

Legend

- Site Extents
- Existing Surface Water System
- Existing Foul Water System
- Proposed Adoptable Surface Water System
- Proposed Adoptable Foul Water System

Drainage Strategy - Surface water

Sodakway testing conducted in accordance with BRE365 confirm infiltration is not viable. Surface water from the development site will discharge into the existing surface water drain **MH Ref: 6123** located to the east of the boundary of the site at a greenfield runoff of 4.0 l/s.

We are proposing permeable paving on all driveways, as well as water butts for each property. Additionally, tree pits are proposed to be used along the highway verges, subject to approval with the relevant adopting bodies.

The surface water pipe network has been designed to cater for all storm events up to and including the 1:100yr+45% Climate Change event.

Proposed Cellular Storage (Cells 1)

Length x Width x Depth
5m (5 cells) x 16m (32 cells) x 1.2m (3 cells)
Cell Unit Size = 1.0m x 0.5m x 0.4m
Ventilated System

Maximum storage volume = 91.2m³

MH S4
CL: 51.490 mAO
HL Overflow: 50.450 mAO (2250)
IL: 49.175 mAO (4500)

Catchpit (CP1)
CL: 51.741 mAO
IL: 49.226 mAO (2250)
Base Level: 48.926 mAO (300mm sump)

Cells 1
CL: 51.756 mAO
Incoming IL: 49.243 mAO
Cells IL: 49.243 mAO

Proposed Cellular Storage (Cells 2)

Length x Width x Depth
36m (36 cells) x 16m (36 cells) x 1.2m (3 cells)
Cell Unit Size = 1.0m x 0.5m x 0.4m
Ventilated System

Maximum storage volume = 738.7m³

MH S6
CL: 51.465 mAO
HL Overflow: 50.400 mAO (2250)
IL: 49.316 mAO (6000)

Catchpit (CP2)
CL: 51.412 mAO
IL: 49.363 mAO (2250)
Base Level: 49.063 mAO (300mm sump)

Cells 2
CL: 51.455 mAO
Incoming IL: 49.392 mAO
Cells IL: 49.392 mAO

Flow Control Chamber Manhole S1H8

Hydro International Hydrabrick Optimum
SHE-0086-4000-1.600-4000
Design head = 1.600 m
Restricted discharge max. = 4.0 l/sec
Flow control orifice size 150mm
Cover level: 50.627 mAO
Invert level: 48.378 mAO

Proposed Surface Water Connection MH6123 (Existing)

A connection is proposed into the existing surface water sewer within Semington Turnpike. Existing rights to connect with title.

Cover level: 50.000 mAO
Invert level: 48.701 mAO
Both cover levels and invert levels given by Wessex Water
Proposed Connection Invert Level: 48.701 mAO

