Horsham District Council
Drainage Team

Our Ref.	P25083_L2
Your Ref.	DC/25/2114
Date:	19th November 2026

Thank you for providing the recent response to the proposed planning application for the erection of 4No. detached dwellings on Church Farm walk, Upper Beeding, West Sussex.

The consultation response has been passed through to Aqua Terra Consultants Ltd as part of our remit in supporting the proposed development.

The consultation response identified an error in the Causeway Flow model whereby the distance between the swale and the outfall was modelled as 62m, whereas the stated physical distance is 140m.

The Causeway flow model has been updated to reflect the 140m and re-run for both the standard and surcharged scenarios with the outputs attached to this response.

The results show that for the standard non-surcharged scenario there is no change to peak levels modelled within the swale or to the peak discharge rate of 1.6l/s. The model does not show any flooding on Site.

For the surcharged scenario (1 in 100 year with climate change event), the exceedance from the central swale increases from 33.3m^3 to 35.5m^3. This exceedance has been considered further following discussion with the LLFA and has been mitigated by altering the side slopes of the swale from 1V:3H to 1V:2.5H. This increases the storage capacity of the swale without changing the swale footprint.

The revised outputs indicate a minor exceedance of 3.5m^3 which is deemed to be acceptable and possible betterment under the conservative assumption of the outfall being surcharged to the 1% AEP plus Climate change fluvial event throughout the full duration of the design storm event.

Whilst there may be concern that the volume flowing the swale could have a reduced level of water quality treatment this is likely to be of negligible consequence as:

- The runoff originating from the access road will have passed through a primary treatment of porous paving, which in itself is sufficient for full treatment of the likely 'low' hazard rating associated with low usage car parking and roads (in accordance with the CIRIA SuDS Manual).
- The majority of the remaining runoff which passes direct to the swale is residential roof runoff with a very low hazard rating.
- The swale will only overtop at the peak of a 1% AEP event with climate change, and therefore the first flush of runoff which carries the highest potential pollutant load will pass through the complete treatment train of porous paving and the swale.

Please feel free to come back to me with any questions or suggestions.

Yours sincerely,

James Mortimer

Director

Registered in England and Wales with Company No. 15820480 at 14 Museum Place, 4th Floor, Cardiff, Wales, CF10 3BH.

Simulation Settings

Rainfall Methodology	FEH-22	Summer CV	1.000	Analysis Speed	Normal	Drain Down Time (mins)	240	Starting Level (m)		2 year (l/s)	1.6	100 year (l/s)	1.6
Rainfall Events	Singular	Winter CV	1.000	Skip Steady State	x	Additional Storage (m³/ha)	20.0	Check Discharge Rate(s)	✓	30 year (l/s)	1.6	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 %)	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	10	0	30	40	10	0	100	45	10	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Region	England, Wales, NI	Positively Drained Area (ha)	0.530	Q 2 year (l/s)	0.7	Q 100 year (l/s)	2.3
Greenfield Method	ReFH2	Include Baseflow	x	Betterment (%)	0	Q 30 year (l/s)	1.8		

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Design Settings

Rainfall Methodology	FEH-22	CV	1.000	Maximum Rainfall (mm/hr)	50.0	Minimum Backdrop Height (m)	0.200	Enforce best practice design rules	✓
Return Period (years)	30	Time of Entry (mins)	5.00	Minimum Velocity (m/s)	1.00	Preferred Cover Depth (m)	1.200		
Additional Flow (%)	0	Maximum Time of Concentration (mins)	30.00	Connection Type	Level Soffits	Include Intermediate Ground	✓		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
Road 1			9.300	1200	519369.210	111135.528	1.413	7.887
Road 2			7.890	1200	519378.146	111156.108	1.468	6.422
Plot 3	0.021	5.00	6.180	1200	519404.949	111175.646	0.855	5.325
Road 3			7.047	1200	519376.462	111174.111	1.482	5.565
Road 4			6.597	1200	519385.154	111180.191	1.416	5.181
Plot 1 US			7.670	1200	519358.613	111189.965	2.100	5.570
Plot 3 DS	0.000		5.450	1200	519414.811	111182.436	1.000	4.450
Plot 1	0.014	5.00	6.125	1200	519365.686	111204.634	1.226	4.899
Plot 1 DS			5.450	1200	519372.429	111214.356	1.000	4.450
Road 5			5.450	1200	519398.253	111194.713	1.000	4.450
Plot 2	0.018	5.00	6.480	1200	519381.454	111192.546	1.149	5.331
Plot 2 DS	0.010		5.450	1200	519388.094	111202.106	1.000	4.450
Central Swale	0.050	5.00	5.450	1200	519423.500	111185.042	1.130	4.320
Outfall			2.300	1200	519476.541	111217.478	1.300	1.000
PP3	0.023	5.00	7.047		519375.966	111169.271	1.300	5.747
PP4	0.012	5.00	6.597		519380.998	111180.334	1.246	5.351
PP2	0.027	5.00	7.890		519374.526	111154.346	1.300	6.590
PP1	0.029	5.00	9.300		519364.685	111130.624	1.300	8.000
PP5	0.016	5.00	7.670		519360.455	111185.589	2.020	5.650

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)
2.001	Road 1	Road 2	22.436	0.600	7.887	6.522	1.365	16.4	100	5.31	50.0
2.002	Road 2	Road 3	18.082	0.600	6.422	5.565	0.857	21.1	200	5.42	50.0
7.000	Plot 3	Plot 3 DS	11.973	0.600	5.325	4.700	0.625	19.2	100	5.11	50.0
2.003	Road 3	Road 4	10.607	0.600	5.565	5.181	0.384	27.6	200	5.50	50.0
2.004	Road 4	Road 5	19.557	0.600	5.181	4.700	0.481	40.7	200	5.67	50.0
6.001	Plot 1 US	Plot 1	16.285	0.600	5.570	4.899	0.671	24.3	100	5.25	50.0
6.002	Plot 1	Plot 1 DS	11.832	0.600	4.899	4.700	0.199	59.5	100	5.45	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)
2.001	1.914	15.0	5.2	1.313	1.268	0.029	0.0	41	1.750
2.002	2.652	83.3	10.2	1.268	1.282	0.056	0.0	47	1.816
7.000	1.772	13.9	3.8	0.755	0.650	0.021	0.0	36	1.507
2.003	2.316	72.8	14.4	1.282	1.216	0.080	0.0	60	1.807
2.004	1.907	59.9	16.5	1.216	0.550	0.092	0.0	71	1.633
6.001	1.573	12.4	2.9	2.000	1.126	0.016	0.0	33	1.290
6.002	1.001	7.9	5.5	1.126	0.650	0.031	0.0	62	1.085

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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)
8.000	Plot 2	Plot 2 DS	11.640	0.600	5.331	4.700	0.631	18.4	100	5.11	50.0
1.000	Central Swale	Outfall	140.000	0.600	4.320	1.000	3.320	42.2	100	6.96	50.0
4.000	PP3	Road 3	4.865	0.600	5.747	5.665	0.082	59.3	100	5.08	50.0
5.000	PP4	Road 4	4.158	0.600	5.351	5.281	0.070	59.4	100	5.07	50.0
3.000	PP2	Road 2	4.026	0.600	6.590	6.522	0.068	59.2	100	5.07	50.0
2.000	PP1	Road 1	6.673	0.600	8.000	7.887	0.113	59.1	100	5.11	50.0
6.000	PP5	Plot 1 US	4.748	0.600	5.650	5.570	0.080	59.3	100	5.08	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)
8.000	1.806	14.2	3.2	1.049	0.650	0.018	0.0	32	1.463
1.000	1.190	9.3	9.0	1.030	1.200	0.050	0.0	79	1.354
4.000	1.002	7.9	4.2	1.200	1.282	0.023	0.0	52	1.018
5.000	1.001	7.9	2.2	1.146	1.216	0.012	0.0	36	0.850
3.000	1.003	7.9	5.0	1.200	1.268	0.027	0.0	57	1.059
2.000	1.004	7.9	5.2	1.200	1.313	0.029	0.0	60	1.075
6.000	1.001	7.9	2.9	1.920	2.000	0.016	0.0	43	0.931

