

Reference: ST-3657/2511-LLFA Response

Response to the LLFA's comments to
Planning Application (Ref: 25/02064/OP)

This document is prepared in support of a planning application for the erection of up to 50 dwellings including affordable housing, together with amenity space, landscaping and all associated infrastructure and works (all matters reserved except means of access) at Land Adjacent To 10 Hambridge Way, Pirton, Hertfordshire. This document seeks to provide further information relating to the Lead Local Flood Authority (LLFA) comments, dated 17th October 2025.

The following information has been provided in support of this document:

- **Appendix A:** Updated Drainage Strategy
- **Appendix B:** Micro Drainage Output Files

The letter from the LLFA recommends an objection in the absence of an acceptable Flood Risk Assessment (FRA) and Drainage Strategy.

The LLFA comments and Stomor's related replies are as follows:

Clarification should be given on the proposed discharge rate for the site and whether this is achievable without increasing the risk of blockage. A HydroBrake has been used to achieve the proposed rate of 0.4l/s which is likely to result in a small opening size.

The maximum discharge rate is limited to the greenfield runoff rate, 0.37 l/s. The basin outfall headwall directs flows through gabions to filter discharge and avoid the risk of blockage. This is identified on the updated Drainage Strategy, which is provided in **Appendix A.**

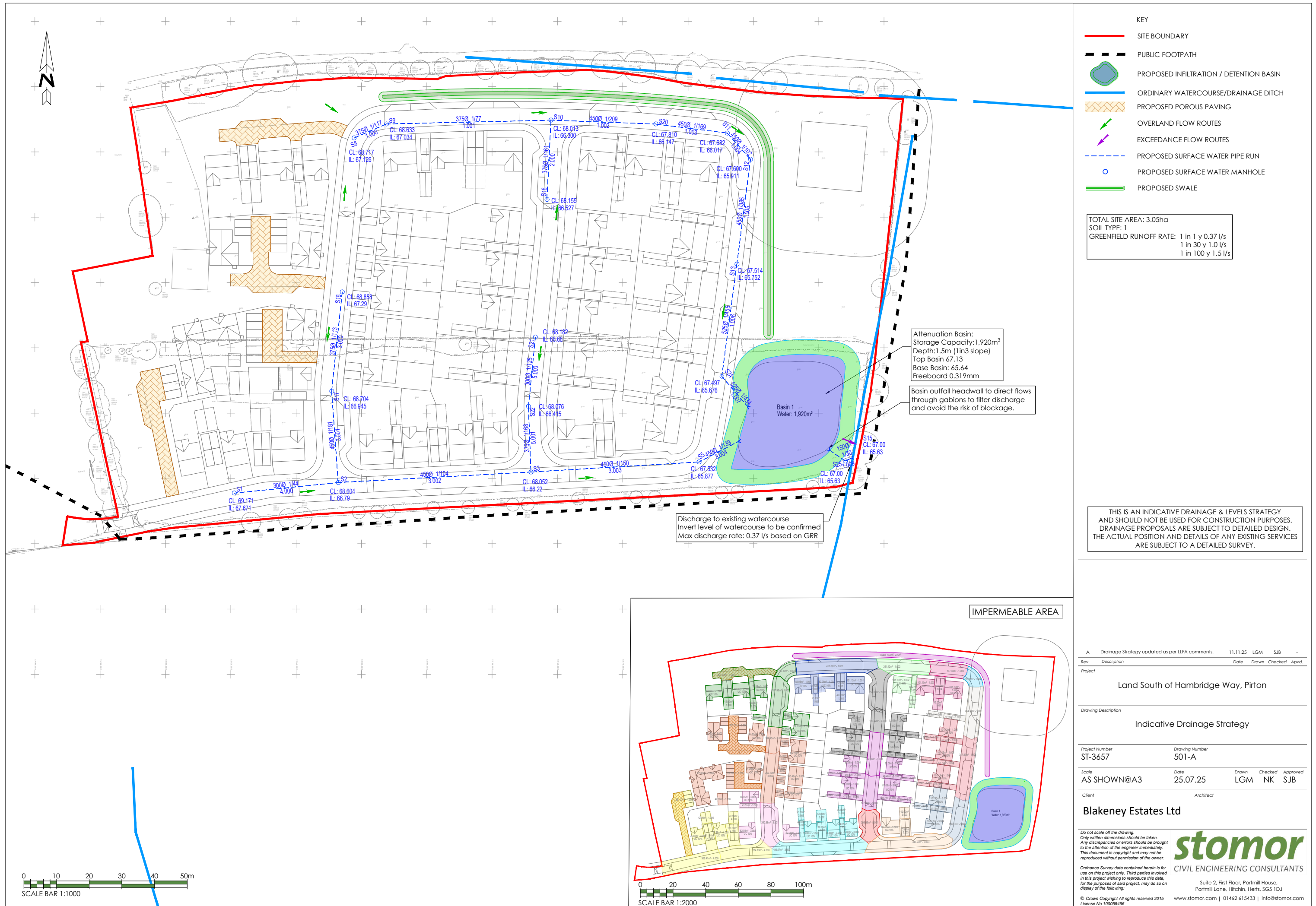
Further detail should be provided on the watercourse which is proposed to receive from the runoff from the site (e.g. cover/invert levels) to ensure it is sufficient condition to receive flows. Given the absence of the above information on the watercourse, the calculations should also be run with a surcharged outfall. This surcharge level must be the 1% AEP flood event of the receiving watercourse if known or bank full if not already hydraulically modelled.

