

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	1440	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations									
15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

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

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	40	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	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)	Invert Level (m)
MH-001-S	0.772	5.00	3.600	1200	524721.924	323044.014	1.130	2.470
IC-004-S			3.600	450	524724.514	323036.679	1.030	2.570
IC-005-S	0.020	5.00	3.600	450	524720.514	323030.177	0.830	2.770
IC-006-S	0.020	5.00	3.600	450	524720.514	323003.857	0.630	2.970
IC-007-S			3.600	450	524724.514	322994.643	0.730	2.870
IC-008-S			3.600	450	524724.196	322960.390	0.580	3.020
IC-009-S	0.020	5.00	3.600	450	524720.514	322960.071	0.550	3.050
IC-010-S		5.00	3.600	450	524720.514	322938.480	0.350	3.250
Outfall			3.600	1200	524727.352	323047.580	1.200	2.400

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)
PN-004-S	IC-004-S	MH-001-S	7.779	0.600	2.570	2.470	0.100	77.8	300	6.82	50.0
PN-005-S	IC-005-S	IC-004-S	7.634	0.600	2.770	2.570	0.200	38.2	225	5.06	50.0
PN-006-S	IC-006-S	IC-004-S	33.065	0.600	2.970	2.670	0.300	110.2	225	5.44	50.0
PN-007-S	IC-007-S	IC-004-S	42.036	0.600	2.870	2.670	0.200	210.2	300	6.75	50.0
PN-008-S	IC-008-S	IC-007-S	34.254	0.600	3.020	2.870	0.150	228.4	225	6.10	50.0
PN-009-S	IC-009-S	IC-008-S	3.696	0.600	3.050	3.020	0.030	123.2	150	5.44	50.0
PN-010-S	IC-010-S	IC-009-S	21.591	0.600	3.250	3.050	0.200	108.0	150	5.37	50.0
Outfall PN	MH-001-S	Outfall	6.495	0.600	2.470	2.400	0.070	92.8	150	6.93	50.0

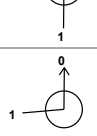
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
PN-004-S	1.784	126.1	15.2	0.730	0.830	0.060	0.0	70	1.218
PN-005-S	2.124	84.4	5.1	0.605	0.805	0.020	0.0	37	1.182
PN-006-S	1.245	49.5	5.1	0.405	0.705	0.020	0.0	49	0.810
PN-007-S	1.080	76.4	5.1	0.430	0.630	0.020	0.0	52	0.617
PN-008-S	0.861	34.2	5.1	0.355	0.505	0.020	0.0	58	0.620
PN-009-S	0.904	16.0	5.1	0.400	0.430	0.020	0.0	58	0.801
PN-010-S	0.966	17.1	0.0	0.200	0.400	0.000	0.0	0	0.000
Outfall PN	1.043	18.4	210.5	0.980	1.050	0.832	0.0	150	1.063

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)
PN-004-S	7.779	77.8	300	Circular	3.600	2.570	0.730	3.600	2.470	0.830
PN-005-S	7.634	38.2	225	Circular	3.600	2.770	0.605	3.600	2.570	0.805
PN-006-S	33.065	110.2	225	Circular	3.600	2.970	0.405	3.600	2.670	0.705
PN-007-S	42.036	210.2	300	Circular	3.600	2.870	0.430	3.600	2.670	0.630
PN-008-S	34.254	228.4	225	Circular	3.600	3.020	0.355	3.600	2.870	0.505
PN-009-S	3.696	123.2	150	Circular	3.600	3.050	0.400	3.600	3.020	0.430
PN-010-S	21.591	108.0	150	Circular	3.600	3.250	0.200	3.600	3.050	0.400
Outfall PN	6.495	92.8	150	Circular	3.600	2.470	0.980	3.600	2.400	1.050