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)
2.001	22.436	16.4	100	Circular	9.300	7.887	1.313	7.890	6.522	1.268
2.002	18.082	21.1	200	Circular	7.890	6.422	1.268	7.047	5.565	1.282
7.000	11.973	19.2	100	Circular	6.180	5.325	0.755	5.450	4.700	0.650
2.003	10.607	27.6	200	Circular	7.047	5.565	1.282	6.597	5.181	1.216
2.004	19.557	40.7	200	Circular	6.597	5.181	1.216	5.450	4.700	0.550
6.001	16.285	24.3	100	Circular	7.670	5.570	2.000	6.125	4.899	1.126
6.002	11.832	59.5	100	Circular	6.125	4.899	1.126	5.450	4.700	0.650
8.000	11.640	18.4	100	Circular	6.480	5.331	1.049	5.450	4.700	0.650
1.000	140.000	42.2	100	Circular	5.450	4.320	1.030	2.300	1.000	1.200
4.000	4.865	59.3	100	Circular	7.047	5.747	1.200	7.047	5.665	1.282
5.000	4.158	59.4	100	Circular	6.597	5.351	1.146	6.597	5.281	1.216

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
2.001	Road 1	1200	Manhole	Adoptable	Road 2	1200	Manhole	Adoptable
2.002	Road 2	1200	Manhole	Adoptable	Road 3	1200	Manhole	Adoptable
7.000	Plot 3	1200	Manhole	Adoptable	Plot 3 DS	1200	Manhole	Adoptable
2.003	Road 3	1200	Manhole	Adoptable	Road 4	1200	Manhole	Adoptable
2.004	Road 4	1200	Manhole	Adoptable	Road 5	1200	Manhole	Adoptable
6.001	Plot 1 US	1200	Manhole	Adoptable	Plot 1	1200	Manhole	Adoptable
6.002	Plot 1	1200	Manhole	Adoptable	Plot 1 DS	1200	Manhole	Adoptable
8.000	Plot 2	1200	Manhole	Adoptable	Plot 2 DS	1200	Manhole	Adoptable
1.000	Central Swale	1200	Manhole	Adoptable	Outfall	1200	Manhole	Adoptable
4.000	PP3		Junction		Road 3	1200	Manhole	Adoptable
5.000	PP4		Junction		Road 4	1200	Manhole	Adoptable

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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)
3.000	4.026	59.2	100	Circular	7.890	6.590	1.200	7.890	6.522	1.268
2.000	6.673	59.1	100	Circular	9.300	8.000	1.200	9.300	7.887	1.313
6.000	4.748	59.3	100	Circular	7.670	5.650	1.920	7.670	5.570	2.000

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
3.000	PP2		Junction		Road 2	1200	Manhole	Adoptable
2.000	PP1		Junction		Road 1	1200	Manhole	Adoptable
6.000	PP5		Junction		Plot 1 US	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
Road 1	519369.210	111135.528	9.300	1.413	1200		1	2.000	7.887	100
							0	2.001	7.887	100
Road 2	519378.146	111156.108	7.890	1.468	1200		1	3.000	6.522	100
							2	2.001	6.522	100
							0	2.002	6.422	200
Plot 3	519404.949	111175.646	6.180	0.855	1200		0	7.000	5.325	100
Road 3	519376.462	111174.111	7.047	1.482	1200		1	4.000	5.665	100
							2	2.002	5.565	200
							0	2.003	5.565	200
Road 4	519385.154	111180.191	6.597	1.416	1200		1	5.000	5.281	100
							2	2.003	5.181	200
							0	2.004	5.181	200
Plot 1 US	519358.613	111189.965	7.670	2.100	1200		1	6.000	5.570	100
							0	6.001	5.570	100
Plot 3 DS	519414.811	111182.436	5.450	1.000	1200		1	7.000	4.700	100
Plot 1	519365.686	111204.634	6.125	1.226	1200		1	6.001	4.899	100
							0	6.002	4.899	100
Plot 1 DS	519372.429	111214.356	5.450	1.000	1200		1	6.002	4.700	100
Road 5	519398.253	111194.713	5.450	1.000	1200		1	2.004	4.700	200

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
Plot 2	519381.454	111192.546	6.480	1.149	1200				
						0	8.000	5.331	100
Plot 2 DS	519388.094	111202.106	5.450	1.000	1200	1	8.000	4.700	100
Central Swale	519423.500	111185.042	5.450	1.130	1200				
						0	1.000	4.320	100
Outfall	519476.541	111217.478	2.300	1.300	1200	1	1.000	1.000	100
PP3	519375.966	111169.271	7.047	1.300					
						0	4.000	5.747	100
PP4	519380.998	111180.334	6.597	1.246					
						0	5.000	5.351	100
PP2	519374.526	111154.346	7.890	1.300					
						0	3.000	6.590	100
PP1	519364.685	111130.624	9.300	1.300					
						0	2.000	8.000	100
PP5	519360.455	111185.589	7.670	2.020					
						0	6.000	5.650	100

Node Central Swale ReFH2 Dynamic Hydrograph

Overrides Design Area	x	Depression Storage Area (m²)	0	Evapo-transpiration (mm/day)	0	Region	England, Wales, NI
Overrides Design Additional Inflow	x	Depression Storage Depth (mm)	0	Area (ha)	0.288	Include Baseflow	x

Applies to All storms

Node Central Swale Online Hydro-Brake® Control

Flap Valve	x	Design Depth (m)	1.000	Sump Available	✓	Min Node Diameter (mm)	1200
Replaces Downstream Link	x	Design Flow (l/s)	1.6	Product Number	CTL-SCL-0057-1600-1000-1600		
Invert Level (m)	4.450	Objective	(CL) Minimise blockage risk	Min Outlet Diameter (m)	0.075		

Node PP3 Online Orifice Control

Flap Valve	x	Replaces Downstream Link	x	Invert Level (m)	5.747	Diameter (m)	0.030	Discharge Coefficient	0.600

Node PP4 Online Orifice Control

Flap Valve	x	Replaces Downstream Link	x	Invert Level (m)	5.350	Diameter (m)	0.020	Discharge Coefficient	0.600

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Node PP2 Online Orifice Control

Flap Valve	Replaces Downstream Link	Invert Level (m)	Diameter (m)	Discharge Coefficient
x	x	6.590	0.040	0.600

Node PP1 Online Orifice Control

Flap Valve	Replaces Downstream Link	Invert Level (m)	Diameter (m)	Discharge Coefficient
x	x	8.000	0.036	0.600

Node PP5 Online Orifice Control

Flap Valve	Replaces Downstream Link	Invert Level (m)	Diameter (m)	Discharge Coefficient
x	x	5.650	0.020	0.600

Node Central Swale Pond Storage Structure

Invert Level (m)	Time to half empty (mins)	Analyse flow through structure
4.450		x

Inlets

Plot 1 DS		Plot 2 DS		Road 5		Plot 3 DS	
Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	115.5	1.000	500.5				

