OK
S2.002	S711	-0.176	0.000	0.53		140.6	OK
S2.003	S712	-0.139	0.000	0.70		141.1	OK
S2.004	S713	-0.210	0.000	0.53		221.3	OK
S2.005	S714	-0.181	0.000	0.64		283.0	OK
S2.006	S715	-0.135	0.000	0.81		337.2	OK
S2.007	S716	-0.232	0.000	0.59		355.9	OK
S2.008	S717	-0.147	0.000	0.58		364.8	OK

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S3.000	S718	15 Summer	30	+0%	100/15 Summer			
S3.001	S719	15 Summer	30	+0%	100/15 Summer			
S3.002	S720	15 Summer	30	+0%	30/15 Summer			
S2.009	S721	15 Summer	30	+0%	30/15 Summer			
S1.008	S722	15 Summer	30	+0%	100/15 Summer			
S4.000	S723	15 Summer	30	+0%				
S5.000	S724	15 Summer	30	+0%	100/15 Summer			
S5.001	S725	15 Summer	30	+0%	100/15 Summer			
S5.002	S726	15 Summer	30	+0%	100/15 Summer			
S6.000	S727	15 Summer	30	+0%	100/15 Summer			
S6.001	S728	15 Summer	30	+0%	100/15 Summer			
S6.002	S729	15 Summer	30	+0%	100/15 Summer			
S5.003	S730	15 Summer	30	+0%	100/15 Summer			
S7.000	S731	15 Summer	30	+0%	100/15 Summer			
S7.001	S732	15 Summer	30	+0%	100/15 Summer			
S7.002	S733	15 Summer	30	+0%	100/15 Summer			
S7.003	S734	15 Summer	30	+0%	100/15 Summer			
S7.004	S735	15 Summer	30	+0%	100/15 Summer			
S5.004	S736	15 Summer	30	+0%	30/15 Summer			
S5.005	S737	15 Summer	30	+0%	30/15 Summer			
S5.006	S738	15 Summer	30	+0%	100/15 Summer			
S5.007	S739	15 Summer	30	+0%	100/15 Summer			
S5.008	S740	15 Summer	30	+0%	100/15 Summer			
S5.009	S741	15 Summer	30	+0%	100/15 Summer			
S5.010	S742	15 Summer	30	+0%	100/15 Summer			
S1.009	S743	15 Summer	30	+0%	100/15 Summer			
S1.010	S744	15 Summer	30	+0%				
S8.000	S747	120 Winter	30	+0%				
S1.011	S748	15 Summer	30	+0%	100/15 Summer			
S1.012	S749	15 Summer	30	+0%	100/15 Summer			
S1.013	S750	15 Summer	30	+0%	100/15 Summer			
S1.014	S751	15 Summer	30	+0%	100/15 Summer			
S1.015	SHW752	15 Summer	30	+0%	100/15 Summer			
S9.000	S754	120 Winter	30	+0%				
S10.000	S755	15 Summer	30	+0%				
S11.000	S756	15 Summer	30	+0%				
S11.001	S757	15 Summer	30	+0%	100/15 Summer			
S10.001	S758	15 Summer	30	+0%	100/15 Summer			
S10.002	S759	15 Summer	30	+0%				
S10.003	S760	15 Summer	30	+0%	100/15 Summer			
S10.004	S761	15 Summer	30	+0%				
S10.005	S762	15 Summer	30	+0%				
S10.006	S763	15 Summer	30	+0%				
S1.016	SPOND 15	480 Winter	30	+0%	30/60 Summer			
S1.017	SFC765	240 Winter	30	+0%				
S12.000	S766	15 Summer	30	+0%	100/15 Summer			
S12.001	S767	15 Summer	30	+0%	100/15 Summer			
S12.002	S768	15 Summer	30	+0%	100/15 Summer			

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S3.000	S718	66.639	-0.205	0.000	0.22	31.3	OK	
S3.001	S719	66.205	-0.090	0.000	0.32	48.1	OK	
S3.002	S720	66.163	0.019	0.000	0.32	59.1	SURCHARGED	
S2.009	S721	66.030	0.109	0.000	2.14	413.7	SURCHARGED	
S1.008	S722	65.680	-0.204	0.000	0.76	755.0	OK	
S4.000	S723	67.177	-0.223	0.000	0.15	34.0	OK	
S5.000	S724	66.466	-0.370	0.000	0.07	30.5	OK	
S5.001	S725	65.940	-0.323	0.000	0.18	52.0	OK	
S5.002	S726	65.755	-0.234	0.000	0.21	77.6	OK	
S6.000	S727	67.068	-0.124	0.000	0.62	50.1	OK	
S6.001	S728	66.639	-0.166	0.000	0.57	92.0	OK	
S6.002	S729	66.203	-0.176	0.000	0.54	122.8	OK	
S5.003	S730	65.709	-0.041	0.000	0.42	172.9	OK	
S7.000	S731	67.423	-0.125	0.000	0.61	46.1	OK	
S7.001	S732	67.125	-0.116	0.000	0.67	67.0	OK	
S7.002	S733	66.879	-0.097	0.000	0.79	67.1	OK	
S7.003	S734	66.682	-0.180	0.000	0.52	92.4	OK	
S7.004	S735	66.358	-0.187	0.000	0.48	127.6	OK	
S5.004	S736	65.618	0.035	0.000	0.85	321.3	SURCHARGED	
S5.005	S737	65.495	0.055	0.000	1.82	345.9	SURCHARGED	
S5.006	S738	65.187	-0.226	0.000	0.76	360.2	OK	
S5.007	S739	65.047	-0.228	0.000	0.77	361.8	OK	
S5.008	S740	64.938	-0.198	0.000	0.81	376.0	OK	
S5.009	S741	64.892	-0.131	0.000	0.99	384.8	OK	
S5.010	S742	64.829	-0.131	0.000	0.98	394.5	OK	
S1.009	S743	64.766	-0.135	0.000	0.98	1147.6	OK	
S1.010	S744	63.237	-0.408	0.000	0.50	1154.5	OK	
S8.000	S747	62.429	-0.750	0.000	0.00	0.0	OK	
S1.011	S748	60.858	-0.228	0.000	0.91	1153.8	OK	
S1.012	S749	60.436	-0.336	0.000	0.70	1132.0	OK	
S1.013	S750	59.664	-0.285	0.000	0.79	1106.6	OK	
S1.014	S751	59.394	-0.172	0.000	0.92	1088.1	OK	
S1.015	SHW752	59.182	-0.108	0.000	1.00	1040.1	OK	
S9.000	S754	60.723	-0.600	0.000	0.00	0.0	OK	
S10.000	S755	74.800	-0.143	0.000	0.28	25.1	OK	
S11.000	S756	74.872	-0.137	0.000	0.32	24.6	OK	
S11.001	S757	73.794	-0.124	0.000	0.41	24.6	OK	
S10.001	S758	73.656	-0.062	0.000	0.95	74.4	OK	
S10.002	S759	73.366	-0.202	0.000	0.42	155.5	OK	
S10.003	S760	70.237	-0.198	0.000	0.70	259.9	OK	
S10.004	S761	68.983	-0.692	0.000	0.12	246.1	OK	
S10.005	S762	66.736	-0.718	0.000	0.09	238.6	OK	
S10.006	S763	63.500	-0.750	0.000	0.07	241.1	OK	
S1.016	SPOND 15	58.153	0.189	0.000	0.06	13.7	SURCHARGED	
S1.017	SFC765	57.425	-0.379	0.000	0.06	13.7	OK	
S12.000	S766	74.564	-0.234	0.000	0.48	77.6	OK	
S12.001	S767	74.514	-0.239	0.000	0.44	134.0	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

PN	US/MH Name	Water		Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)				
S12.002	S768	74.485	-0.110	0.000	0.94		154.2	OK		

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S12.003	S769	15 Summer	30	+0%	100/15	Summer		
S12.004	S770	15 Summer	30	+0%	100/15	Summer		
S13.000	S771	15 Summer	30	+0%				
S13.001	S772	15 Summer	30	+0%				
S13.002	S773	15 Summer	30	+0%				
S13.003	S774	15 Summer	30	+0%				
S12.005	S775	15 Summer	30	+0%				
S12.006	S776	15 Summer	30	+0%				
S12.007	S777	15 Summer	30	+0%				
S12.008	S778	15 Summer	30	+0%				
S12.009	SHW779	360 Winter	30	+0%	100/240	Summer		
S14.000	S782	120 Winter	30	+0%				
S12.010	SPOND 14	360 Winter	30	+0%	2/15	Summer		
S12.011	SFC784	360 Winter	30	+0%				
S12.012	S785	2880 Summer	30	+0%				
S12.013	S786	360 Winter	30	+0%				
S1.018	S787	360 Winter	30	+0%				
S1.019	S788	360 Winter	30	+0%	100/240	Summer		
S1.020	SHW789	240 Winter	30	+0%	100/30	Summer		
S15.000	S790	15 Summer	30	+0%	100/15	Summer		
S15.001	S791	15 Summer	30	+0%	100/15	Summer		
S15.002	S792	15 Summer	30	+0%	100/15	Summer		
S15.003	S793	15 Summer	30	+0%	100/15	Summer		
S15.004	S794	15 Summer	30	+0%	30/15	Summer		
S15.005	S795	15 Summer	30	+0%				
S15.006	S796	15 Summer	30	+0%				
S15.007	S797	15 Summer	30	+0%	100/15	Summer		
S15.008	S798	15 Summer	30	+0%	100/15	Summer		
S15.009	S799	15 Summer	30	+0%	100/15	Summer		
S15.010	S7100	15 Summer	30	+0%	100/15	Summer		
S15.011	S7101	15 Summer	30	+0%	100/15	Summer		
S15.012	S7102	15 Summer	30	+0%	100/15	Summer		
S15.013	S7103	15 Summer	30	+0%	100/15	Summer		
S15.014	S7104	15 Summer	30	+0%	100/15	Summer		
S15.015	S7105	15 Summer	30	+0%	100/15	Summer		
S15.016	S7106	15 Summer	30	+0%	100/15	Summer		
S16.000	S7107	15 Summer	30	+0%				
S16.001	S7108	15 Summer	30	+0%				
S16.002	S7109	15 Summer	30	+0%				
S16.003	S7110	15 Summer	30	+0%				
S16.004	S7111	15 Summer	30	+0%				
S16.005	S7112	15 Summer	30	+0%				
S16.006	S7113	15 Summer	30	+0%				
S16.007	S7114	15 Summer	30	+0%				
S16.008	S7115	15 Summer	30	+0%	100/15	Summer		
S16.009	S7116	15 Summer	30	+0%	100/15	Summer		
S16.010	S7117	15 Summer	30	+0%	100/15	Summer		
S16.011	S7118	15 Summer	30	+0%	30/15	Summer		

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S12.003	S769	74.434	-0.120	0.000	0.89		183.8	OK	
S12.004	S770	74.337	-0.127	0.000	0.87		219.8	OK	
S13.000	S771	75.823	-0.234	0.000	0.30		60.5	OK	
S13.001	S772	75.402	-0.211	0.000	0.39		60.4	OK	
S13.002	S773	75.269	-0.189	0.000	0.47		98.3	OK	
S13.003	S774	74.530	-0.226	0.000	0.33		99.3	OK	
S12.005	S775	73.944	-0.296	0.000	0.40		311.8	OK	
S12.006	S776	72.541	-0.548	0.000	0.24		303.2	OK	
S12.007	S777	71.896	-0.528	0.000	0.27		293.1	OK	
S12.008	S778	71.340	-0.527	0.000	0.28		294.2	OK	
S12.009	SHW779	71.107	-0.456	0.000	0.04		43.5	OK	
S14.000	S782	71.382	-0.750	0.000	0.00		0.0	OK	
S12.010	SPOND 14	71.107	0.949	0.000	0.04		3.4	SURCHARGED	
S12.011	SFC784	69.654	-0.336	0.000	0.02		3.4	OK	
S12.012	S785	69.251	-2.949	0.000	0.00		3.3	OK	
S12.013	S786	60.626	-1.206	0.000	0.00		3.4	OK	
S1.018	S787	57.236	-2.428	0.000	0.00		17.1	OK	
S1.019	S788	57.047	-0.425	0.000	0.08		17.1	OK	
S1.020	SHW789	56.918	0.000	0.000	0.11		17.2	OK	
S15.000	S790	64.959	-0.142	0.000	0.29		20.7	OK	
S15.001	S791	64.448	-0.111	0.000	0.50		34.0	OK	
S15.002	S792	63.930	-0.087	0.000	0.68		47.2	OK	
S15.003	S793	63.380	-0.059	0.000	0.87		60.7	OK	
S15.004	S794	62.821	0.042	0.000	1.06		70.1	SURCHARGED	
S15.005	S795	62.135	-0.259	0.000	0.21		79.3	OK	
S15.006	S796	61.204	-0.239	0.000	0.28		90.8	OK	
S15.007	S797	60.547	-0.203	0.000	0.42		104.4	OK	
S15.008	S798	60.173	-0.177	0.000	0.66		121.5	OK	
S15.009	S799	60.080	-0.164	0.000	0.70		132.0	OK	
S15.010	S7100	60.008	-0.116	0.000	0.89		151.0	OK	
S15.011	S7101	59.938	-0.102	0.000	0.86		162.0	OK	
S15.012	S7102	59.849	-0.075	0.000	0.99		170.0	OK	
S15.013	S7103	59.596	-0.210	0.000	0.54		181.0	OK	
S15.014	S7104	58.776	-0.165	0.000	0.69		189.9	OK	
S15.015	S7105	58.084	-0.101	0.000	0.92		191.2	OK	
S15.016	S7106	57.480	-0.209	0.000	0.56		194.7	OK	
S16.000	S7107	65.030	-0.229	0.000	0.13		17.8	OK	
S16.001	S7108	64.465	-0.205	0.000	0.22		31.6	OK	
S16.002	S7109	63.900	-0.182	0.000	0.33		46.3	OK	
S16.003	S7110	63.233	-0.247	0.000	0.25		62.2	OK	
S16.004	S7111	62.687	-0.217	0.000	0.36		91.2	OK	
S16.005	S7112	61.610	-0.221	0.000	0.34		114.6	OK	
S16.006	S7113	60.886	-0.221	0.000	0.34		130.1	OK	
S16.007	S7114	59.694	-0.232	0.000	0.45		156.4	OK	
S16.008	S7115	58.735	-0.189	0.000	0.59		171.0	OK	
S16.009	S7116	57.943	-0.126	0.000	0.78		170.7	OK	
S16.010	S7117	57.459	-0.073	0.000	0.86		168.8	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S16.011	S7118	57.385	0.010	0.000	0.66	156.6	SURCHARGED	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 7

