Design Settings

Rainfall Methodology	FEH-13	Minimum Velocity (m/s)	0.10
Return Period (years)	100	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)	10.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	1.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
MH-0001-S	0.000	10.00	8.550	1200	516573.619	290132.079	1.545
MH-0002-S	0.000	10.00	8.600	1200	516573.262	290118.072	1.550
MH-0003-S	0.000	10.00	8.700	1200	516560.609	290112.460	1.600
MH-0004-S	0.066	10.00	9.250	1200	516523.835	290096.252	1.950
MH-0011-S	0.066	10.00	8.910	450	516522.206	290062.708	1.460
Dummy Node 2			8.440	1200	516575.175	290132.971	1.436
Outfall	0.000		8.120	450	516586.874	290135.907	1.170

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)
PN001	Dummy Node 2	Outfall	12.062	0.600	7.004	6.950	0.054	223.4	225	11.77	1.0
PN002	MH-0002-S	MH-0001-S	14.012	0.600	7.050	7.005	0.045	311.4	450	11.53	1.0
PN003	MH-0003-S	MH-0002-S	13.842	0.600	7.100	7.050	0.050	276.8	375	10.94	1.0
PN004	MH-0004-S	MH-0003-S	40.187	0.600	7.300	7.100	0.200	200.9	225	10.73	1.0
PN011	MH-0011-S	MH-0002-S	75.312	0.600	7.450	7.050	0.400	188.3	225	11.32	1.0
Dummy Pipe 2	MH-0001-S	Dummy Node 2	1.794	0.600	7.075	7.065	0.010	179.4	1000	11.54	1.0

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)
PN001	0.871	34.6	0.4	1.211	0.945	0.132	0.0	16	0.281
PN002	1.147	182.3	0.4	1.100	1.095	0.132	0.0	15	0.221
PN003	1.084	119.7	0.2	1.225	1.175	0.066	0.0	11	0.187
PN004	0.918	36.5	0.2	1.725	1.375	0.066	0.0	12	0.238
PN011	0.949	37.7	0.2	1.235	1.325	0.066	0.0	11	0.234
Dummy Pipe 2	2.493	1958.4	0.4	0.475	0.375	0.132	0.0	11	0.247

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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)
PN001	12.062	223.4	225	Circular	8.440	7.004	1.211	8.120	6.950	0.945
PN002	14.012	311.4	450	Circular	8.600	7.050	1.100	8.550	7.005	1.095
PN003	13.842	276.8	375	Circular	8.700	7.100	1.225	8.600	7.050	1.175
PN004	40.187	200.9	225	Circular	9.250	7.300	1.725	8.700	7.100	1.375
PN011	75.312	188.3	225	Circular	8.910	7.450	1.235	8.600	7.050	1.325
Dummy Pipe 2	1.794	179.4	1000	Circular	8.550	7.075	0.475	8.440	7.065	0.375

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
PN001	Dummy Node 2	1200	Manhole	Adoptable	Outfall	450	Manhole	Adoptable
PN002	MH-0002-S	1200	Manhole	Adoptable	MH-0001-S	1200	Manhole	Adoptable
PN003	MH-0003-S	1200	Manhole	Adoptable	MH-0002-S	1200	Manhole	Adoptable
PN004	MH-0004-S	1200	Manhole	Adoptable	MH-0003-S	1200	Manhole	Adoptable
PN011	MH-0011-S	450	Manhole	Adoptable	MH-0002-S	1200	Manhole	Adoptable
Dummy Pipe 2	MH-0001-S	1200	Manhole	Adoptable	Dummy Node 2	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
MH-0001-S	516573.619	290132.079	8.550	1.545	1200	1	PN002	7.005	450
						0	Dummy Pipe 2	7.075	1000
MH-0002-S	516573.262	290118.072	8.600	1.550	1200	1	PN003	7.050	375
						2	PN011	7.050	225
						0	PN002	7.050	450
MH-0003-S	516560.609	290112.460	8.700	1.600	1200	1	PN004	7.100	225
						0	PN003	7.100	375
MH-0004-S	516523.835	290096.252	9.250	1.950	1200	0	PN004	7.300	225
MH-0011-S	516522.206	290062.708	8.910	1.460	450	0	PN011	7.450	225
Dummy Node 2	516575.175	290132.971	8.440	1.436	1200	1	Dummy Pipe 2	7.065	1000
						0	PN001	7.004	225
Outfall	516586.874	290135.907	8.120	1.170	450	1	PN001	6.950	225