Node PP3 Carpark Storage Structure

Base Inf Coefficient (m/hr)	Side Inf Coefficient (m/hr)	Safety Factor	Porosity	Invert Level (m)	Time to half empty (mins)	Width (m)	Length (m)	Slope (1:X)	Depth (m)	Inf Depth (m)
0.00000	0.00000	2.0	0.35	6.297	56	5.000	15.000	150.0	0.500	

Node PP4 Carpark Storage Structure

Base Inf Coefficient (m/hr)	Side Inf Coefficient (m/hr)	Safety Factor	Porosity	Invert Level (m)	Time to half empty (mins)	Width (m)	Length (m)	Slope (1:X)	Depth (m)	Inf Depth (m)
0.00000	0.00000	2.0	0.35	5.847	32	5.000	16.000	150.0	0.500	

Node PP2 Carpark Storage Structure

Base Inf Coefficient (m/hr)	Side Inf Coefficient (m/hr)	Safety Factor	Porosity	Invert Level (m)	Time to half empty (mins)	Width (m)	Length (m)	Slope (1:X)	Depth (m)	Inf Depth (m)
0.00000	0.00000	2.0	0.35	7.140	35	5.000	19.000	150.0	0.500	

Node PP1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	Side Inf Coefficient (m/hr)	Safety Factor	Porosity	Invert Level (m)	Time to half empty (mins)	Width (m)	Length (m)	Slope (1:X)	Depth (m)	Inf Depth (m)
0.00000	0.00000	2.0	0.35	8.550	50	5.000	19.000	150.0	0.500	

Node PP5 Carpark Storage Structure

Base Inf Coefficient (m/hr)	Side Inf Coefficient (m/hr)	Safety Factor	Porosity	Invert Level (m)	Time to half empty (mins)	Width (m)	Length (m)	Slope (1:X)	Depth (m)	Inf Depth (m)
0.00000	0.00000	2.0	0.35	6.920	58	14.000	5.000	150.0	0.500	

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year +10% A 15 minute summer	116.513	32.969	2 year +10% A 120 minute winter	24.640	9.801	2 year +10% A 480 minute summer	15.311	4.046	2 year +10% A 960 minute winter	6.070	2.413
2 year +10% A 15 minute winter	81.763	32.969	2 year +10% A 180 minute summer	30.266	7.789	2 year +10% A 480 minute winter	10.172	4.046	2 year +10% A 1440 minute summer	6.617	1.773
2 year +10% A 30 minute summer	75.926	21.485	2 year +10% A 180 minute winter	19.674	7.789	2 year +10% A 600 minute summer	12.558	3.435	2 year +10% A 1440 minute winter	4.447	1.773
2 year +10% A 30 minute winter	53.282	21.485	2 year +10% A 240 minute summer	24.661	6.517	2 year +10% A 600 minute winter	8.581	3.435	30 year +40% CC +10% A 15 minute summer	417.828	118.231
2 year +10% A 60 minute summer	51.244	13.542	2 year +10% A 240 minute winter	16.384	6.517	2 year +10% A 720 minute summer	11.186	2.998	30 year +40% CC +10% A 15 minute winter	293.213	118.231
2 year +10% A 60 minute winter	34.045	13.542	2 year +10% A 360 minute summer	19.306	4.968	2 year +10% A 720 minute winter	7.518	2.998	30 year +40% CC +10% A 30 minute summer	277.491	78.520
2 year +10% A 120 minute summer	37.088	9.801	2 year +10% A 360 minute winter	12.550	4.968	2 year +10% A 960 minute summer	9.164	2.413	30 year +40% CC +10% A 30 minute winter	194.730	78.520

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Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year +40% CC +10% A 60 minute summer	188.819	49.899
30 year +40% CC +10% A 60 minute winter	125.447	49.899
30 year +40% CC +10% A 120 minute summer	117.951	31.171
30 year +40% CC +10% A 120 minute winter	78.364	31.171
30 year +40% CC +10% A 180 minute summer	90.774	23.359
30 year +40% CC +10% A 180 minute winter	59.006	23.359
30 year +40% CC +10% A 240 minute summer	71.595	18.920
30 year +40% CC +10% A 240 minute winter	47.566	18.920
30 year +40% CC +10% A 360 minute summer	54.124	13.928
30 year +40% CC +10% A 360 minute winter	35.182	13.928
30 year +40% CC +10% A 480 minute summer	42.114	11.129
30 year +40% CC +10% A 480 minute winter	27.980	11.129
30 year +40% CC +10% A 600 minute summer	34.093	9.325
30 year +40% CC +10% A 600 minute winter	23.295	9.325
30 year +40% CC +10% A 720 minute summer	30.066	8.058
30 year +40% CC +10% A 720 minute winter	20.206	8.058
30 year +40% CC +10% A 960 minute summer	24.250	6.386
30 year +40% CC +10% A 960 minute winter	16.064	6.386
30 year +40% CC +10% A 1440 minute summer	17.130	4.591
30 year +40% CC +10% A 1440 minute winter	11.512	4.591
100 year +45% CC +10% A 15 minute summer	543.591	153.817
100 year +45% CC +10% A 15 minute winter	381.467	153.817
100 year +45% CC +10% A 30 minute summer	365.058	103.299
100 year +45% CC +10% A 30 minute winter	256.181	103.299
100 year +45% CC +10% A 60 minute summer	249.444	65.921
100 year +45% CC +10% A 60 minute winter	165.724	65.921
100 year +45% CC +10% A 120 minute summer	152.602	40.328
100 year +45% CC +10% A 120 minute winter	101.385	40.328
100 year +45% CC +10% A 180 minute summer	116.683	30.026
100 year +45% CC +10% A 180 minute winter	75.847	30.026
100 year +45% CC +10% A 240 minute summer	91.831	24.268
100 year +45% CC +10% A 240 minute winter	61.011	24.268
100 year +45% CC +10% A 360 minute summer	69.451	17.872
100 year +45% CC +10% A 360 minute winter	45.145	17.872
100 year +45% CC +10% A 480 minute summer	54.198	14.323
100 year +45% CC +10% A 480 minute winter	36.008	14.323
100 year +45% CC +10% A 600 minute summer	43.998	12.034
100 year +45% CC +10% A 600 minute winter	30.062	12.034
100 year +45% CC +10% A 720 minute summer	38.893	10.424
100 year +45% CC +10% A 720 minute winter	26.138	10.424
100 year +45% CC +10% A 960 minute summer	31.471	8.287
100 year +45% CC +10% A 960 minute winter	20.847	8.287
100 year +45% CC +10% A 1440 minute summer	22.272	5.969
100 year +45% CC +10% A 1440 minute winter	14.968	5.969

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Results for 2 year +10% A Critical Storm Duration. Lowest mass balance: 99.69%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	Road 1	23	7.912	0.025	2.1	0.0288	0.0000	OK
15 minute summer	Road 2	14	6.454	0.032	4.6	0.0361	0.0000	OK
15 minute summer	Plot 3	10	5.365	0.040	4.4	0.0665	0.0000	OK
15 minute summer	Road 3	14	5.604	0.039	6.0	0.0443	0.0000	OK
30 minute summer	Road 4	23	5.227	0.046	6.6	0.0520	0.0000	OK
120 minute summer	Plot 1 US	74	5.588	0.018	0.9	0.0205	0.0000	OK
480 minute winter	Plot 3 DS	448	4.749	0.299	1.1	0.0000	0.0000	OK
15 minute summer	Plot 1	11	4.948	0.049	3.6	0.0682	0.0000	OK
480 minute winter	Plot 1 DS	448	4.750	0.300	1.1	0.0000	0.0000	OK
480 minute winter	Road 5	440	4.751	0.301	2.9	0.0000	0.0000	OK
15 minute summer	Plot 2	10	5.367	0.036	3.7	0.0526	0.0000	OK
480 minute winter	Plot 2 DS	448	4.750	0.300	1.1	0.0000	0.0000	OK
480 minute winter	Central Swale	448	4.749	0.429	3.5	54.2345	0.0000	SURCHARGED
120 minute summer	Outfall	110	1.027	0.027	1.5	0.0000	0.0000	OK
30 minute summer	PP3	23	6.369	0.622	4.3	0.9332	0.0000	SURCHARGED
30 minute summer	PP4	24	5.892	0.541	2.2	0.3819	0.0000	SURCHARGED
15 minute summer	PP2	13	7.202	0.612	5.8	0.7951	0.0000	SURCHARGED
30 minute summer	PP1	22	8.627	0.627	5.4	1.0946	0.0000	SURCHARGED
120 minute summer	PP5	74	6.779	1.129	1.8	0.1986	0.0000	SURCHARGED

