

**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)	0.650
CV	0.750	Preferred Cover Depth (m)	1.350
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)	100.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
7	0.073	5.00	34.230	3000	341863.353	391119.014	2.160	32.070
8	0.075	5.00	34.131	3000	341893.462	391125.466	2.055	32.076
6	0.077	5.00	34.094	3000	341873.211	391137.652	2.077	32.017
9	0.143	5.00	33.826	3000	341817.679	391116.409	1.784	32.042
5	0.025	5.00	33.825	3000	341841.833	391156.018	1.899	31.926
4	0.061	5.00	33.431	3000	341855.764	391178.971	1.572	31.859
3	0.000		33.484	1350	341864.376	391180.803	1.677	31.807
2	0.000		33.440	1350	341930.955	391138.711	2.096	31.344
1			33.322	1050	341937.825	391130.369	2.042	31.280

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	7	6	21.084	0.600	32.070	32.017	0.053	400.0	600	5.29	53.8
2.000	8	6	23.635	0.600	32.076	32.017	0.059	400.0	600	5.33	53.6
1.001	6	5	36.358	0.600	32.017	31.926	0.091	400.0	600	5.83	51.2
3.000	9	5	46.393	0.600	32.042	31.926	0.116	400.0	600	5.64	52.1
1.002	5	4	26.850	0.600	31.926	31.859	0.067	400.0	600	6.20	49.6
1.003	4	3	8.805	0.600	31.859	31.807	0.052	170.0	225	6.34	0.0
1.004	3	2	78.769	0.600	31.807	31.344	0.463	170.0	225	7.66	0.0
1.005	2	1	10.807	0.600	31.344	31.280	0.064	170.0	225	7.84	0.0

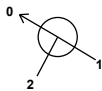
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.211	684.9	10.6	1.560	1.477	0.073	0.0	51	0.454
2.000	1.211	684.9	10.9	1.455	1.477	0.075	0.0	52	0.457
1.001	1.211	684.9	31.2	1.477	1.299	0.225	0.0	86	0.626
3.000	1.211	684.9	20.2	1.184	1.299	0.143	0.0	69	0.549
1.002	1.211	684.9	52.9	1.299	0.972	0.393	0.0	112	0.731
1.003	1.000	39.7	0.0	1.347	1.452	0.454	0.0	0	0.000
1.004	1.000	39.7	0.0	1.452	1.871	0.454	0.0	0	0.000
1.005	1.000	39.7	0.0	1.871	1.817	0.454	0.0	0	0.000

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	21.084	400.0	600	Double	34.230	32.070	1.560	34.094	32.017	1.477
2.000	23.635	400.0	600	Double	34.131	32.076	1.455	34.094	32.017	1.477
1.001	36.358	400.0	600	Double	34.094	32.017	1.477	33.825	31.926	1.299
3.000	46.393	400.0	600	Double	33.826	32.042	1.184	33.825	31.926	1.299
1.002	26.850	400.0	600	Double	33.825	31.926	1.299	33.431	31.859	0.972
1.003	8.805	170.0	225	Circular	33.431	31.859	1.347	33.484	31.807	1.452
1.004	78.769	170.0	225	Circular	33.484	31.807	1.452	33.440	31.344	1.871
1.005	10.807	170.0	225	Circular	33.440	31.344	1.871	33.322	31.280	1.817

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	7	3000	Manhole	Adoptable	6	3000	Manhole	Adoptable
2.000	8	3000	Manhole	Adoptable	6	3000	Manhole	Adoptable
1.001	6	3000	Manhole	Adoptable	5	3000	Manhole	Adoptable
3.000	9	3000	Manhole	Adoptable	5	3000	Manhole	Adoptable
1.002	5	3000	Manhole	Adoptable	4	3000	Manhole	Adoptable
1.003	4	3000	Manhole	Adoptable	3	1350	Manhole	Adoptable
1.004	3	1350	Manhole	Adoptable	2	1350	Manhole	Adoptable
1.005	2	1350	Manhole	Adoptable	1	1050	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
7	341863.353	391119.014	34.230	2.160	3000				
						0	1.000	32.070	600
8	341893.462	391125.466	34.131	2.055	3000				
						0	2.000	32.076	600
6	341873.211	391137.652	34.094	2.077	3000				
						1	2.000	32.017	600
						2	1.000	32.017	600
						0	1.001	32.017	600
9	341817.679	391116.409	33.826	1.784	3000				
						0	3.000	32.042	600
5	341841.833	391156.018	33.825	1.899	3000				
						1	3.000	31.926	600
						2	1.001	31.926	600
						0	1.002	31.926	600
4	341855.764	391178.971	33.431	1.572	3000				
						1	1.002	31.859	600
						0	1.003	31.859	225
3	341864.376	391180.803	33.484	1.677	1350				
						1	1.003	31.807	225
						0	1.004	31.807	225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
2	341930.955	391138.711	33.440	2.096	1350		1	1.004	31.344 225
1	341937.825	391130.369	33.322	2.042	1050		0	1.005	31.344 225
							1	1.005	31.280 225