As the application is currently Outline, we will confirm invert levels of the watercourse at the detailed design stage. However, as suggested, we have run the calculations with a surcharged outfall at the 1% AEP flood event. These calculations are provided in **Appendix B.**

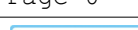
We note that an attenuation basin is proposed to provide the majority of the storage volume required for the site, with some permeable paving proposed in the west. Although this is an outline application, we require evidence that there will be sufficient space on the development to incorporate source control SuDS measures. We typically expect a minimum of 20% of storage volume required for the site to be provided within source control SuDS.

Due to the requirements to model a range of storm events, including longer duration events, this results in a need for storage at the lower end of the site, in the vicinity of the flow control. Therefore, even if additional storage features were provided further upstream in the development, there would still be a requirement to have the large storage features at the lower end of the site. Notwithstanding this, we appreciate the need for source control methods and have provided an additional swale.







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Micro Drainage Network 2020.1		

Existing Network Details for Surface Network 1

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# - Indicates pipe length does not match coordinates
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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
1.000	10.783	0.092	117.1	0.124	5.00		0.0 0.600	o	375	Pipe/Conduit
1.001	50.400	0.659	76.5	0.090	0.00		0.0 0.600	o	375	Pipe/Conduit
2.000	24.323	0.151	161.0	0.095	5.00		0.0 0.600	o	375	Pipe/Conduit
1.002	32.096	0.154	209.1	0.044	0.00		0.0 0.600	o	450	Pipe/Conduit
1.003	22.038	0.130	169.1	0.030	0.00		0.0 0.600	o	450	Pipe/Conduit
1.004	10.721	0.105	101.6	0.014	0.00		0.0 0.600	o	450	Pipe/Conduit
1.005	32.396	0.084	385.0	0.034	0.00		0.0 0.600	o	450	Pipe/Conduit
1.006	34.693	0.076	455.1	0.084	0.00		0.0 0.600	o	525	Pipe/Conduit
1.007	15.525	0.036	433.8	0.000	0.00		0.0 0.600	o	525	Pipe/Conduit
3.000	30.598	0.270	113.3	0.201	5.00		0.0 0.600	o	375	Pipe/Conduit
3.001	28.035	0.155	180.9	0.056	0.00		0.0 0.600	o	450	Pipe/Conduit
4.000	32.010	0.731	43.8	0.129	5.00		0.0 0.600	o	300	Pipe/Conduit
3.002	59.085	0.570	103.7	0.095	0.00		0.0 0.600	o	450	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	67.126	0.124	0.0	1.67	184.9
1.001	67.034	0.214	0.0	2.07	229.0
2.000	66.527	0.095	0.0	1.43	157.4
1.002	66.300	0.353	0.0	1.40	223.0
1.003	66.147	0.383	0.0	1.56	248.2
1.004	66.017	0.397	0.0	2.02	320.7
1.005	65.911	0.431	0.0	1.03	163.8
1.006	65.752	0.515	0.0	1.04	225.9
1.007	65.676	0.515	0.0	1.07	231.4
3.000	67.290	0.201	0.0	1.70	187.9
3.001	66.945	0.257	0.0	1.51	239.9
4.000	67.671	0.129	0.0	2.38	168.5
3.002	66.790	0.482	0.0	2.00	317.6

[illegible]

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Simulation Criteria for Surface Network 1

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

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 515037 231595 TL 15037 31595
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

