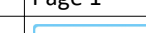


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Alexandra Business Park 2nd Floor, The Court, Prescott Road St Helens, WA10 3TP	SUPREME DEVOPMENTS MANCHESTER BRADSTONE ROAD 7194 P2	
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Alexandra Business Park
2nd Floor, The Court, Prescott Road
St Helens, WA10 3TP

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BRADSTONE ROAD
7194 P2

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Network Design Table for Storm

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
Sw-3.000	18.141	0.181	100.0	0.001	4.00	0.0	0.600	o	100	Pipe/Conduit		
Sw-3.001	16.375	0.164	100.0	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit		
Sw-3.002	20.843	0.208	100.0	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit		
Sw-1.001	40.353	0.099	406.4	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit		
Sw-4.000	9.180	0.092	100.0	0.005	4.00	0.0	0.600	o	100	Pipe/Conduit		
Sw-4.001	23.900	0.404	59.2	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit		
Sw-5.000	14.604	0.265	55.2	0.018	4.00	0.0	0.600	o	100	Pipe/Conduit		
Sw-6.000	13.300	0.275	48.3	0.012	4.00	0.0	0.600	o	100	Pipe/Conduit		
Sw-7.000	34.845	0.348	100.0	0.031	4.00	0.0	0.600	o	150	Pipe/Conduit		
Sw-7.001	15.346	0.153	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit		
Sw-7.002	27.792	0.473	58.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit		
Sw-8.000	15.860	0.157	100.7	0.017	4.00	0.0	0.600	o	150	Pipe/Conduit		
Sw-8.001	4.038	0.041	99.4	0.033	0.00	0.0	0.600	o	225	Pipe/Conduit		
Sw-9.000	22.676	0.227	100.0	0.010	4.00	0.0	0.600	o	100	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)
Sw-3.000	50.00	4.39	51.000	0.001	0.0	0.0	0.0	0.77	6.0	0.1
Sw-3.001	50.00	4.75	50.819	0.001	0.0	0.0	0.0	0.77	6.0	0.1
Sw-3.002	50.00	5.20	50.655	0.001	0.0	0.0	0.0	0.77	6.0	0.1
Sw-1.001	50.00	6.57	49.950	0.045	0.0	0.0	0.0	0.49	8.7	6.1
Sw-4.000	50.00	4.20	50.916	0.005	0.0	0.0	0.0	0.77	6.0	0.7
Sw-4.001	50.00	4.60	50.824	0.005	0.0	0.0	0.0	1.00	7.9	0.7
Sw-5.000	50.00	4.23	50.663	0.018	0.0	0.0	0.0	1.04	8.2	2.4
Sw-6.000	50.00	4.20	50.673	0.012	0.0	0.0	0.0	1.11	8.7	1.7
Sw-7.000	50.00	4.58	50.857	0.031	0.0	0.0	0.0	1.00	17.8	4.3
Sw-7.001	50.00	4.83	50.509	0.031	0.0	0.0	0.0	1.00	17.8	4.3
Sw-7.002	50.00	5.18	50.355	0.031	0.0	0.0	0.0	1.31	23.2	4.3
Sw-8.000	50.00	4.26	50.400	0.017	0.0	0.0	0.0	1.00	17.7	2.3
Sw-8.001	50.00	4.32	50.243	0.050	0.0	0.0	0.0	1.31	52.1	6.8
Sw-9.000	50.00	4.49	50.765	0.010	0.0	0.0	0.0	0.77	6.0	1.4