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	Road 1	2.001	Road 2	2.1	1.334	0.138	0.0350	
15 minute summer	Road 2	2.002	Road 3	4.6	1.227	0.055	0.0680	
15 minute summer	Plot 3	7.000	Plot 3 DS	4.3	1.531	0.312	0.0340	
15 minute summer	Road 3	2.003	Road 4	6.0	1.243	0.083	0.0517	
30 minute summer	Road 4	2.004	Road 5	6.6	1.245	0.111	0.1044	
120 minute summer	Plot 1 US	6.001	Plot 1	0.9	0.642	0.071	0.0295	
15 minute summer	Plot 1	6.002	Plot 1 DS	3.5	0.954	0.452	0.0440	
15 minute summer	Plot 2	8.000	Plot 2 DS	3.6	1.482	0.257	0.0287	
120 minute summer	Central Swale	1.000	Outfall	1.5	0.875	0.161	0.2415	28.2
30 minute summer	PP3	4.000	Road 3	1.4	0.752	0.184	0.0094	
30 minute summer	PP4	5.000	Road 4	0.6	0.586	0.077	0.0043	
15 minute summer	PP2	3.000	Road 2	2.5	0.871	0.321	0.0117	
30 minute summer	PP1	2.000	Road 1	2.1	0.986	0.264	0.0142	
120 minute summer	PP5	6.000	Plot 1 US	0.9	0.739	0.112	0.0057	

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Results for 30 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.83%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	Road 1	47	7.915	0.028	2.5	0.0314	0.0000	OK
60 minute summer	Road 2	46	6.457	0.035	5.4	0.0391	0.0000	OK
15 minute summer	Plot 3	11	5.551	0.226	15.8	0.3780	0.0000	SURCHARGED
60 minute summer	Road 3	46	5.608	0.043	7.1	0.0485	0.0000	OK
30 minute summer	Road 4	26	5.231	0.050	7.8	0.0563	0.0000	OK
120 minute summer	Plot 1 US	88	5.589	0.019	1.0	0.0219	0.0000	OK
720 minute winter	Plot 3 DS	720	5.204	0.754	2.5	0.0000	0.0000	OK
720 minute winter	Plot 1	705	5.205	0.306	1.8	0.4251	0.0000	SURCHARGED
720 minute winter	Plot 1 DS	705	5.204	0.754	2.5	0.0000	0.0000	OK
720 minute winter	Road 5	705	5.206	0.756	5.5	0.0000	0.0000	OK
15 minute summer	Plot 2	10	5.415	0.084	13.3	0.1238	0.0000	OK
720 minute winter	Plot 2 DS	705	5.205	0.755	2.5	0.0000	0.0000	OK
720 minute winter	Central Swale	705	5.203	0.883	6.7	202.1298	0.0000	FLOOD RISK
1440 minute summer	Outfall	630	1.027	0.027	1.5	0.0000	0.0000	OK
60 minute winter	PP3	51	6.621	0.874	8.7	7.5437	0.0000	SURCHARGED
120 minute summer	PP4	90	6.046	0.695	4.1	4.2139	0.0000	SURCHARGED
60 minute summer	PP2	44	7.414	0.824	14.2	7.3990	0.0000	SURCHARGED
60 minute winter	PP1	49	8.866	0.866	10.8	8.8249	0.0000	SURCHARGED
120 minute summer	PP5	88	7.135	1.485	5.6	5.0949	0.0000	SURCHARGED

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	Road 1	2.001	Road 2	2.5	1.399	0.163	0.0394	
60 minute summer	Road 2	2.002	Road 3	5.4	1.275	0.065	0.0769	
15 minute summer	Plot 3	7.000	Plot 3 DS	14.0	1.876	1.005	0.0937	
60 minute summer	Road 3	2.003	Road 4	7.1	1.322	0.098	0.0572	
30 minute winter	Road 4	2.004	Road 5	7.8	1.299	0.130	0.3150	
120 minute summer	Plot 1 US	6.001	Plot 1	1.0	0.654	0.082	0.0723	
15 minute summer	Plot 1	6.002	Plot 1 DS	10.4	1.326	1.320	0.0916	
15 minute summer	Plot 2	8.000	Plot 2 DS	13.1	1.952	0.923	0.0781	
1440 minute summer	Central Swale	1.000	Outfall	1.5	0.875	0.161	0.2415	122.4
60 minute winter	PP3	4.000	Road 3	1.7	0.789	0.219	0.0106	
120 minute summer	PP4	5.000	Road 4	0.7	0.609	0.087	0.0047	
60 minute summer	PP2	3.000	Road 2	3.0	0.906	0.375	0.0131	
60 minute winter	PP1	2.000	Road 1	2.5	1.031	0.312	0.0160	
120 minute summer	PP5	6.000	Plot 1 US	1.0	0.770	0.128	0.0063	

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Results for 100 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 99.78%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	Road 1	53	7.916	0.029	2.6	0.0326	0.0000	OK
60 minute winter	Road 2	50	6.458	0.036	5.8	0.0404	0.0000	OK
15 minute summer	Plot 3	12	5.908	0.583	20.5	0.9745	0.0000	FLOOD RISK
60 minute winter	Road 3	51	5.609	0.044	7.6	0.0503	0.0000	OK
960 minute summer	Road 4	960	5.381	0.200	6.8	0.2258	0.0000	OK
120 minute summer	Plot 1 US	94	5.590	0.020	1.0	0.0223	0.0000	OK
960 minute summer	Plot 3 DS	960	5.379	0.929	3.6	0.0000	0.0000	OK
15 minute summer	Plot 1	12	5.409	0.510	15.0	0.7099	0.0000	SURCHARGED
960 minute summer	Plot 1 DS	960	5.379	0.929	3.6	0.0000	0.0000	OK
960 minute summer	Road 5	960	5.380	0.930	6.8	0.0000	0.0000	OK
15 minute summer	Plot 2	11	5.668	0.337	17.4	0.4960	0.0000	SURCHARGED
960 minute summer	Plot 2 DS	960	5.379	0.929	3.6	0.0000	0.0000	OK
960 minute summer	Central Swale	960	5.378	1.058	8.8	279.9483	0.0000	FLOOD RISK
960 minute summer	Outfall	960	1.028	0.028	1.5	0.0000	0.0000	OK
60 minute winter	PP3	58	6.756	1.009	11.5	11.1264	0.0000	FLOOD RISK
120 minute summer	PP4	96	6.114	0.763	5.3	6.1322	0.0000	SURCHARGED
60 minute summer	PP2	47	7.524	0.934	18.8	11.0883	0.0000	SURCHARGED
60 minute winter	PP1	53	8.993	0.993	14.3	13.0959	0.0000	SURCHARGED
120 minute summer	PP5	94	7.241	1.591	7.2	7.6987	0.0000	SURCHARGED