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
PN-004-S	IC-004-S	450	Manhole	Adoptable	MH-001-S	1200	Manhole	Adoptable
PN-005-S	IC-005-S	450	Manhole	Adoptable	IC-004-S	450	Manhole	Adoptable
PN-006-S	IC-006-S	450	Manhole	Adoptable	IC-004-S	450	Manhole	Adoptable
PN-007-S	IC-007-S	450	Manhole	Adoptable	IC-004-S	450	Manhole	Adoptable
PN-008-S	IC-008-S	450	Manhole	Adoptable	IC-007-S	450	Manhole	Adoptable
PN-009-S	IC-009-S	450	Manhole	Adoptable	IC-008-S	450	Manhole	Adoptable
PN-010-S	IC-010-S	450	Manhole	Adoptable	IC-009-S	450	Manhole	Adoptable
Outfall PN	MH-001-S	1200	Manhole	Adoptable	Outfall	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
MH-001-S	524721.924	323044.014	3.600	1.130	1200	 1	PN-004-S	2.470	300
IC-004-S	524724.514	323036.679	3.600	1.030	450	 0 1 2 3 23	Outfall PN	2.470	150
IC-005-S	524720.514	323030.177	3.600	0.830	450	 0	PN-005-S	2.770	225
IC-006-S	524720.514	323003.857	3.600	0.630	450	 0	PN-006-S	2.970	225
IC-007-S	524724.514	322994.643	3.600	0.730	450	 1	PN-008-S	2.870	225
IC-008-S	524724.196	322960.390	3.600	0.580	450	 0 1	PN-007-S	2.870	300
IC-009-S	524720.514	322960.071	3.600	0.550	450	 1	PN-010-S	3.050	150
						 0	PN-009-S	3.050	150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
IC-010-S	524720.514	322938.480	3.600	0.350	450				
						0	PN-010-S	3.250	150
Outfall	524727.352	323047.580	3.600	1.200	1200		1	Outfall PN	2.400
								2.400	150

Node MH-001-S Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	2.470	Product Number	CTL-SHE-0065-2000-1130-2000
Design Depth (m)	1.130	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node IC-004-S Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.570
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	200.0	0.0	0.400	200.0	2.0	0.401	0.0	2.0

Node MH-001-S Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.470
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	

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	0.610	7700.0	7700.0	1.031	0.0	7830.6
0.609	0.0	0.0	1.030	7700.0	7830.6			

Results for 2 year Critical Storm Duration. Lowest mass balance: 93.62%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
600 minute summer	MH-001-S	600	3.121	0.651	22.0	96.3529	0.0000	SURCHARGED
600 minute summer	IC-004-S	600	3.121	0.551	21.2	76.1826	0.0000	SURCHARGED
120 minute summer	IC-005-S	68	3.122	0.352	2.4	0.0559	0.0000	SURCHARGED
600 minute summer	IC-006-S	600	3.121	0.151	2.5	0.0240	0.0000	OK
120 minute winter	IC-007-S	70	3.129	0.259	6.9	0.0412	0.0000	OK
360 minute summer	IC-008-S	184	3.127	0.107	3.5	0.0170	0.0000	OK
360 minute summer	IC-009-S	184	3.135	0.085	0.9	0.0136	0.0000	OK
15 minute summer	IC-010-S	1	3.250	0.000	0.0	0.0000	0.0000	OK
240 minute winter	Outfall	100	2.432	0.032	1.8	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)
600 minute summer	MH-001-S	Outfall PN	Outfall	1.8	0.650	0.099	0.0182	188.3
600 minute summer	IC-004-S	PN-004-S	MH-001-S	-20.1	-0.286	-0.160	0.5478	
120 minute summer	IC-005-S	PN-005-S	IC-004-S	1.4	0.746	0.016	0.3036	
600 minute summer	IC-006-S	PN-006-S	IC-004-S	-2.5	0.271	-0.050	1.1256	
120 minute winter	IC-007-S	PN-007-S	IC-004-S	-6.9	0.320	-0.091	2.8383	
360 minute summer	IC-008-S	PN-008-S	IC-007-S	4.1	0.349	0.120	0.9798	
360 minute summer	IC-009-S	PN-009-S	IC-008-S	3.5	0.450	0.219	0.0440	
15 minute summer	IC-010-S	PN-010-S	IC-009-S	0.0	0.000	0.000	0.0596	