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Network Design Table for Storm												
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
Sw-9.001	14.161	0.336	42.1	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit		
Sw-8.002	5.239	0.052	100.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit		
Sw-10.000	3.859	0.455	8.5	0.012	4.00	0.0	0.600	o	100	Pipe/Conduit		
Sw-8.003	22.319	0.079	282.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit		
Sw-11.000	19.303	0.064	303.4	0.023	4.00	0.0	0.600	o	150	Pipe/Conduit		
Sw-11.001	13.110	0.064	206.1	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit		
Sw-11.002	8.878	0.250	35.6	0.011	0.00	0.0	0.600	o	150	Pipe/Conduit		
Sw-11.003	2.113	0.119	17.7	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit		
Sw-11.004	13.968	0.427	32.7	0.021	0.00	0.0	0.600	o	150	Pipe/Conduit		
Sw-8.004	8.276	0.050	167.0	0.034	0.00	0.0	0.600	o	225	Pipe/Conduit		
Sw-1.002	11.581	0.061	188.6	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit		
Sw-1.003	12.088	0.023	533.6	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)		
Sw-9.001	50.00	4.69	50.538	0.010	0.0	0.0	0.0	1.19	9.4	1.4		
Sw-8.002	50.00	4.76	50.202	0.060	0.0	0.0	0.0	1.31	52.0	8.2		
Sw-10.000	50.00	4.02	50.605	0.012	0.0	0.0	0.0	2.67	21.0	1.6		
Sw-8.003	50.00	5.24	50.150	0.072	0.0	0.0	0.0	0.77	30.7	9.7		
Sw-11.000	50.00	4.56	50.800	0.023	0.0	0.0	0.0	0.57	10.1	3.2		
Sw-11.001	50.00	4.88	50.736	0.023	0.0	0.0	0.0	0.70	12.3	3.2		
Sw-11.002	50.00	4.96	50.673	0.034	0.0	0.0	0.0	1.69	29.9	4.6		
Sw-11.003	50.00	4.98	50.423	0.034	0.0	0.0	0.0	2.41	42.5	4.6		
Sw-11.004	50.00	5.11	50.304	0.055	0.0	0.0	0.0	1.77	31.2	7.5		
Sw-8.004	50.00	5.37	49.877	0.161	0.0	0.0	0.0	1.01	40.1	21.8		
Sw-1.002	50.00	6.73	49.827	0.273	0.0	0.0	0.0	1.14	80.7	37.0		
Sw-1.003	50.00	7.09	49.766	0.273	0.0	0.0	0.0	0.56	22.2	37.0		
Free Flowing Outfall Details for Storm												
Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)						
Sw-1.003	MH-26	51.333	49.743	49.450	0	0						
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Simulation Criteria for Storm

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 Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of 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	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.355		

