

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	1.000	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	✓
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)
1	0.023	5.00	45.850	450	385967.722	156788.502	0.850
2	0.006	5.00	45.850	450	385974.284	156793.250	0.950
3	0.010	5.00	45.850	450	385963.524	156809.058	1.080
4	0.087	5.00	45.650	450	385963.880	156811.240	0.700
5	0.003	5.00	45.650	450	385965.046	156811.675	0.900
6			45.400	450	385983.770	156817.485	1.470
7	0.031	5.00	45.750	450	385987.641	156842.317	1.300
8			45.100	1200	385996.482	156822.193	1.240
9			44.600	450	386009.206	156820.480	0.868

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	1	2	8.100	0.600	45.000	44.900	0.100	81.0	150	5.12	46.7
1.001	2	3	19.123	0.600	44.900	44.770	0.130	147.1	150	5.51	45.4
1.002	3	5	3.027	0.600	44.770	44.750	0.020	150.0	150	5.57	45.2
2.000	4	5	1.245	0.600	44.950	44.750	0.200	6.2	150	5.01	47.1
1.003	5	6	19.605	0.600	44.750	44.005	0.745	26.3	150	5.73	44.0
1.004	6	8	13.556	0.600	43.930	43.860	0.070	193.7	225	5.98	43.8
3.000	7	8	21.980	0.600	44.450	43.935	0.515	42.7	150	5.24	46.3
1.005	8	9	12.839	0.600	43.860	43.732	0.128	100.0	225	6.14	43.3

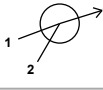
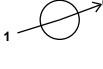
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.118	19.8	3.9	0.700	0.800	0.023	0.0	45	0.868
1.001	0.826	14.6	4.8	0.800	0.930	0.029	0.0	59	0.739
1.002	0.818	14.5	6.4	0.930	0.750	0.039	0.0	69	0.791
2.000	4.066	71.8	14.8	0.550	0.750	0.087	0.0	46	3.210
1.003	1.970	34.8	20.5	0.750	1.245	0.129	0.0	83	2.050
1.004	0.936	37.2	20.4	1.245	1.015	0.129	0.0	119	0.957
3.000	1.544	27.3	5.2	1.150	1.015	0.031	0.0	44	1.192
1.005	1.307	52.0	25.0	1.015	0.643	0.160	0.0	110	1.297

Pipeline Schedule

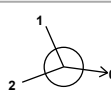
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	8.100	81.0	150	Circular	45.850	45.000	0.700	45.850	44.900	0.800
1.001	19.123	147.1	150	Circular	45.850	44.900	0.800	45.850	44.770	0.930
1.002	3.027	150.0	150	Circular	45.850	44.770	0.930	45.650	44.750	0.750
2.000	1.245	6.2	150	Circular	45.650	44.950	0.550	45.650	44.750	0.750
1.003	19.605	26.3	150	Circular	45.650	44.750	0.750	45.400	44.005	1.245
1.004	13.556	193.7	225	Circular	45.400	43.930	1.245	45.100	43.860	1.015
3.000	21.980	42.7	150	Circular	45.750	44.450	1.150	45.100	43.935	1.015
1.005	12.839	100.0	225	Circular	45.100	43.860	1.015	44.600	43.732	0.643

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	450	Manhole	Adoptable	2	450	Manhole	Adoptable
1.001	2	450	Manhole	Adoptable	3	450	Manhole	Adoptable
1.002	3	450	Manhole	Adoptable	5	450	Manhole	Adoptable
2.000	4	450	Manhole	Adoptable	5	450	Manhole	Adoptable
1.003	5	450	Manhole	Adoptable	6	450	Manhole	Adoptable
1.004	6	450	Manhole	Adoptable	8	1200	Manhole	Adoptable
3.000	7	450	Manhole	Adoptable	8	1200	Manhole	Adoptable
1.005	8	1200	Manhole	Adoptable	9	450	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
1	385967.722	156788.502	45.850	0.850	450		0	1.000	45.000	150
2	385974.284	156793.250	45.850	0.950	450		1	1.000	44.900	150
3	385963.524	156809.058	45.850	1.080	450		1	1.001	44.770	150
4	385963.880	156811.240	45.650	0.700	450		0	1.002	44.770	150
5	385965.046	156811.675	45.650	0.900	450		1	2.000	44.750	150
6	385983.770	156817.485	45.400	1.470	450		2	1.002	44.750	150
7	385987.641	156842.317	45.750	1.300	450		0	1.003	44.750	150
							1	1.003	44.005	150
							0	1.004	43.930	225
							0	3.000	44.450	150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
8	385996.482	156822.193	45.100	1.240	1200		1	3.000	43.935	150
							2	1.004	43.860	225
							0	1.005	43.860	225
9	386009.206	156820.480	44.600	0.868	450		1	1.005	43.732	225

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Additional Storage (m³/ha)	0.0
Summer CV	1.000	Skip Steady State	x	Check Discharge Rate(s)	✓
Winter CV	1.000	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	40	0	0
100	45	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.95
Greenfield Method	IH124	Growth Factor 100 year	2.48
Positively Drained Area (ha)		Betterment (%)	0
SAAR (mm)		QBar	
Soil Index	1	Q 1 year (l/s)	
SPR	0.10	Q 30 year (l/s)	
Region	1	Q 100 year (l/s)	
Growth Factor 1 year	0.85		

