

ADS Structural Ltd		Page 3
Alexandra Business Park 2nd Floor, The Court, Prescott Road St Helens, WA10 3TP	RAINFORD AVENUE SOUTHWAY HOUSING 4248	
Date 09/01/2023 10:00 File drainage model.MDX	Designed by GlynRatcliffe Checked by	
Innovyze Network 2020.1.3		

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	0.359	

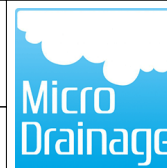
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<u>Online Controls for Storm</u> <u>Hydro-Brake® Optimum Manhole: MH-03, DS/PN: Sw-1.003, Volume (m³): 0.9</u> <table><tr><td>Unit Reference</td><td>MD-SHE-0071-1900-0600-1900</td></tr><tr><td>Design Head (m)</td><td>0.600</td></tr><tr><td>Design Flow (l/s)</td><td>1.9</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>71</td></tr><tr><td>Invert Level (m)</td><td>31.500</td></tr><tr><td>Minimum Outlet Pipe Diameter (mm)</td><td>100</td></tr><tr><td>Suggested Manhole Diameter (mm)</td><td>1200</td></tr></table> <table><tr><th>Control Points</th><th>Head (m)</th><th>Flow (l/s)</th></tr><tr><td>Design Point (Calculated)</td><td>0.600</td><td>1.9</td></tr><tr><td>Flush-Flo™</td><td>0.178</td><td>1.9</td></tr><tr><td>Kick-Flo®</td><td>0.396</td><td>1.6</td></tr><tr><td>Mean Flow over Head Range</td><td>-</td><td>1.6</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><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr><tr><td>0.100</td><td>1.8</td><td>1.200</td><td>2.6</td><td>3.000</td><td>4.0</td><td>7.000</td><td>5.9</td></tr><tr><td>0.200</td><td>1.9</td><td>1.400</td><td>2.8</td><td>3.500</td><td>4.3</td><td>7.500</td><td>6.1</td></tr><tr><td>0.300</td><td>1.8</td><td>1.600</td><td>3.0</td><td>4.000</td><td>4.5</td><td>8.000</td><td>6.3</td></tr><tr><td>0.400</td><td>1.6</td><td>1.800</td><td>3.1</td><td>4.500</td><td>4.8</td><td>8.500</td><td>6.5</td></tr><tr><td>0.500</td><td>1.7</td><td>2.000</td><td>3.3</td><td>5.000</td><td>5.1</td><td>9.000</td><td>6.7</td></tr><tr><td>0.600</td><td>1.9</td><td>2.200</td><td>3.4</td><td>5.500</td><td>5.3</td><td>9.500</td><td>6.9</td></tr><tr><td>0.800</td><td>2.2</td><td>2.400</td><td>3.6</td><td>6.000</td><td>5.5</td><td></td><td></td></tr><tr><td>1.000</td><td>2.4</td><td>2.600</td><td>3.7</td><td>6.500</td><td>5.7</td><td></td><td></td></tr></table>			Unit Reference	MD-SHE-0071-1900-0600-1900	Design Head (m)	0.600	Design Flow (l/s)	1.9	Flush-Flo™	Calculated	Objective	Minimise upstream storage	Application	Surface	Sump Available	Yes	Diameter (mm)	71	Invert Level (m)	31.500	Minimum Outlet Pipe Diameter (mm)	100	Suggested Manhole Diameter (mm)	1200	Control Points	Head (m)	Flow (l/s)	Design Point (Calculated)	0.600	1.9	Flush-Flo™	0.178	1.9	Kick-Flo®	0.396	1.6	Mean Flow over Head Range	-	1.6	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	1.8	1.200	2.6	3.000	4.0	7.000	5.9	0.200	1.9	1.400	2.8	3.500	4.3	7.500	6.1	0.300	1.8	1.600	3.0	4.000	4.5	8.000	6.3	0.400	1.6	1.800	3.1	4.500	4.8	8.500	6.5	0.500	1.7	2.000	3.3	5.000	5.1	9.000	6.7	0.600	1.9	2.200	3.4	5.500	5.3	9.500	6.9	0.800	2.2	2.400	3.6	6.000	5.5			1.000	2.4	2.600	3.7	6.500	5.7		