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Online Controls for Surface Network 1 Hydro-Brake® Optimum Manhole: S25, DS/PN: 1.009, Volume (m³): 2.5 Unit Reference MD-SHE-0028-4000-1000-4000 Design Head (m)1.000 Design Flow (l/s)0.4 Flush-Flo™Calculated ObjectiveMinimise upstream storage ApplicationSurface Sump AvailableYes Diameter (mm)28 Invert Level (m)65.630 Minimum Outlet Pipe Diameter (mm)75 Suggested Manhole Diameter (mm)1200 <table><tr><td>Control Points</td><td>Head (m)</td><td>Flow (l/s)</td><td>Control Points</td><td>Head (m)</td><td>Flow (l/s)</td></tr><tr><td>Design Point (Calculated)</td><td>1.000</td><td>0.4</td><td>Kick-Flo®</td><td>0.256</td><td>0.2</td></tr><tr><td>Flush-Flo™</td><td>0.127</td><td>0.3</td><td>Mean Flow over Head Range</td><td>-</td><td>0.3</td></tr></table> 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 <table><tr><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td></tr><tr><td>0.100</td><td>0.3</td><td>1.200</td><td>0.4</td><td>3.000</td><td>0.6</td><td>7.000</td><td>0.9</td></tr><tr><td>0.200</td><td>0.3</td><td>1.400</td><td>0.5</td><td>3.500</td><td>0.7</td><td>7.500</td><td>1.0</td></tr><tr><td>0.300</td><td>0.2</td><td>1.600</td><td>0.5</td><td>4.000</td><td>0.7</td><td>8.000</td><td>1.0</td></tr><tr><td>0.400</td><td>0.3</td><td>1.800</td><td>0.5</td><td>4.500</td><td>0.8</td><td>8.500</td><td>1.0</td></tr><tr><td>0.500</td><td>0.3</td><td>2.000</td><td>0.5</td><td>5.000</td><td>0.8</td><td>9.000</td><td>1.1</td></tr><tr><td>0.600</td><td>0.3</td><td>2.200</td><td>0.6</td><td>5.500</td><td>0.8</td><td>9.500</td><td>1.1</td></tr><tr><td>0.800</td><td>0.4</td><td>2.400</td><td>0.6</td><td>6.000</td><td>0.9</td><td></td><td></td></tr><tr><td>1.000</td><td>0.4</td><td>2.600</td><td>0.6</td><td>6.500</td><td>0.9</td><td></td><td></td></tr></table> <tr><td colspan="3">©1982-2020 Innovyze</td></tr>			Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)	Design Point (Calculated)	1.000	0.4	Kick-Flo®	0.256	0.2	Flush-Flo™	0.127	0.3	Mean Flow over Head Range	-	0.3	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	0.3	1.200	0.4	3.000	0.6	7.000	0.9	0.200	0.3	1.400	0.5	3.500	0.7	7.500	1.0	0.300	0.2	1.600	0.5	4.000	0.7	8.000	1.0	0.400	0.3	1.800	0.5	4.500	0.8	8.500	1.0	0.500	0.3	2.000	0.5	5.000	0.8	9.000	1.1	0.600	0.3	2.200	0.6	5.500	0.8	9.500	1.1	0.800	0.4	2.400	0.6	6.000	0.9			1.000	0.4	2.600	0.6	6.500	0.9			©1982-2020 Innovyze		
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Storage Structures for Surface Network 1

Tank or Pond Manhole: S23, DS/PN: 1.008

Invert Level (m) 65.640

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	850.0	0.400	1050.0	0.800	1250.0	1.200	1450.0
0.100	900.0	0.500	1100.0	0.900	1300.0	1.300	1500.0
0.200	950.0	0.600	1150.0	1.000	1350.0	1.400	1530.0
0.300	1000.0	0.700	1200.0	1.100	1400.0	1.500	1580.0