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) SurchARGE	First (Y) Flood	First (Z) Overflow	Overflow Act.
S15.017	S7119	15 Summer	30	+0%	30/15 Summer			
S15.018	SHW7120	480 Summer	30	+0%	30/15 Summer			
S17.000	S7121	15 Summer	30	+0%				
S17.001	S7122	15 Summer	30	+0%	100/15 Summer			
S17.002	S7123	15 Summer	30	+0%	100/15 Summer			
S17.003	S7124	15 Summer	30	+0%	100/15 Summer			
S17.004	S7125	480 Summer	30	+0%	100/15 Summer			
S18.000	S7126	15 Summer	30	+0%				
S18.001	S7127	15 Summer	30	+0%	100/15 Summer			
S18.002	S7128	15 Summer	30	+0%	100/15 Summer			
S18.003	S7129	15 Summer	30	+0%	100/15 Summer			
S18.004	S7130	15 Summer	30	+0%	100/15 Summer			
S18.005	S7131	480 Summer	30	+0%	30/480 Summer			
S17.005	S7132	480 Summer	30	+0%	30/120 Summer			
S17.006	SHW7133	480 Summer	30	+0%	30/120 Summer			
S19.000	S7136	480 Summer	30	+0%	100/120 Summer			
S1.021	SPOND 16	480 Summer	30	+0%	2/240 Summer			
S1.022	SFC7138	4320 Summer	30	+0%				
S1.023	S7139	2880 Winter	30	+0%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S15.017	S7119	57.280	0.082	0.000	0.99		322.7	SURCHARGED	
S15.018	SHW7120	56.894	0.100	0.000	0.25		70.5	SURCHARGED	
S17.000	S7121	58.641	-0.154	0.000	0.21		14.5		OK
S17.001	S7122	57.940	-0.120	0.000	0.43		29.1		OK
S17.002	S7123	57.115	-0.112	0.000	0.67		34.9		OK
S17.003	S7124	57.025	-0.089	0.000	0.73		39.4		OK
S17.004	S7125	56.894	-0.021	0.000	0.21		9.9		OK
S18.000	S7126	58.422	-0.156	0.000	0.20		14.8		OK
S18.001	S7127	57.516	-0.156	0.000	0.44		28.9		OK
S18.002	S7128	57.368	-0.120	0.000	0.64		33.4		OK
S18.003	S7129	57.272	-0.099	0.000	0.70		37.6		OK
S18.004	S7130	57.095	-0.086	0.000	0.76		41.6		OK
S18.005	S7131	56.894	0.000	0.000	0.09		10.0	SURCHARGED	
S17.005	S7132	56.894	0.201	0.000	0.12		18.7	SURCHARGED	
S17.006	SHW7133	56.894	0.167	0.000	0.05		17.0	SURCHARGED	
S19.000	S7136	56.894	-0.296	0.000	0.00		0.0		OK
S1.021	SPOND 16	56.894	0.544	0.000	0.09		22.2	SURCHARGED	
S1.022	SFC7138	55.758	-2.298	0.000	0.00		22.2		OK
S1.023	S7139	55.258	-1.558	0.000	0.00		22.2		OK

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for HIF - 7

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FEH
 FEH Rainfall Version 2013
 Site Location GB 489026 242081 SP 89026 42081
 Data Type Point
 Cv (Summer) 0.950
 Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
 Analysis Timestep Fine Inertia Status ON
 DTS Status OFF

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440, 2880, 4320
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S701	15 Summer	100	+40%	100/15 Summer				74.333
S1.001	S702	15 Summer	100	+40%	100/15 Summer				73.648
S1.002	S703	15 Summer	100	+40%	100/15 Summer				72.470
S1.003	S704	15 Summer	100	+40%	100/15 Summer				71.033
S1.004	S705	15 Summer	100	+40%	100/15 Summer				70.769
S1.005	S706	15 Summer	100	+40%	100/15 Summer				70.168
S1.006	S707	15 Summer	100	+40%	100/15 Summer				69.492
S1.007	S708	15 Summer	100	+40%	100/15 Summer				67.928
S2.000	S709	15 Summer	100	+40%					74.467
S2.001	S710	15 Summer	100	+40%					73.803
S2.002	S711	15 Summer	100	+40%	100/15 Summer				73.726
S2.003	S712	15 Summer	100	+40%	100/15 Summer				72.348
S2.004	S713	15 Summer	100	+40%	100/15 Summer				72.025
S2.005	S714	15 Summer	100	+40%	100/15 Summer				70.701
S2.006	S715	15 Summer	100	+40%	100/15 Summer				69.415
S2.007	S716	15 Summer	100	+40%	100/15 Summer				67.609
S2.008	S717	15 Summer	100	+40%	100/15 Summer				67.213

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100 year Return Period Summary of Critical Results by Maximum Level (Rank
1) for HIF - 7

PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)					
S1.000	S701	0.118	0.000	0.85		132.0	SURCHARGED	
S1.001	S702	0.432	0.000	0.91		236.2	SURCHARGED	
S1.002	S703	0.736	0.000	1.23		302.3	SURCHARGED	
S1.003	S704	0.309	0.000	1.18		296.4	SURCHARGED	
S1.004	S705	0.245	0.000	0.82		333.4	SURCHARGED	
S1.005	S706	0.544	0.000	0.88		365.8	SURCHARGED	
S1.006	S707	0.768	0.000	1.09		464.2	SURCHARGED	
S1.007	S708	0.704	0.000	0.98		449.9	SURCHARGED	
S2.000	S709	-0.196	0.000	0.46		122.1	OK	
S2.001	S710	-0.143	0.000	0.56		120.8	OK	
S2.002	S711	0.080	0.000	0.94		251.6	SURCHARGED	
S2.003	S712	0.402	0.000	1.22		246.6	SURCHARGED	
S2.004	S713	0.344	0.000	0.88		367.4	SURCHARGED	
S2.005	S714	0.820	0.000	0.96		424.7	SURCHARGED	
S2.006	S715	1.034	0.000	1.16		484.0	FLOOD RISK	
S2.007	S716	0.675	0.000	0.80		478.1	SURCHARGED	
S2.008	S717	0.895	0.000	0.77		487.6	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank
1) for HIF - 7

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S3.000	S718	15 Summer	100	+40%	100/15	Summer		
S3.001	S719	15 Summer	100	+40%	100/15	Summer		
S3.002	S720	15 Summer	100	+40%	30/15	Summer		
S2.009	S721	15 Summer	100	+40%	30/15	Summer		
S1.008	S722	15 Summer	100	+40%	100/15	Summer		
S4.000	S723	15 Summer	100	+40%				
S5.000	S724	15 Summer	100	+40%	100/15	Summer		
S5.001	S725	15 Summer	100	+40%	100/15	Summer		
S5.002	S726	15 Summer	100	+40%	100/15	Summer		
S6.000	S727	15 Summer	100	+40%	100/15	Summer		
S6.001	S728	15 Summer	100	+40%	100/15	Summer		
S6.002	S729	15 Summer	100	+40%	100/15	Summer		
S5.003	S730	15 Summer	100	+40%	100/15	Summer		
S7.000	S731	15 Summer	100	+40%	100/15	Summer		
S7.001	S732	15 Summer	100	+40%	100/15	Summer		
S7.002	S733	15 Summer	100	+40%	100/15	Summer		
S7.003	S734	15 Summer	100	+40%	100/15	Summer		
S7.004	S735	15 Summer	100	+40%	100/15	Summer		
S5.004	S736	15 Summer	100	+40%	30/15	Summer		
S5.005	S737	15 Summer	100	+40%	30/15	Summer		
S5.006	S738	15 Summer	100	+40%	100/15	Summer		
S5.007	S739	15 Summer	100	+40%	100/15	Summer		
S5.008	S740	15 Summer	100	+40%	100/15	Summer		
S5.009	S741	15 Summer	100	+40%	100/15	Summer		
S5.010	S742	15 Summer	100	+40%	100/15	Summer		
S1.009	S743	15 Summer	100	+40%	100/15	Summer		
S1.010	S744	15 Summer	100	+40%				
S8.000	S747	120 Winter	100	+40%				
S1.011	S748	15 Summer	100	+40%	100/15	Summer		
S1.012	S749	15 Summer	100	+40%	100/15	Summer		
S1.013	S750	15 Summer	100	+40%	100/15	Summer		
S1.014	S751	15 Summer	100	+40%	100/15	Summer		
S1.015	SHW752	15 Summer	100	+40%	100/15	Summer		
S9.000	S754	120 Winter	100	+40%				
S10.000	S755	15 Summer	100	+40%				
S11.000	S756	15 Summer	100	+40%				
S11.001	S757	15 Summer	100	+40%	100/15	Summer		
S10.001	S758	15 Summer	100	+40%	100/15	Summer		
S10.002	S759	15 Summer	100	+40%				
S10.003	S760	15 Summer	100	+40%	100/15	Summer		
S10.004	S761	15 Summer	100	+40%				
S10.005	S762	15 Summer	100	+40%				
S10.006	S763	15 Summer	100	+40%				
S1.016	SPOND	15 960 Winter	100	+40%	30/60	Summer		
S1.017	SFC765	480 Winter	100	+40%				
S12.000	S766	15 Summer	100	+40%	100/15	Summer		
S12.001	S767	15 Summer	100	+40%	100/15	Summer		
S12.002	S768	15 Summer	100	+40%	100/15	Summer		

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100 year Return Period Summary of Critical Results by Maximum Level (Rank
1) for HIF - 7

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S3.000	S718	67.371	0.527	0.000	0.40	57.4	SURCHARGED	
S3.001	S719	67.252	0.957	0.000	0.49	74.7	FLOOD RISK	
S3.002	S720	67.127	0.983	0.000	0.55	102.0	FLOOD RISK	
S2.009	S721	66.974	1.053	0.000	2.81	544.2	FLOOD RISK	
S1.008	S722	66.687	0.803	0.000	0.99	987.1	SURCHARGED	
S4.000	S723	67.207	-0.193	0.000	0.27	62.4	OK	
S5.000	S724	67.345	0.509	0.000	0.13	55.7	SURCHARGED	
S5.001	S725	67.244	0.981	0.000	0.29	86.4	FLOOD RISK	
S5.002	S726	67.076	1.087	0.000	0.26	96.8	FLOOD RISK	
S6.000	S727	67.831	0.639	0.000	1.08	87.5	SURCHARGED	
S6.001	S728	67.492	0.687	0.000	0.93	149.8	SURCHARGED	
S6.002	S729	67.200	0.821	0.000	0.73	167.1	SURCHARGED	
S5.003	S730	66.926	1.176	0.000	0.57	234.6	SURCHARGED	
S7.000	S731	67.869	0.321	0.000	1.10	82.8	SURCHARGED	
S7.001	S732	67.617	0.376	0.000	1.01	100.2	SURCHARGED	
S7.002	S733	67.380	0.404	0.000	1.14	96.3	SURCHARGED	
S7.003	S734	67.249	0.387	0.000	0.80	141.9	SURCHARGED	
S7.004	S735	67.109	0.563	0.000	0.72	190.0	SURCHARGED	
S5.004	S736	66.795	1.212	0.000	1.10	418.3	SURCHARGED	
S5.005	S737	66.619	1.179	0.000	2.43	461.3	SURCHARGED	
S5.006	S738	66.418	1.004	0.000	1.01	475.0	SURCHARGED	
S5.007	S739	66.280	1.004	0.000	0.97	460.8	SURCHARGED	
S5.008	S740	66.182	1.046	0.000	1.03	481.1	SURCHARGED	
S5.009	S741	66.037	1.013	0.000	1.28	500.4	SURCHARGED	
S5.010	S742	65.882	0.923	0.000	1.29	515.3	SURCHARGED	
S1.009	S743	65.721	0.820	0.000	1.29	1519.8	SURCHARGED	
S1.010	S744	63.310	-0.334	0.000	0.66	1518.2	OK	
S8.000	S747	62.429	-0.750	0.000	0.00	0.0	OK	
S1.011	S748	61.237	0.152	0.000	1.21	1522.6	SURCHARGED	
S1.012	S749	60.852	0.080	0.000	0.91	1480.6	SURCHARGED	
S1.013	S750	60.239	0.290	0.000	1.01	1403.3	SURCHARGED	
S1.014	S751	59.856	0.291	0.000	1.18	1398.4	SURCHARGED	
S1.015	SHW752	59.470	0.181	0.000	1.35	1399.6	SURCHARGED	
S9.000	S754	60.723	-0.600	0.000	0.00	0.0	OK	
S10.000	S755	74.834	-0.109	0.000	0.52	46.2	OK	
S11.000	S756	74.909	-0.100	0.000	0.58	45.2	OK	
S11.001	S757	74.169	0.251	0.000	0.77	46.4	SURCHARGED	
S10.001	S758	74.024	0.306	0.000	1.73	134.9	SURCHARGED	
S10.002	S759	73.445	-0.123	0.000	0.74	275.6	OK	
S10.003	S760	70.811	0.376	0.000	1.22	456.5	SURCHARGED	
S10.004	S761	69.059	-0.616	0.000	0.21	441.7	OK	
S10.005	S762	66.796	-0.658	0.000	0.16	432.3	OK	
S10.006	S763	63.554	-0.696	0.000	0.12	434.2	OK	
S1.016	SPOND 15	58.655	0.691	0.000	0.06	13.7	SURCHARGED	
S1.017	SFC765	57.600	-0.204	0.000	0.06	13.7	OK	
S12.000	S766	75.376	0.578	0.000	0.85	138.9	SURCHARGED	
S12.001	S767	75.338	0.585	0.000	0.78	236.7	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for HIF - 7

PN	US/MH Name	Water		Surcharged		Flooded		Pipe		Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status		
S12.002	S768	75.202	0.607	0.000	1.67		273.9		SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank
1) for HIF - 7

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S12.003	S769	15 Summer	100	+40%	100/15 Summer			
S12.004	S770	15 Summer	100	+40%	100/15 Summer			
S13.000	S771	15 Summer	100	+40%				
S13.001	S772	15 Summer	100	+40%				
S13.002	S773	15 Summer	100	+40%				
S13.003	S774	15 Summer	100	+40%				
S12.005	S775	15 Summer	100	+40%				
S12.006	S776	15 Summer	100	+40%				
S12.007	S777	15 Summer	100	+40%				
S12.008	S778	480 Winter	100	+40%				
S12.009	SHW779	480 Winter	100	+40%	100/240 Summer			
S14.000	S782	480 Winter	100	+40%				
S12.010	SPOND 14	480 Winter	100	+40%	2/15 Summer			
S12.011	SFC784	480 Winter	100	+40%				
S12.012	S785	2880 Summer	100	+40%				
S12.013	S786	480 Winter	100	+40%				
S1.018	S787	480 Winter	100	+40%				
S1.019	S788	480 Winter	100	+40%	100/240 Summer			
S1.020	SHW789	480 Winter	100	+40%	100/30 Summer			
S15.000	S790	15 Summer	100	+40%	100/15 Summer			
S15.001	S791	15 Summer	100	+40%	100/15 Summer			
S15.002	S792	15 Summer	100	+40%	100/15 Summer			
S15.003	S793	15 Summer	100	+40%	100/15 Summer			
S15.004	S794	15 Summer	100	+40%	30/15 Summer			
S15.005	S795	15 Summer	100	+40%				
S15.006	S796	15 Summer	100	+40%				
S15.007	S797	15 Summer	100	+40%	100/15 Summer			
S15.008	S798	15 Summer	100	+40%	100/15 Summer			
S15.009	S799	15 Summer	100	+40%	100/15 Summer			
S15.010	S7100	15 Summer	100	+40%	100/15 Summer			
S15.011	S7101	15 Summer	100	+40%	100/15 Summer			
S15.012	S7102	15 Summer	100	+40%	100/15 Summer			
S15.013	S7103	15 Summer	100	+40%	100/15 Summer			
S15.014	S7104	30 Summer	100	+40%	100/15 Summer			
S15.015	S7105	30 Summer	100	+40%	100/15 Summer			
S15.016	S7106	15 Summer	100	+40%	100/15 Summer			
S16.000	S7107	15 Summer	100	+40%				
S16.001	S7108	15 Summer	100	+40%				
S16.002	S7109	15 Summer	100	+40%				
S16.003	S7110	15 Summer	100	+40%				
S16.004	S7111	15 Summer	100	+40%				
S16.005	S7112	15 Summer	100	+40%				
S16.006	S7113	15 Summer	100	+40%				
S16.007	S7114	15 Summer	100	+40%				
S16.008	S7115	15 Summer	100	+40%	100/15 Summer			
S16.009	S7116	15 Summer	100	+40%	100/15 Summer			
S16.010	S7117	30 Summer	100	+40%	100/15 Summer			
S16.011	S7118	15 Summer	100	+40%	30/15 Summer			