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<u>Storage Structures for Storm</u> <u>Porous Car Park Manhole: MH-PARKING-2, DS/PN: Sw-1.002</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td><td>Width (m)</td><td>2.4</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Length (m)</td><td>6.0</td></tr><tr><td>Max Percolation (l/s)</td><td>4.0</td><td>Slope (1:X)</td><td>50.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Porosity</td><td>0.30</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Invert Level (m)</td><td>31.722</td><td>Cap Volume Depth (m)</td><td>0.150</td></tr></table> <u>Porous Car Park Manhole: MH-CP-1, DS/PN: Sw-2.001</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td><td>Width (m)</td><td>2.4</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Length (m)</td><td>6.0</td></tr><tr><td>Max Percolation (l/s)</td><td>4.0</td><td>Slope (1:X)</td><td>50.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Porosity</td><td>0.30</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Invert Level (m)</td><td>31.743</td><td>Cap Volume Depth (m)</td><td>0.150</td></tr></table> <u>Trench Soakaway Manhole: MH-PLANTER-1, DS/PN: Sw-3.001</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td><td>Trench Width (m)</td><td>1.2</td></tr><tr><td>Infiltration Coefficient Side (m/hr)</td><td>0.00000</td><td>Trench Length (m)</td><td>6.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Slope (1:X)</td><td>500.0</td></tr><tr><td>Porosity</td><td>0.30</td><td>Cap Volume Depth (m)</td><td>0.000</td></tr><tr><td>Invert Level (m)</td><td>31.794</td><td>Cap Infiltration Depth (m)</td><td>0.300</td></tr></table> <u>Trench Soakaway Manhole: MH-PLANNTER-2, DS/PN: Sw-4.001</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td><td>Trench Width (m)</td><td>1.2</td></tr><tr><td>Infiltration Coefficient Side (m/hr)</td><td>0.00000</td><td>Trench Length (m)</td><td>2.3</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Slope (1:X)</td><td>500.0</td></tr><tr><td>Porosity</td><td>0.30</td><td>Cap Volume Depth (m)</td><td>0.000</td></tr><tr><td>Invert Level (m)</td><td>31.757</td><td>Cap Infiltration Depth (m)</td><td>0.300</td></tr></table>			Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	2.4	Membrane Percolation (mm/hr)	1000	Length (m)	6.0	Max Percolation (l/s)	4.0	Slope (1:X)	50.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	31.722	Cap Volume Depth (m)	0.150	Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	2.4	Membrane Percolation (mm/hr)	1000	Length (m)	6.0	Max Percolation (l/s)	4.0	Slope (1:X)	50.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	31.743	Cap Volume Depth (m)	0.150	Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	1.2	Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	6.0	Safety Factor	2.0	Slope (1:X)	500.0	Porosity	0.30	Cap Volume Depth (m)	0.000	Invert Level (m)	31.794	Cap Infiltration Depth (m)	0.300	Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	1.2	Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	2.3	Safety Factor	2.0	Slope (1:X)	500.0	Porosity	0.30	Cap Volume Depth (m)	0.000	Invert Level (m)	31.757	Cap Infiltration Depth (m)	0.300
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PN	US/MH Name	Overflow Act.	Water	Surcharged	Flooded	Flow / Cap.	Overflow (l/s)	Half Drain
			Level (m)	Depth (m)	Volume (m³)			Time (mins)
Sw-1.003	MH-03		31.826	0.226	0.000	0.39		

PN	US/MH Name	Pipe	Status	Level Exceeded
		Flow (l/s)		
Sw-1.000	MH-RWP-3	1.3	OK*	
Sw-1.001	MH-01	2.4	OK	
Sw-1.002	MH-PARKING-2	2.4	SURCHARGED*	
Sw-2.000	MH-RWP-1	1.3	OK*	
Sw-2.001	MH-CP-1	1.2	OK*	
Sw-3.000	MH-RWP-2	1.2	OK*	
Sw-3.001	MH-PLANTER-1	1.5	OK	
Sw-2.002	MH-8	1.6	SURCHARGED	
Sw-4.000	MH-10	0.1	OK	
Sw-4.001	MH-PLANNTER-2	0.3	OK*	
Sw-1.003	MH-03	1.9	SURCHARGED	

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