

Shaun Tonge Engineering					Page 1																																																																																																																																																																																																																		
11 Broomhead Road Wombell Barnsley S73 0SA																																																																																																																																																																																																																							
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<u>Summary of Results for 30 year Return Period</u> Half Drain Time : 28 minutes. <table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr><tr><td>15 min Summer</td><td>46.898</td><td>0.578</td><td>6.7</td><td>16.5</td><td>O K</td></tr><tr><td>30 min Summer</td><td>46.986</td><td>0.666</td><td>7.3</td><td>19.0</td><td>O K</td></tr><tr><td>60 min Summer</td><td>47.016</td><td>0.696</td><td>7.5</td><td>19.8</td><td>O K</td></tr><tr><td>120 min Summer</td><td>46.973</td><td>0.653</td><td>7.2</td><td>18.6</td><td>O K</td></tr><tr><td>180 min Summer</td><td>46.912</td><td>0.592</td><td>6.8</td><td>16.9</td><td>O K</td></tr><tr><td>240 min Summer</td><td>46.853</td><td>0.533</td><td>6.5</td><td>15.2</td><td>O K</td></tr><tr><td>360 min Summer</td><td>46.750</td><td>0.430</td><td>5.8</td><td>12.3</td><td>O K</td></tr><tr><td>480 min Summer</td><td>46.670</td><td>0.350</td><td>5.3</td><td>10.0</td><td>O K</td></tr><tr><td>600 min Summer</td><td>46.605</td><td>0.285</td><td>4.9</td><td>8.1</td><td>O K</td></tr><tr><td>720 min Summer</td><td>46.552</td><td>0.232</td><td>4.5</td><td>6.6</td><td>O K</td></tr><tr><td>960 min Summer</td><td>46.472</td><td>0.152</td><td>4.0</td><td>4.3</td><td>O K</td></tr><tr><td>1440 min Summer</td><td>46.382</td><td>0.062</td><td>3.5</td><td>1.8</td><td>O K</td></tr><tr><td>2160 min Summer</td><td>46.360</td><td>0.040</td><td>2.7</td><td>1.1</td><td>O K</td></tr><tr><td>2880 min Summer</td><td>46.352</td><td>0.032</td><td>2.2</td><td>0.9</td><td>O K</td></tr><tr><td>4320 min Summer</td><td>46.343</td><td>0.023</td><td>1.6</td><td>0.7</td><td>O K</td></tr><tr><td>5760 min Summer</td><td>46.339</td><td>0.019</td><td>1.3</td><td>0.5</td><td>O K</td></tr><tr><td>7200 min Summer</td><td>46.336</td><td>0.016</td><td>1.1</td><td>0.4</td><td>O K</td></tr><tr><td>8640 min Summer</td><td>46.334</td><td>0.014</td><td>0.9</td><td>0.4</td><td>O K</td></tr><tr><td>10080 min Summer</td><td>46.332</td><td>0.012</td><td>0.8</td><td>0.3</td><td>O K</td></tr><tr><td>15 min Winter</td><td>46.977</td><td>0.657</td><td>7.3</td><td>18.7</td><td>O K</td></tr></table> <table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Time-Peak (mins)</th></tr><tr><td>15 min Summer</td><td>69.625</td><td>0.0</td><td>16</td></tr><tr><td>30 min Summer</td><td>46.099</td><td>0.0</td><td>26</td></tr><tr><td>60 min Summer</td><td>29.238</td><td>0.0</td><td>42</td></tr><tr><td>120 min Summer</td><td>18.009</td><td>0.0</td><td>78</td></tr><tr><td>180 min Summer</td><td>13.416</td><td>0.0</td><td>110</td></tr><tr><td>240 min