Existing Ground Contours

2m Maintenance Strip

Permanent Body of Water

Base Extents

Top of Bank

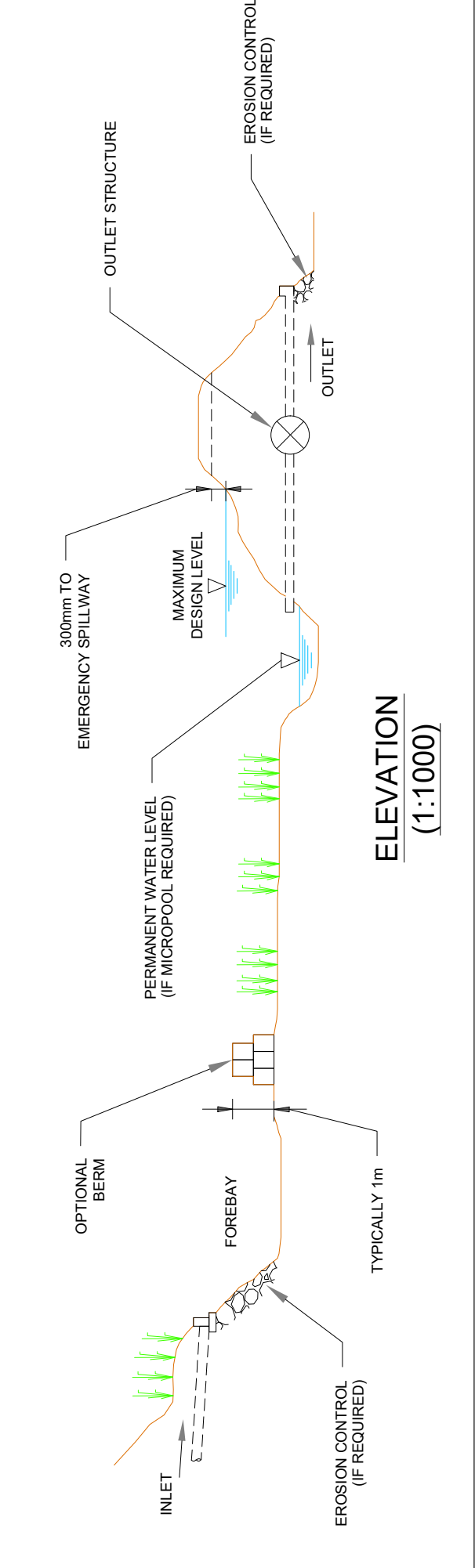
Forebay

Dry-Weather Flow Channel

Proposed Retention Basin

Sized to contain the 1:100 year storm + 45% climate change stormwater storage

Base Level: 49.414 mAO
Top of Bank Level: 50.714 mAO
Top Water Level (1 in 100 yr+cc): 50.612 mAO
Freeboard: 302 mm
Maximum storage volume: 942 m³



Preliminary Surface Water
Drainage Layout

Turnpike Close
Semington

WM RN
07.06.24 Preliminary Issue for review
07.06.24
WM RN

BETTS ASSOCIATES
CONSULTING ENGINEERS
BETTS GEO
CONSULTING ENGINEERS

HSL HOLLINS STRATEGIC LAND

Project title:

Drawing title:

Scale: 1:500
for the original size of A1
Down by: WM
Checked by: RN
Passed by: RN
Date: July 2026
Drawing status:

Preliminary

Job No: HYD1097
Project: XX
Disc: ZZ
Type: DR
Number: C 0001
Revision: P01

Do not scale this drawing
6-7 Old Warm Farm Barn, Warm Road, Second Floor, Chis 21Y
enquiries@hollins.co.uk

Client: HSL

PRELIMINARY SURFACE WATER DRAINAGE NETWORK DETAILS

Site at Turnpike Close, Semington

For

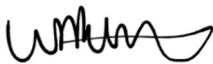
Hollins Strategic Land

Rev. 1.0

7th August 2026

**Surface Water Drainage Network Details
Turnpike Close, Semington**

7th August 2026

Issue no.	Rev. 1.0	
Date:	7 th August 2026	
Prepared By:	Will Murphy 	
Checked By:	Richard Nicholas 	
Authorised By:	Richard Nicholas 	

Betts Associates Ltd
Old Marsh Farm Barns
Welsh Road
Sealand
Tel no. 01244 288178
Flintshire
CH5 2LY

Project no. SEA388

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Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	x	1 year (l/s)	4.0
Rainfall Events	Singular	Drain Down Time (mins)	1440	2 year (l/s)	4.0
Summer CV	1.000	Additional Storage (m³/ha)	0.0	30 year (l/s)	4.0
Winter CV	1.000	Starting Level (m)		100 year (l/s)	4.0
Analysis Speed	Detailed	Check Discharge Rate(s)	✓	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 %)
1	0	0	0
2	0	0	0
30	0	0	0
100	0	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		