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Simulation Settings

Rainfall Methodology	FEH-13	Analysis Speed	Normal	Additional Storage (m³/ha)	0.0
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 %)
5	0	0	0
10	0	0	0
30	0	0	0
100	0	0	0
100	40	0	0

Node MH-0001-S Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	7.075	Product Number	CTL-SHE-0104-5700-1545-5700
Design Depth (m)	1.545	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.7	Min Node Diameter (mm)	1200

Node MH-0002-S Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	7.050
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	0

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	0.0	0.0	0.975	126.0	0.0	1.276	0.0	0.0
0.974	0.0	0.0	1.275	126.0	0.0			

Node MH-0002-S Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	7.050
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	0

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	110.0	0.0	1.200	375.0	0.0	1.201	0.0	0.0

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Results for 5 year Critical Storm Duration. Lowest mass balance: 99.62%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	MH-0001-S	90	7.185	0.180	3.9	0.2038	0.0000	OK
120 minute winter	MH-0002-S	90	7.185	0.135	9.9	16.2287	0.0000	OK
120 minute winter	MH-0003-S	90	7.185	0.085	5.0	0.0967	0.0000	OK
15 minute winter	MH-0004-S	13	7.385	0.085	10.6	0.0958	0.0000	OK
15 minute winter	MH-0011-S	11	7.541	0.091	10.6	0.0145	0.0000	OK
120 minute winter	Dummy Node 2	90	7.056	0.052	3.9	0.0593	0.0000	OK
120 minute winter	Outfall	90	7.000	0.050	3.9	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)
120 minute winter	MH-0001-S	Hydro-Brake®	Dummy Node 2	3.9				
120 minute winter	MH-0002-S	PN002	MH-0001-S	3.9	0.149	0.021	0.6963	
120 minute winter	MH-0003-S	PN003	MH-0002-S	4.9	0.568	0.041	0.3785	
15 minute winter	MH-0004-S	PN004	MH-0003-S	10.6	0.834	0.290	0.5113	
15 minute winter	MH-0011-S	PN011	MH-0002-S	10.9	1.204	0.289	0.9197	
120 minute winter	Dummy Node 2	PN001	Outfall	3.9	0.571	0.112	0.0819	24.4

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Results for 10 year Critical Storm Duration. Lowest mass balance: 99.62%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	MH-0001-S	92	7.215	0.210	4.6	0.2373	0.0000	OK
120 minute winter	MH-0002-S	92	7.215	0.165	12.2	20.2811	0.0000	OK
120 minute winter	MH-0003-S	90	7.215	0.115	6.3	0.1301	0.0000	OK
15 minute winter	MH-0004-S	13	7.398	0.098	13.7	0.1105	0.0000	OK
15 minute winter	MH-0011-S	11	7.553	0.103	13.7	0.0164	0.0000	OK
120 minute winter	Dummy Node 2	92	7.061	0.057	4.6	0.0644	0.0000	OK
120 minute winter	Outfall	92	7.004	0.054	4.6	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)
120 minute winter	MH-0001-S	Hydro-Brake®	Dummy Node 2	4.6				
120 minute winter	MH-0002-S	PN002	MH-0001-S	4.6	0.173	0.025	0.8760	
120 minute winter	MH-0003-S	PN003	MH-0002-S	5.9	0.597	0.049	0.5209	
15 minute winter	MH-0004-S	PN004	MH-0003-S	13.7	0.899	0.375	0.6158	
15 minute winter	MH-0011-S	PN011	MH-0002-S	14.1	1.249	0.373	1.1812	
120 minute winter	Dummy Node 2	PN001	Outfall	4.6	0.597	0.132	0.0920	32.2