Summer</td><td>10.836</td><td>0.0</td><td>144</td></tr><tr><td>360 min Summer</td><td>7.992</td><td>0.0</td><td>208</td></tr><tr><td>480 min Summer</td><td>6.438</td><td>0.0</td><td>268</td></tr><tr><td>600 min Summer</td><td>5.441</td><td>0.0</td><td>330</td></tr><tr><td>720 min Summer</td><td>4.740</td><td>0.0</td><td>390</td></tr><tr><td>960 min Summer</td><td>3.810</td><td>0.0</td><td>510</td></tr><tr><td>1440 min Summer</td><td>2.797</td><td>0.0</td><td>736</td></tr><tr><td>2160 min Summer</td><td>2.051</td><td>0.0</td><td>1084</td></tr><tr><td>2880 min Summer</td><td>1.644</td><td>0.0</td><td>1452</td></tr><tr><td>4320 min Summer</td><td>1.203</td><td>0.0</td><td>2152</td></tr><tr><td>5760 min Summer</td><td>0.963</td><td>0.0</td><td>2856</td></tr><tr><td>7200 min Summer</td><td>0.810</td><td>0.0</td><td>3624</td></tr><tr><td>8640 min Summer</td><td>0.703</td><td>0.0</td><td>4400</td></tr><tr><td>10080 min Summer</td><td>0.624</td><td>0.0</td><td>5000</td></tr><tr><td>15 min Winter</td><td>69.625</td><td>0.0</td><td>16</td></tr></table>						Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	15 min Summer	46.898	0.578	6.7	16.5	O K	30 min Summer	46.986	0.666	7.3	19.0	O K	60 min Summer	47.016	0.696	7.5	19.8	O K	120 min Summer	46.973	0.653	7.2	18.6	O K	180 min Summer	46.912	0.592	6.8	16.9	O K	240 min Summer	46.853	0.533	6.5	15.2	O K	360 min Summer	46.750	0.430	5.8	12.3	O K	480 min Summer	46.670	0.350	5.3	10.0	O K	600 min Summer	46.605	0.285	4.9	8.1	O K	720 min Summer	46.552	0.232	4.5	6.6	O K	960 min Summer	46.472	0.152	4.0	4.3	O K	1440 min Summer	46.382	0.062	3.5	1.8	O K	2160 min Summer	46.360	0.040	2.7	1.1	O K	2880 min Summer	46.352	0.032	2.2	0.9	O K	4320 min Summer	46.343	0.023	1.6	0.7	O K	5760 min Summer	46.339	0.019	1.3	0.5	O K	7200 min Summer	46.336	0.016	1.1	0.4	O K	8640 min Summer	46.334	0.014	0.9	0.4	O K	10080 min Summer	46.332	0.012	0.8	0.3	O K	15 min Winter	46.977	0.657	7.3	18.7	O K	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)	15 min Summer	69.625	0.0	16	30 min Summer	46.099	0.0	26	60 min Summer	29.238	0.0	42	120 min Summer	18.009	0.0	78	180 min Summer	13.416	0.0	110	240 min Summer	10.836	0.0	144	360 min Summer	7.992	0.0	208	480 min Summer	6.438	0.0	268	600 min Summer	5.441	0.0	330	720 min Summer	4.740	0.0	390	960 min Summer	3.810	0.0	510	1440 min Summer	2.797	0.0	736	2160 min Summer	2.051	0.0	1084	2880 min Summer	1.644	0.0	1452	4320 min Summer	1.203	0.0	2152	5760 min Summer	0.963	0.0	2856	7200 min Summer	0.810	0.0	3624	8640 min Summer	0.703	0.0	4400	10080 min Summer	0.624	0.0	5000	15 min Winter	69.625	0.0	16
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Shaun Tonge Engineering					Page 2	
11 Broomhead Road Wombell Barnsley S73 0SA						
Date 04/07/2019 10:31 File Plots 12-23 & 27-36.SRCX						
			Designed by Shaun			
			Checked by			
CADS			Source Control 2018.1			
<u>Summary of Results for 30 year Return Period</u>						
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	
30 min Winter	47.081	0.761	7.9	21.7	O K	
60 min Winter	47.109	0.789	8.1	22.5	O K	
120 min Winter	47.030	0.710	7.6	20.2	O K	
180 min Winter	46.935	0.615	7.0	17.5	O K	