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	1	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	1.000
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)
S18	0.099	5.00	52.111	1500	389506.261	160141.102	1.874	50.237
S17	0.124	5.00	52.114	1500	389477.173	160139.542	1.950	50.164
S16	0.062	5.00	52.060	1500	389440.763	160138.659	1.987	50.073
S15	0.094	5.00	51.987	1800	389421.994	160137.686	1.961	50.026
S14	0.113	5.00	52.006	1500	389396.614	160126.696	2.049	49.957
S13	0.068	5.00	52.119	2100	389367.056	160111.750	2.245	49.874
S12	0.073	5.00	51.483	1350	389376.239	160093.481	1.660	49.823
S11	0.071	5.00	51.429	1350	389386.088	160073.888	1.661	49.768
S10	0.069		50.914	1350	389397.462	160057.314	1.363	49.552
CP1			51.741	1350	389531.754	160151.325	2.515	49.226
S8	0.018	5.00	50.914	1350	389448.937	160053.272	1.500	49.414
S7	0.123	5.00	51.415	1800	389456.652	160056.674	2.034	49.381
S6	0.218	5.00	51.465	2100	389479.639	160068.338	2.149	49.316
S5	0.086	5.00	50.908	1800	389539.992	160086.186	1.749	49.159
S4	0.108	5.00	51.490	1500	389533.470	160142.886	2.315	49.175
S3	0.124	5.00	51.054	2100	389539.729	160111.725	1.959	49.095
S2	0.034	5.00	50.858	1800	389575.604	160116.913	1.853	49.005
S1HB			50.627	2100	389585.940	160114.459	1.649	48.978
S19			50.500	1350	389602.262	160124.155	1.636	48.864
MH6123			50.000	1350	389628.395	160116.356	1.299	48.701
Cells 1		5.00	51.756		389531.397	160154.089	2.513	49.243
Cells 2		5.00	51.455		389476.265	160078.704	2.063	49.392
CP2			51.412	1350	389478.058	160074.313	2.049	49.363

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	S18	S17	29.129	0.600	50.237	50.164	0.073	399.0	450	5.48	30.0
1.001	S17	S16	36.421	0.600	50.164	50.073	0.091	400.2	450	6.08	28.5
1.002	S16	S15	18.794	0.600	50.073	50.026	0.047	399.9	450	6.39	27.9
1.003	S15	S14	27.692	0.600	50.026	49.957	0.069	401.3	450	6.85	26.9
1.004	S14	S13	33.082	0.600	49.957	49.874	0.083	398.6	450	7.39	26.0
1.005	S13	S12	20.447	0.600	49.874	49.823	0.051	400.9	450	7.73	25.4
3.000	Cells 1	CP1	2.787	0.600	49.243	49.226	0.017	163.9	225	5.05	31.1
1.007	S11	S10	21.607	0.600	49.768	49.714	0.054	400.1	600	8.13	24.7
3.001	CP1	S4	8.612	0.600	50.398	50.450	-0.052	-165.6	225	20.45	14.5
2.000	Cells 2	CP2	4.743	0.600	49.392	49.363	0.029	163.6	225	5.08	31.0
1.010	S8	S7	13.058	0.600	49.414	49.381	0.033	395.7	600	5.18	30.7

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	1.011	160.8	10.7	1.424	1.500	0.099	0.0
1.001	1.010	160.6	23.0	1.500	1.537	0.223	0.0
1.002	1.010	160.7	28.7	1.537	1.511	0.285	0.0
1.003	1.008	160.4	36.9	1.511	1.599	0.379	0.0
1.004	1.012	160.9	46.1	1.599	1.795	0.492	0.0
1.005	1.009	160.5	51.4	1.795	1.210	0.560	0.0
3.000	1.018	40.5	0.0	2.288	2.290	0.000	0.0
1.007	1.211	342.4	62.9	1.061	0.600	0.704	0.0
3.001	0.009	0.4	0.0	1.118	0.815	0.000	0.0
2.000	1.019	40.5	0.0	1.838	1.824	0.000	0.0
1.010	1.218	344.3	2.0	0.900	1.434	0.018	0.0

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)
1.011	S7	S6	25.777	0.600	49.381	49.316	0.065	396.6	600	5.53	29.9
1.012	S6	S5	62.937	0.600	49.316	49.159	0.157	400.9	600	17.00	16.3
1.013	S5	S3	25.540	0.600	49.159	49.095	0.064	399.1	600	17.35	16.1
3.002	S4	S3	31.784	0.600	49.175	49.095	0.080	397.3	600	20.88	14.3
1.014	S3	S2	36.248	0.600	49.095	49.005	0.090	402.8	600	21.38	14.1
1.015	S2	S1HB	10.766	0.600	49.005	48.978	0.027	398.7	600	21.53	14.1
1.016	S1HB	S19	18.944	0.600	48.978	48.864	0.114	166.2	225	21.84	13.9
2.001	CP2	S6	6.181	0.600	50.363	50.400	-0.037	-167.0	225	16.13	16.9
4.006	S12	S11	21.929	0.600	49.823	49.768	0.055	398.7	600	7.84	25.2
1.017	S19	MH6123	27.272	0.600	48.864	48.701	0.163	167.3	225	22.29	13.8