Simulation Settings

Rainfall Methodology	FEH-22	Drain Down Time (mins)	240	30 year (l/s)	9.1
Rainfall Events	Singular	Additional Storage (m³/ha)	20.0	100 year (l/s)	11.2
Summer CV	0.750	Starting Level (m)		Check Discharge Volume	✓
Winter CV	0.840	Check Discharge Rate(s)	✓	100 year 360 minute (m³)	201
Analysis Speed	Detailed	1 year (l/s)	4.7		
Skip Steady State	✓	2 year (l/s)	5.0		

Storm Durations

15	60	180	360	600	960	2160
30	120	240	480	720	1440	2880

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	45	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.70
Greenfield Method	FEH	Growth Factor 100 year	2.08
Positively Drained Area (ha)	0.699	Betterment (%)	0
SAAR (mm)	860	QMed	5.0
Host	1	QBar	5.4
BFIHost	0.351	Q 1 year (l/s)	4.7
Region	10	Q 2 year (l/s)	5.0
QBar/QMed conversion factor	1.075	Q 30 year (l/s)	9.1
Growth Factor 1 year	0.87	Q 100 year (l/s)	11.2
Growth Factor 2 year	0.93		

Pre-development Discharge Volume

Site Makeup	Greenfield	Return Period (years)	100
Greenfield Method	FSR/FEH	Climate Change (%)	0
Positively Drained Area (ha)	0.699	Storm Duration (mins)	360
Soil Index	5	Betterment (%)	0
SPR	0.53	PR	0.554
CWI	124.650	Runoff Volume (m³)	201

Node 4 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	31.859	Product Number	CTL-SHE-0098-5000-1500-5000
Design Depth (m)	1.500	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node 7 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	32.520	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	108	Depth (m)	0.400
Safety Factor	2.0	Width (m)	4.500	Inf Depth (m)	
Porosity	0.95	Length (m)	15.000		

Node 5 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	32.380	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.400
Safety Factor	2.0	Width (m)	4.500	Inf Depth (m)	
Porosity	0.95	Length (m)	17.000		



Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.77%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	7	236	33.286	1.216	17.8	34.6220	0.0000	SURCHARGED
240 minute winter	8	232	33.285	1.209	7.5	9.4323	0.0000	SURCHARGED
240 minute winter	6	236	33.285	1.268	17.4	9.8999	0.0000	SURCHARGED
240 minute winter	9	236	33.287	1.245	14.3	10.7978	0.0000	SURCHARGED
240 minute winter	5	236	33.285	1.359	20.2	38.4569	0.0000	SURCHARGED
240 minute winter	4	236	33.286	1.427	9.3	11.1932	0.0000	FLOOD RISK
15 minute winter	3	9	31.860	0.053	4.9	0.0765	0.0000	OK
30 minute summer	2	236	31.399	0.055	4.9	0.0790	0.0000	OK
960 minute winter	1	465	31.333	0.053	4.9	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	7	1.000	6	-14.4	0.159	-0.021	11.8778	
240 minute winter	8	2.000	6	6.9	0.162	0.010	13.3149	
240 minute winter	6	1.001	5	-9.4	0.271	-0.014	20.4824	
240 minute winter	9	3.000	5	10.6	0.247	0.015	26.1357	
240 minute winter	5	1.002	4	7.3	0.179	0.011	15.1261	
240 minute winter	4	1.003	3	4.9	0.664	0.123	0.0648	
15 minute winter	3	1.004	2	4.9	0.768	0.124	0.5767	
30 minute summer	2	1.005	1	4.9	0.669	0.123	0.0790	75.2