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<p style="text-align: center;"><u>Online Controls for Storm</u></p> <p style="text-align: center;"><u>Hydro-Brake® Optimum Manhole: MH-ATT-TK, DS/PN: Sw-1.002, Volume (m³): 1.9</u></p> <table><tr><td>Unit Reference</td><td>MD-SHE-0155-1050-0550-1050</td></tr><tr><td>Design Head (m)</td><td>0.550</td></tr><tr><td>Design Flow (l/s)</td><td>10.5</td></tr><tr><td>Flush-Flo™</td><td>Calculated</td></tr><tr><td>Objective</td><td>Minimise upstream storage</td></tr><tr><td>Application</td><td>Surface</td></tr><tr><td>Sump Available</td><td>Yes</td></tr><tr><td>Diameter (mm)</td><td>155</td></tr><tr><td>Invert Level (m)</td><td>49.827</td></tr><tr><td>Minimum Outlet Pipe Diameter (mm)</td><td>225</td></tr><tr><td>Suggested Manhole Diameter (mm)</td><td>1200</td></tr></table> <table><tr><td>Control Points</td><td>Head (m)</td><td>Flow (l/s)</td></tr><tr><td>Design Point (Calculated)</td><td>0.550</td><td>10.5</td></tr><tr><td>Flush-Flo™</td><td>0.236</td><td>10.5</td></tr><tr><td>Kick-Flo®</td><td>0.430</td><td>9.3</td></tr><tr><td>Mean Flow over Head Range</td><td>-</td><td>8.4</td></tr></table> <p>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</p> <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>5.6</td><td>1.200</td><td>15.2</td><td>3.000</td><td>23.5</td><td>7.000</td><td>35.3</td></tr><tr><td>0.200</td><td>10.4</td><td>1.400</td><td>16.3</td><td>3.500</td><td>25.3</td><td>7.500</td><td>36.6</td></tr><tr><td>0.300</td><td>10.4</td><td>1.600</td><td>17.4</td><td>4.000</td><td>27.0</td><td>8.000</td><td>37.8</td></tr><tr><td>0.400</td><td>9.8</td><td>1.800</td><td>18.4</td><td>4.500</td><td>28.6</td><td>8.500</td><td>39.0</td></tr><tr><td>0.500</td><td>10.0</td><td>2.000</td><td>19.4</td><td>5.000</td><td>30.1</td><td>9.000</td><td>40.1</td></tr><tr><td>0.600</td><td>10.9</td><td>2.200</td><td>20.3</td><td>5.500</td><td>31.5</td><td>9.500</td><td>41.2</td></tr><tr><td>0.800</td><td>12.5</td><td>2.400</td><td>21.1</td><td>6.000</td><td>32.7</td><td></td><td></td></tr><tr><td>1.000</td><td>13.9</td><td>2.600</td><td>21.9</td><td>6.500</td><td>34.0</td><td></td><td></td></tr></table>			Unit Reference	MD-SHE-0155-1050-0550-1050	Design Head (m)	0.550	Design Flow (l/s)	10.5	Flush-Flo™	Calculated	Objective	Minimise upstream storage	Application	Surface	Sump Available	Yes	Diameter (mm)	155	Invert Level (m)	49.827	Minimum Outlet Pipe Diameter (mm)	225	Suggested Manhole Diameter (mm)	1200	Control Points	Head (m)	Flow (l/s)	Design Point (Calculated)	0.550	10.5	Flush-Flo™	0.236	10.5	Kick-Flo®	0.430	9.3	Mean Flow over Head Range	-	8.4	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	5.6	1.200	15.2	3.000	23.5	7.000	35.3	0.200	10.4	1.400	16.3	3.500	25.3	7.500	36.6	0.300	10.4	1.600	17.4	4.000	27.0	8.000	37.8	0.400	9.8	1.800	18.4	4.500	28.6	8.500	39.0	0.500	10.0	2.000	19.4	5.000	30.1	9.000	40.1	0.600	10.9	2.200	20.3	5.500	31.5	9.500	41.2	0.800	12.5	2.400	21.1	6.000	32.7			1.000	13.9	2.600	21.9	6.500	34.0		
Unit Reference	MD-SHE-0155-1050-0550-1050																																																																																																														
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<div>Storage Structures for Storm</div> <div>Cellular Storage Manhole: MH-ATT-TK, DS/PN: Sw-1.002</div> <div>Invert Level (m) 49.827 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000</div> <table><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>110.0</td><td>540.0</td><td>0.551</td><td>0.0</td><td>759.6</td></tr><tr><td>0.550</td><td>110.0</td><td>759.6</td><td></td><td></td><td></td></tr></tbody></table>			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	110.0	540.0	0.551	0.0	759.6	0.550	110.0	759.6			
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)															
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<u>1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm</u>																																																							
	<table><tr><th>PN</th><th>US/MH Name</th><th>Status</th><th>Level Exceeded</th></tr><tr><td>Sw-8.000</td><td>MH-RG-1</td><td>OK*</td><td></td></tr><tr><td>Sw-8.001</td><td>MH-15</td><td>OK</td><td></td></tr><tr><td>Sw-9.000</td><td>MH-RWP-8</td><td>OK*</td><td></td></tr><tr><td>Sw-9.001</td><td>MH-08</td><td>OK</td><td></td></tr><tr><td>Sw-8.002</td><td>MH-09</td><td>OK</td><td></td></tr><tr><td>Sw-10.000</td><td>MH-RWP-4</td><td>OK*</td><td></td></tr><tr><td>Sw-8.003</td><td>MH-JUN</td><td>OK*</td><td></td></tr><tr><td>Sw-11.000</td><td>MH-RWP-9</td><td>OK*</td><td></td></tr><tr><td>Sw-11.001</td><td>MH-04</td><td>OK</td><td></td></tr><tr><td>Sw-11.002</td><td>MH-05</td><td>OK</td><td></td></tr><tr><td>Sw-11.003</td><td>MH-06</td><td>OK</td><td></td></tr><tr><td>Sw-11.004</td><td>MH-07</td><td>OK</td><td>2</td></tr></table>	PN	US/MH Name	Status	Level Exceeded	Sw-8.000	MH-RG-1	OK*		Sw-8.001	MH-15	OK		Sw-9.000	MH-RWP-8	OK*		Sw-9.001	MH-08	OK		Sw-8.002	MH-09	OK		Sw-10.000	MH-RWP-4	OK*		Sw-8.003	MH-JUN	OK*		Sw-11.000	MH-RWP-9	OK*		Sw-11.001	MH-04	OK		Sw-11.002	MH-05	OK		Sw-11.003	MH-06	OK		Sw-11.004	MH-07	OK	2		
PN	US/MH Name	Status	Level Exceeded																																																				
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Sw-11.004	MH-07	OK	2																																																				
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

