

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
N1-HW1	1.374	5.00	38.700		479526.775	173806.019	1.200
N1-SW1	0.043	5.00	38.658		479510.728	173800.522	1.200
N1-SW2	0.032	5.00	38.608		479492.230	173793.017	1.200
N1-SW3	0.038	5.00	38.565		479476.632	173785.541	1.200
N1-SW4	0.024	5.00	38.525		479462.558	173777.976	1.200
N1-SW5	0.051	5.00	38.494		479451.861	173771.471	1.200
N1-SW6	0.048	5.00	38.461		479442.142	173762.663	1.200
N1-SW7	0.045	5.00	38.550		479409.588	173743.961	1.383
N1-SW8	0.032	5.00	38.550		479393.295	173733.495	1.431
N1-SW9	0.031	5.00	38.500		479382.278	173727.361	1.413
N1-HW2	0.020	5.00	38.450		479372.884	173722.879	1.389
N1-CH1	0.422	5.00	38.500	1950	479362.070	173718.536	1.772
N1-CH2	0.000	5.00	38.000	1500	479355.255	173718.205	1.408
N1-CH3	0.000	5.00	37.700	1500	479349.210	173719.507	1.232
N1-CH4	0.000	5.00	37.680	1500	479344.546	173722.180	1.470
N1-CH5			37.680	1500	479340.963	173727.405	1.497
N1-CH6	0.000	5.00	37.600	1500	479338.263	173732.042	1.440
N1-CH7 (HB)			37.500	1500	479322.562	173725.221	1.413
N1-HW3 (Outlet)			37.500	1500	479302.592	173716.546	1.505

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	N1-HW1	N1-SW1	16.962	0.030	37.500	37.458	0.042	400.0	1200	5.08	50.0
1.001	N1-SW1	N1-SW2	19.962	0.030	37.458	37.408	0.050	397.7	1200	5.17	50.0
1.002	N1-SW2	N1-SW3	17.297	0.030	37.408	37.365	0.043	400.0	1200	5.25	49.7
1.003	N1-SW3	N1-SW4	15.978	0.030	37.365	37.325	0.040	400.0	1200	5.33	49.5
1.004	N1-SW4	N1-SW5	12.520	0.030	37.325	37.294	0.031	400.0	1200	5.38	49.3
1.005	N1-SW5	N1-SW6	13.116	0.030	37.294	37.261	0.033	400.0	1200	5.44	49.0
1.006	N1-SW6	N1-SW7	37.544	0.030	37.261	37.167	0.094	400.0	1200	5.62	48.4

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	3.591	17667.2	186.2	0.000	0.000	1.374	0.0	159	1.196
1.001	3.602	17720.2	192.0	0.000	0.000	1.417	0.0	161	1.209
1.002	3.591	17667.2	195.3	0.000	0.000	1.449	0.0	163	1.212
1.003	3.591	17667.2	199.4	0.000	0.000	1.487	0.0	165	1.219
1.004	3.591	17667.2	201.7	0.000	0.000	1.511	0.0	166	1.221
1.005	3.591	17667.2	207.6	0.000	0.000	1.562	0.0	168	1.230
1.006	3.591	17667.2	211.3	0.000	0.183	1.610	0.0	170	1.237

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.007	N1-SW7	N1-SW8	19.365	0.030	37.167	37.119	0.048	400.0	1200	5.71	48.1
1.008	N1-SW8	N1-SW9	12.610	0.030	37.119	37.087	0.032	400.0	1200	5.77	47.9
1.009	N1-SW9	N1-HW2	10.408	0.030	37.087	37.061	0.026	400.0	1200	5.82	47.7
1.010	N1-HW2	N1-CH1	11.654	0.600	37.061	36.728	0.333	35.0	525	5.87	47.5
1.011	N1-CH1	N1-CH2	6.823	0.600	36.728	36.592	0.136	50.0	525	5.90	47.4
1.012	N1-CH2	N1-CH3	6.184	0.600	36.592	36.468	0.124	50.0	525	5.94	47.3
1.013	N1-CH3	N1-CH4	5.376	0.600	36.468	36.360	0.108	50.0	525	5.96	47.2
1.014	N1-CH4	N1-CH5	6.335	0.600	36.210	36.183	0.027	236.0	525	6.04	46.9
1.015	N1-CH5	N1-CH6	5.366	0.600	36.183	36.160	0.023	236.0	525	6.10	46.7
1.016	N1-CH6	N1-CH7 (HB)	17.119	0.600	36.160	36.087	0.073	236.0	525	6.29	46.1
1.017	N1-CH7 (HB)	N1-HW3 (Outlet)	21.773	0.600	36.087	35.995	0.092	236.0	525	6.54	45.3