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.62%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	MH-0001-S	94	7.274	0.269	5.1	0.3043	0.0000	OK
120 minute winter	MH-0002-S	94	7.274	0.224	17.0	28.9490	0.0000	OK
120 minute winter	MH-0003-S	94	7.274	0.174	8.8	0.1970	0.0000	OK
15 minute winter	MH-0004-S	13	7.418	0.118	19.0	0.1337	0.0000	OK
15 minute winter	MH-0011-S	11	7.572	0.122	19.0	0.0194	0.0000	OK
120 minute winter	Dummy Node 2	94	7.064	0.060	5.0	0.0680	0.0000	OK
120 minute winter	Outfall	94	7.007	0.057	5.0	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)
120 minute winter	MH-0001-S	Hydro-Brake®	Dummy Node 2	5.0				
120 minute winter	MH-0002-S	PN002	MH-0001-S	5.1	0.188	0.028	1.2452	
120 minute winter	MH-0003-S	PN003	MH-0002-S	8.2	0.638	0.068	0.8221	
15 minute winter	MH-0004-S	PN004	MH-0003-S	19.0	0.989	0.521	0.7909	
15 minute winter	MH-0011-S	PN011	MH-0002-S	19.4	1.315	0.515	1.6044	
120 minute winter	Dummy Node 2	PN001	Outfall	5.0	0.613	0.146	0.0992	46.2

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Results for 100 year Critical Storm Duration. Lowest mass balance: 99.62%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	MH-0001-S	140	7.362	0.357	5.5	0.4032	0.0000	OK
180 minute winter	MH-0002-S	140	7.362	0.312	18.0	43.0964	0.0000	OK
180 minute winter	MH-0003-S	140	7.362	0.262	9.3	0.2959	0.0000	OK
15 minute winter	MH-0004-S	13	7.443	0.143	25.6	0.1613	0.0000	OK
15 minute winter	MH-0011-S	11	7.594	0.144	25.6	0.0230	0.0000	OK
180 minute winter	Dummy Node 2	140	7.067	0.063	5.4	0.0707	0.0000	OK
180 minute winter	Outfall	140	7.010	0.060	5.4	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)
180 minute winter	MH-0001-S	Hydro-Brake®	Dummy Node 2	5.4				
180 minute winter	MH-0002-S	PN002	MH-0001-S	5.5	0.183	0.030	1.7642	
180 minute winter	MH-0003-S	PN003	MH-0002-S	8.7	0.623	0.072	1.2457	
15 minute winter	MH-0004-S	PN004	MH-0003-S	25.6	1.070	0.701	0.9982	
15 minute winter	MH-0011-S	PN011	MH-0002-S	26.0	1.367	0.689	2.0729	
180 minute winter	Dummy Node 2	PN001	Outfall	5.4	0.625	0.157	0.1050	75.1

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.62%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	MH-0001-S	148	7.489	0.484	5.8	0.5475	0.0000	OK
180 minute winter	MH-0002-S	148	7.489	0.439	25.5	66.6265	0.0000	OK
180 minute winter	MH-0003-S	148	7.489	0.389	13.1	0.4402	0.0000	SURCHARGED
180 minute winter	MH-0004-S	144	7.490	0.190	13.1	0.2150	0.0000	OK
15 minute winter	MH-0011-S	12	7.632	0.182	35.9	0.0290	0.0000	OK
180 minute winter	Dummy Node 2	148	7.068	0.064	5.6	0.0721	0.0000	OK
180 minute winter	Outfall	148	7.011	0.061	5.6	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)
180 minute winter	MH-0001-S	Hydro-Brake®	Dummy Node 2	5.6				
180 minute winter	MH-0002-S	PN002	MH-0001-S	5.8	0.174	0.032	2.2131	
180 minute winter	MH-0003-S	PN003	MH-0002-S	12.5	0.664	0.104	1.5267	
180 minute winter	MH-0004-S	PN004	MH-0003-S	13.1	0.637	0.358	1.5185	
15 minute winter	MH-0011-S	PN011	MH-0002-S	36.3	1.410	0.962	2.6504	
180 minute winter	Dummy Node 2	PN001	Outfall	5.6	0.631	0.163	0.1077	104.2

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