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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 Return Period(s) (years) 2, 30, 100 Climate Change (%) 0, 35, 40																																																																																																																															
<table border="1"> <thead> <tr> <th colspan="3"></th> <th colspan="5">Water Surcharged Flooded</th> </tr> <tr> <th>PN</th> <th>US/MH Name</th> <th>Event</th> <th>US/CL (m)</th> <th>Level (m)</th> <th>Depth (m)</th> <th>Volume (m³)</th> <th>Flow / Cap. (l/s)</th> <th>Overflow</th> </tr> </thead> <tbody> <tr> <td>1.000</td> <td>S8</td> <td>15 minute 2 year Summer I+0%</td> <td>68.717</td> <td>67.242</td> <td>-0.259</td> <td>0.000</td> <td>0.21</td> <td></td> </tr> <tr> <td>1.001</td> <td>S9</td> <td>15 minute 2 year Summer I+0%</td> <td>68.633</td> <td>67.145</td> <td>-0.264</td> <td>0.000</td> <td>0.19</td> <td></td> </tr> <tr> <td>2.000</td> <td>S18</td> <td>15 minute 2 year Summer I+0%</td> <td>68.155</td> <td>66.620</td> <td>-0.282</td> <td>0.000</td> <td>0.14</td> <td></td> </tr> <tr> <td>1.002</td> <td>S10</td> <td>15 minute 2 year Summer I+0%</td> <td>68.013</td> <td>66.482</td> <td>-0.268</td> <td>0.000</td> <td>0.34</td> <td></td> </tr> <tr> <td>1.003</td> <td>S20</td> <td>15 minute 2 year Summer I+0%</td> <td>67.810</td> <td>66.329</td> <td>-0.268</td> <td>0.000</td> <td>0.34</td> <td></td> </tr> <tr> <td>1.004</td> <td>S11</td> <td>15 minute 2 year Summer I+0%</td> <td>67.682</td> <td>66.213</td> <td>-0.253</td> <td>0.000</td> <td>0.39</td> <td></td> </tr> <tr> <td>1.005</td> <td>S12</td> <td>15 minute 2 year Summer I+0%</td> <td>67.600</td> <td>66.148</td> <td>-0.214</td> <td>0.000</td> <td>0.53</td> <td></td> </tr> <tr> <td>1.006</td> <td>S13</td> <td>1440 minute 2 year Summer I+0%</td> <td>67.514</td> <td>66.090</td> <td>-0.187</td> <td>0.000</td> <td>0.04</td> <td></td> </tr> <tr> <td>1.007</td> <td>S24</td> <td>1440 minute 2 year Summer I+0%</td> <td>67.497</td> <td>66.090</td> <td>-0.110</td> <td>0.000</td> <td>0.06</td> <td></td> </tr> <tr> <td>3.000</td> <td>S16</td> <td>15 minute 2 year Summer I+0%</td> <td>68.858</td> <td>67.415</td> <td>-0.250</td> <td>0.000</td> <td>0.24</td> <td></td> </tr> <tr> <td>3.001</td> <td>S17</td> <td>15 minute 2 year Summer I+0%</td> <td>68.704</td> <td>67.095</td> <td>-0.300</td> <td>0.000</td> <td>0.24</td> <td></td> </tr> <tr> <td>4.000</td> <td>S1</td> <td>15 minute 2 year Summer I+0%</td> <td>69.171</td> <td>67.754</td> <td>-0.217</td> <td>0.000</td> <td>0.17</td> <td></td> </tr> </tbody> </table>						Water Surcharged Flooded					PN	US/MH Name	Event	US/CL (m)	Level (m)	Depth (m)	Volume (m³)	Flow / Cap. (l/s)	Overflow	1.000	S8	15 minute 2 year Summer I+0%	68.717	67.242	-0.259	0.000	0.21		1.001	S9	15 minute 2 year Summer I+0%	68.633	67.145	-0.264	0.000	0.19		2.000	S18	15 minute 2 year Summer I+0%	68.155	66.620	-0.282	0.000	0.14		1.002	S10	15 minute 2 year Summer I+0%	68.013	66.482	-0.268	0.000	0.34		1.003	S20	15 minute 2 year Summer I+0%	67.810	66.329	-0.268	0.000	0.34		1.004	S11	15 minute 2 year Summer I+0%	67.682	66.213	-0.253	0.000	0.39		1.005	S12	15 minute 2 year Summer I+0%	67.600	66.148	-0.214	0.000	0.53		1.006	S13	1440 minute 2 year Summer I+0%	67.514	66.090	-0.187	0.000	0.04		1.007	S24	1440 minute 2 year Summer I+0%	67.497	66.090	-0.110	0.000	0.06		3.000	S16	15 minute 2 year Summer I+0%	68.858	67.415	-0.250	0.000	0.24		3.001	S17	15 minute 2 year Summer I+0%	68.704	67.095	-0.300	0.000	0.24		4.000	S1	15 minute 2 year Summer I+0%	69.171	67.754	-0.217	0.000	0.17	
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Simulation Criteria Areal Reduction Factor 1.000 Hot Start (mins) 0 Hot Start Level (mm) 0 Manhole Headloss Coeff (Global) 0.500 Foul Sewage per hectare (l/s) 0.000 Additional Flow - % of Total Flow 0.000 MADD Factor * 10m³/ha Storage 2.000 Inlet Coefficient 0.800 Flow per Person per Day (l/per/day) 0.000																																																																																																																																																	
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Synthetic Rainfall Details Rainfall Model FEH FEH Rainfall Version 2013 Site Location GB 515037 231595 TL 15037 31595 Data Type Point Cv (Summer) 1.000 Cv (Winter) 1.000 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 Return Period(s) (years) 2, 30, 100 Climate Change (%) 0, 35, 40																																																																																																																																																	
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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Surface Network 1