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	Road 1	2.001	Road 2	2.6	1.427	0.175	0.0415	
60 minute winter	Road 2	2.002	Road 3	5.8	1.298	0.069	0.0808	
15 minute summer	Plot 3	7.000	Plot 3 DS	17.2	2.193	1.233	0.0937	
60 minute winter	Road 3	2.003	Road 4	7.6	1.348	0.105	0.0601	
60 minute winter	Road 4	2.004	Road 5	8.3	1.289	0.139	0.3663	
120 minute summer	Plot 1 US	6.001	Plot 1	1.0	0.472	0.085	0.0726	
15 minute summer	Plot 1	6.002	Plot 1 DS	12.8	1.638	1.631	0.0916	
15 minute summer	Plot 2	8.000	Plot 2 DS	15.4	1.964	1.083	0.0911	
960 minute summer	Central Swale	1.000	Outfall	1.5	0.881	0.166	0.2459	97.3
60 minute winter	PP3	4.000	Road 3	1.9	0.805	0.236	0.0112	
120 minute summer	PP4	5.000	Road 4	0.7	0.617	0.091	0.0048	
60 minute summer	PP2	3.000	Road 2	3.1	0.921	0.400	0.0138	
60 minute winter	PP1	2.000	Road 1	2.6	1.051	0.334	0.0168	
120 minute summer	PP5	6.000	Plot 1 US	1.0	0.778	0.133	0.0064	

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Simulation Settings

Rainfall Methodology	FEH-22	Summer CV	1.000	Analysis Speed	Normal	Drain Down Time (mins)	240	Starting Level (m)		2 year (l/s)	1.6	100 year (l/s)	1.6
Rainfall Events	Singular	Winter CV	1.000	Skip Steady State	x	Additional Storage (m³/ha)	20.0	Check Discharge Rate(s)	✓	30 year (l/s)	1.6	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 %)	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	10	0	30	40	10	0	100	45	10	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Region	England, Wales, NI	Positively Drained Area (ha)	0.530	Q 2 year (l/s)	0.7	Q 100 year (l/s)	2.3
Greenfield Method	ReFH2	Include Baseflow	x	Betterment (%)	0	Q 30 year (l/s)	1.8		

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Design Settings

Rainfall Methodology	FEH-22	CV	1.000	Maximum Rainfall (mm/hr)	50.0	Minimum Backdrop Height (m)	0.200	Enforce best practice design rules	✓
Return Period (years)	30	Time of Entry (mins)	5.00	Minimum Velocity (m/s)	1.00	Preferred Cover Depth (m)	1.200		
Additional Flow (%)	0	Maximum Time of Concentration (mins)	30.00	Connection Type	Level Soffits	Include Intermediate Ground	✓		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
Road 1			9.300	1200	519369.210	111135.528	1.413	7.887
Road 2			7.890	1200	519378.146	111156.108	1.468	6.422
Plot 3	0.021	5.00	6.180	1200	519404.949	111175.646	0.855	5.325
Road 3			7.047	1200	519376.462	111174.111	1.482	5.565
Road 4			6.597	1200	519385.154	111180.191	1.416	5.181
Plot 1 US			7.670	1200	519358.613	111189.965	2.100	5.570
Plot 3 DS	0.000		5.450	1200	519414.811	111182.436	1.000	4.450
Plot 1	0.014	5.00	6.125	1200	519365.686	111204.634	1.226	4.899
Plot 1 DS			5.450	1200	519372.429	111214.356	1.000	4.450
Road 5			5.450	1200	519398.253	111194.713	1.000	4.450
Plot 2	0.018	5.00	6.480	1200	519381.454	111192.546	1.149	5.331
Plot 2 DS	0.010		5.450	1200	519388.094	111202.106	1.000	4.450
Central Swale	0.050	5.00	5.450	1200	519423.500	111185.042	1.130	4.320
Outfall			2.300	1200	519476.541	111217.478	1.300	1.000
PP3	0.023	5.00	7.047		519375.966	111169.271	1.300	5.747
PP4	0.012	5.00	6.597		519380.998	111180.334	1.246	5.351
PP2	0.027	5.00	7.890		519374.526	111154.346	1.300	6.590
PP1	0.029	5.00	9.300		519364.685	111130.624	1.300	8.000
PP5	0.016	5.00	7.670		519360.455	111185.589	2.020	5.650

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)
2.001	Road 1	Road 2	22.436	0.600	7.887	6.522	1.365	16.4	100	5.31	50.0
2.002	Road 2	Road 3	18.082	0.600	6.422	5.565	0.857	21.1	200	5.42	50.0
7.000	Plot 3	Plot 3 DS	11.973	0.600	5.325	4.700	0.625	19.2	100	5.11	50.0
2.003	Road 3	Road 4	10.607	0.600	5.565	5.181	0.384	27.6	200	5.50	50.0
2.004	Road 4	Road 5	19.557	0.600	5.181	4.700	0.481	40.7	200	5.67	50.0
6.001	Plot 1 US	Plot 1	16.285	0.600	5.570	4.899	0.671	24.3	100	5.25	50.0
6.002	Plot 1	Plot 1 DS	11.832	0.600	4.899	4.700	0.199	59.5	100	5.45	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)
2.001	1.914	15.0	5.2	1.313	1.268	0.029	0.0	41	1.750
2.002	2.652	83.3	10.2	1.268	1.282	0.056	0.0	47	1.816
7.000	1.772	13.9	3.8	0.755	0.650	0.021	0.0	36	1.507
2.003	2.316	72.8	14.4	1.282	1.216	0.080	0.0	60	1.807
2.004	1.907	59.9	16.5	1.216	0.550	0.092	0.0	71	1.633
6.001	1.573	12.4	2.9	2.000	1.126	0.016	0.0	33	1.290
6.002	1.001	7.9	5.5	1.126	0.650	0.031	0.0	62	1.085

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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)
8.000	Plot 2	Plot 2 DS	11.640	0.600	5.331	4.700	0.631	18.4	100	5.11	50.0
1.000	Central Swale	Outfall	140.000	0.600	4.320	1.000	3.320	42.2	100	6.96	50.0
4.000	PP3	Road 3	4.865	0.600	5.747	5.665	0.082	59.3	100	5.08	50.0
5.000	PP4	Road 4	4.158	0.600	5.351	5.281	0.070	59.4	100	5.07	50.0
3.000	PP2	Road 2	4.026	0.600	6.590	6.522	0.068	59.2	100	5.07	50.0
2.000	PP1	Road 1	6.673	0.600	8.000	7.887	0.113	59.1	100	5.11	50.0
6.000	PP5	Plot 1 US	4.748	0.600	5.650	5.570	0.080	59.3	100	5.08	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)
8.000	1.806	14.2	3.2	1.049	0.650	0.018	0.0	32	1.463
1.000	1.190	9.3	9.0	1.030	1.200	0.050	0.0	79	1.354
4.000	1.002	7.9	4.2	1.200	1.282	0.023	0.0	52	1.018
5.000	1.001	7.9	2.2	1.146	1.216	0.012	0.0	36	0.850
3.000	1.003	7.9	5.0	1.200	1.268	0.027	0.0	57	1.059
2.000	1.004	7.9	5.2	1.200	1.313	0.029	0.0	60	1.075
6.000	1.001	7.9	2.9	1.920	2.000	0.016	0.0	43	0.931