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Network 2018.1.1

100 year Return Period Summary of Critical Results by Maximum Level (Rank
1) for HIF - 7


PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S12.003	S769	75.068	0.514	0.000	1.56	322.8	SURCHARGED		
S12.004	S770	74.838	0.374	0.000	1.54	389.4	SURCHARGED		
S13.000	S771	75.883	-0.174	0.000	0.55	111.0	OK		
S13.001	S772	75.478	-0.135	0.000	0.72	111.1	OK		
S13.002	S773	75.361	-0.097	0.000	0.86	180.4	OK		
S13.003	S774	74.594	-0.162	0.000	0.61	182.1	OK		
S12.005	S775	74.046	-0.194	0.000	0.72	561.6	OK		
S12.006	S776	72.648	-0.441	0.000	0.44	543.6	OK		
S12.007	S777	72.014	-0.410	0.000	0.48	525.6	OK		
S12.008	S778	71.636	-0.231	0.000	0.06	63.0	OK		
S12.009	SHW779	71.635	0.073	0.000	0.06	58.8	SURCHARGED		
S14.000	S782	71.635	-0.497	0.000	0.00	0.0	OK		
S12.010	SPOND 14	71.635	1.477	0.000	0.05	4.0	SURCHARGED		
S12.011	SFC784	69.656	-0.334	0.000	0.03	4.0	OK		
S12.012	S785	69.251	-2.949	0.000	0.00	3.7	OK		
S12.013	S786	60.627	-1.205	0.000	0.00	4.0	OK		
S1.018	S787	57.597	-2.067	0.000	0.00	17.1	OK		
S1.019	S788	57.596	0.124	0.000	0.08	17.6	SURCHARGED		
S1.020	SHW789	57.589	0.671	0.000	0.11	17.6	SURCHARGED		
S15.000	S790	65.230	0.129	0.000	0.53	37.9	SURCHARGED		
S15.001	S791	65.106	0.547	0.000	0.79	53.2	SURCHARGED		
S15.002	S792	64.805	0.788	0.000	0.96	66.7	SURCHARGED		
S15.003	S793	64.273	0.834	0.000	1.22	85.0	SURCHARGED		
S15.004	S794	63.264	0.485	0.000	1.49	98.9	SURCHARGED		
S15.005	S795	62.161	-0.233	0.000	0.30	114.0	OK		
S15.006	S796	61.239	-0.204	0.000	0.41	134.9	OK		
S15.007	S797	60.939	0.189	0.000	0.62	154.4	SURCHARGED		
S15.008	S798	60.738	0.388	0.000	0.96	176.3	SURCHARGED		
S15.009	S799	60.630	0.386	0.000	1.02	194.2	SURCHARGED		
S15.010	S7100	60.498	0.374	0.000	1.32	223.3	SURCHARGED		
S15.011	S7101	60.321	0.281	0.000	1.32	249.6	SURCHARGED		
S15.012	S7102	60.131	0.208	0.000	1.57	268.8	SURCHARGED		
S15.013	S7103	59.892	0.085	0.000	0.81	274.6	SURCHARGED		
S15.014	S7104	59.355	0.413	0.000	0.98	268.2	SURCHARGED		
S15.015	S7105	58.968	0.782	0.000	1.26	262.3	SURCHARGED		
S15.016	S7106	58.314	0.625	0.000	0.77	267.3	SURCHARGED		
S16.000	S7107	65.057	-0.202	0.000	0.23	32.7	OK		
S16.001	S7108	64.502	-0.168	0.000	0.40	57.9	OK		
S16.002	S7109	63.951	-0.131	0.000	0.60	85.0	OK		
S16.003	S7110	63.285	-0.195	0.000	0.46	114.2	OK		
S16.004	S7111	62.756	-0.148	0.000	0.66	167.1	OK		
S16.005	S7112	61.676	-0.155	0.000	0.63	210.0	OK		
S16.006	S7113	60.953	-0.154	0.000	0.63	238.1	OK		
S16.007	S7114	59.807	-0.119	0.000	0.83	286.7	OK		
S16.008	S7115	59.215	0.291	0.000	0.98	285.9	SURCHARGED		
S16.009	S7116	58.609	0.540	0.000	1.16	252.4	SURCHARGED		
S16.010	S7117	58.330	0.798	0.000	1.11	219.4	SURCHARGED		



Drainage Technical Addendum

DATE:	20 July 2021	CONFIDENTIALITY:	Public
SUBJECT:	Drainage Technical Addendum		
PROJECT:	Milton Keynes East	AUTHOR:	DSF
CHECKED:	BU	APPROVED:	SP

HIF 8

WSP Group Ltd		Page 1
.	Milton Keynes East	
.	HIF 8 None pumped section	
.	Pump inflow excluded	
Date 26/05/2021	Designed by DSF	
File HIF Infrastructure 8.MDX	Checked by PB	
XP Solutions	Network 2018.1.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for HIF - 8

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model	
Return Period (years)	5
FEH Rainfall Version	2013
Site Location	GB 489026 242081 SP 89026 42081
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for HIF - 8


Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.605	4-8	1.089	8-12	0.073

Total Area Contributing (ha) = 1.767

Total Pipe Volume (m³) = 343.231

Network Design Table for HIF - 8

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	73.375	0.482	152.2	0.071	5.00	0.0	0.600	o	225	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 (l/s)	Flow (l/s)
S1.000	50.00	6.16	61.598	0.071	0.0	0.0	0.0	1.06	42.0	9.6

WSP Group Ltd		Page 2
. . .		Milton Keynes East HIF 8 None pumped section Pump inflow excluded
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Network Design Table for HIF - 8

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S2.000	73.737	0.328	225.0	0.069	5.00	0.0	0.600	o	225	Pipe/Conduit	
S3.000	59.840	0.360	166.2	0.062	5.00	0.0	0.600	o	225	Pipe/Conduit	
S2.001	10.841	0.048	225.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.000	60.594	0.353	171.7	0.056	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	12.217	0.054	226.2	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.002	66.355	0.199	333.4	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.003	39.815	0.295	135.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S5.000	32.999	0.209	157.9	0.192	5.00	0.0	0.600	o	450	Pipe/Conduit	
S5.001	26.587	0.164	162.1	0.060	0.00	0.0	0.600	o	450	Pipe/Conduit	
S5.002	22.626	0.075	300.0	0.031	0.00	0.0	0.600	o	525	Pipe/Conduit	
S5.003	11.013	0.037	300.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S5.004	24.851	0.083	300.0	0.079	0.00	0.0	0.600	o	525	Pipe/Conduit	
S5.005	13.557	0.045	300.0	0.011	0.00	0.0	0.600	o	525	Pipe/Conduit	
S5.006	18.781	0.063	300.0	0.021	0.00	0.0	0.600	o	525	Pipe/Conduit	
S5.007	7.683	0.026	300.0	0.015	0.00	0.0	0.600	o	525	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 (l/s)	Flow (l/s)
S2.000	50.00	6.42	61.492	0.069	0.0	0.0	0.0	0.87	34.5	9.3
S3.000	50.00	5.99	61.524	0.062	0.0	0.0	0.0	1.01	40.2	8.4
S2.001	50.00	6.59	61.089	0.131	0.0	0.0	0.0	1.04	73.8	17.7
S4.000	50.00	6.02	61.469	0.056	0.0	0.0	0.0	0.99	39.6	7.6
S1.001	50.00	6.76	60.966	0.257	0.0	0.0	0.0	1.20	132.6	34.9
S1.002	50.00	7.88	60.912	0.257	0.0	0.0	0.0	0.99	109.0	34.9
S1.003	50.00	8.31	60.713	0.257	0.0	0.0	0.0	1.56	172.1	34.9
S5.000	50.00	5.34	60.695	0.192	0.0	0.0	0.0	1.62	256.9	26.0
S5.001	50.00	5.62	60.486	0.252	0.0	0.0	0.0	1.59	253.5	34.1
S5.002	50.00	5.91	60.247	0.283	0.0	0.0	0.0	1.29	278.8	38.3
S5.003	50.00	6.05	60.172	0.283	0.0	0.0	0.0	1.29	278.8	38.3
S5.004	50.00	6.38	60.135	0.362	0.0	0.0	0.0	1.29	278.8	49.0
S5.005	50.00	6.55	60.052	0.373	0.0	0.0	0.0	1.29	278.8	50.5
S5.006	50.00	6.79	60.007	0.394	0.0	0.0	0.0	1.29	278.8	53.4
S5.007	50.00	6.89	59.944	0.409	0.0	0.0	0.0	1.29	278.8	55.4



Network Design Table for HIF - 8

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.004	23.396	0.067	350.0	0.104	0.00	0.0	0.600	o	675	Pipe/Conduit	
S1.005	14.557	1.600	9.1	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit	
S6.000	27.917	0.423	66.0	0.040	5.00	0.0	0.600	o	225	Pipe/Conduit	
S6.001	26.233	0.067	389.9	0.042	0.00	0.0	0.600	o	225	Pipe/Conduit	
S7.000	21.550	0.273	78.9	0.061	5.00	0.0	0.600	o	225	Pipe/Conduit	
S7.001	13.114	0.350	37.5	0.040	0.00	0.0	0.600	o	225	Pipe/Conduit	
S6.002	14.784	0.049	301.7	0.046	0.00	0.0	0.600	o	375	Pipe/Conduit	
S6.003	18.703	1.440	13.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.006	14.336	0.532	26.9	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
S1.007	63.174	0.126	500.0	0.000	0.00	0.0	0.600	o	825	Pipe/Conduit	
S8.000	132.323	1.651	80.1	0.268	5.00	0.0	0.600	o	375	Pipe/Conduit	
S9.000	77.598	0.296	262.2	0.000	5.00	0.0	0.600	o	750	Pipe/Conduit	
S9.001	118.416	0.265	446.9	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
S9.002	15.815	0.043	367.8	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
S8.001	36.339	0.222	163.7	0.000	0.00	0.0	0.600	o	750	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 (l/s)	Flow (l/s)
S1.004	50.00	8.59	59.768	0.771	0.0	0.0	0.0	1.40	499.2	104.4
S1.005	50.00	8.61	59.701	0.771	0.0	0.0	0.0	8.72	3120.5	104.4
S6.000	50.00	5.29	60.530	0.040	0.0	0.0	0.0	1.61	64.1	5.4
S6.001	50.00	5.95	60.107	0.082	0.0	0.0	0.0	0.66	26.1	11.1
S7.000	50.00	5.24	60.663	0.061	0.0	0.0	0.0	1.47	58.6	8.2
S7.001	50.00	5.35	60.390	0.101	0.0	0.0	0.0	2.14	85.2	13.7
S6.002	50.00	6.19	59.890	0.228	0.0	0.0	0.0	1.04	114.6	30.9
S6.003	50.00	6.25	59.841	0.228	0.0	0.0	0.0	5.05	557.8	30.9
S1.006	50.00	8.66	58.026	0.999	0.0	0.0	0.0	5.40	2387.2	135.3
S1.007	50.00	9.45	57.494	0.999	0.0	0.0	0.0	1.32	706.1	135.3
S8.000	50.00	6.09	59.775	0.268	0.0	0.0	0.0	2.03	223.7	36.4
S9.000	50.00	5.75	58.353	0.000	0.0	0.0	0.0	1.72	761.5	0.0
S9.001	50.00	7.25	58.057	0.000	0.0	0.0	0.0	1.32	582.0	0.0
S9.002	50.00	7.43	57.792	0.000	0.0	0.0	0.0	1.45	642.0	0.0
S8.001	50.00	7.71	57.749	0.268	0.0	0.0	0.0	2.18	965.2	36.4

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Milton Keynes East
HIF 8 None pumped section
Pump inflow excluded



Date 26/05/2021
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Network Design Table for HIF - 8

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S8.002	62.710	0.150	418.1	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
S10.000	53.121	0.719	73.8	0.000	5.00	0.0	0.600	o	375	Pipe/Conduit	
S10.001	69.813	1.397	50.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S10.002	42.322	0.150	282.1	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S11.000	46.982	0.157	300.0	0.071	5.00	0.0	0.600	o	225	Pipe/Conduit	
S11.001	22.073	0.074	298.3	0.023	0.00	0.0	0.600	o	375	Pipe/Conduit	
S12.000	48.436	0.161	300.0	0.071	5.00	0.0	0.600	o	225	Pipe/Conduit	
S12.001	26.066	0.076	343.0	0.028	0.00	0.0	0.600	o	375	Pipe/Conduit	
S13.000	47.569	0.408	116.6	0.215	5.00	0.0	0.600	o	375	Pipe/Conduit	
S13.001	18.924	0.133	142.3	0.048	0.00	0.0	0.600	o	375	Pipe/Conduit	
S13.002	15.097	0.062	243.5	0.010	0.00	0.0	0.600	o	375	Pipe/Conduit	
S12.002	24.049	0.080	300.6	0.034	0.00	0.0	0.600	o	525	Pipe/Conduit	
S11.002	21.759	0.506	43.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S11.003	56.540	0.150	376.9	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.008	11.455	0.075	152.7	0.000	0.00	0.0	0.600	o	375	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 (l/s)	Flow (l/s)
S8.002	50.00	8.47	57.527	0.268	0.0	0.0	0.0	1.36	601.8	36.4
S10.000	50.00	5.42	59.643	0.000	0.0	0.0	0.0	2.11	233.1	0.0
S10.001	50.00	5.82	58.924	0.000	0.0	0.0	0.0	2.88	458.3	0.0
S10.002	50.00	6.31	57.527	0.000	0.0	0.0	0.0	1.44	408.5	0.0
S11.000	50.00	6.04	58.687	0.071	0.0	0.0	0.0	0.75	29.8	9.6
S11.001	50.00	6.40	58.380	0.093	0.0	0.0	0.0	1.04	115.3	12.6
S12.000	50.00	6.08	58.725	0.071	0.0	0.0	0.0	0.75	29.8	9.6
S12.001	50.00	6.52	58.414	0.100	0.0	0.0	0.0	0.97	107.4	13.5
S13.000	50.00	5.47	60.663	0.215	0.0	0.0	0.0	1.68	185.2	29.1
S13.001	50.00	5.68	60.255	0.263	0.0	0.0	0.0	1.52	167.5	35.6
S13.002	50.00	5.90	60.122	0.273	0.0	0.0	0.0	1.16	127.7	37.0
S12.002	50.00	6.83	58.188	0.406	0.0	0.0	0.0	1.29	278.5	55.0
S11.002	50.00	6.94	58.108	0.500	0.0	0.0	0.0	3.42	740.9	67.6
S11.003	50.00	7.70	57.527	0.500	0.0	0.0	0.0	1.25	352.9	67.6
S1.008	50.00	9.59	57.368	1.767	0.0	0.0	0.0	1.46	161.7«	239.3

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Milton Keynes East
HIF 8 None pumped section
Pump inflow excluded



Date 26/05/2021
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Network Design Table for HIF - 8