Results for 30 year Critical Storm Duration. Lowest mass balance: 95.49%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute winter	MH-001-S	945	3.252	0.782	25.1	400.1490	0.0000	SURCHARGED
960 minute winter	IC-004-S	945	3.252	0.682	10.1	76.2035	0.0000	SURCHARGED
15 minute summer	IC-005-S	13	3.268	0.498	10.9	0.0791	0.0000	SURCHARGED
960 minute winter	IC-006-S	960	3.253	0.283	0.8	0.0449	0.0000	SURCHARGED
960 minute winter	IC-007-S	945	3.252	0.382	1.5	0.0608	0.0000	SURCHARGED
960 minute winter	IC-008-S	945	3.252	0.232	1.0	0.0369	0.0000	SURCHARGED
960 minute winter	IC-009-S	960	3.252	0.202	0.6	0.0322	0.0000	SURCHARGED
30 minute summer	IC-010-S	19	3.252	0.002	0.0	0.0004	0.0000	OK
30 minute summer	Outfall	8	2.432	0.032	1.8	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)
960 minute winter	MH-001-S	Outfall PN	Outfall	1.8	0.650	0.099	0.0182	233.5
960 minute winter	IC-004-S	PN-004-S	MH-001-S	-9.5	-0.155	-0.075	0.5478	
15 minute summer	IC-005-S	PN-005-S	IC-004-S	10.3	1.147	0.122	0.3036	
960 minute winter	IC-006-S	PN-006-S	IC-004-S	0.6	0.271	0.012	1.3150	
960 minute winter	IC-007-S	PN-007-S	IC-004-S	-1.5	0.266	-0.019	2.9601	
960 minute winter	IC-008-S	PN-008-S	IC-007-S	-1.0	0.280	-0.028	1.3623	
960 minute winter	IC-009-S	PN-009-S	IC-008-S	0.6	0.335	0.037	0.0651	
30 minute summer	IC-010-S	PN-010-S	IC-009-S	0.0	0.001	0.000	0.1658	

Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 97.45%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	MH-001-S	1410	3.339	0.869	24.0	599.8248	0.0000	FLOOD RISK
1440 minute winter	IC-004-S	1410	3.339	0.769	6.9	76.2172	0.0000	FLOOD RISK
1440 minute winter	IC-005-S	1410	3.339	0.569	0.6	0.0904	0.0000	FLOOD RISK
1440 minute winter	IC-006-S	1440	3.339	0.369	0.6	0.0586	0.0000	FLOOD RISK
1440 minute winter	IC-007-S	1440	3.339	0.469	0.8	0.0745	0.0000	FLOOD RISK
1440 minute winter	IC-008-S	1440	3.339	0.319	0.6	0.0507	0.0000	FLOOD RISK
1440 minute winter	IC-009-S	1410	3.339	0.289	0.6	0.0459	0.0000	FLOOD RISK
1440 minute winter	IC-010-S	1410	3.339	0.089	0.1	0.0141	0.0000	OK
30 minute summer	Outfall	7	2.432	0.032	1.8	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)
1440 minute winter	MH-001-S	Outfall PN	Outfall	1.8	0.650	0.099	0.0182	288.7
1440 minute winter	IC-004-S	PN-004-S	MH-001-S	-6.5	-0.125	-0.052	0.5478	
1440 minute winter	IC-005-S	PN-005-S	IC-004-S	0.6	0.482	0.007	0.3036	
1440 minute winter	IC-006-S	PN-006-S	IC-004-S	0.6	0.271	0.012	1.3150	
1440 minute winter	IC-007-S	PN-007-S	IC-004-S	-0.8	0.266	-0.010	2.9601	
1440 minute winter	IC-008-S	PN-008-S	IC-007-S	0.6	0.246	0.017	1.3623	
1440 minute winter	IC-009-S	PN-009-S	IC-008-S	0.6	0.298	0.037	0.0651	
1440 minute winter	IC-010-S	PN-010-S	IC-009-S	-0.1	0.004	-0.003	0.3072	