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.007	3.591	17667.2	215.8	0.183	0.231	1.655	0.0	171	1.244
1.008	3.591	17667.2	219.0	0.231	0.213	1.687	0.0	173	1.248
1.009	3.591	17667.2	222.2	0.213	0.189	1.718	0.0	174	1.253
1.010	3.795	1642.9	223.9	0.864	1.247	1.738	0.0	129	2.690
1.011	3.173	686.8	277.6	1.247	0.883	2.160	0.0	232	3.012
1.012	3.173	686.8	276.9	0.883	0.707	2.160	0.0	231	3.009
1.013	3.173	686.8	276.3	0.707	0.795	2.160	0.0	231	3.006
1.014	1.453	314.6	274.8	0.945	0.972	2.160	0.0	382	1.628
1.015	1.453	314.6	273.7	0.972	0.915	2.160	0.0	381	1.627
1.016	1.453	314.6	270.0	0.915	0.888	2.160	0.0	377	1.624
1.017	1.453	314.6	265.3	0.888	0.980	2.160	0.0	371	1.620

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	0.840	Drain Down Time (mins)	240	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
----	----	----	-----	-----	-----	-----	-----	-----	-----	-----	------

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	35	0	0
100	40	0	0

Node N1-CH1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	36.728	Product Number	CTL-SHE-0118-7000-1400-7000
Design Depth (m)	1.400	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	7.0	Min Node Diameter (mm)	1200

Node N1-HW1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	1.000	Sump Available	✓
Replaces Downstream Link	x	Product Number	CTL-SHE-0117-6200-1000-6200
Invert Level (m)	37.500	Min Outlet Diameter (m)	0.150
Design Depth (m)	1.000	Min Node Diameter (mm)	1200
Design Flow (l/s)	6.2		

Node N1-HW1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	38.100	Slope (1:X)	500.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.600
Safety Factor	2.0	Width (m)	79.000	Inf Depth (m)	
Porosity	0.30	Length (m)	79.000		

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.33%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	N1-HW1	232	38.266	0.766	44.3	181.0018	0.0000	OK
1440 minute winter	N1-SW1	1410	37.727	0.268	16.9	0.1925	0.0000	OK
1440 minute winter	N1-SW2	1440	37.725	0.317	38.3	0.1692	0.0000	OK
1440 minute winter	N1-SW3	1440	37.725	0.360	23.3	0.2276	0.0000	OK
1440 minute winter	N1-SW4	1440	37.724	0.399	29.1	0.1596	0.0000	OK
1440 minute winter	N1-SW5	1440	37.724	0.430	30.0	0.3653	0.0000	OK
1440 minute winter	N1-SW6	1440	37.724	0.463	42.2	0.3703	0.0000	OK
1440 minute winter	N1-SW7	1440	37.725	0.558	33.8	0.3635	0.0000	OK
1440 minute winter	N1-SW8	1440	37.726	0.607	31.8	0.2713	0.0000	OK
1440 minute winter	N1-SW9	1440	37.726	0.639	30.7	0.2806	0.0000	OK
1440 minute winter	N1-HW2	1440	37.726	0.665	28.2	0.1916	0.0000	SURCHARGED
1440 minute winter	N1-CH1	1440	37.726	0.998	24.3	7.7352	0.0000	SURCHARGED
15 minute summer	N1-CH2	8	36.631	0.039	7.0	0.0688	0.0000	OK
120 minute winter	N1-CH3	28	36.508	0.040	7.0	0.0698	0.0000	OK
120 minute summer	N1-CH4	32	36.268	0.058	7.0	0.1019	0.0000	OK
120 minute summer	N1-CH5	32	36.241	0.058	7.0	0.1016	0.0000	OK
120 minute summer	N1-CH6	32	36.215	0.055	7.0	0.0970	0.0000	OK
180 minute summer	N1-CH7 (HB)	44	36.142	0.055	7.0	0.0967	0.0000	OK
240 minute winter	N1-HW3 (Outlet)	48	36.048	0.053	7.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
240 minute winter	N1-HW1	1.000	N1-SW1	11.0	0.517	0.001	3.3294	
1440 minute winter	N1-SW1	1.001	N1-SW2	18.4	0.525	0.001	8.0999	
1440 minute winter	N1-SW2	1.002	N1-SW3	23.0	0.531	0.001	8.8989	
1440 minute winter	N1-SW3	1.003	N1-SW4	25.6	0.539	0.001	9.9456	
1440 minute winter	N1-SW4	1.004	N1-SW5	26.3	0.537	0.001	9.0543	
1440 minute winter	N1-SW5	1.005	N1-SW6	35.5	0.546	0.002	10.7789	
1440 minute winter	N1-SW6	1.006	N1-SW7	23.6	0.528	0.001	39.2196	
1440 minute winter	N1-SW7	1.007	N1-SW8	31.6	0.536	0.002	25.4034	
1440 minute winter	N1-SW8	1.008	N1-SW9	30.5	0.511	0.002	18.6247	
1440 minute winter	N1-SW9	1.009	N1-HW2	28.1	0.479	0.002	16.6804	
1440 minute winter	N1-HW2	1.010	N1-CH1	21.9	0.130	0.013	5.0353	
1440 minute winter	N1-CH1	Hydro-Brake®	N1-CH2	7.0				
15 minute summer	N1-CH2	1.012	N1-CH3	7.0	0.966	0.010	0.0448	
120 minute winter	N1-CH3	1.013	N1-CH4	7.0	1.000	0.010	0.0376	
120 minute summer	N1-CH4	1.014	N1-CH5	7.0	0.548	0.022	0.0808	
120 minute summer	N1-CH5	1.015	N1-CH6	7.0	0.568	0.022	0.0661	
120 minute summer	N1-CH6	1.016	N1-CH7 (HB)	7.0	0.588	0.022	0.2035	
180 minute summer	N1-CH7 (HB)	1.017	N1-HW3 (Outlet)	7.0	0.602	0.022	0.2530	142.4

Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 99.33%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
480 minute winter	N1-HW1	472	38.564	1.064	78.9	745.1085	0.0000	OK
1440 minute winter	N1-SW1	1410	38.177	0.719	13.5	0.5157	0.0000	OK
1440 minute winter	N1-SW2	1440	38.177	0.769	14.5	0.4101	0.0000	OK
1440 minute winter	N1-SW3	1440	38.178	0.813	17.4	0.5143	0.0000	OK
1440 minute winter	N1-SW4	1440	38.177	0.852	15.9	0.3410	0.0000	OK
1440 minute winter	N1-SW5	1440	38.177	0.883	28.2	0.7509	0.0000	OK
1440 minute winter	N1-SW6	1440	38.177	0.916	20.1	0.7330	0.0000	OK
1440 minute winter	N1-SW7	1440	38.177	1.010	26.2	0.6577	0.0000	OK
1440 minute winter	N1-SW8	1440	38.177	1.058	32.8	0.4728	0.0000	OK
1440 minute winter	N1-SW9	1440	38.177	1.090	29.1	0.4785	0.0000	OK
1440 minute winter	N1-HW2	1440	38.178	1.117	35.2	0.3216	0.0000	FLOOD RISK
1440 minute winter	N1-CH1	1440	38.182	1.454	30.9	11.2679	0.0000	SURCHARGED
1440 minute winter	N1-CH2	1440	36.631	0.039	7.1	0.0694	0.0000	OK
1440 minute winter	N1-CH3	1440	36.508	0.040	7.1	0.0704	0.0000	OK
1440 minute winter	N1-CH4	1440	36.268	0.058	7.1	0.1028	0.0000	OK
1440 minute winter	N1-CH5	1440	36.241	0.058	7.1	0.1025	0.0000	OK
1440 minute winter	N1-CH6	1440	36.215	0.055	7.1	0.0978	0.0000	OK
1440 minute winter	N1-CH7 (HB)	1440	36.142	0.055	7.1	0.0975	0.0000	OK
1440 minute winter	N1-HW3 (Outlet)	1440	36.049	0.054	7.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
480 minute winter	N1-HW1	1.000	N1-SW1	10.5	0.513	0.001	27.2742	
1440 minute winter	N1-SW1	1.001	N1-SW2	12.6	0.528	0.001	40.6422	
1440 minute winter	N1-SW2	1.002	N1-SW3	16.7	0.529	0.001	39.3308	
1440 minute winter	N1-SW3	1.003	N1-SW4	15.0	0.527	0.001	39.8964	
1440 minute winter	N1-SW4	1.004	N1-SW5	17.8	0.523	0.001	33.7408	
1440 minute winter	N1-SW5	1.005	N1-SW6	-20.9	0.524	-0.001	37.7771	
1440 minute winter	N1-SW6	1.006	N1-SW7	14.5	0.526	0.001	122.8675	
1440 minute winter	N1-SW7	1.007	N1-SW8	32.4	0.527	0.002	72.1747	
1440 minute winter	N1-SW8	1.008	N1-SW9	28.7	0.530	0.002	50.4019	
1440 minute winter	N1-SW9	1.009	N1-HW2	35.1	0.479	0.002	43.7626	
1440 minute winter	N1-HW2	1.010	N1-CH1	29.2	0.138	0.018	5.0353	
1440 minute winter	N1-CH1	Hydro-Brake®	N1-CH2	7.1				
1440 minute winter	N1-CH2	1.012	N1-CH3	7.1	0.969	0.010	0.0454	
1440 minute winter	N1-CH3	1.013	N1-CH4	7.1	1.005	0.010	0.0380	
1440 minute winter	N1-CH4	1.014	N1-CH5	7.1	0.551	0.023	0.0819	
1440 minute winter	N1-CH5	1.015	N1-CH6	7.1	0.570	0.023	0.0670	
1440 minute winter	N1-CH6	1.016	N1-CH7 (HB)	7.1	0.591	0.023	0.2060	
1440 minute winter	N1-CH7 (HB)	1.017	N1-HW3 (Outlet)	7.1	0.605	0.023	0.2560	653.9