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)
2.001	22.436	16.4	100	Circular	9.300	7.887	1.313	7.890	6.522	1.268
2.002	18.082	21.1	200	Circular	7.890	6.422	1.268	7.047	5.565	1.282
7.000	11.973	19.2	100	Circular	6.180	5.325	0.755	5.450	4.700	0.650
2.003	10.607	27.6	200	Circular	7.047	5.565	1.282	6.597	5.181	1.216
2.004	19.557	40.7	200	Circular	6.597	5.181	1.216	5.450	4.700	0.550
6.001	16.285	24.3	100	Circular	7.670	5.570	2.000	6.125	4.899	1.126
6.002	11.832	59.5	100	Circular	6.125	4.899	1.126	5.450	4.700	0.650
8.000	11.640	18.4	100	Circular	6.480	5.331	1.049	5.450	4.700	0.650
1.000	140.000	42.2	100	Circular	5.450	4.320	1.030	2.300	1.000	1.200
4.000	4.865	59.3	100	Circular	7.047	5.747	1.200	7.047	5.665	1.282
5.000	4.158	59.4	100	Circular	6.597	5.351	1.146	6.597	5.281	1.216

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
2.001	Road 1	1200	Manhole	Adoptable	Road 2	1200	Manhole	Adoptable
2.002	Road 2	1200	Manhole	Adoptable	Road 3	1200	Manhole	Adoptable
7.000	Plot 3	1200	Manhole	Adoptable	Plot 3 DS	1200	Manhole	Adoptable
2.003	Road 3	1200	Manhole	Adoptable	Road 4	1200	Manhole	Adoptable
2.004	Road 4	1200	Manhole	Adoptable	Road 5	1200	Manhole	Adoptable
6.001	Plot 1 US	1200	Manhole	Adoptable	Plot 1	1200	Manhole	Adoptable
6.002	Plot 1	1200	Manhole	Adoptable	Plot 1 DS	1200	Manhole	Adoptable
8.000	Plot 2	1200	Manhole	Adoptable	Plot 2 DS	1200	Manhole	Adoptable
1.000	Central Swale	1200	Manhole	Adoptable	Outfall	1200	Manhole	Adoptable
4.000	PP3		Junction		Road 3	1200	Manhole	Adoptable
5.000	PP4		Junction		Road 4	1200	Manhole	Adoptable

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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)
3.000	4.026	59.2	100	Circular	7.890	6.590	1.200	7.890	6.522	1.268
2.000	6.673	59.1	100	Circular	9.300	8.000	1.200	9.300	7.887	1.313
6.000	4.748	59.3	100	Circular	7.670	5.650	1.920	7.670	5.570	2.000

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
3.000	PP2		Junction		Road 2	1200	Manhole	Adoptable
2.000	PP1		Junction		Road 1	1200	Manhole	Adoptable
6.000	PP5		Junction		Plot 1 US	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
Road 1	519369.210	111135.528	9.300	1.413	1200	1	2.000	7.887	100
						0	2.001	7.887	100
Road 2	519378.146	111156.108	7.890	1.468	1200	1	3.000	6.522	100
						2	2.001	6.522	100
						0	2.002	6.422	200
Plot 3	519404.949	111175.646	6.180	0.855	1200	0	7.000	5.325	100
Road 3	519376.462	111174.111	7.047	1.482	1200	1	4.000	5.665	100
						2	2.002	5.565	200
						0	2.003	5.565	200
Road 4	519385.154	111180.191	6.597	1.416	1200	1	5.000	5.281	100
						2	2.003	5.181	200
						0	2.004	5.181	200
Plot 1 US	519358.613	111189.965	7.670	2.100	1200	1	6.000	5.570	100
						0	6.001	5.570	100
Plot 3 DS	519414.811	111182.436	5.450	1.000	1200	1	7.000	4.700	100
Plot 1	519365.686	111204.634	6.125	1.226	1200	1	6.001	4.899	100
						0	6.002	4.899	100
Plot 1 DS	519372.429	111214.356	5.450	1.000	1200	1	6.002	4.700	100
Road 5	519398.253	111194.713	5.450	1.000	1200	1	2.004	4.700	200

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
Plot 2	519381.454	111192.546	6.480	1.149	1200	0	8.000	5.331	100
Plot 2 DS	519388.094	111202.106	5.450	1.000	1200	1	8.000	4.700	100
Central Swale	519423.500	111185.042	5.450	1.130	1200	0	1.000	4.320	100
Outfall	519476.541	111217.478	2.300	1.300	1200	1	1.000	1.000	100
PP3	519375.966	111169.271	7.047	1.300		0	4.000	5.747	100
PP4	519380.998	111180.334	6.597	1.246		0	5.000	5.351	100
PP2	519374.526	111154.346	7.890	1.300		0	3.000	6.590	100
PP1	519364.685	111130.624	9.300	1.300		0	2.000	8.000	100
PP5	519360.455	111185.589	7.670	2.020		0	6.000	5.650	100

Node Central Swale ReFH2 Dynamic Hydrograph

Overrides Design Area	x	Depression Storage Area (m²)	0	Evapo-transpiration (mm/day)	0	Region	England, Wales, NI
Overrides Design Additional Inflow	x	Depression Storage Depth (mm)	0	Area (ha)	0.288	Include Baseflow	x

Applies to All storms

Node Outfall Surcharged Outfall

Overrides Design Area	x	Overrides Design Additional Inflow	x	Depression Storage Area (m²)	0	Depression Storage Depth (mm)	0	Evapo-transpiration (mm/day)	0

Applies to All storms

Time (mins)	Level (m)	Time (mins)	Level (m)
0	4.760	1440	4.760

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Node Central Swale Online Hydro-Brake® Control

Flap Valve	x	Design Depth (m)	1.000	Sump Available	✓	Min Node Diameter (mm)	1200
Replaces Downstream Link	x	Design Flow (l/s)	1.6	Product Number	CTL-SCL-0057-1600-1000-1600		
Invert Level (m)	4.450	Objective	(CL) Minimise blockage risk	Min Outlet Diameter (m)	0.075		

Node PP3 Online Orifice Control

Flap Valve	x	Replaces Downstream Link	x	Invert Level (m)	5.747	Diameter (m)	0.030	Discharge Coefficient	0.600

Node PP4 Online Orifice Control

Flap Valve	x	Replaces Downstream Link	x	Invert Level (m)	5.350	Diameter (m)	0.020	Discharge Coefficient	0.600

Node PP2 Online Orifice Control

Flap Valve	x	Replaces Downstream Link	x	Invert Level (m)	6.590	Diameter (m)	0.040	Discharge Coefficient	0.600

Node PP1 Online Orifice Control

Flap Valve	x	Replaces Downstream Link	x	Invert Level (m)	8.000	Diameter (m)	0.036	Discharge Coefficient	0.600

Node PP5 Online Orifice Control

Flap Valve	x	Replaces Downstream Link	x	Invert Level (m)	5.650	Diameter (m)	0.020	Discharge Coefficient	0.600

Node Central Swale Pond Storage Structure

Invert Level (m)	4.450	Time to half empty (mins)		Analyse flow through structure	x

Inlets

Plot 1 DS		Plot 2 DS		Road 5		Plot 3 DS	
Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	115.5	1.000	500.5				

Node PP3 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	6.297	Width (m)	5.000	Slope (1:X)	150.0	Inf Depth (m)	
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.35	Time to half empty (mins)	56	Length (m)	15.000	Depth (m)	0.500		

Node PP4 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	5.847	Width (m)	5.000	Slope (1:X)	150.0	Inf Depth (m)	
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.35	Time to half empty (mins)	32	Length (m)	16.000	Depth (m)	0.500		

Node PP2 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	7.140	Width (m)	5.000	Slope (1:X)	150.0	Inf Depth (m)	
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.35	Time to half empty (mins)	35	Length (m)	19.000	Depth (m)	0.500		

Node PP1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	8.550	Width (m)	5.000	Slope (1:X)	150.0	Inf Depth (m)	
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.35	Time to half empty (mins)	50	Length (m)	19.000	Depth (m)	0.500		