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.011	1.216	343.9	15.2	1.434	1.549	0.141	0.0
1.012	1.210	342.1	21.2	1.549	1.149	0.359	0.0
1.013	1.213	342.8	25.9	1.149	1.359	0.445	0.0
3.002	1.215	343.6	5.6	1.715	1.359	0.108	0.0
1.014	1.207	341.3	34.6	1.359	1.253	0.677	0.0
1.015	1.213	343.0	36.2	1.253	1.049	0.711	0.0
1.016	1.011	40.2	35.8	1.424	1.411	0.711	0.0
2.001	0.009	0.4	0.0	0.824	0.840	0.000	0.0
4.006	3.483	32260.5	57.6	0.000	0.001	0.633	0.0
1.017	1.008	40.1	35.4	1.411	1.074	0.711	0.0

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	29.129	399.0	450	Circular	52.111	50.237	1.424	52.114	50.164	1.500
1.001	36.421	400.2	450	Circular	52.114	50.164	1.500	52.060	50.073	1.537
1.002	18.794	399.9	450	Circular	52.060	50.073	1.537	51.987	50.026	1.511
1.003	27.692	401.3	450	Circular	51.987	50.026	1.511	52.006	49.957	1.599
1.004	33.082	398.6	450	Circular	52.006	49.957	1.599	52.119	49.874	1.795
1.005	20.447	400.9	450	Circular	52.119	49.874	1.795	51.483	49.823	1.210
3.000	2.787	163.9	225	Circular	51.756	49.243	2.288	51.741	49.226	2.290
1.007	21.607	400.1	600	Circular	51.429	49.768	1.061	50.914	49.714	0.600
3.001	8.612	-165.6	225	Circular	51.741	50.398	1.118	51.490	50.450	0.815
2.000	4.743	163.6	225	Circular	51.455	49.392	1.838	51.412	49.363	1.824
1.010	13.058	395.7	600	Circular	50.914	49.414	0.900	51.415	49.381	1.434
1.011	25.777	396.6	600	Circular	51.415	49.381	1.434	51.465	49.316	1.549
1.012	62.937	400.9	600	Circular	51.465	49.316	1.549	50.908	49.159	1.149
1.013	25.540	399.1	600	Circular	50.908	49.159	1.149	51.054	49.095	1.359
3.002	31.784	397.3	600	Circular	51.490	49.175	1.715	51.054	49.095	1.359
1.014	36.248	402.8	600	Circular	51.054	49.095	1.359	50.858	49.005	1.253

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S18	1500	Manhole	Adoptable	S17	1500	Manhole	Adoptable
1.001	S17	1500	Manhole	Adoptable	S16	1500	Manhole	Adoptable
1.002	S16	1500	Manhole	Adoptable	S15	1800	Manhole	Adoptable
1.003	S15	1800	Manhole	Adoptable	S14	1500	Manhole	Adoptable
1.004	S14	1500	Manhole	Adoptable	S13	2100	Manhole	Adoptable
1.005	S13	2100	Manhole	Adoptable	S12	1350	Junction	
3.000	Cells 1		Junction		CP1	1350	Manhole	Adoptable
1.007	S11	1350	Junction		S10	1350	Junction	
3.001	CP1	1350	Manhole	Adoptable	S4	1500	Manhole	Adoptable
2.000	Cells 2		Junction		CP2	1350	Manhole	Adoptable
1.010	S8	1350	Junction		S7	1800	Manhole	Adoptable
1.011	S7	1800	Manhole	Adoptable	S6	2100	Manhole	Adoptable
1.012	S6	2100	Manhole	Adoptable	S5	1800	Manhole	Adoptable
1.013	S5	1800	Manhole	Adoptable	S3	2100	Manhole	Adoptable
3.002	S4	1500	Manhole	Adoptable	S3	2100	Manhole	Adoptable
1.014	S3	2100	Manhole	Adoptable	S2	1800	Manhole	Adoptable