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.009	5.352	0.084	63.7	0.000	0.00	0.0	0.600	o	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 (l/s)	Flow (l/s)
S1.009	50.00	9.62	57.293	1.767	0.0	0.0	0.0	2.55	405.6	239.3

Milton Keynes East
HIF 8 None pumped section
Pump inflow excluded



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Manhole Schedules for HIF - 8

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out			Pipes In			Backdrop (mm)
					PN	Invert Level (m)	Diameter (mm)	PN	Invert Level (m)	Diameter (mm)	
S801	63.023	1.425	Open Manhole	1200	S1.000	61.598	225				
S802	62.617	1.125	Open Manhole	1200	S2.000	61.492	225				
S803	62.649	1.125	Open Manhole	1200	S3.000	61.524	225				
S804	62.976	1.887	Open Manhole	1200	S2.001	61.089	300	S2.000	61.164	225	
								S3.000	61.164	225	
S805	62.594	1.125	Open Manhole	1200	S4.000	61.469	225				
S806	63.380	2.414	Open Manhole	1350	S1.001	60.966	375	S1.000	61.116	225	
								S2.001	61.041	300	
								S4.000	61.116	225	
S807	62.800	1.888	Open Manhole	1350	S1.002	60.912	375	S1.001	60.912	375	
S808	62.000	1.287	Open Manhole	1500	S1.003	60.713	375	S1.002	60.713	375	
S809	62.545	1.850	Open Manhole	1200	S5.000	60.695	450				
S810	62.136	1.650	Open Manhole	1200	S5.001	60.486	450	S5.000	60.486	450	
S811	61.972	1.725	Open Manhole	1500	S5.002	60.247	525	S5.001	60.322	450	
S812	62.223	2.051	Open Manhole	1500	S5.003	60.172	525	S5.002	60.172	525	
S813	62.294	2.159	Open Manhole	1500	S5.004	60.135	525	S5.003	60.135	525	
S814	62.236	2.184	Open Manhole	1500	S5.005	60.052	525	S5.004	60.052	525	
S815	62.163	2.157	Open Manhole	1500	S5.006	60.007	525	S5.005	60.007	525	
S816	62.013	2.069	Open Manhole	1500	S5.007	59.944	525	S5.006	59.944	525	
S817	61.993	2.225	Open Manhole	1500	S1.004	59.768	675	S1.003	60.418	375	350
								S5.007	59.918	525	
S818	61.955	2.254	Open Manhole	1500	S1.005	59.701	675	S1.004	59.701	675	
S819	61.955	1.425	Open Manhole	1050	S6.000	60.530	225				
S820	61.532	1.425	Open Manhole	1050	S6.001	60.107	225	S6.000	60.107	225	
S821	62.088	1.425	Open Manhole	1050	S7.000	60.663	225				
S822	61.815	1.425	Open Manhole	1050	S7.001	60.390	225	S7.000	60.390	225	
S823	61.635	1.745	Open Manhole	1200	S6.002	59.890	375	S6.001	60.040	225	
								S7.001	60.040	225	
S824	61.741	1.900	Open Manhole	1350	S6.003	59.841	375	S6.002	59.841	375	
S825	59.676	1.650	Open Manhole	1800	S1.006	58.026	750	S1.005	58.101	675	
								S6.003	58.401	375	
SHW826	59.150	1.656	Open Manhole	1800	S1.007	57.494	825	S1.006	57.494	750	
S827	65.000	5.225	Open Manhole	1350	S8.000	59.775	375				
S828	65.000	6.647	Open Manhole	1800	S9.000	58.353	750				
S829	65.000	6.943	Open Manhole	1800	S9.001	58.057	750	S9.000	58.057	750	
S830	62.540	4.748	Open Manhole	1800	S9.002	57.792	750	S9.001	57.792	750	
S831	62.604	4.855	Open Manhole	1800	S8.001	57.749	750	S8.000	58.124	375	
								S9.002	57.749	750	

Milton Keynes East
 HIF 8 None pumped section
 Pump inflow excluded



Date 26/05/2021
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Manhole Schedules for HIF - 8

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backd (mm)
SHW832	59.150	1.623	Open Manhole	1800	S8.002	57.527	750	S8.001	57.527	750	
S833	65.000	5.357	Open Manhole	1350	S10.000	59.643	375				
S834	65.000	6.076	Open Manhole	1350	S10.001	58.924	450	S10.000	58.924	375	
SHW835	59.150	1.623	Open Manhole	1500	S10.002	57.527	600	S10.001	57.527	450	
S836	60.112	1.425	Open Manhole	1200	S11.000	58.687	225				
S837	61.068	2.687	Open Manhole	1350	S11.001	58.380	375	S11.000	58.530	225	
S838	60.150	1.425	Open Manhole	1200	S12.000	58.725	225				
S839	61.056	2.643	Open Manhole	1350	S12.001	58.414	375	S12.000	58.564	225	
S840	62.438	1.775	Open Manhole	1200	S13.000	60.663	375				
S841	61.830	1.575	Open Manhole	1200	S13.001	60.255	375	S13.000	60.255	375	
S842	61.697	1.575	Open Manhole	1200	S13.002	60.122	375	S13.001	60.122	375	
S843	61.560	3.373	Open Manhole	1500	S12.002	58.188	525	S12.001	58.338	375	
								S13.002	60.060	375	
S844	61.530	3.422	Open Manhole	1500	S11.002	58.108	525	S11.001	58.306	375	
								S12.002	58.108	525	
SHW845	59.150	1.623	Open Manhole	1500	S11.003	57.527	600	S11.002	57.602	525	
SPOND 9	59.150	1.782	Open Manhole	1800	S1.008	57.368	375	S1.007	57.368	825	
								S8.002	57.377	750	
								S10.002	57.377	600	
								S11.003	57.377	600	
SFC847	59.150	1.857	Open Manhole	1500	S1.009	57.293	450	S1.008	57.293	375	
SHW856	60.000	2.791	Open Manhole	0		OUTFALL		S1.009	57.209	450	

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.Milton Keynes East
HIF 8 None pumped section
Pump inflow excluded

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Area Summary for HIF - 8

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.071	0.071	0.071
2.000	User	-	100	0.069	0.069	0.069
3.000	User	-	100	0.062	0.062	0.062
2.001	-	-	100	0.000	0.000	0.000
4.000	User	-	100	0.056	0.056	0.056
1.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
5.000	User	-	100	0.192	0.192	0.192
5.001	User	-	100	0.060	0.060	0.060
5.002	User	-	100	0.031	0.031	0.031
5.003	-	-	100	0.000	0.000	0.000
5.004	User	-	100	0.079	0.079	0.079
5.005	User	-	100	0.011	0.011	0.011
5.006	User	-	100	0.021	0.021	0.021
5.007	User	-	100	0.015	0.015	0.015
1.004	User	-	100	0.104	0.104	0.104
1.005	-	-	100	0.000	0.000	0.000
6.000	User	-	100	0.040	0.040	0.040
6.001	User	-	100	0.042	0.042	0.042
7.000	User	-	100	0.061	0.061	0.061
7.001	User	-	100	0.040	0.040	0.040
6.002	User	-	100	0.046	0.046	0.046
6.003	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
8.000	User	-	100	0.268	0.268	0.268
9.000	-	-	100	0.000	0.000	0.000
9.001	-	-	100	0.000	0.000	0.000
9.002	-	-	100	0.000	0.000	0.000
8.001	-	-	100	0.000	0.000	0.000
8.002	-	-	100	0.000	0.000	0.000
10.000	-	-	100	0.000	0.000	0.000
10.001	-	-	100	0.000	0.000	0.000
10.002	-	-	100	0.000	0.000	0.000
11.000	User	-	100	0.071	0.071	0.071
11.001	User	-	100	0.023	0.023	0.023
12.000	User	-	100	0.071	0.071	0.071
12.001	User	-	100	0.028	0.028	0.028
13.000	User	-	100	0.215	0.215	0.215
13.001	User	-	100	0.048	0.048	0.048
13.002	User	-	100	0.010	0.010	0.010
12.002	User	-	100	0.034	0.034	0.034
11.002	-	-	100	0.000	0.000	0.000
11.003	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				1.767	1.767	1.767

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Online Controls for HIF - 8

Hydro-Brake® Optimum Manhole: SPOND 9, DS/PN: S1.008, Volume (m³): 91.3

Unit Reference	MD-SHE-0116-7100-1600-7100
Design Head (m)	1.600
Design Flow (l/s)	7.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	116
Invert Level (m)	57.368
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.600	7.1
Flush-Flo™	0.470	7.1
Kick-Flo®	0.971	5.6
Mean Flow over Head Range	-	6.2

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.1	1.200	6.2	3.000	9.5	7.000	14.3
0.200	6.3	1.400	6.7	3.500	10.3	7.500	14.8
0.300	6.8	1.600	7.1	4.000	10.9	8.000	15.2
0.400	7.1	1.800	7.5	4.500	11.6	8.500	15.7
0.500	7.1	2.000	7.9	5.000	12.2	9.000	16.1
0.600	7.0	2.200	8.2	5.500	12.7	9.500	16.5
0.800	6.6	2.400	8.6	6.000	13.3		
1.000	5.7	2.600	8.9	6.500	13.8		

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Storage Structures for HIF - 8

Tank or Pond Manhole: SPOND 9, DS/PN: S1.008

Invert Level (m) 57.368

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	1000.0	1.782	2650.0

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 8

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF


Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) SurchARGE	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S801	15 Summer	2	+0%	100/15 Summer				61.691
S2.000	S802	15 Summer	2	+0%	100/15 Summer				61.594
S3.000	S803	15 Summer	2	+0%	100/15 Summer				61.612
S2.001	S804	15 Summer	2	+0%	100/15 Summer				61.226
S4.000	S805	15 Summer	2	+0%	100/15 Summer				61.553
S1.001	S806	15 Summer	2	+0%	100/15 Summer				61.152
S1.002	S807	15 Summer	2	+0%	100/15 Summer				61.097
S1.003	S808	15 Summer	2	+0%					60.853
S5.000	S809	15 Summer	2	+0%	100/15 Summer				60.822
S5.001	S810	15 Summer	2	+0%	100/15 Summer				60.632
S5.002	S811	15 Summer	2	+0%	100/15 Summer				60.428
S5.003	S812	15 Summer	2	+0%	100/15 Summer				60.365
S5.004	S813	15 Summer	2	+0%	100/15 Summer				60.332
S5.005	S814	15 Summer	2	+0%	100/15 Summer				60.263
S5.006	S815	15 Summer	2	+0%	100/15 Summer				60.222
S5.007	S816	15 Summer	2	+0%	100/15 Summer				60.174
S1.004	S817	15 Summer	2	+0%					60.039

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 8


PN	US/MH Name	Surcharged Flooded		Pipe		Level Exceeded	Status
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)		
S1.000	S801	-0.132	0.000	0.35		14.2	OK
S2.000	S802	-0.123	0.000	0.39		13.0	OK
S3.000	S803	-0.137	0.000	0.31		12.2	OK
S2.001	S804	-0.163	0.000	0.43		25.0	OK
S4.000	S805	-0.141	0.000	0.29		11.2	OK
S1.001	S806	-0.189	0.000	0.49		49.9	OK
S1.002	S807	-0.190	0.000	0.46		47.3	OK
S1.003	S808	-0.235	0.000	0.30		46.8	OK
S5.000	S809	-0.323	0.000	0.17		38.7	OK
S5.001	S810	-0.304	0.000	0.23		48.8	OK
S5.002	S811	-0.344	0.000	0.24		53.2	OK
S5.003	S812	-0.332	0.000	0.28		52.6	OK
S5.004	S813	-0.328	0.000	0.28		63.8	OK
S5.005	S814	-0.314	0.000	0.32		63.8	OK
S5.006	S815	-0.310	0.000	0.31		66.5	OK
S5.007	S816	-0.295	0.000	0.40		68.0	OK
S1.004	S817	-0.404	0.000	0.34		126.6	OK

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 8


PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.005	S818	15 Summer	2	+0%				
S6.000	S819	15 Summer	2	+0%	100/15 Summer			
S6.001	S820	15 Summer	2	+0%	30/15 Summer			
S7.000	S821	15 Summer	2	+0%	100/15 Summer			
S7.001	S822	15 Summer	2	+0%	100/15 Summer			
S6.002	S823	15 Summer	2	+0%	30/15 Summer			
S6.003	S824	15 Summer	2	+0%				
S1.006	S825	15 Summer	2	+0%				
S1.007	SHW826	4320 Summer	2	+0%	100/360 Summer			
S8.000	S827	15 Summer	2	+0%	100/15 Summer			
S9.000	S828	120 Winter	2	+0%				
S9.001	S829	120 Winter	2	+0%				
S9.002	S830	15 Summer	2	+0%				
S8.001	S831	15 Summer	2	+0%				
S8.002	SHW832	4320 Summer	2	+0%	100/240 Summer			
S10.000	S833	120 Winter	2	+0%				
S10.001	S834	120 Winter	2	+0%				
S10.002	SHW835	4320 Summer	2	+0%	100/120 Summer			
S11.000	S836	15 Summer	2	+0%	30/15 Summer			
S11.001	S837	15 Summer	2	+0%				
S12.000	S838	15 Summer	2	+0%	30/15 Summer			
S12.001	S839	15 Summer	2	+0%	100/15 Summer			
S13.000	S840	15 Summer	2	+0%	100/15 Summer			
S13.001	S841	15 Summer	2	+0%	100/15 Summer			
S13.002	S842	15 Summer	2	+0%	30/15 Summer			
S12.002	S843	15 Summer	2	+0%	100/15 Summer			
S11.002	S844	15 Summer	2	+0%				
S11.003	SHW845	4320 Summer	2	+0%	100/15 Summer			
S1.008	SPOND 9	4320 Summer	2	+0%	2/480 Summer			
S1.009	SFC847	4320 Summer	2	+0%				

PN	US/MH Name	Water Surcharged Flooded			Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)					
S1.005	S818	59.827	-0.549	0.000	0.08		126.8	OK	
S6.000	S819	60.585	-0.170	0.000	0.14		8.1	OK	
S6.001	S820	60.238	-0.094	0.000	0.62		15.1	OK	
S7.000	S821	60.736	-0.152	0.000	0.23		12.4	OK	
S7.001	S822	60.468	-0.147	0.000	0.26		19.2	OK	
S6.002	S823	60.069	-0.196	0.000	0.46		41.7	OK	
S6.003	S824	59.917	-0.299	0.000	0.09		41.8	OK	
S1.006	S825	58.210	-0.566	0.000	0.14		155.4	OK	
S1.007	SHW826	57.795	-0.524	0.000	0.01		6.5	OK	
S8.000	S827	59.903	-0.247	0.000	0.25		54.8	OK	
S9.000	S828	58.353	-0.750	0.000	0.00		0.0	OK	
S9.001	S829	58.057	-0.750	0.000	0.00		0.0	OK	