US/MH			Water		Surcharged	Flooded		
PN	Name	Event	US/CL (m)	Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	
3.002	S2	15 minute 30 year Summer I+35%	68.604	67.415	0.175	0.000	0.82	
5.000	S21	15 minute 30 year Summer I+35%	68.182	67.280	0.320	0.000	0.64	
5.001	S22	15 minute 30 year Summer I+35%	68.076	67.164	0.374	0.000	0.45	
3.003	S3	15 minute 30 year Summer I+35%	68.052	67.058	0.388	0.000	1.29	
3.004	S5	1440 minute 30 year Summer I+35%	67.532	66.565	0.238	0.000	0.12	
1.008	S23	1440 minute 30 year Winter I+35%	67.130	66.565	0.475	0.000	0.01	
1.009	S25	1440 minute 30 year Winter I+35%	67.000	66.605	0.825	0.000	0.04	

US/MH			Pipe	
PN	Name	Overflow (l/s)	Flow (l/s)	Status
3.002	S2		240.7	SURCHARGED
5.000	S21		55.6	SURCHARGED
5.001	S22		57.9	SURCHARGED
3.003	S3		308.4	SURCHARGED
3.004	S5		27.2	SURCHARGED
1.008	S23		1.7	SURCHARGED
1.009	S25		0.4	SURCHARGED

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

Simulation Criteria

Areal Reduction Factor 1.000

Hot Start (mins) 0

Hot Start Level (mm) 0

Manhole Headloss Coeff (Global) 0.500

Foul Sewage per hectare (l/s) 0.000

Additional Flow - % of Total Flow 0.000

MADD Factor * 10m³/ha Storage 2.000

Inlet Coefficient 0.800

Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0

Number of Offline Controls 0

Number of Time/Area Diagrams 0

Number of Online Controls 1

Number of Storage Structures 1

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH

FEH Rainfall Version 2013

Site Location GB 515037 231595 TL 15037 31595

Data Type Point

Cv (Summer) 1.000

Cv (Winter) 1.000

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

Return Period(s) (years) 2, 30, 100

Climate Change (%) 0, 35, 40

PN	US/MH Name	Event	US/CL (m)	Water Surcharged Flooded				Flow / Cap.
				Level (m)	Depth (m)	Volume (m³)		
1.000	S8	15 minute 100 year Summer I+40%	68.717	67.779	0.277	0.000	0.76	
1.001	S9	15 minute 100 year Summer I+40%	68.633	67.696	0.287	0.000	0.75	
2.000	S18	15 minute 100 year Summer I+40%	68.155	67.505	0.603	0.000	0.46	
1.002	S10	15 minute 100 year Summer I+40%	68.013	67.399	0.648	0.000	1.17	
1.003	S20	15 minute 100 year Summer I+40%	67.810	67.183	0.586	0.000	1.19	
1.004	S11	15 minute 100 year Summer I+40%	67.682	66.987	0.520	0.000	1.36	
1.005	S12	1440 minute 100 year Summer I+40%	67.600	66.811	0.450	0.000	0.16	
1.006	S13	1440 minute 100 year Winter I+40%	67.514	66.811	0.534	0.000	0.09	
1.007	S24	1440 minute 100 year Winter I+40%	67.497	66.811	0.610	0.000	0.12	
3.000	S16	15 minute 100 year Summer I+40%	68.858	68.559	0.894	0.000	0.83	
3.001	S17	15 minute 100 year Summer I+40%	68.704	68.398	1.003	0.000	0.78	
4.000	S1	15 minute 100 year Summer I+40%	69.171	68.492	0.521	0.000	0.61	

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

		Pipe	
	US/MH	Overflow	Flow
PN	Name	(l/s)	(l/s)
			Status
1.000	S8	90.0	SURCHARGED
1.001	S9	158.7	SURCHARGED
2.000	S18	62.7	SURCHARGED
1.002	S10	225.4	SURCHARGED
1.003	S20	241.8	SURCHARGED
1.004	S11	249.6	SURCHARGED
1.005	S12	22.2	SURCHARGED
1.006	S13	16.9	SURCHARGED
1.007	S24	16.8	SURCHARGED
3.000	S16	138.3	FLOOD RISK
3.001	S17	160.2	SURCHARGED
4.000	S1	94.6	SURCHARGED

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