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)
1.015	10.766	398.7	600	Circular	50.858	49.005	1.253	50.627	48.978	1.049
1.016	18.944	166.2	225	Circular	50.627	48.978	1.424	50.500	48.864	1.411
2.001	6.181	-167.0	225	Circular	51.412	50.363	0.824	51.465	50.400	0.840
4.006	21.929	398.7	600	Swale	51.483	49.823	0.000	51.429	49.768	0.001
1.017	27.272	167.3	225	Circular	50.500	48.864	1.411	50.000	48.701	1.074

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.015	S2	1800	Manhole	Adoptable	S1HB	2100	Manhole	Adoptable
1.016	S1HB	2100	Manhole	Adoptable	S19	1350	Manhole	Adoptable
2.001	CP2	1350	Manhole	Adoptable	S6	2100	Manhole	Adoptable
4.006	S12	1350	Junction		S11	1350	Junction	
1.017	S19	1350	Manhole	Adoptable	MH6123	1350	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S18	389506.261	160141.102	52.111	1.874	1500				
						0	1.000	50.237	450
S17	389477.173	160139.542	52.114	1.950	1500		1	1.000	50.164
						0	1.001	50.164	450
S16	389440.763	160138.659	52.060	1.987	1500		1	1.001	50.073
						0	1.002	50.073	450
S15	389421.994	160137.686	51.987	1.961	1800		1	1.002	50.026
						0	1.003	50.026	450
S14	389396.614	160126.696	52.006	2.049	1500		1	1.003	49.957
						0	1.004	49.957	450
S13	389367.056	160111.750	52.119	2.245	2100		1	1.004	49.874
						0	1.005	49.874	450
S12	389376.239	160093.481	51.483	1.660	1350		1	1.005	49.823
						0	4.006	49.823	600
S11	389386.088	160073.888	51.429	1.661	1350		1	4.006	49.768
						0	1.007	49.768	600
S10	389397.462	160057.314	50.914	1.363	1350		1	1.007	49.714
						0	3.000	49.226	225
CP1	389531.754	160151.325	51.741	2.515	1350		1	3.000	49.226
						0	3.001	50.398	225
S8	389448.937	160053.272	50.914	1.500	1350				
						0	1.010	49.414	600

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S7	389456.652	160056.674	51.415	2.034	1800		1	1.010	49.381	600
							0	1.011	49.381	600
S6	389479.639	160068.338	51.465	2.149	2100		1	2.001	50.400	225
							2	1.011	49.316	600
							0	1.012	49.316	600
S5	389539.992	160086.186	50.908	1.749	1800		1	1.012	49.159	600
							0	1.013	49.159	600
S4	389533.470	160142.886	51.490	2.315	1500		1	3.001	50.450	225
							0	3.002	49.175	600
S3	389539.729	160111.725	51.054	1.959	2100		1	3.002	49.095	600
							2	1.013	49.095	600
							0	1.014	49.095	600
S2	389575.604	160116.913	50.858	1.853	1800		1	1.014	49.005	600
							0	1.015	49.005	600
S1HB	389585.940	160114.459	50.627	1.649	2100		1	1.015	48.978	600
							0	1.016	48.978	225
S19	389602.262	160124.155	50.500	1.636	1350		1	1.016	48.864	225
							0	1.017	48.864	225
MH6123	389628.395	160116.356	50.000	1.299	1350		1	1.017	48.701	225
Cells 1	389531.397	160154.089	51.756	2.513						
							0	3.000	49.243	225
Cells 2	389476.265	160078.704	51.455	2.063						
							0	2.000	49.392	225
CP2	389478.058	160074.313	51.412	2.049	1350		1	2.000	49.363	225
							0	2.001	50.363	225

Node S1HB Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	48.978	Product Number	CTL-SHE-0086-4000-1600-4000
Design Depth (m)	1.600	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	4.0	Min Node Diameter (mm)	1200

Node CP2 Offline Orifice Control

Flap Valve	✓	Invert Level (m)	49.363	Discharge Coefficient	0.600
Loop to Node	S6	Diameter (m)	0.225		