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 8

PN	US/MH Name	Water		Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)				
S9.002	S830	57.863	-0.679	0.000	0.01		2.2	OK		
S8.001	S831	57.880	-0.619	0.000	0.07		51.9	OK		
S8.002	SHW832	57.795	-0.482	0.000	0.00		1.7	OK		
S10.000	S833	59.643	-0.375	0.000	0.00		0.0	OK		
S10.001	S834	58.924	-0.450	0.000	0.00		0.0	OK		
S10.002	SHW835	57.795	-0.332	0.000	0.00		0.0	OK		
S11.000	S836	58.801	-0.111	0.000	0.51		14.4	OK		
S11.001	S837	58.489	-0.267	0.000	0.18		17.9	OK		
S12.000	S838	58.839	-0.111	0.000	0.51		14.5	OK		
S12.001	S839	58.528	-0.260	0.000	0.20		18.7	OK		
S13.000	S840	60.792	-0.246	0.000	0.25		42.9	OK		
S13.001	S841	60.413	-0.217	0.000	0.37		51.3	OK		
S13.002	S842	60.313	-0.184	0.000	0.52		53.0	OK		
S12.002	S843	58.400	-0.313	0.000	0.34		76.5	OK		
S11.002	S844	58.254	-0.378	0.000	0.17		94.8	OK		
S11.003	SHW845	57.795	-0.332	0.000	0.01		3.2	OK		
S1.008	SPOND 9	57.795	0.052	0.000	0.03		3.4	SURCHARGED		
S1.009	SFC847	57.701	-0.042	0.000	0.02		3.4	OK		

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 8

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF


Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S801	15 Summer	5	+0%	100/15 Summer				61.708
S2.000	S802	15 Summer	5	+0%	100/15 Summer				61.613
S3.000	S803	15 Summer	5	+0%	100/15 Summer				61.628
S2.001	S804	15 Summer	5	+0%	100/15 Summer				61.252
S4.000	S805	15 Summer	5	+0%	100/15 Summer				61.568
S1.001	S806	15 Summer	5	+0%	100/15 Summer				61.187
S1.002	S807	15 Summer	5	+0%	100/15 Summer				61.130
S1.003	S808	15 Summer	5	+0%					60.878
S5.000	S809	15 Summer	5	+0%	100/15 Summer				60.843
S5.001	S810	15 Summer	5	+0%	100/15 Summer				60.657
S5.002	S811	15 Summer	5	+0%	100/15 Summer				60.462
S5.003	S812	15 Summer	5	+0%	100/15 Summer				60.400
S5.004	S813	15 Summer	5	+0%	100/15 Summer				60.369
S5.005	S814	15 Summer	5	+0%	100/15 Summer				60.302
S5.006	S815	15 Summer	5	+0%	100/15 Summer				60.263
S5.007	S816	15 Summer	5	+0%	100/15 Summer				60.217
S1.004	S817	15 Summer	5	+0%					60.086

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 8


PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)					
S1.000	S801	-0.115	0.000	0.46		18.6	OK	
S2.000	S802	-0.104	0.000	0.51		17.2	OK	
S3.000	S803	-0.121	0.000	0.42		16.2	OK	
S2.001	S804	-0.137	0.000	0.57		33.2	OK	
S4.000	S805	-0.126	0.000	0.39		14.8	OK	
S1.001	S806	-0.154	0.000	0.65		66.2	OK	
S1.002	S807	-0.156	0.000	0.61		62.9	OK	
S1.003	S808	-0.210	0.000	0.40		62.3	OK	
S5.000	S809	-0.302	0.000	0.23		51.9	OK	
S5.001	S810	-0.279	0.000	0.31		65.5	OK	
S5.002	S811	-0.310	0.000	0.32		70.9	OK	
S5.003	S812	-0.297	0.000	0.37		70.1	OK	
S5.004	S813	-0.291	0.000	0.38		84.9	OK	
S5.005	S814	-0.275	0.000	0.42		84.8	OK	
S5.006	S815	-0.269	0.000	0.41		88.5	OK	
S5.007	S816	-0.252	0.000	0.53		90.5	OK	
S1.004	S817	-0.357	0.000	0.45		168.7	OK	

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 8


PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.005	S818	15 Summer	5	+0%				
S6.000	S819	15 Summer	5	+0%	100/15 Summer			
S6.001	S820	15 Summer	5	+0%	30/15 Summer			
S7.000	S821	15 Summer	5	+0%	100/15 Summer			
S7.001	S822	15 Summer	5	+0%	100/15 Summer			
S6.002	S823	15 Summer	5	+0%	30/15 Summer			
S6.003	S824	15 Summer	5	+0%				
S1.006	S825	15 Summer	5	+0%				
S1.007	SHW826	4320 Summer	5	+0%	100/360 Summer			
S8.000	S827	15 Summer	5	+0%	100/15 Summer			
S9.000	S828	120 Winter	5	+0%				
S9.001	S829	120 Winter	5	+0%				
S9.002	S830	15 Summer	5	+0%				
S8.001	S831	15 Summer	5	+0%				
S8.002	SHW832	4320 Summer	5	+0%	100/240 Summer			
S10.000	S833	120 Winter	5	+0%				
S10.001	S834	120 Winter	5	+0%				
S10.002	SHW835	4320 Summer	5	+0%	100/120 Summer			
S11.000	S836	15 Summer	5	+0%	30/15 Summer			
S11.001	S837	15 Summer	5	+0%				
S12.000	S838	15 Summer	5	+0%	30/15 Summer			
S12.001	S839	15 Summer	5	+0%	100/15 Summer			
S13.000	S840	15 Summer	5	+0%	100/15 Summer			
S13.001	S841	15 Summer	5	+0%	100/15 Summer			
S13.002	S842	15 Summer	5	+0%	30/15 Summer			
S12.002	S843	15 Summer	5	+0%	100/15 Summer			
S11.002	S844	15 Summer	5	+0%				
S11.003	SHW845	4320 Summer	5	+0%	100/15 Summer			
S1.008	SPOND 9	4320 Summer	5	+0%	2/480 Summer			
S1.009	SFC847	4320 Summer	5	+0%				

PN	US/MH Name	Water			Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)					
S1.005	S818	59.847	-0.529	0.000	0.11			168.8	OK		
S6.000	S819	60.595	-0.160	0.000	0.18			10.9	OK		
S6.001	S820	60.268	-0.064	0.000	0.83			20.2	OK		
S7.000	S821	60.749	-0.139	0.000	0.31			16.6	OK		
S7.001	S822	60.482	-0.133	0.000	0.35			25.7	OK		
S6.002	S823	60.103	-0.162	0.000	0.61			55.8	OK		
S6.003	S824	59.927	-0.289	0.000	0.12			55.8	OK		
S1.006	S825	58.241	-0.535	0.000	0.18			207.9	OK		
S1.007	SHW826	57.839	-0.480	0.000	0.01			7.8	OK		
S8.000	S827	59.926	-0.224	0.000	0.34			73.5	OK		
S9.000	S828	58.353	-0.750	0.000	0.00			0.0	OK		
S9.001	S829	58.057	-0.750	0.000	0.00			0.0	OK		

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
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PN	US/MH Name	Water Surcharged			Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)			
S9.002	S830	57.890	-0.652	0.000	0.01	3.5	OK		
S8.001	S831	57.904	-0.595	0.000	0.09	69.3	OK		
S8.002	SHW832	57.839	-0.438	0.000	0.00	2.0	OK		
S10.000	S833	59.643	-0.375	0.000	0.00	0.0	OK		
S10.001	S834	58.924	-0.450	0.000	0.00	0.0	OK		
S10.002	SHW835	57.838	-0.289	0.000	0.00	0.0	OK		
S11.000	S836	58.824	-0.088	0.000	0.68	19.4	OK		
S11.001	S837	58.507	-0.249	0.000	0.24	24.0	OK		
S12.000	S838	58.862	-0.088	0.000	0.68	19.5	OK		
S12.001	S839	58.547	-0.241	0.000	0.27	25.1	OK		
S13.000	S840	60.815	-0.223	0.000	0.34	57.6	OK		
S13.001	S841	60.443	-0.187	0.000	0.49	68.8	OK		
S13.002	S842	60.351	-0.146	0.000	0.69	70.9	OK		
S12.002	S843	58.438	-0.274	0.000	0.46	102.7	OK		
S11.002	S844	58.279	-0.354	0.000	0.23	127.0	OK		
S11.003	SHW845	57.839	-0.288	0.000	0.01	3.9	OK		
S1.008	SPOND 9	57.839	0.096	0.000	0.04	4.6	SURCHARGED		
S1.009	SFC847	57.701	-0.042	0.000	0.03	4.6	OK		

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 8

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF


Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S801	15 Summer	30	+0%	100/15 Summer				61.749
S2.000	S802	15 Summer	30	+0%	100/15 Summer				61.663
S3.000	S803	15 Summer	30	+0%	100/15 Summer				61.667
S2.001	S804	15 Summer	30	+0%	100/15 Summer				61.327
S4.000	S805	15 Summer	30	+0%	100/15 Summer				61.603
S1.001	S806	15 Summer	30	+0%	100/15 Summer				61.289
S1.002	S807	15 Summer	30	+0%	100/15 Summer				61.210
S1.003	S808	15 Summer	30	+0%					60.928
S5.000	S809	15 Summer	30	+0%	100/15 Summer				60.890
S5.001	S810	15 Summer	30	+0%	100/15 Summer				60.723
S5.002	S811	15 Summer	30	+0%	100/15 Summer				60.560
S5.003	S812	15 Summer	30	+0%	100/15 Summer				60.508
S5.004	S813	15 Summer	30	+0%	100/15 Summer				60.480
S5.005	S814	15 Summer	30	+0%	100/15 Summer				60.417
S5.006	S815	15 Summer	30	+0%	100/15 Summer				60.383
S5.007	S816	15 Summer	30	+0%	100/15 Summer				60.340
S1.004	S817	15 Summer	30	+0%					60.195

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
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PN	US/MH Name	Surcharged Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap. (l/s)	Overflow Flow (l/s)	
S1.000	S801	-0.074	0.000	0.74	30.2	OK
S2.000	S802	-0.054	0.000	0.84	28.2	OK
S3.000	S803	-0.082	0.000	0.69	26.6	OK
S2.001	S804	-0.062	0.000	0.88	51.6	OK
S4.000	S805	-0.091	0.000	0.63	24.1	OK
S1.001	S806	-0.052	0.000	1.00	102.0	OK
S1.002	S807	-0.077	0.000	0.96	98.7	OK
S1.003	S808	-0.160	0.000	0.63	98.0	OK
S5.000	S809	-0.255	0.000	0.38	85.6	OK
S5.001	S810	-0.213	0.000	0.53	113.5	OK
S5.002	S811	-0.212	0.000	0.56	124.6	OK
S5.003	S812	-0.189	0.000	0.64	121.2	OK
S5.004	S813	-0.180	0.000	0.65	147.9	OK
S5.005	S814	-0.160	0.000	0.75	148.9	OK
S5.006	S815	-0.149	0.000	0.71	153.1	OK
S5.007	S816	-0.129	0.000	0.91	155.0	OK
S1.004	S817	-0.248	0.000	0.71	266.2	OK

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 8

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.005	S818	15 Summer	30	+0%				
S6.000	S819	15 Summer	30	+0%	100/15 Summer			
S6.001	S820	15 Summer	30	+0%	30/15 Summer			
S7.000	S821	15 Summer	30	+0%	100/15 Summer			
S7.001	S822	15 Summer	30	+0%	100/15 Summer			
S6.002	S823	15 Summer	30	+0%	30/15 Summer			
S6.003	S824	15 Summer	30	+0%				
S1.006	S825	15 Summer	30	+0%				
S1.007	SHW826	960 Winter	30	+0%	100/360 Summer			
S8.000	S827	15 Summer	30	+0%	100/15 Summer			
S9.000	S828	120 Winter	30	+0%				
S9.001	S829	120 Winter	30	+0%				
S9.002	S830	960 Winter	30	+0%				
S8.001	S831	960 Winter	30	+0%				
S8.002	SHW832	960 Winter	30	+0%	100/240 Summer			
S10.000	S833	120 Winter	30	+0%				
S10.001	S834	120 Winter	30	+0%				
S10.002	SHW835	960 Winter	30	+0%	100/120 Summer			
S11.000	S836	15 Summer	30	+0%	30/15 Summer			
S11.001	S837	15 Summer	30	+0%				
S12.000	S838	15 Summer	30	+0%	30/15 Summer			
S12.001	S839	15 Summer	30	+0%	100/15 Summer			
S13.000	S840	15 Summer	30	+0%	100/15 Summer			
S13.001	S841	15 Summer	30	+0%	100/15 Summer			
S13.002	S842	15 Summer	30	+0%	30/15 Summer			
S12.002	S843	15 Summer	30	+0%	100/15 Summer			
S11.002	S844	15 Summer	30	+0%				
S11.003	SHW845	960 Winter	30	+0%	100/15 Summer			
S1.008	SPOND 9	960 Winter	30	+0%	2/480 Summer			
S1.009	SFC847	960 Winter	30	+0%				

PN	US/MH Name	Water			Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)					
S1.005	S818	59.884	-0.492	0.000	0.17			266.2		OK	
S6.000	S819	60.615	-0.140	0.000	0.30			18.0		OK	
S6.001	S820	60.442	0.110	0.000	1.54			37.2	SURCHARGED		
S7.000	S821	60.778	-0.110	0.000	0.51			27.4		OK	
S7.001	S822	60.522	-0.093	0.000	0.64			47.4		OK	
S6.002	S823	60.273	0.008	0.000	1.13			103.5	SURCHARGED		
S6.003	S824	59.962	-0.254	0.000	0.23			104.2		OK	
S1.006	S825	58.311	-0.465	0.000	0.31			351.1		OK	
S1.007	SHW826	57.975	-0.344	0.000	0.04			24.6		OK	
S8.000	S827	59.976	-0.174	0.000	0.56			121.2		OK	
S9.000	S828	58.353	-0.750	0.000	0.00			0.0		OK	
S9.001	S829	58.057	-0.750	0.000	0.00			0.0		OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for HIF - 8

PN	US/MH Name	Water		Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)				
S9.002	S830	57.974	-0.568	0.000	0.00		0.1	OK		
S8.001	S831	57.974	-0.525	0.000	0.01		6.6	OK		
S8.002	SHW832	57.974	-0.303	0.000	0.01		6.0	OK		
S10.000	S833	59.643	-0.375	0.000	0.00		0.0	OK		
S10.001	S834	58.924	-0.450	0.000	0.00		0.0	OK		
S10.002	SHW835	57.974	-0.153	0.000	0.00		0.0	OK		
S11.000	S836	58.943	0.031	0.000	1.11		31.6	SURCHARGED		
S11.001	S837	58.551	-0.205	0.000	0.42		40.9	OK		
S12.000	S838	58.984	0.034	0.000	1.09		31.2	SURCHARGED		
S12.001	S839	58.600	-0.188	0.000	0.46		43.3	OK		
S13.000	S840	60.866	-0.172	0.000	0.56		94.9	OK		
S13.001	S841	60.599	-0.031	0.000	0.81		112.2	OK		
S13.002	S842	60.508	0.011	0.000	1.11		113.5	SURCHARGED		
S12.002	S843	58.534	-0.179	0.000	0.75		169.0	OK		
S11.002	S844	58.332	-0.300	0.000	0.38		209.6	OK		
S11.003	SHW845	57.974	-0.153	0.000	0.04		12.3	OK		
S1.008	SPOND 9	57.974	0.231	0.000	0.06		6.7	SURCHARGED		
S1.009	SFC847	57.702	-0.041	0.000	0.04		6.7	OK		