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Node PP5 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	6.920	Width (m)	14.000	Slope (1:X)	150.0
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.35	Time to half empty (mins)	58	Length (m)	5.000	Depth (m)	0.500

Inf Depth (m)

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year +10% A 15 minute summer	116.513	32.969	2 year +10% A 720 minute summer	11.186	2.998	30 year +40% CC +10% A 360 minute summer	54.124	13.928	100 year +45% CC +10% A 120 minute summer	152.602	40.328
2 year +10% A 15 minute winter	81.763	32.969	2 year +10% A 720 minute winter	7.518	2.998	30 year +40% CC +10% A 360 minute winter	35.182	13.928	100 year +45% CC +10% A 120 minute winter	101.385	40.328
2 year +10% A 30 minute summer	75.926	21.485	2 year +10% A 960 minute summer	9.164	2.413	30 year +40% CC +10% A 480 minute summer	42.114	11.129	100 year +45% CC +10% A 180 minute summer	116.683	30.026
2 year +10% A 30 minute winter	53.282	21.485	2 year +10% A 960 minute winter	6.070	2.413	30 year +40% CC +10% A 480 minute winter	27.980	11.129	100 year +45% CC +10% A 180 minute winter	75.847	30.026
2 year +10% A 60 minute summer	51.244	13.542	2 year +10% A 1440 minute summer	6.617	1.773	30 year +40% CC +10% A 600 minute summer	34.093	9.325	100 year +45% CC +10% A 240 minute summer	91.831	24.268
2 year +10% A 60 minute winter	34.045	13.542	2 year +10% A 1440 minute winter	4.447	1.773	30 year +40% CC +10% A 600 minute winter	23.295	9.325	100 year +45% CC +10% A 240 minute winter	61.011	24.268
2 year +10% A 120 minute summer	37.088	9.801	30 year +40% CC +10% A 15 minute summer	417.828	118.231	30 year +40% CC +10% A 720 minute summer	30.066	8.058	100 year +45% CC +10% A 360 minute summer	69.451	17.872
2 year +10% A 120 minute winter	24.640	9.801	30 year +40% CC +10% A 15 minute winter	293.213	118.231	30 year +40% CC +10% A 720 minute winter	20.206	8.058	100 year +45% CC +10% A 360 minute winter	45.145	17.872
2 year +10% A 180 minute summer	30.266	7.789	30 year +40% CC +10% A 30 minute summer	277.491	78.520	30 year +40% CC +10% A 960 minute summer	24.250	6.386	100 year +45% CC +10% A 480 minute summer	54.198	14.323
2 year +10% A 180 minute winter	19.674	7.789	30 year +40% CC +10% A 30 minute winter	194.730	78.520	30 year +40% CC +10% A 960 minute winter	16.064	6.386	100 year +45% CC +10% A 480 minute winter	36.008	14.323
2 year +10% A 240 minute summer	24.661	6.517	30 year +40% CC +10% A 60 minute summer	188.819	49.899	30 year +40% CC +10% A 1440 minute summer	17.130	4.591	100 year +45% CC +10% A 600 minute summer	43.998	12.034
2 year +10% A 240 minute winter	16.384	6.517	30 year +40% CC +10% A 60 minute winter	125.447	49.899	30 year +40% CC +10% A 1440 minute winter	11.512	4.591	100 year +45% CC +10% A 600 minute winter	30.062	12.034
2 year +10% A 360 minute summer	19.306	4.968	30 year +40% CC +10% A 120 minute summer	117.951	31.171	100 year +45% CC +10% A 15 minute summer	543.591	153.817	100 year +45% CC +10% A 720 minute summer	38.893	10.424
2 year +10% A 360 minute winter	12.550	4.968	30 year +40% CC +10% A 120 minute winter	78.364	31.171	100 year +45% CC +10% A 15 minute winter	381.467	153.817	100 year +45% CC +10% A 720 minute winter	26.138	10.424
2 year +10% A 480 minute summer	15.311	4.046	30 year +40% CC +10% A 180 minute summer	90.774	23.359	100 year +45% CC +10% A 30 minute summer	365.058	103.299	100 year +45% CC +10% A 960 minute summer	31.471	8.287
2 year +10% A 480 minute winter	10.172	4.046	30 year +40% CC +10% A 180 minute winter	59.006	23.359	100 year +45% CC +10% A 30 minute winter	256.181	103.299	100 year +45% CC +10% A 960 minute winter	20.847	8.287
2 year +10% A 600 minute summer	12.558	3.435	30 year +40% CC +10% A 240 minute summer	71.595	18.920	100 year +45% CC +10% A 60 minute summer	249.444	65.921	100 year +45% CC +10% A 1440 minute summer	22.272	5.969
2 year +10% A 600 minute winter	8.581	3.435	30 year +40% CC +10% A 240 minute winter	47.566	18.920	100 year +45% CC +10% A 60 minute winter	165.724	65.921	100 year +45% CC +10% A 1440 minute winter	14.968	5.969

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Results for 2 year +10% A Critical Storm Duration. Lowest mass balance: 99.05%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	Road 1	23	7.912	0.025	2.1	0.0288	0.0000	OK
15 minute summer	Road 2	14	6.454	0.032	4.6	0.0361	0.0000	OK
15 minute summer	Plot 3	10	5.365	0.040	4.4	0.0665	0.0000	OK
15 minute summer	Road 3	14	5.604	0.039	6.0	0.0443	0.0000	OK
30 minute summer	Road 4	23	5.227	0.046	6.6	0.0520	0.0000	OK
120 minute summer	Plot 1 US	74	5.588	0.018	0.9	0.0205	0.0000	OK
1440 minute winter	Plot 3 DS	1110	4.860	0.410	0.6	0.0000	0.0000	OK
15 minute summer	Plot 1	11	4.948	0.049	3.6	0.0682	0.0000	OK
1440 minute winter	Plot 1 DS	1080	4.860	0.410	0.6	0.0000	0.0000	OK
1440 minute winter	Road 5	1110	4.861	0.411	1.3	0.0000	0.0000	OK
15 minute summer	Plot 2	10	5.367	0.036	3.7	0.0526	0.0000	OK
1440 minute winter	Plot 2 DS	1110	4.860	0.410	0.6	0.0000	0.0000	OK
1440 minute winter	Central Swale	1110	4.859	0.539	1.6	82.8307	0.0000	SURCHARGED
15 minute summer	Outfall	1	4.760	3.760	0.0	0.0000	0.0000	OK
30 minute summer	PP3	23	6.369	0.622	4.3	0.9332	0.0000	SURCHARGED
30 minute summer	PP4	24	5.892	0.541	2.2	0.3819	0.0000	SURCHARGED
15 minute summer	PP2	13	7.202	0.612	5.8	0.7951	0.0000	SURCHARGED
30 minute summer	PP1	22	8.627	0.627	5.4	1.0946	0.0000	SURCHARGED
120 minute summer	PP5	74	6.779	1.129	1.8	0.1986	0.0000	SURCHARGED