Node CP1 Offline Orifice Control

Flap Valve	✓	Invert Level (m)	49.226	Discharge Coefficient	0.600
Loop to Node	S4	Diameter (m)	0.225		

Node S8 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	55.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	49.414	Main Channel Slope (1:X)	400.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.035

Inlets
S10

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	547.7	547.7	1.500	1167.6	1186.2

Node Cells 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	49.243
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	80.0	0.0	1.200	80.0	38.0	1.201	0.0	38.0

Node Cells 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	49.392
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	648.0	648.0	1.200	648.0	756.3	1.201	0.0	756.3

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S18	10	50.311	0.074	10.1	0.1311	0.0000	OK
15 minute summer	S17	11	50.276	0.112	22.4	0.1973	0.0000	OK
15 minute summer	S16	11	50.211	0.138	28.3	0.2432	0.0000	OK
15 minute summer	S15	11	50.179	0.153	36.7	0.3884	0.0000	OK
15 minute summer	S14	12	50.127	0.170	46.4	0.3007	0.0000	OK
15 minute summer	S13	12	50.033	0.159	51.5	0.5507	0.0000	OK
15 minute summer	S12	12	49.933	0.110	57.6	0.0000	0.0000	OK
15 minute summer	S11	12	49.932	0.164	62.6	0.0000	0.0000	OK
720 minute winter	S10	675	49.741	0.190	10.3	0.0000	0.0000	OK
15 minute summer	CP1	1	49.226	0.000	0.0	0.0000	0.0000	OK
720 minute winter	S8	675	49.742	0.328	11.4	0.0000	0.0000	OK
720 minute winter	S7	675	49.742	0.361	6.4	0.9183	0.0000	OK
720 minute winter	S6	675	49.742	0.426	8.4	1.4752	0.0000	OK
720 minute winter	S5	675	49.742	0.583	7.8	1.4833	0.0000	OK
720 minute winter	S4	675	49.742	0.567	1.4	1.0017	0.0000	OK
720 minute winter	S3	675	49.742	0.647	7.0	2.2408	0.0000	SURCHARGED
720 minute winter	S2	675	49.742	0.737	5.2	1.8755	0.0000	SURCHARGED
720 minute winter	S1HB	675	49.742	0.764	4.0	2.6462	0.0000	SURCHARGED
15 minute summer	S19	162	48.910	0.046	3.6	0.0656	0.0000	OK
15 minute summer	MH6123	162	48.746	0.045	3.6	0.0000	0.0000	OK
15 minute summer	Cells 1	1	49.243	0.000	0.0	0.0000	0.0000	OK
15 minute summer	Cells 2	1	49.392	0.000	0.0	0.0000	0.0000	OK
15 minute summer	CP2	1	49.363	0.000	0.0	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)
15 minute summer	S18	1.000	S17	9.8	0.419	0.061	0.6927	
15 minute summer	S17	1.001	S16	22.3	0.627	0.139	1.3039	
15 minute summer	S16	1.002	S15	27.6	0.624	0.172	0.8301	
15 minute summer	S15	1.003	S14	35.8	0.702	0.223	1.4108	
15 minute summer	S14	1.004	S13	46.0	0.878	0.286	1.7351	
15 minute summer	S13	1.005	S12	51.8	1.318	0.323	0.8179	
15 minute summer	S12	4.006	S11	56.9	0.412	0.002	3.0916	
15 minute summer	S11	1.007	S10	60.8	1.016	0.178	1.3007	
720 minute winter	S10	Flow through Pond	S8	9.6	0.032	0.000	156.6663	
15 minute summer	CP1	3.001	S4	0.0	0.000	0.000	0.0000	
15 minute summer	CP1	Orifice	S4	0.0				0.0
720 minute winter	S8	1.010	S7	5.3	0.430	0.015	2.1837	
720 minute winter	S7	1.011	S6	6.4	0.424	0.018	5.0384	
720 minute winter	S6	1.012	S5	7.1	0.395	0.021	15.5256	
720 minute winter	S5	1.013	S3	5.9	0.334	0.017	7.1656	
720 minute winter	S4	3.002	S3	1.4	0.093	0.004	8.8585	
720 minute winter	S3	1.014	S2	4.9	0.219	0.014	10.2102	
720 minute winter	S2	1.015	S1HB	4.0	0.260	0.012	3.0325	
720 minute winter	S1HB	1.016	S19	3.6	0.615	0.089	0.1097	
15 minute summer	S19	1.017	MH6123	3.6	0.624	0.089	0.1557	64.5
15 minute summer	Cells 1	3.000	CP1	0.0	0.000	0.000	0.0000	
15 minute summer	Cells 2	2.000	CP2	0.0	0.000	0.000	0.0000	
15 minute summer	CP2	2.001	S6	0.0	0.000	0.000	0.0000	
15 minute summer	CP2	Orifice	S6	0.0				0.0