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for HIF - 8

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF


Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S801	15 Summer	100	+40%	100/15 Summer				62.416
S2.000	S802	15 Summer	100	+40%	100/15 Summer				62.436
S3.000	S803	15 Summer	100	+40%	100/15 Summer				62.198
S2.001	S804	15 Summer	100	+40%	100/15 Summer				61.867
S4.000	S805	15 Summer	100	+40%	100/15 Summer				62.007
S1.001	S806	15 Summer	100	+40%	100/15 Summer				61.754
S1.002	S807	15 Summer	100	+40%	100/15 Summer				61.577
S1.003	S808	15 Summer	100	+40%					61.009
S5.000	S809	15 Summer	100	+40%	100/15 Summer				61.204
S5.001	S810	15 Summer	100	+40%	100/15 Summer				61.071
S5.002	S811	15 Summer	100	+40%	100/15 Summer				60.954
S5.003	S812	15 Summer	100	+40%	100/15 Summer				60.900
S5.004	S813	15 Summer	100	+40%	100/15 Summer				60.855
S5.005	S814	15 Summer	100	+40%	100/15 Summer				60.754
S5.006	S815	15 Summer	100	+40%	100/15 Summer				60.682
S5.007	S816	15 Summer	100	+40%	100/15 Summer				60.568
S1.004	S817	30 Summer	100	+40%					60.443

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for HIF - 8


PN	US/MH Name	Surcharged Flooded		Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)				
S1.000	S801	0.593	0.000	1.28	52.3	SURCHARGED	
S2.000	S802	0.719	0.000	1.46	48.9	FLOOD RISK	
S3.000	S803	0.449	0.000	1.19	46.4	SURCHARGED	
S2.001	S804	0.478	0.000	1.45	84.7	SURCHARGED	
S4.000	S805	0.313	0.000	1.10	42.0	SURCHARGED	
S1.001	S806	0.413	0.000	1.63	166.5	SURCHARGED	
S1.002	S807	0.290	0.000	1.52	155.6	SURCHARGED	
S1.003	S808	-0.079	0.000	0.98	153.3	OK	
S5.000	S809	0.059	0.000	0.70	156.5	SURCHARGED	
S5.001	S810	0.135	0.000	0.89	190.9	SURCHARGED	
S5.002	S811	0.182	0.000	0.89	197.2	SURCHARGED	
S5.003	S812	0.203	0.000	1.05	199.0	SURCHARGED	
S5.004	S813	0.195	0.000	1.05	238.6	SURCHARGED	
S5.005	S814	0.177	0.000	1.22	244.1	SURCHARGED	
S5.006	S815	0.150	0.000	1.18	253.3	SURCHARGED	
S5.007	S816	0.099	0.000	1.52	259.6	SURCHARGED	
S1.004	S817	0.000	0.000	1.08	408.3	OK	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for HIF - 8

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.005	S818	15 Summer	100	+40%				
S6.000	S819	15 Summer	100	+40%	100/15 Summer			
S6.001	S820	15 Summer	100	+40%	30/15 Summer			
S7.000	S821	15 Summer	100	+40%	100/15 Summer			
S7.001	S822	15 Summer	100	+40%	100/15 Summer			
S6.002	S823	15 Summer	100	+40%	30/15 Summer			
S6.003	S824	15 Summer	100	+40%				
S1.006	S825	15 Summer	100	+40%				
S1.007	SHW826	960 Summer	100	+40%	100/360 Summer			
S8.000	S827	15 Summer	100	+40%	100/15 Summer			
S9.000	S828	960 Summer	100	+40%				
S9.001	S829	960 Summer	100	+40%				
S9.002	S830	960 Summer	100	+40%				
S8.001	S831	960 Summer	100	+40%				
S8.002	SHW832	960 Summer	100	+40%	100/240 Summer			
S10.000	S833	120 Winter	100	+40%				
S10.001	S834	120 Winter	100	+40%				
S10.002	SHW835	960 Summer	100	+40%	100/120 Summer			
S11.000	S836	15 Summer	100	+40%	30/15 Summer			
S11.001	S837	15 Summer	100	+40%				
S12.000	S838	15 Summer	100	+40%	30/15 Summer			
S12.001	S839	15 Summer	100	+40%	100/15 Summer			
S13.000	S840	15 Summer	100	+40%	100/15 Summer			
S13.001	S841	15 Summer	100	+40%	100/15 Summer			
S13.002	S842	15 Summer	100	+40%	30/15 Summer			
S12.002	S843	15 Summer	100	+40%	100/15 Summer			
S11.002	S844	15 Summer	100	+40%				
S11.003	SHW845	960 Summer	100	+40%	100/15 Summer			
S1.008	SPOND 9	960 Summer	100	+40%	2/480 Summer			
S1.009	SFC847	480 Winter	100	+40%				

PN	US/MH Name	Water			Surcharged		Flooded		Pipe	
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status	Level Exceeded	
S1.005	S818	59.934	-0.442	0.000	0.26		415.0		OK	
S6.000	S819	61.111	0.356	0.000	0.56		33.1	SURCHARGED		
S6.001	S820	60.987	0.655	0.000	2.75		66.4	SURCHARGED		
S7.000	S821	61.154	0.266	0.000	0.94		50.1	SURCHARGED		
S7.001	S822	60.917	0.302	0.000	1.13		83.3	SURCHARGED		
S6.002	S823	60.437	0.173	0.000	2.05		186.6	SURCHARGED		
S6.003	S824	60.006	-0.209	0.000	0.40		186.6	OK		
S1.006	S825	58.407	-0.369	0.000	0.51		586.4	OK		
S1.007	SHW826	58.387	0.068	0.000	0.11		67.4	SURCHARGED		
S8.000	S827	60.224	0.074	0.000	1.01		218.7	SURCHARGED		
S9.000	S828	58.387	-0.716	0.000	0.00		0.0	OK		
S9.001	S829	58.387	-0.420	0.000	0.00		0.2	OK		

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for HIF - 8


PN	US/MH Name	Water		Surcharged		Flooded		Pipe	
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Flow (l/s)	Status	Level Exceeded
S9.002	S830	58.387	-0.155	0.000	0.00		0.5		OK
S8.001	S831	58.387	-0.112	0.000	0.02		15.0		OK
S8.002	SHW832	58.387	0.110	0.000	0.03		13.1		SURCHARGED
S10.000	S833	59.643	-0.375	0.000	0.00		0.0		OK
S10.001	S834	58.924	-0.450	0.000	0.00		0.0		OK
S10.002	SHW835	58.387	0.260	0.000	0.00		0.0		SURCHARGED
S11.000	S836	59.403	0.491	0.000	1.93		55.0		SURCHARGED
S11.001	S837	58.622	-0.133	0.000	0.73		71.5		OK
S12.000	S838	59.494	0.544	0.000	1.90		54.4		SURCHARGED
S12.001	S839	58.861	0.072	0.000	0.77		72.2		SURCHARGED
S13.000	S840	61.511	0.473	0.000	1.02		173.3		SURCHARGED
S13.001	S841	61.071	0.441	0.000	1.52		212.1		SURCHARGED
S13.002	S842	60.739	0.242	0.000	2.15		220.2		SURCHARGED
S12.002	S843	58.778	0.066	0.000	1.37		308.2		SURCHARGED
S11.002	S844	58.434	-0.198	0.000	0.70		382.6		OK
S11.003	SHW845	58.387	0.260	0.000	0.11		33.7		SURCHARGED
S1.008	SPOND 9	58.387	0.644	0.000	0.07		7.1		SURCHARGED
S1.009	SFC847	57.703	-0.040	0.000	0.04		7.1		OK



Drainage Technical Addendum

DATE:	20 July 2021	CONFIDENTIALITY:	Public
SUBJECT:	Drainage Technical Addendum		
PROJECT:	Milton Keynes East	AUTHOR:	DSF
CHECKED:	BU	APPROVED:	SP

Tongwell 1

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for TONGWELL -1.SWS

Pipe Sizes HIF 7 Manhole Sizes HIF 7

FEH Rainfall Model

Return Period (years)	10
FEH Rainfall Version	2013
Site Location GB 489026 242081 SP 89026 42081	
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits




Time Area Diagram for TONGWELL -1.SWS

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.243	4-8	0.821	8-12	0.375

Total Area Contributing (ha) = 1.439


Total Pipe Volume (m³) = 140.781

Network Design Table for TONGWELL -1.SWS








PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	71.789	0.225	319.2	0.384	5.00	0.0	0.600	o	525	Pipe/Conduit	
S1.001	62.487	0.196	319.2	0.370	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.002	24.670	0.077	319.2	0.072	0.00	0.0	0.600	o	525	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 (l/s)	Flow (l/s)
S1.000	50.00	5.96	62.500	0.384	0.0	0.0	0.0	1.25	270.2	52.0
S1.001	50.00	6.79	62.275	0.754	0.0	0.0	0.0	1.25	270.2	102.2
S1.002	50.00	7.12	62.079	0.826	0.0	0.0	0.0	1.25	270.2	111.9

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Network Design Table for TONGWELL -1.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.003	29.604	0.093	318.3	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.004	55.049	0.172	320.0	0.116	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.005	56.821	0.114	500.0	0.152	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.006	87.887	0.176	500.0	0.231	0.00	0.0	0.600	o	750	Pipe/Conduit	
S1.007	47.199	0.094	500.0	0.113	0.00	0.0	0.600	o	750	Pipe/Conduit	
S1.008	18.306	0.057	321.2	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
S1.009	9.542	0.030	318.1	0.000	0.00	0.0	0.600	o	750	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 (l/s)	Flow (l/s)
S1.003	50.00	7.52	62.002	0.826	0.0	0.0	0.0	1.25	270.6	111.9
S1.004	50.00	8.25	61.909	0.942	0.0	0.0	0.0	1.25	269.8	127.6
S1.005	50.00	9.13	60.845	1.095	0.0	0.0	0.0	1.08	306.0	148.2
S1.006	50.00	10.30	60.731	1.326	0.0	0.0	0.0	1.24	549.9	179.6
S1.007	50.00	10.94	60.555	1.439	0.0	0.0	0.0	1.24	549.9	194.9
S1.008	50.00	11.13	60.461	1.439	0.0	0.0	0.0	1.56	687.4	194.9
S1.009	50.00	11.23	60.404	1.439	0.0	0.0	0.0	1.56	690.8	194.9

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Manhole Schedules for TONGWELL -1.SWS

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1	65.000	2.500	Open Manhole	1500	S1.000	62.500	525				
S2	65.000	2.725	Open Manhole	1500	S1.001	62.275	525	S1.000	62.275	525	
S3	65.000	2.921	Open Manhole	1500	S1.002	62.079	525	S1.001	62.079	525	
S1	65.000	2.998	Open Manhole	1500	S1.003	62.002	525	S1.002	62.002	525	
S2	65.000	3.091	Open Manhole	1500	S1.004	61.909	525	S1.003	61.909	525	
S3	64.212	3.367	Open Manhole	1500	S1.005	60.845	600	S1.004	61.737	525	817
S4	63.644	2.913	Open Manhole	1800	S1.006	60.731	750	S1.005	60.731	600	
S5	63.063	2.508	Open Manhole	1800	S1.007	60.555	750	S1.006	60.555	750	
S6	62.827	2.366	Open Manhole	1800	S1.008	60.461	750	S1.007	60.461	750	
S7	63.000	2.596	Open Manhole	1800	S1.009	60.404	750	S1.008	60.404	750	
S8	62.000	1.626	Open Manhole	0		OUTFALL		S1.009	60.374	750	

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Area Summary for TONGWELL -1.SWS

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.384	0.384	0.384
1.001	User	-	100	0.370	0.370	0.370
1.002	User	-	100	0.072	0.072	0.072
1.003	-	-	100	0.000	0.000	0.000
1.004	User	-	100	0.116	0.116	0.116
1.005	User	-	100	0.152	0.152	0.152
1.006	User	-	100	0.231	0.231	0.231
1.007	User	-	100	0.113	0.113	0.113
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				1.439	1.439	1.439


Simulation Criteria for TONGWELL -1.SWS

Volumetric Runoff Coeff 0.950 Additional Flow - % of Total Flow 0.000
 Areal Reduction Factor 1.000 MADD Factor * 10m³/ha Storage 0.000
 Hot Start (mins) 0 Inlet Coefficient 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) 960
 Foul Sewage per hectare (l/s) 0.000 Output Interval (mins) 8

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

Synthetic Rainfall Details

Rainfall Model FEH
 Return Period (years) 100
 FEH Rainfall Version 2013
 Site Location GB 489026 242081 SP 89026 42081
 Data Type Point
 Summer Storms No
 Winter Storms Yes
 Cv (Summer) 0.750
 Cv (Winter) 0.950
 Storm Duration (mins) 480

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Online Controls for TONGWELL -1.SWS

Hydro-Brake® Optimum Manhole: S3, DS/PN: S1.002, Volume (m³): 18.4

Unit Reference	MD-SHE-0192-2000-1500-2000
Design Head (m)	1.500
Design Flow (l/s)	20.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	192
Invert Level (m)	62.079
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500


Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	20.0
Flush-Flo™	0.452	20.0
Kick-Flo®	0.984	16.4
Mean Flow over Head Range	-	17.3

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	6.7	1.200	18.0	3.000	27.8	7.000	41.9
0.200	17.7	1.400	19.3	3.500	30.0	7.500	43.3
0.300	19.4	1.600	20.6	4.000	32.0	8.000	44.7
0.400	19.9	1.800	21.8	4.500	33.8	8.500	46.0
0.500	20.0	2.000	22.9	5.000	35.6	9.000	47.3
0.600	19.7	2.200	24.0	5.500	37.3	9.500	48.6
0.800	18.8	2.400	25.0	6.000	38.9		
1.000	16.5	2.600	26.0	6.500	40.4		

Hydro-Brake® Optimum Manhole: S6, DS/PN: S1.008, Volume (m³): 26.1

Unit Reference	MD-SHE-0124-8000-1500-8000
Design Head (m)	1.500
Design Flow (l/s)	8.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	124
Invert Level (m)	60.461
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

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Hydro-Brake® Optimum Manhole: S6, DS/PN: S1.008, Volume (m³): 26.1

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	8.0
Flush-Flo™	0.444	8.0
Kick-Flo®	0.925	6.4
Mean Flow over Head Range	-	7.0

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.4	1.200	7.2	3.000	11.1	7.000	16.6
0.200	7.2	1.400	7.7	3.500	11.9	7.500	17.2
0.300	7.8	1.600	8.2	4.000	12.7	8.000	17.7
0.400	8.0	1.800	8.7	4.500	13.4	8.500	18.2
0.500	8.0	2.000	9.2	5.000	14.1	9.000	18.7
0.600	7.9	2.200	9.6	5.500	14.8	9.500	19.2
0.800	7.3	2.400	10.0	6.000	15.4		
1.000	6.6	2.600	10.4	6.500	16.0		

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Storage Structures for TONGWELL -1.SWS

Cellular Storage Manhole: S3, DS/PN: S1.002


Invert Level (m) 62.079 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	450.0	0.0	1.510	0.0	0.0
1.500	450.0	0.0			

Cellular Storage Manhole: S6, DS/PN: S1.008

Invert Level (m) 60.461 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	595.0	0.0	1.510	0.0	0.0
1.500	595.0	0.0			

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for TONGWELL -1.SWS

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details


Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40


PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15	Summer	2	+0%	30/15	Summer		62.702
S1.001	S2	15	Summer	2	+0%	30/15	Summer		62.552
S1.002	S3	240	Summer	2	+0%	100/15	Summer		62.314
S1.003	S1	240	Summer	2	+0%				62.103
S1.004	S2	120	Summer	2	+0%	100/960	Summer		62.017
S1.005	S3	15	Summer	2	+0%	100/240	Summer		61.027
S1.006	S4	15	Summer	2	+0%	100/240	Summer		60.935
S1.007	S5	480	Summer	2	+0%	100/120	Summer		60.845
S1.008	S6	480	Summer	2	+0%	30/360	Summer		60.842
S1.009	S7	480	Summer	2	+0%				60.479