Node 3 Online Orifice Control

Flap Valve	x	Invert Level (m)	44.770	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Diameter (m)	0.040		

Node 4 Online Orifice Control

Flap Valve	x	Invert Level (m)	44.950	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Diameter (m)	0.040		

Node 8 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	43.860	Product Number	CTL-SHE-0090-3800-1200-3800
Design Depth (m)	1.200	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	3.8	Min Node Diameter (mm)	1200

Node 1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	45.140	Slope (1:X)	999.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	43	Depth (m)	0.350
Safety Factor	2.0	Width (m)	6.000	Inf Depth (m)	
Porosity	0.30	Length (m)	26.000		

Node 4 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	45.040	Slope (1:X)	9999.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.350
Safety Factor	2.0	Width (m)	23.000	Inf Depth (m)	
Porosity	0.30	Length (m)	25.200		

Node 8 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	43.860
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	288

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	44.0	0.0	0.750	44.0	0.0	0.751	0.0	0.0

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.28%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	1	22	45.156	0.156	3.1	0.2529	0.0000	SURCHARGED
30 minute summer	2	22	45.156	0.256	3.9	0.0407	0.0000	SURCHARGED
30 minute summer	3	22	45.155	0.385	3.3	0.0612	0.0000	SURCHARGED
240 minute summer	4	164	45.087	0.137	4.9	7.9364	0.0000	OK
15 minute summer	5	12	44.782	0.032	3.4	0.0051	0.0000	OK
180 minute summer	6	120	43.997	0.067	3.1	0.0106	0.0000	OK
15 minute summer	7	10	44.493	0.043	4.8	0.0069	0.0000	OK
180 minute summer	8	120	43.996	0.136	4.9	5.8537	0.0000	OK
15 minute summer	9	1	43.732	0.000	2.3	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)
30 minute summer	1	1.000	2	3.1	0.617	0.155	0.1426	
30 minute summer	2	1.001	3	2.2	0.277	0.148	0.3367	
30 minute summer	3	Orifice	5	2.0				
240 minute summer	4	Orifice	5	1.1				
15 minute summer	5	1.003	6	3.4	1.243	0.098	0.0538	
180 minute summer	6	1.004	8	3.0	0.616	0.080	0.2375	
15 minute summer	7	3.000	8	4.7	1.147	0.173	0.0908	
180 minute summer	8	Hydro-Brake®	9	3.3				29.8

Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.28%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	1	48	45.339	0.339	13.2	8.7716	0.0000	SURCHARGED
60 minute summer	2	47	45.339	0.439	4.0	0.0697	0.0000	SURCHARGED
60 minute summer	3	47	45.336	0.566	4.1	0.0901	0.0000	SURCHARGED
180 minute winter	4	172	45.264	0.314	12.3	38.7140	0.0000	SURCHARGED
15 minute summer	5	11	44.791	0.041	5.4	0.0065	0.0000	OK
240 minute summer	6	248	44.400	0.470	4.4	0.0748	0.0000	SURCHARGED
15 minute summer	7	10	44.547	0.097	19.1	0.0154	0.0000	OK
240 minute summer	8	248	44.400	0.540	9.1	23.1635	0.0000	SURCHARGED
15 minute summer	9	1	43.732	0.000	3.6	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)
60 minute summer	1	1.000	2	-3.8	0.517	-0.190	0.1426	
60 minute summer	2	1.001	3	2.4	0.326	0.162	0.3367	
60 minute summer	3	Orifice	5	2.5				
180 minute winter	4	Orifice	5	1.8				
15 minute summer	5	1.003	6	5.4	1.411	0.154	0.1092	
240 minute summer	6	1.004	8	4.3	0.688	0.115	0.5391	
15 minute summer	7	3.000	8	18.9	1.621	0.692	0.2560	
240 minute summer	8	Hydro-Brake®	9	3.8				88.0

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.28%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	1	57	45.444	0.444	12.8	13.6646	0.0000	SURCHARGED
60 minute winter	2	57	45.443	0.543	3.7	0.0863	0.0000	SURCHARGED
60 minute winter	3	57	45.440	0.670	4.0	0.1065	0.0000	SURCHARGED
240 minute winter	4	228	45.352	0.402	13.2	53.9739	0.0000	FLOOD RISK
360 minute winter	5	336	45.056	0.306	4.6	0.0486	0.0000	SURCHARGED
360 minute winter	6	336	45.048	1.118	4.6	0.1778	0.0000	SURCHARGED
360 minute winter	7	336	45.048	0.598	3.5	0.0950	0.0000	SURCHARGED
360 minute winter	8	336	45.047	1.187	7.6	32.7137	0.0000	FLOOD RISK
15 minute summer	9	1	43.732	0.000	3.8	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)
60 minute winter	1	1.000	2	-3.5	0.557	-0.176	0.1426	
60 minute winter	2	1.001	3	2.6	0.323	0.178	0.3367	
60 minute winter	3	Orifice	5	2.7				
240 minute winter	4	Orifice	5	2.1				
360 minute winter	5	1.003	6	4.6	1.252	0.133	0.3451	
360 minute winter	6	1.004	8	4.5	0.693	0.122	0.5391	
360 minute winter	7	3.000	8	3.5	0.708	0.128	0.3870	
360 minute winter	8	Hydro-Brake®	9	3.8				114.3