Results for 100 year Critical Storm Duration. Lowest mass balance: 96.50%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	MH-001-S	1410	3.339	0.869	24.0	601.4326	0.0000	FLOOD RISK
1440 minute winter	IC-004-S	1410	3.339	0.769	6.9	76.2173	0.0000	FLOOD RISK
1440 minute winter	IC-005-S	1410	3.339	0.569	0.6	0.0905	0.0000	FLOOD RISK
1440 minute winter	IC-006-S	1410	3.339	0.369	0.6	0.0587	0.0000	FLOOD RISK
1440 minute winter	IC-007-S	1410	3.339	0.469	1.1	0.0746	0.0000	FLOOD RISK
1440 minute winter	IC-008-S	1410	3.339	0.319	0.6	0.0508	0.0000	FLOOD RISK
1440 minute winter	IC-009-S	1410	3.339	0.289	0.6	0.0460	0.0000	FLOOD RISK
1440 minute winter	IC-010-S	1410	3.339	0.089	0.1	0.0142	0.0000	OK
60 minute summer	Outfall	14	2.432	0.032	1.8	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)
1440 minute winter	MH-001-S	Outfall PN	Outfall	1.8	0.650	0.099	0.0182	288.8
1440 minute winter	IC-004-S	PN-004-S	MH-001-S	-6.5	-0.125	-0.052	0.5478	
1440 minute winter	IC-005-S	PN-005-S	IC-004-S	0.6	0.482	0.007	0.3036	
1440 minute winter	IC-006-S	PN-006-S	IC-004-S	0.6	0.271	0.012	1.3150	
1440 minute winter	IC-007-S	PN-007-S	IC-004-S	-1.1	0.266	-0.015	2.9601	
1440 minute winter	IC-008-S	PN-008-S	IC-007-S	0.6	0.246	0.017	1.3623	
1440 minute winter	IC-009-S	PN-009-S	IC-008-S	0.6	0.298	0.037	0.0651	
1440 minute winter	IC-010-S	PN-010-S	IC-009-S	0.1	0.004	0.004	0.3083	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 96.58%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	MH-001-S	1440	3.479	1.009	33.5	923.2681	0.0000	FLOOD RISK
1440 minute winter	IC-004-S	1440	3.479	0.909	5.9	76.2395	0.0000	FLOOD RISK
1440 minute winter	IC-005-S	1440	3.479	0.709	0.8	0.1127	0.0000	FLOOD RISK
1440 minute winter	IC-006-S	1440	3.479	0.509	0.8	0.0809	0.0000	FLOOD RISK
1440 minute winter	IC-007-S	1440	3.479	0.609	1.4	0.0968	0.0000	FLOOD RISK
1440 minute winter	IC-008-S	1440	3.479	0.459	0.8	0.0730	0.0000	FLOOD RISK
1440 minute winter	IC-009-S	1440	3.479	0.429	0.8	0.0682	0.0000	FLOOD RISK
1440 minute winter	IC-010-S	1440	3.479	0.229	0.1	0.0364	0.0000	FLOOD RISK
1440 minute winter	Outfall	1440	2.432	0.032	1.9	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)
1440 minute winter	MH-001-S	Outfall PN	Outfall	1.9	0.655	0.102	0.0186	304.2
1440 minute winter	IC-004-S	PN-004-S	MH-001-S	-5.5	-0.170	-0.044	0.5478	
1440 minute winter	IC-005-S	PN-005-S	IC-004-S	0.8	0.301	0.009	0.3036	
1440 minute winter	IC-006-S	PN-006-S	IC-004-S	0.8	0.271	0.016	1.3150	
1440 minute winter	IC-007-S	PN-007-S	IC-004-S	1.8	0.266	0.024	2.9601	
1440 minute winter	IC-008-S	PN-008-S	IC-007-S	1.4	0.246	0.041	1.3623	
1440 minute winter	IC-009-S	PN-009-S	IC-008-S	0.8	0.298	0.049	0.0651	
1440 minute winter	IC-010-S	PN-010-S	IC-009-S	-0.1	-0.004	-0.005	0.3801	

Water Quality (TSS)

Node	Treatment	Effectiveness	SuDS Component	Mitigation TSS	Cumulative TSS
IC-004-S	Depth/Area	1.0	Pond	0.700	0.000
MH-001-S	Depth/Area	1.0	Pond	0.700	0.000
Outfall					0.000

Water Quality (Metals)

Node	Treatment	Effectiveness	SuDS Component	Mitigation Metals	Cumulative Metals
IC-004-S	Depth/Area	1.0	Pond	0.700	0.000
MH-001-S	Depth/Area	1.0	Pond	0.700	0.000
Outfall					0.000

Water Quality (Hydrocarbons)

Node	Treatment	Effectiveness	SuDS Component	Mitigation Hydrocarbons	Cumulative Hydrocarbons
IC-004-S	Depth/Area	1.0	Pond	0.500	0.000
MH-001-S	Depth/Area	1.0	Pond	0.500	0.000
Outfall					0.000