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m ³)	Pipe Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow Status	Level Exceeded
S1.000	S1	-0.323	0.000	0.30	74.7	OK	

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for TONGWELL -1.SWS

PN	US/MH Name	Surcharged		Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status	
S1.001	S2	-0.249	0.000	0.53		130.7	OK	
S1.002	S3	-0.290	0.000	0.08		17.9	OK	
S1.003	S1	-0.424	0.000	0.08		17.9	OK	
S1.004	S2	-0.417	0.000	0.09		21.9	OK	
S1.005	S3	-0.418	0.000	0.16		43.0	OK	
S1.006	S4	-0.546	0.000	0.15		73.0	OK	
S1.007	S5	-0.460	0.000	0.07		33.8	OK	
S1.008	S6	-0.369	0.000	0.02		7.9	OK	
S1.009	S7	-0.675	0.000	0.02		7.9	OK	

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for TONGWELL -1.SWS

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details


Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40


PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Summer	5	+0%	30/15 Summer				62.738
S1.001	S2	15 Summer	5	+0%	30/15 Summer				62.609
S1.002	S3	240 Summer	5	+0%	100/15 Summer				62.378
S1.003	S1	120 Summer	5	+0%					62.107
S1.004	S2	30 Summer	5	+0%	100/960 Summer				62.030
S1.005	S3	15 Summer	5	+0%	100/240 Summer				61.058
S1.006	S4	15 Summer	5	+0%	100/240 Summer				60.969
S1.007	S5	480 Summer	5	+0%	100/120 Summer				60.956
S1.008	S6	480 Summer	5	+0%	30/360 Summer				60.952
S1.009	S7	480 Winter	5	+0%					60.479

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m ³)	Pipe Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow Status	Level Exceeded
S1.000	S1	-0.287	0.000	0.40	100.2	OK	

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5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for TONGWELL -1.SWS

PN	US/MH Name	Surcharged		Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status	
S1.001	S2	-0.192	0.000	0.70		173.4	OK	
S1.002	S3	-0.226	0.000	0.09		18.9	OK	
S1.003	S1	-0.420	0.000	0.08		18.9	OK	
S1.004	S2	-0.404	0.000	0.12		29.0	OK	
S1.005	S3	-0.387	0.000	0.21		57.8	OK	
S1.006	S4	-0.512	0.000	0.20		97.7	OK	
S1.007	S5	-0.349	0.000	0.09		41.0	OK	
S1.008	S6	-0.258	0.000	0.02		8.0	OK	
S1.009	S7	-0.675	0.000	0.02		8.0	OK	

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.	Milton Keynes East	
.	HIF 8 None pumped section	
.	Pump inflow excluded	
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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for TONGWELL -1.SWS

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details


Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40


PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Summer	30	+0%	30/15 Summer				63.037
S1.001	S2	15 Summer	30	+0%	30/15 Summer				62.925
S1.002	S3	120 Summer	30	+0%	100/15 Summer				62.567
S1.003	S1	60 Summer	30	+0%					62.118
S1.004	S2	15 Summer	30	+0%	100/960 Summer				62.088
S1.005	S3	480 Winter	30	+0%	100/240 Summer				61.385
S1.006	S4	480 Summer	30	+0%	100/240 Summer				61.336
S1.007	S5	480 Summer	30	+0%	100/120 Summer				61.301
S1.008	S6	480 Winter	30	+0%	30/360 Summer				61.249
S1.009	S7	480 Winter	30	+0%					60.479

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.012	0.000	0.65		162.2	SURCHARGED	

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.	Milton Keynes East	
.	HIF 8 None pumped section	
.	Pump inflow excluded	
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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for TONGWELL -1.SWS

PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)					
S1.001	S2	0.124	0.000	1.23		301.9	SURCHARGED	
S1.002	S3	-0.037	0.000	0.09		19.9	OK	
S1.003	S1	-0.409	0.000	0.09		20.0	OK	
S1.004	S2	-0.346	0.000	0.25		60.4	OK	
S1.005	S3	-0.060	0.000	0.11		30.5	OK	
S1.006	S4	-0.145	0.000	0.10		51.8	OK	
S1.007	S5	-0.004	0.000	0.12		56.3	OK	
S1.008	S6	0.038	0.000	0.02		8.0	SURCHARGED	
S1.009	S7	-0.675	0.000	0.02		8.0	OK	

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.	Milton Keynes East	
.	HIF 8 None pumped section	
.	Pump inflow excluded	
Date 26/05/2021	Designed by DSF	
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XP Solutions	Network 2018.1.1	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for TONGWELL -1.SWS

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details


Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Summer	100	+40%	30/15 Summer				64.216
S1.001	S2	15 Summer	100	+40%	30/15 Summer				63.855
S1.002	S3	240 Winter	100	+40%	100/15 Summer				63.156
S1.003	S1	960 Winter	100	+40%					62.470
S1.004	S2	960 Winter	100	+40%	100/960 Summer				62.459
S1.005	S3	960 Summer	100	+40%	100/240 Summer				62.509
S1.006	S4	960 Summer	100	+40%	100/240 Summer				62.520
S1.007	S5	960 Summer	100	+40%	100/120 Summer				62.535
S1.008	S6	960 Summer	100	+40%	30/360 Summer				62.535
S1.009	S7	960 Winter	100	+40%					60.482

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	1.191	0.000	1.21		300.3	SURCHARGED	

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.	Milton Keynes East	
.	HIF 8 None pumped section	
.	Pump inflow excluded	
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for TONGWELL -1.SWS

PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (1/s)	Pipe Flow (1/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)					
S1.001	S2	1.055	0.000	2.35		578.8	SURCHARGED	
S1.002	S3	0.552	0.000	0.09		20.0	SURCHARGED	
S1.003	S1	-0.057	0.000	0.09		20.0	OK	
S1.004	S2	0.025	0.000	0.10		25.1	SURCHARGED	
S1.005	S3	1.064	0.000	0.14		38.0	SURCHARGED	
S1.006	S4	1.039	0.000	0.10		50.1	SURCHARGED	
S1.007	S5	1.230	0.000	0.11		52.1	SURCHARGED	
S1.008	S6	1.324	0.000	0.02		8.8	FLOOD RISK	
S1.009	S7	-0.672	0.000	0.02		8.9	OK	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for TONGWELL -1.SWS

Pipe Sizes HIF 7 Manhole Sizes HIF 7






FEH Rainfall Model

Return Period (years)	10
FEH Rainfall Version	2013
Site Location GB 489026 242081 SP 89026 42081	
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for TONGWELL -1.SWS

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	69.112	7.080	9.8	0.890	5.00	0.0	0.600	o	525	Pipe/Conduit	
S2.000	79.955	1.777	45.0	0.096	5.00	0.0	0.600	o	375	Pipe/Conduit	
S2.001	92.373	1.847	50.0	0.106	0.00	0.0	0.600	o	375	Pipe/Conduit	
S2.002	80.319	0.535	150.0	0.101	0.00	0.0	0.600	o	375	Pipe/Conduit	
S3.000	72.925	1.823	40.0	0.077	5.00	0.0	0.600	o	375	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 (l/s)	Flow (l/s)
S1.000	50.00	5.16	66.300	0.890	0.0	0.0	0.0	7.20	1558.2	120.6
S2.000	50.00	5.49	65.900	0.096	0.0	0.0	0.0	2.71	299.0	12.9
S2.001	50.00	6.09	64.123	0.202	0.0	0.0	0.0	2.57	283.6	27.4
S2.002	50.00	7.00	62.276	0.303	0.0	0.0	0.0	1.48	163.1	41.0
S3.000	50.00	5.42	65.600	0.077	0.0	0.0	0.0	2.87	317.2	10.4

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Network Design Table for TONGWELL -1.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S3.001	80.631	1.792	45.0	0.072	0.00	0.0	0.600	o	375	Pipe/Conduit	
S3.002	51.335	1.770	29.0	0.056	0.00	0.0	0.600	o	375	Pipe/Conduit	
S3.003	30.899	0.097	319.2	0.022	0.00	0.0	0.600	o	375	Pipe/Conduit	
S3.004	22.370	0.112	200.0	0.034	0.00	0.0	0.600	o	375	Pipe/Conduit	
S2.003	83.120	0.369	225.0	0.096	0.00	0.0	0.600	o	225	Pipe/Conduit	
S2.004	13.132	0.058	225.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	93.823	0.188	500.0	0.381	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.002	98.585	0.197	500.0	0.305	0.00	0.0	0.600	o	600	Pipe/Conduit	
S4.000	89.228	0.145	615.1	0.064	5.00	0.0	0.600	1800	[] 1800	1800 Culvert	
S4.001	58.473	0.117	501.7	0.071	0.00	0.0	0.600	1800	[] 1800	1800 Culvert	
S4.002	61.118	0.204	300.0	0.067	0.00	0.0	0.600	2100	[] 2100	2100 Culvert	
S4.003	61.253	0.204	300.0	0.053	0.00	0.0	0.600	2100	[] 2100	2100 Culvert	
S4.004	16.670	0.057	290.0	0.000	0.00	0.0	0.600	o	2100	Pipe/Conduit	
S1.003	78.474	0.157	500.0	0.265	0.00	0.0	0.600	1200	[] 1200	1200 Culvert	
S1.004	64.812	0.130	500.0	0.293	0.00	0.0	0.600	1200	[] 1200	1200 Culvert	
S1.005	18.397	0.082	225.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.006	7.328	0.030	244.3	0.000	0.00	0.0	0.600	o	525	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 (l/s)	Flow (l/s)
S3.001	50.00	5.92	63.777	0.149	0.0	0.0	0.0	2.71	299.0	20.2
S3.002	50.00	6.17	61.985	0.205	0.0	0.0	0.0	3.38	372.8	27.8
S3.003	50.00	6.68	60.215	0.228	0.0	0.0	0.0	1.01	111.4	30.8
S3.004	50.00	6.98	60.118	0.261	0.0	0.0	0.0	1.28	141.1	35.4
S2.003	50.00	8.59	60.006	0.660	0.0	0.0	0.0	0.87	34.5	89.3
S2.004	50.00	8.85	59.637	0.660	0.0	0.0	0.0	0.87	34.5	89.3
S1.001	50.00	10.29	59.145	1.931	0.0	0.0	0.0	1.08	306.0	261.4
S1.002	50.00	11.81	58.957	2.236	0.0	0.0	0.0	1.08	306.0	302.8
S4.000	50.00	5.75	58.300	0.064	0.0	0.0	0.0	1.98	6244.3	8.7
S4.001	50.00	6.20	58.155	0.135	0.0	0.0	0.0	2.19	6918.0	18.3
S4.002	50.00	6.53	57.738	0.202	0.0	0.0	0.0	3.11	13456.7	27.4
S4.003	50.00	6.85	57.535	0.255	0.0	0.0	0.0	3.11	13456.7	34.5
S4.004	50.00	6.94	57.330	0.255	0.0	0.0	0.0	3.09	10691.8	34.5
S1.003	50.00	12.57	57.573	2.756	0.0	0.0	0.0	1.71	2330.7	373.2
S1.004	50.00	13.20	57.442	3.049	0.0	0.0	0.0	1.71	2330.7	412.9
S1.005	50.00	13.41	57.312	3.049	0.0	0.0	0.0	1.49	322.4	412.9
S1.006	50.00	13.50	57.230	3.049	0.0	0.0	0.0	1.43	309.3	412.9

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Manhole Schedules for TONGWELL -1.SWS

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
ST1	68.165	1.865	Open Manhole	1500	S1.000	66.300	525				
ST1-1	67.546	1.646	Open Manhole	1350	S2.000	65.900	375				
ST1-2	65.721	1.597	Open Manhole	1350	S2.001	64.123	375	S2.000	64.123	375	
ST1-3	63.867	1.591	Open Manhole	1350	S2.002	62.276	375	S2.001	62.276	375	
ST1-4	67.300	1.700	Open Manhole	1350	S3.000	65.600	375				
ST1-5	65.400	1.623	Open Manhole	1350	S3.001	63.777	375	S3.000	63.777	375	
ST1-6	63.610	1.625	Open Manhole	1350	S3.002	61.985	375	S3.001	61.985	375	
ST1-7	61.500	1.285	Open Manhole	1350	S3.003	60.215	375	S3.002	60.215	375	
ST1-8	65.500	5.382	Open Manhole	1350	S3.004	60.118	375	S3.003	60.118	375	
ST1-9	65.502	5.496	Open Manhole	1350	S2.003	60.006	225	S2.002	61.740	375	1884
								S3.004	60.006	375	
ST1-10	67.221	7.585	Open Manhole	1200	S2.004	59.637	225	S2.003	59.637	225	
ST1-11	66.784	7.639	Open Manhole	1500	S1.001	59.145	600	S1.000	59.220	525	
								S2.004	59.579	225	59
ST1-12	64.907	5.950	Open Manhole	1500	S1.002	58.957	600	S1.001	58.957	600	
ST1-13	60.400	2.100	Open Manhole	3000	S4.000	58.300	1800				
ST1-14	60.400	2.245	Open Manhole	3000	S4.001	58.155	1800	S4.000	58.155	1800	
ST1-15	62.928	5.190	Open Manhole	3000	S4.002	57.738	2100	S4.001	58.038	1800	
ST1-16	63.600	6.065	Open Manhole	3000	S4.003	57.535	2100	S4.002	57.535	2100	
ST1-17	63.600	6.270	Open Manhole	3000	S4.004	57.330	2100	S4.003	57.330	2100	
ST1-18	63.559	6.286	Open Manhole	3000	S1.003	57.573	1200	S1.002	58.760	600	587
								S4.004	57.273	2100	
ST1-19	63.167	5.751	Open Manhole	3000	S1.004	57.442	1200	S1.003	57.416	1200	
ST1-20	62.827	5.515	Open Manhole	3000	S1.005	57.312	525	S1.004	57.312	1200	
ST1-21	62.000	4.770	Open Manhole	1500	S1.006	57.230	525	S1.005	57.230	525	
S8	62.000	4.800	Open Manhole	0		OUTFALL		S1.006	57.200	525	

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PIPELINE SCHEDULES for TONGWELL -1.SWS

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	525	ST1	68.165	66.300	1.340	Open Manhole	1500
S2.000	o	375	ST1-1	67.546	65.900	1.271	Open Manhole	1350
S2.001	o	375	ST1-2	65.721	64.123	1.222	Open Manhole	1350
S2.002	o	375	ST1-3	63.867	62.276	1.216	Open Manhole	1350
S3.000	o	375	ST1-4	67.300	65.600	1.325	Open Manhole	1350
S3.001	o	375	ST1-5	65.400	63.777	1.248	Open Manhole	1350
S3.002	o	375	ST1-6	63.610	61.985	1.250	Open Manhole	1350
S3.003	o	375	ST1-7	61.500	60.215	0.910	Open Manhole	1350
S3.004	o	375	ST1-8	65.500	60.118	5.007	Open Manhole	1350
S2.003	o	225	ST1-9	65.502	60.006	5.271	Open Manhole	1350
S2.004	o	225	ST1-10	67.221	59.637	7.359	Open Manhole	1200
S1.001	o	600	ST1-11	66.784	59.145	7.039	Open Manhole	1500
S1.002	o	600	ST1-12	64.907	58.957	5.350	Open Manhole	1500
S4.000	1800 []	1800	ST1-13	60.400	58.300	0.300	Open Manhole	3000
S4.001	1800 []	1800	ST1-14	60.400	58.155	0.445	Open Manhole	3000
S4.002	2100 []	2100	ST1-15	62.928	57.738	3.090	Open Manhole	3000