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.93%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S18	10	50.330	0.093	15.8	0.1637	0.0000	OK
15 minute summer	S17	11	50.308	0.144	35.3	0.2547	0.0000	OK
15 minute summer	S16	11	50.257	0.184	44.3	0.3244	0.0000	OK
15 minute summer	S15	11	50.228	0.202	57.6	0.5153	0.0000	OK
15 minute summer	S14	11	50.178	0.221	73.6	0.3911	0.0000	OK
15 minute summer	S13	12	50.077	0.203	82.2	0.7032	0.0000	OK
15 minute summer	S12	12	49.978	0.155	91.1	0.0000	0.0000	OK
15 minute summer	S11	12	49.978	0.210	99.8	0.0000	0.0000	OK
720 minute winter	S10	705	49.867	0.316	13.3	0.0000	0.0000	OK
15 minute summer	CP1	1	49.226	0.000	0.0	0.0000	0.0000	OK
720 minute winter	S8	705	49.868	0.454	12.9	0.0000	0.0000	OK
720 minute winter	S7	705	49.868	0.487	6.1	1.2393	0.0000	OK
720 minute winter	S6	705	49.868	0.552	7.9	1.9119	0.0000	OK
720 minute winter	S5	705	49.868	0.709	7.1	1.8043	0.0000	SURCHARGED
720 minute winter	S4	705	49.868	0.693	1.9	1.2244	0.0000	SURCHARGED
720 minute winter	S3	705	49.868	0.773	6.6	2.6775	0.0000	SURCHARGED
720 minute winter	S2	705	49.868	0.863	5.0	2.1962	0.0000	SURCHARGED
720 minute winter	S1HB	705	49.868	0.890	4.0	3.0827	0.0000	SURCHARGED
15 minute summer	S19	340	48.910	0.046	3.6	0.0656	0.0000	OK
15 minute summer	MH6123	340	48.746	0.045	3.6	0.0000	0.0000	OK
15 minute summer	Cells 1	1	49.243	0.000	0.0	0.0000	0.0000	OK
15 minute summer	Cells 2	1	49.392	0.000	0.0	0.0000	0.0000	OK
15 minute summer	CP2	1	49.363	0.000	0.0	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)
15 minute summer	S18	1.000	S17	15.5	0.470	0.096	0.9761	
15 minute summer	S17	1.001	S16	34.7	0.680	0.216	1.9028	
15 minute summer	S16	1.002	S15	43.3	0.667	0.270	1.2207	
15 minute summer	S15	1.003	S14	56.4	0.772	0.351	2.0317	
15 minute summer	S14	1.004	S13	72.4	0.989	0.450	2.4215	
15 minute summer	S13	1.005	S12	81.9	1.417	0.510	1.2014	
15 minute summer	S12	4.006	S11	90.8	0.442	0.003	4.6250	
15 minute summer	S11	1.007	S10	98.4	1.165	0.287	1.8328	
720 minute winter	S10	Flow through Pond	S8	10.5	0.043	0.000	242.6137	
15 minute summer	CP1	3.001	S4	0.0	0.000	0.000	0.0000	
15 minute summer	CP1	Orifice	S4	0.0				0.0
720 minute winter	S8	1.010	S7	-5.7	0.420	-0.017	3.0931	
720 minute winter	S7	1.011	S6	6.0	0.414	0.018	6.6532	
720 minute winter	S6	1.012	S5	6.5	0.387	0.019	17.3991	
720 minute winter	S5	1.013	S3	5.5	0.334	0.016	7.1940	
720 minute winter	S4	3.002	S3	1.7	0.101	0.005	8.9528	
720 minute winter	S3	1.014	S2	4.7	0.240	0.014	10.2102	
720 minute winter	S2	1.015	S1HB	4.0	0.188	0.012	3.0325	
720 minute winter	S1HB	1.016	S19	3.6	0.615	0.089	0.1097	
15 minute summer	S19	1.017	MH6123	3.6	0.624	0.089	0.1557	101.9
15 minute summer	Cells 1	3.000	CP1	0.0	0.000	0.000	0.0000	
15 minute summer	Cells 2	2.000	CP2	0.0	0.000	0.000	0.0000	
15 minute summer	CP2	2.001	S6	0.0	0.000	0.000	0.0000	
15 minute summer	CP2	Orifice	S6	0.0				0.0