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	Road 1	2.001	Road 2	2.1	1.334	0.138	0.0350	
15 minute summer	Road 2	2.002	Road 3	4.6	1.227	0.055	0.0680	
15 minute summer	Plot 3	7.000	Plot 3 DS	4.3	1.531	0.312	0.0340	
15 minute summer	Road 3	2.003	Road 4	6.0	1.243	0.083	0.0517	
30 minute summer	Road 4	2.004	Road 5	6.6	1.245	0.111	0.1044	
120 minute summer	Plot 1 US	6.001	Plot 1	0.9	0.642	0.071	0.0295	
15 minute summer	Plot 1	6.002	Plot 1 DS	3.5	0.954	0.452	0.0440	
15 minute summer	Plot 2	8.000	Plot 2 DS	3.6	1.482	0.257	0.0287	
1440 minute winter	Central Swale	1.000	Outfall	0.9	0.121	0.102	1.0954	40.5
30 minute summer	PP3	4.000	Road 3	1.4	0.752	0.184	0.0094	
30 minute summer	PP4	5.000	Road 4	0.6	0.586	0.077	0.0043	
15 minute summer	PP2	3.000	Road 2	2.5	0.871	0.321	0.0117	
30 minute summer	PP1	2.000	Road 1	2.1	0.986	0.264	0.0142	
120 minute summer	PP5	6.000	Plot 1 US	0.9	0.739	0.112	0.0057	

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Results for 30 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.48%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	Road 1	47	7.915	0.028	2.5	0.0314	0.0000	OK
60 minute summer	Road 2	46	6.457	0.035	5.4	0.0391	0.0000	OK
15 minute summer	Plot 3	11	5.551	0.226	15.8	0.3780	0.0000	SURCHARGED
60 minute summer	Road 3	46	5.608	0.043	7.1	0.0485	0.0000	OK
960 minute summer	Road 4	960	5.256	0.075	6.0	0.0843	0.0000	OK
120 minute summer	Plot 1 US	88	5.589	0.019	1.0	0.0219	0.0000	OK
1440 minute summer	Plot 3 DS	1320	5.254	0.804	2.1	0.0000	0.0000	OK
960 minute summer	Plot 1	960	5.254	0.355	2.0	0.4944	0.0000	SURCHARGED
960 minute summer	Plot 1 DS	960	5.254	0.804	2.9	0.0000	0.0000	OK
960 minute summer	Road 5	960	5.255	0.805	6.0	0.0000	0.0000	OK
15 minute summer	Plot 2	10	5.415	0.084	13.3	0.1238	0.0000	OK
960 minute summer	Plot 2 DS	960	5.254	0.804	2.9	0.0000	0.0000	OK
960 minute summer	Central Swale	960	5.253	0.933	7.5	223.1678	0.0000	FLOOD RISK
15 minute summer	Outfall	1	4.760	3.760	0.6	0.0000	0.0000	OK
60 minute winter	PP3	51	6.621	0.874	8.7	7.5437	0.0000	SURCHARGED
120 minute summer	PP4	90	6.046	0.695	4.1	4.2139	0.0000	SURCHARGED
60 minute summer	PP2	44	7.414	0.824	14.2	7.3990	0.0000	SURCHARGED
60 minute winter	PP1	49	8.866	0.866	10.8	8.8249	0.0000	SURCHARGED
120 minute summer	PP5	88	7.135	1.485	5.6	5.0949	0.0000	SURCHARGED

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	Road 1	2.001	Road 2	2.5	1.399	0.163	0.0394	
60 minute summer	Road 2	2.002	Road 3	5.4	1.275	0.065	0.0769	
15 minute summer	Plot 3	7.000	Plot 3 DS	14.0	1.876	1.005	0.0937	
60 minute summer	Road 3	2.003	Road 4	7.1	1.322	0.098	0.0572	
30 minute winter	Road 4	2.004	Road 5	7.8	1.299	0.130	0.3312	
120 minute summer	Plot 1 US	6.001	Plot 1	1.0	0.637	0.082	0.0723	
15 minute summer	Plot 1	6.002	Plot 1 DS	10.4	1.326	1.320	0.0916	
15 minute summer	Plot 2	8.000	Plot 2 DS	13.1	1.952	0.923	0.0781	
180 minute summer	Central Swale	1.000	Outfall	1.5	0.193	0.161	1.0954	28.6
60 minute winter	PP3	4.000	Road 3	1.7	0.789	0.219	0.0106	
120 minute summer	PP4	5.000	Road 4	0.7	0.609	0.087	0.0047	
60 minute summer	PP2	3.000	Road 2	3.0	0.906	0.375	0.0131	
60 minute winter	PP1	2.000	Road 1	2.5	1.031	0.312	0.0160	
120 minute summer	PP5	6.000	Plot 1 US	1.0	0.770	0.128	0.0063	

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Results for 100 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 99.51%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	Road 1	53	7.916	0.029	2.6	0.0326	0.0000	OK
60 minute winter	Road 2	50	6.458	0.036	5.8	0.0404	0.0000	OK
15 minute summer	Plot 3	12	5.908	0.583	20.5	0.9745	0.0000	FLOOD RISK
60 minute winter	Road 3	51	5.609	0.044	7.6	0.0503	0.0000	OK
1440 minute summer	Road 4	1320	5.450	0.269	5.9	0.3043	0.0000	SURCHARGED
120 minute summer	Plot 1 US	94	5.590	0.020	1.0	0.0223	0.0000	OK
1440 minute summer	Plot 3 DS	1410	5.450	1.000	2.8	0.0000	0.0000	OK
1440 minute summer	Plot 1	1410	5.450	0.551	1.9	0.7666	0.0000	SURCHARGED
1440 minute summer	Plot 1 DS	1410	5.450	1.000	2.8	0.0000	0.0000	OK
1440 minute summer	Road 5	1320	5.450	1.000	5.9	0.0000	3.4892	FLOOD
15 minute summer	Plot 2	11	5.668	0.337	17.4	0.4960	0.0000	SURCHARGED
1440 minute summer	Plot 2 DS	1410	5.450	1.000	2.8	0.0000	0.0000	OK
1440 minute summer	Central Swale	1410	5.448	1.128	7.6	314.9308	0.0000	FLOOD RISK
15 minute summer	Outfall	1	4.760	3.760	1.1	0.0000	0.0000	OK
60 minute winter	PP3	58	6.756	1.009	11.5	11.1264	0.0000	FLOOD RISK
120 minute summer	PP4	96	6.114	0.763	5.3	6.1322	0.0000	SURCHARGED
60 minute summer	PP2	47	7.524	0.934	18.8	11.0883	0.0000	SURCHARGED
60 minute winter	PP1	53	8.993	0.993	14.3	13.0959	0.0000	SURCHARGED
120 minute summer	PP5	94	7.241	1.591	7.2	7.6987	0.0000	SURCHARGED

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	Road 1	2.001	Road 2	2.6	1.427	0.175	0.0415	
60 minute winter	Road 2	2.002	Road 3	5.8	1.298	0.069	0.0808	
15 minute summer	Plot 3	7.000	Plot 3 DS	17.2	2.193	1.233	0.0937	
60 minute winter	Road 3	2.003	Road 4	7.6	1.348	0.105	0.0601	
60 minute winter	Road 4	2.004	Road 5	8.3	1.289	0.139	0.3663	
120 minute summer	Plot 1 US	6.001	Plot 1	1.0	0.472	0.085	0.0726	
15 minute summer	Plot 1	6.002	Plot 1 DS	12.8	1.638	1.631	0.0916	
15 minute summer	Plot 2	8.000	Plot 2 DS	15.4	1.964	1.083	0.0911	
120 minute summer	Central Swale	1.000	Outfall	1.5	0.193	0.161	1.0954	26.0
60 minute winter	PP3	4.000	Road 3	1.9	0.805	0.236	0.0112	
480 minute summer	PP4	5.000	Road 4	1.4	0.610	0.180	0.0206	
60 minute summer	PP2	3.000	Road 2	3.1	0.921	0.400	0.0138	
60 minute winter	PP1	2.000	Road 1	2.6	1.051	0.334	0.0168	
120 minute summer	PP5	6.000	Plot 1 US	1.0	0.778	0.133	0.0064	

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