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	69.112	9.8	ST1-11	66.784	59.220	7.039	Open Manhole	1500
S2.000	79.955	45.0	ST1-2	65.721	64.123	1.222	Open Manhole	1350
S2.001	92.373	50.0	ST1-3	63.867	62.276	1.216	Open Manhole	1350
S2.002	80.319	150.0	ST1-9	65.502	61.740	3.387	Open Manhole	1350
S3.000	72.925	40.0	ST1-5	65.400	63.777	1.248	Open Manhole	1350
S3.001	80.631	45.0	ST1-6	63.610	61.985	1.250	Open Manhole	1350
S3.002	51.335	29.0	ST1-7	61.500	60.215	0.910	Open Manhole	1350
S3.003	30.899	319.2	ST1-8	65.500	60.118	5.007	Open Manhole	1350
S3.004	22.370	200.0	ST1-9	65.502	60.006	5.121	Open Manhole	1350
S2.003	83.120	225.0	ST1-10	67.221	59.637	7.360	Open Manhole	1200
S2.004	13.132	225.0	ST1-11	66.784	59.579	6.981	Open Manhole	1500
S1.001	93.823	500.0	ST1-12	64.907	58.957	5.350	Open Manhole	1500
S1.002	98.585	500.0	ST1-18	63.559	58.760	4.199	Open Manhole	3000
S4.000	89.228	615.1	ST1-14	60.400	58.155	0.445	Open Manhole	3000
S4.001	58.473	501.7	ST1-15	62.928	58.038	3.090	Open Manhole	3000
S4.002	61.118	300.0	ST1-16	63.600	57.535	3.965	Open Manhole	3000

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PIPELINE SCHEDULES for TONGWELL -1.SWS

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S4.003	2100 []	2100	ST1-16	63.600	57.535	3.965	Open Manhole	3000
S4.004	o	2100	ST1-17	63.600	57.330	4.170	Open Manhole	3000
S1.003	1200 []	1200	ST1-18	63.559	57.573	4.786	Open Manhole	3000
S1.004	1200 []	1200	ST1-19	63.167	57.442	4.525	Open Manhole	3000
S1.005	o	525	ST1-20	62.827	57.312	4.990	Open Manhole	3000
S1.006	o	525	ST1-21	62.000	57.230	4.245	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S4.003	61.253	300.0	ST1-17	63.600	57.330	4.170	Open Manhole	3000
S4.004	16.670	290.0	ST1-18	63.559	57.273	4.186	Open Manhole	3000
S1.003	78.474	500.0	ST1-19	63.167	57.416	4.551	Open Manhole	3000
S1.004	64.812	500.0	ST1-20	62.827	57.312	4.315	Open Manhole	3000
S1.005	18.397	225.0	ST1-21	62.000	57.230	4.245	Open Manhole	1500
S1.006	7.328	244.3	S8	62.000	57.200	4.275	Open Manhole	0

Free Flowing Outfall Details for TONGWELL -1.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.006	S8	62.000	57.200	0.000	0	0

Simulation Criteria for TONGWELL -1.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	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 Storage Structures	1
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model FEH
Return Period (years) 2

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Synthetic Rainfall Details

FEH Rainfall Version	2013
Site Location	GB 489026 242081 SP 89026 42081
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for TONGWELL -2.SWS









Pipe Sizes HIF 7 Manhole Sizes HIF 7

FEH Rainfall Model

Return Period (years)	10
FEH Rainfall Version	2013
Site Location GB 489026 242081 SP 89026 42081	
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for TONGWELL -2.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	73.793	1.157	63.8	0.269	5.00	0.0	0.600	o	375	Pipe/Conduit	
S1.001	96.514	0.424	227.4	0.198	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.002	80.449	0.230	350.0	0.207	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.003	69.283	0.217	319.0	0.184	0.00	0.0	0.600	1200 []	1200	Culvert	
S1.004	97.172	0.304	319.3	0.293	0.00	0.0	0.600	1200 []	1200	Culvert	
S1.005	80.750	0.253	319.2	0.273	0.00	0.0	0.600	1200 []	1200	Culvert	
S1.006	23.309	0.175	133.5	0.000	0.00	0.0	0.600	1200 []	1200	Culvert	
S1.007	41.595	0.058	721.0	0.318	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 (l/s)	Flow (l/s)
S1.000	50.00	5.54	62.200	0.269	0.0	0.0	0.0	2.27	250.9	36.4
S1.001	50.00	6.74	60.968	0.467	0.0	0.0	0.0	1.34	213.7	63.2
S1.002	50.00	7.77	60.394	0.674	0.0	0.0	0.0	1.30	366.4	91.3
S1.003	50.00	8.31	59.564	0.858	0.0	0.0	0.0	2.15	2922.1	116.1
S1.004	50.00	9.06	59.347	1.151	0.0	0.0	0.0	2.15	2920.8	155.9
S1.005	50.00	9.69	59.042	1.424	0.0	0.0	0.0	2.15	2921.3	192.8
S1.006	50.00	9.81	58.789	1.424	0.0	0.0	0.0	3.33	4526.1	192.8
S1.007	50.00	10.58	58.615	1.741	0.0	0.0	0.0	0.90	254.2	235.8

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Manhole Schedules for TONGWELL -2.SWS

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
ST2-1	63.600	1.400	Open Manhole	1350	S1.000	62.200	375				
ST2-2	62.679	1.711	Open Manhole	1350	S1.001	60.968	450	S1.000	61.043	375	
ST2-3	62.035	1.641	Open Manhole	1500	S1.002	60.394	600	S1.001	60.544	450	
ST2-4	61.671	2.107	Open Manhole	3000	S1.003	59.564	1200	S1.002	60.164	600	
ST2-5	61.803	2.456	Open Manhole	3000	S1.004	59.347	1200	S1.003	59.347	1200	
ST2-6	61.851	2.809	Open Manhole	3000	S1.005	59.042	1200	S1.004	59.042	1200	
ST2-7	62.255	3.466	Open Manhole	3000	S1.006	58.789	1200	S1.005	58.789	1200	
ST2-8	62.534	3.920	Open Manhole	3000	S1.007	58.615	600	S1.006	58.615	1200	
ST2-9	62.500	3.943	Open Manhole	0		OUTFALL		S1.007	58.557	600	

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PIPELINE SCHEDULES for TONGWELL -2.SWS

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	375	ST2-1	63.600	62.200	1.025	Open Manhole	1350
S1.001	o	450	ST2-2	62.679	60.968	1.261	Open Manhole	1350
S1.002	o	600	ST2-3	62.035	60.394	1.041	Open Manhole	1500
S1.003	1200 []	1200	ST2-4	61.671	59.564	0.907	Open Manhole	3000
S1.004	1200 []	1200	ST2-5	61.803	59.347	1.256	Open Manhole	3000
S1.005	1200 []	1200	ST2-6	61.851	59.042	1.609	Open Manhole	3000
S1.006	1200 []	1200	ST2-7	62.255	58.789	2.266	Open Manhole	3000
S1.007	o	600	ST2-8	62.534	58.615	3.320	Open Manhole	3000

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	73.793	63.8	ST2-2	62.679	61.043	1.261	Open Manhole	1350
S1.001	96.514	227.4	ST2-3	62.035	60.544	1.041	Open Manhole	1500
S1.002	80.449	350.0	ST2-4	61.671	60.164	0.907	Open Manhole	3000
S1.003	69.283	319.0	ST2-5	61.803	59.347	1.256	Open Manhole	3000
S1.004	97.172	319.3	ST2-6	61.851	59.042	1.609	Open Manhole	3000
S1.005	80.750	319.2	ST2-7	62.255	58.789	2.266	Open Manhole	3000
S1.006	23.309	133.5	ST2-8	62.534	58.615	2.720	Open Manhole	3000
S1.007	41.595	721.0	ST2-9	62.500	58.557	3.343	Open Manhole	0

Free Flowing Outfall Details for TONGWELL -2.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
S1.007	ST2-9	62.500	58.557	0.000	0	0

Simulation Criteria for TONGWELL -2.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	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 Storage Structures	0
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

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Synthetic Rainfall Details

Table with 2 columns: Parameter and Value. Parameters include Rainfall Model (FEH), Return Period (years) (2), FEH Rainfall Version (2013), Site Location (GB 489026 242081 SP 89026 42081), Data Type (Point), Summer Storms (Yes), Winter Storms (Yes), Cv (Summer) (0.750), Cv (Winter) (0.840), and Storm Duration (mins) (30).

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Online Controls for TONGWELL -2.SWS

Complex Manhole: ST2-8, DS/PN: S1.007, Volume (m³): 55.3

Orifice

Diameter (m) 0.196 Discharge Coefficient 0.600 Invert Level (m) 58.615

Hydro-Brake® Optimum

Unit Reference	MD-SHE-0395-1000-1000-1000
Design Head (m)	1.000
Design Flow (l/s)	100.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	395
Invert Level (m)	59.046
Minimum Outlet Pipe Diameter (mm)	450
Suggested Manhole Diameter (mm)	Site Specific Design (Contact Hydro International)

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	100.0
Flush-Flo™	0.550	99.9
Kick-Flo®	0.846	92.2
Mean Flow over Head Range	-	76.0

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	10.9	1.200	109.2	3.000	170.7	7.000	258.7
0.200	39.0	1.400	117.7	3.500	184.1	7.500	267.6
0.300	75.0	1.600	125.6	4.000	196.6	8.000	276.2
0.400	97.4	1.800	133.1	4.500	208.2	8.500	284.5
0.500	99.7	2.000	140.1	5.000	219.3	9.000	292.7
0.600	99.7	2.200	146.7	5.500	229.8	9.500	300.5
0.800	94.6	2.400	153.1	6.000	239.8		
1.000	100.0	2.600	159.2	6.500	249.4		

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for TONGWELL -2.SWS

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 0
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status OFF
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 2, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	ST2-1	15	Summer	2	+0%	100/15	Summer		62.322
S1.001	ST2-2	15	Summer	2	+0%	100/15	Summer		61.175
S1.002	ST2-3	15	Summer	2	+0%	100/15	Summer		60.637
S1.003	ST2-4	15	Summer	2	+0%	100/30	Summer		59.705
S1.004	ST2-5	15	Summer	2	+0%	100/15	Summer		59.505
S1.005	ST2-6	30	Summer	2	+0%	100/15	Summer		59.379
S1.006	ST2-7	30	Summer	2	+0%	100/15	Summer		59.347
S1.007	ST2-8	30	Summer	2	+0%	2/15	Summer		59.328

PN	US/MH Name	Depth (m)	Surcharged Volume (m ³)	Flooded Flow / Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	ST2-1	-0.253	0.000	0.23	53.7	OK	
S1.001	ST2-2	-0.243	0.000	0.41	82.2	OK	
S1.002	ST2-3	-0.357	0.000	0.34	114.2	OK	

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for TONGWELL -2.SWS

PN	US/MH Name	Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)			
S1.003	ST2-4	-1.059	0.000	0.06		137.9	OK	
S1.004	ST2-5	-1.042	0.000	0.07		171.5	OK	
S1.005	ST2-6	-0.863	0.000	0.06		151.3	OK	
S1.006	ST2-7	-0.642	0.000	0.05		115.6	OK	
S1.007	ST2-8	0.113	0.000	0.59		129.3	SURCHARGED	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for TONGWELL -2.SWS

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 0
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 489026 242081 SP 89026 42081
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status OFF
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 2, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	ST2-1	15	Summer	30	+0%	100/15	Summer		62.391
S1.001	ST2-2	15	Summer	30	+0%	100/15	Summer		61.416
S1.002	ST2-3	15	Summer	30	+0%	100/15	Summer		60.811
S1.003	ST2-4	30	Summer	30	+0%	100/30	Summer		59.951
S1.004	ST2-5	30	Summer	30	+0%	100/15	Summer		59.916
S1.005	ST2-6	30	Summer	30	+0%	100/15	Summer		59.868
S1.006	ST2-7	30	Summer	30	+0%	100/15	Summer		59.797
S1.007	ST2-8	30	Summer	30	+0%	2/15	Summer		59.746

PN	US/MH Name	Depth (m)	Surcharged Volume (m ³)	Flooded Flow / Cap. (l/s)	Pipe Overflow Flow (l/s)	Status	Level Exceeded
S1.000	ST2-1	-0.184	0.000	0.50	118.8	OK	
S1.001	ST2-2	-0.002	0.000	0.96	194.5	OK	
S1.002	ST2-3	-0.182	0.000	0.82	276.6	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for TONGWELL -2.SWS

PN	US/MH Name	Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)			
S1.003	ST2-4	-0.813	0.000	0.13		299.9	OK	
S1.004	ST2-5	-0.630	0.000	0.13		328.0	OK	
S1.005	ST2-6	-0.375	0.000	0.10		245.6	OK	
S1.006	ST2-7	-0.192	0.000	0.07		159.2	OK	
S1.007	ST2-8	0.532	0.000	0.82		179.4	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for TONGWELL -2.SWS

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 0
 Number of Online Controls 1 Number of Time/Area Diagrams 0
 Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
 FEH Rainfall Version 2013
 Site Location GB 489026 242081 SP 89026 42081
 Data Type Point
 Cv (Summer) 0.950
 Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
 Analysis Timestep Fine Inertia Status OFF
 DTS Status OFF

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440,
 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 2, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	ST2-1	15 Summer	100	+40%	100/15 Summer				63.165
S1.001	ST2-2	15 Summer	100	+40%	100/15 Summer				62.322
S1.002	ST2-3	30 Summer	100	+40%	100/15 Summer				61.537
S1.003	ST2-4	30 Summer	100	+40%	100/30 Summer				61.506
S1.004	ST2-5	30 Summer	100	+40%	100/15 Summer				61.499
S1.005	ST2-6	30 Summer	100	+40%	100/15 Summer				61.490
S1.006	ST2-7	30 Summer	100	+40%	100/15 Summer				61.479
S1.007	ST2-8	30 Summer	100	+40%	2/15 Summer				61.471

PN	US/MH Name	Depth (m)	Surcharged Volume (m ³)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	ST2-1	0.590	0.000	0.84			200.7	SURCHARGED	
S1.001	ST2-2	0.904	0.000	1.58			320.7	SURCHARGED	
S1.002	ST2-3	0.543	0.000	1.22			411.3	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for TONGWELL -2.SWS

PN	US/MH Name	Surcharged Flooded		Flow / Overflow		Pipe Flow	Status	Level Exceeded
		Depth (m)	Volume (m ³)	Cap.	(l/s)	(l/s)		
S1.003	ST2-4	0.742	0.000	0.19		448.6	FLOOD RISK	
S1.004	ST2-5	0.953	0.000	0.17		420.1	SURCHARGED	
S1.005	ST2-6	1.248	0.000	0.12		287.7	SURCHARGED	
S1.006	ST2-7	1.490	0.000	0.11		261.0	SURCHARGED	
S1.007	ST2-8	2.256	0.000	1.31		285.3	SURCHARGED	



Drainage Technical Addendum

DATE:	20 July 2021	CONFIDENTIALITY:	Public
SUBJECT:	Drainage Technical Addendum		
PROJECT:	Milton Keynes East	AUTHOR:	DSF
CHECKED:	BU	APPROVED:	SP

APPENDIX D – DRAINAGE SCHEMATIC