240 min Winter	46.848	0.528	6.4	15.0	O K	
360 min Winter	46.709	0.389	5.5	11.1	O K	
480 min Winter	46.606	0.286	4.9	8.1	O K	
600 min Winter	46.527	0.207	4.4	5.9	O K	
720 min Winter	46.465	0.145	4.0	4.1	O K	
960 min Winter	46.382	0.062	3.5	1.8	O K	
1440 min Winter	46.359	0.039	2.7	1.1	O K	
2160 min Winter	46.349	0.029	2.0	0.8	O K	
2880 min Winter	46.343	0.023	1.6	0.7	O K	
4320 min Winter	46.337	0.017	1.1	0.5	O K	
5760 min Winter	46.334	0.014	0.9	0.4	O K	
7200 min Winter	46.331	0.011	0.8	0.3	O K	
8640 min Winter	46.330	0.010	0.7	0.3	O K	
10080 min Winter	46.329	0.009	0.6	0.3	O K	
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)			
30 min Winter	46.099	0.0	27			
60 min Winter	29.238	0.0	46			
120 min Winter	18.009	0.0	82			
180 min Winter	13.416	0.0	118			
240 min Winter	10.836	0.0	152			
360 min Winter	7.992	0.0	216			
480 min Winter	6.438	0.0	280			
600 min Winter	5.441	0.0	340			
720 min Winter	4.740	0.0	400			
960 min Winter	3.810	0.0	508			
1440 min Winter	2.797	0.0	730			
2160 min Winter	2.051	0.0	1080			
2880 min Winter	1.644	0.0	1452			
4320 min Winter	1.203	0.0	2124			
5760 min Winter	0.963	0.0	2880			
7200 min Winter	0.810	0.0	3672			
8640 min Winter	0.703	0.0	4400			
10080 min Winter	0.624	0.0	5048			
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<u>Rainfall Details</u> <table> <tr> <td>Rainfall Model</td> <td>FSR</td> <td>Winter Storms</td> <td>Yes</td> </tr> <tr> <td>Return Period (years)</td> <td>30</td> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Region</td> <td>England and Wales</td> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>M5-60 (mm)</td> <td>19.000</td> <td>Shortest Storm (mins)</td> <td>15</td> </tr> <tr> <td>Ratio R</td> <td>0.362</td> <td>Longest Storm (mins)</td> <td>10080</td> </tr> <tr> <td>Summer Storms</td> <td>Yes</td> <td>Climate Change %</td> <td>+0</td> </tr> </table> <u>Time Area Diagram</u> Total Area (ha) 0.160 <table> <tr> <th colspan="2">Time (mins)</th> <th>Area</th> </tr> <tr> <th>From:</th> <th>To:</th> <th>(ha)</th> </tr> <tr> <td>0</td> <td>4</td> <td>0.160</td> </tr> </table>			Rainfall Model	FSR	Winter Storms	Yes	Return Period (years)	30	Cv (Summer)	0.750	Region	England and Wales	Cv (Winter)	0.840	M5-60 (mm)	19.000	Shortest Storm (mins)	15	Ratio R	0.362	Longest Storm (mins)	10080	Summer Storms	Yes	Climate Change %	+0	Time (mins)		Area	From:	To:	(ha)	0	4	0.160
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<u>Model Details</u> Storage is Online Cover Level (m) 48.700 <u>Cellular Storage Structure</u> Invert Level (m) 46.320 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.73800 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.73800 <table border="1"> <thead> <tr> <th>Depth (m)</th> <th>Area (m²)</th> <th>Inf. Area (m²)</th> <th>Depth (m)</th> <th>Area (m²)</th> <th>Inf. Area (m²)</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>30.0</td> <td>30.0</td> <td>0.900</td> <td>0.0</td> <td>79.6</td> </tr> <tr> <td>0.800</td> <td>30.0</td> <td>79.6</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	0.000	30.0	30.0	0.900	0.0	79.6	0.800	30.0	79.6			
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