		Water	Surcharged	Flooded			Half Drain	Pipe	
	US/MH	Overflow	Level	Depth	Volume	Flow /	Overflow	Time	Flow
PN	Name	Act.	(m)	(m)	(m³)	Cap.	(l/s)	(mins)	(l/s)
Sw-1.000	MH-RWP-5		50.850	0.000	0.000	3.71			14.6
Sw-2.000	MH-RWP-6		50.930	0.000	0.000	1.26			7.6
Sw-2.001	MH-10		51.424	0.622	0.000	0.54			3.1
Sw-2.002	MH-11		51.409	0.776	0.000	0.54			3.1
Sw-3.000	MH-RWP-7		51.100	0.000	0.000	0.04			0.2
Sw-3.001	MH-12		51.386	0.468	0.000	0.10			0.6
Sw-3.002	MH-13		51.390	0.636	0.000	0.11			0.6
Sw-1.001	MH-14		51.401	1.301	0.000	0.95			8.0
Sw-4.000	MH-RG		51.016	0.000	0.000	0.33			2.0
Sw-4.001	MH-01		51.375	0.450	0.000	0.13			1.0
Sw-5.000	MH-RWP-2		50.763	0.000	0.000	1.16			9.5
Sw-6.000	MH-RWP-3		50.773	0.000	0.000	0.52			4.5
Sw-7.000	MH-RWP-1		51.007	0.000	0.000	0.64			11.3
Sw-7.001	MH-02		51.390	0.731	0.000	0.35			5.8
Sw-7.002	MH-03		51.379	0.874	0.000	0.26			5.8
Sw-8.000	MH-RG-1		50.550	0.000	0.000	0.50			8.8
Sw-8.001	MH-15		51.391	0.923	0.000	0.28			8.5
Sw-9.000	MH-RWP-8		50.865	0.000	0.000	0.59			3.6
Sw-9.001	MH-08		51.395	0.757	0.000	0.21			1.8
Sw-8.002	MH-09		51.388	0.961	0.000	0.31			9.8
Sw-10.000	MH-RWP-4		50.705	0.000	0.000	0.31			5.8
Sw-8.003	MH-JUN		50.375	0.000	0.000	1.11			34.0
Sw-11.000	MH-RWP-9		50.950	0.000	0.000	1.26			12.8
Sw-11.001	MH-04		51.378	0.492	0.000	0.38			4.3
Sw-11.002	MH-05		51.369	0.546	0.000	0.24			6.3
Sw-11.003	MH-06		51.359	0.786	0.000	0.29			6.3
Sw-11.004	MH-07		51.357	0.903	2.964	0.34			9.8

	US/MH		Level
PN	Name	Status	Exceeded
Sw-1.000	MH-RWP-5	SURCHARGED*	
Sw-2.000	MH-RWP-6	SURCHARGED*	
Sw-2.001	MH-10	SURCHARGED	
Sw-2.002	MH-11	SURCHARGED	
Sw-3.000	MH-RWP-7	SURCHARGED*	
Sw-3.001	MH-12	SURCHARGED	
Sw-3.002	MH-13	SURCHARGED	
Sw-1.001	MH-14	SURCHARGED	
Sw-4.000	MH-RG	SURCHARGED*	
Sw-4.001	MH-01	FLOOD RISK	
Sw-5.000	MH-RWP-2	SURCHARGED*	
Sw-6.000	MH-RWP-3	SURCHARGED*	
Sw-7.000	MH-RWP-1	SURCHARGED*	
Sw-7.001	MH-02	SURCHARGED	
Sw-7.002	MH-03	FLOOD RISK	

ADS Structural Ltd		Page 17	
Alexandra Business Park 2nd Floor, The Court, Prescott Road St Helens, WA10 3TP	SUPREME DEVOPMENTS MANCHESTER BRADSTONE ROAD 7194 P2		
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Sw-10.000	MH-RWP-4	SURCHARGED*	
Sw-8.003	MH-JUN	SURCHARGED*	
Sw-11.000	MH-RWP-9	SURCHARGED*	
Sw-11.001	MH-04	FLOOD RISK	
Sw-11.002	MH-05	FLOOD RISK	
Sw-11.003	MH-06	FLOOD RISK	
Sw-11.004	MH-07	FLOOD	2
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