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.33%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
600 minute winter	N1-HW1	570	38.700	1.200	84.1	1002.9560	9.2222	FLOOD
1440 minute winter	N1-SW1	1410	38.323	0.865	13.4	0.6206	0.0000	OK
1440 minute winter	N1-SW2	1410	38.323	0.915	20.4	0.4879	0.0000	OK
1440 minute winter	N1-SW3	1440	38.324	0.959	31.2	0.6068	0.0000	OK
1440 minute winter	N1-SW4	1440	38.324	0.999	48.6	0.3995	0.0000	OK
1440 minute winter	N1-SW5	1440	38.324	1.030	36.4	0.8755	0.0000	OK
1440 minute winter	N1-SW6	1440	38.324	1.063	41.7	0.8502	0.0000	OK
1440 minute winter	N1-SW7	1440	38.323	1.156	36.1	0.7528	0.0000	OK
1440 minute winter	N1-SW8	1440	38.324	1.205	28.3	0.5386	0.0000	FLOOD RISK
1440 minute winter	N1-SW9	1440	38.323	1.236	26.3	0.5428	0.0000	FLOOD RISK
1440 minute winter	N1-HW2	1410	38.323	1.262	26.5	0.3636	0.0000	FLOOD RISK
1440 minute winter	N1-CH1	1380	38.322	1.594	25.9	12.3552	0.0000	FLOOD RISK
1440 minute winter	N1-CH2	1410	36.632	0.040	7.4	0.0710	0.0000	OK
1440 minute winter	N1-CH3	1440	36.509	0.041	7.4	0.0720	0.0000	OK
1440 minute winter	N1-CH4	1440	36.269	0.059	7.4	0.1051	0.0000	OK
1440 minute winter	N1-CH5	1410	36.242	0.059	7.4	0.1049	0.0000	OK
1440 minute winter	N1-CH6	1410	36.217	0.057	7.4	0.1001	0.0000	OK
1440 minute winter	N1-CH7 (HB)	1410	36.143	0.056	7.4	0.0997	0.0000	OK
1440 minute winter	N1-HW3 (Outlet)	1440	36.050	0.055	7.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
600 minute winter	N1-HW1	1.000	N1-SW1	8.1	0.514	0.000	39.8694	
1440 minute winter	N1-SW1	1.001	N1-SW2	12.7	0.526	0.001	56.4181	
1440 minute winter	N1-SW2	1.002	N1-SW3	30.7	0.531	0.002	53.6880	
1440 minute winter	N1-SW3	1.003	N1-SW4	36.5	0.539	0.002	53.7620	
1440 minute winter	N1-SW4	1.004	N1-SW5	23.5	0.537	0.001	45.0149	
1440 minute winter	N1-SW5	1.005	N1-SW6	36.7	0.549	0.002	49.9565	
1440 minute winter	N1-SW6	1.006	N1-SW7	23.5	0.536	0.001	159.7437	
1440 minute winter	N1-SW7	1.007	N1-SW8	27.8	0.545	0.002	92.4461	
1440 minute winter	N1-SW8	1.008	N1-SW9	25.8	0.518	0.001	64.0698	
1440 minute winter	N1-SW9	1.009	N1-HW2	26.4	0.487	0.001	55.2663	
1440 minute winter	N1-HW2	1.010	N1-CH1	23.8	0.137	0.014	5.0353	
1440 minute winter	N1-CH1	Hydro-Brake®	N1-CH2	7.4				
1440 minute winter	N1-CH2	1.012	N1-CH3	7.4	0.982	0.011	0.0469	
1440 minute winter	N1-CH3	1.013	N1-CH4	7.4	1.018	0.011	0.0393	
1440 minute winter	N1-CH4	1.014	N1-CH5	7.4	0.556	0.024	0.0847	
1440 minute winter	N1-CH5	1.015	N1-CH6	7.4	0.577	0.024	0.0693	
1440 minute winter	N1-CH6	1.016	N1-CH7 (HB)	7.4	0.599	0.024	0.2127	
1440 minute winter	N1-CH7 (HB)	1.017	N1-HW3 (Outlet)	7.4	0.613	0.024	0.2643	672.8