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.84%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S18	12	50.521	0.284	44.2	0.5022	0.0000	OK
15 minute summer	S17	12	50.516	0.352	92.0	0.6219	0.0000	OK
15 minute summer	S16	12	50.489	0.416	109.1	0.7347	0.0000	OK
15 minute summer	S15	12	50.459	0.433	144.2	1.1027	0.0000	OK
15 minute summer	S14	11	50.393	0.436	189.1	0.7697	0.0000	OK
1440 minute winter	S13	1410	50.378	0.504	11.8	1.7475	0.0000	SURCHARGED
1440 minute winter	S12	1410	50.378	0.555	13.0	0.0000	0.0000	OK
1440 minute winter	S11	1410	50.378	0.610	13.8	0.0000	0.0000	SURCHARGED
1440 minute winter	S10	1410	50.378	0.826	14.6	0.0000	0.0000	OK
15 minute summer	CP1	1	49.226	0.000	0.0	0.0000	0.0000	OK
1440 minute winter	S8	1410	50.378	0.964	13.1	0.0000	0.0000	SURCHARGED
1440 minute winter	S7	1410	50.378	0.997	10.9	2.5386	0.0000	SURCHARGED
1440 minute winter	S6	1410	50.378	1.062	8.4	3.6804	0.0000	SURCHARGED
1440 minute winter	S5	1410	50.378	1.219	4.8	3.1035	0.0000	SURCHARGED
1440 minute winter	S4	1410	50.378	1.203	2.3	2.1265	0.0000	SURCHARGED
1440 minute winter	S3	1410	50.378	1.283	4.8	4.4458	0.0000	SURCHARGED
1440 minute winter	S2	1410	50.378	1.373	4.1	3.4954	0.0000	SURCHARGED
1440 minute winter	S1HB	1410	50.378	1.400	3.7	4.8510	0.0000	FLOOD RISK
1440 minute winter	S19	1410	48.911	0.047	3.7	0.0669	0.0000	OK
1440 minute winter	MH6123	1410	48.747	0.046	3.7	0.0000	0.0000	OK
15 minute summer	Cells 1	1	49.243	0.000	0.0	0.0000	0.0000	OK
15 minute summer	Cells 2	1	49.392	0.000	0.0	0.0000	0.0000	OK
15 minute summer	CP2	1	49.363	0.000	0.0	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)
15 minute summer	S18	1.000	S17	37.7	0.505	0.234	3.4738	
15 minute summer	S17	1.001	S16	83.8	0.744	0.522	5.2091	
15 minute summer	S16	1.002	S15	108.8	0.729	0.677	2.9095	
15 minute summer	S15	1.003	S14	144.1	0.921	0.898	4.3419	
15 minute summer	S14	1.004	S13	186.5	1.245	1.159	4.9222	
1440 minute winter	S13	1.005	S12	11.5	0.929	0.072	3.2397	
1440 minute winter	S12	4.006	S11	12.3	0.267	0.000	30.0819	
1440 minute winter	S11	1.007	S10	13.3	0.642	0.039	6.0862	
1440 minute winter	S10	Flow through Pond	S8	5.8	0.028	0.000	657.4277	
15 minute summer	CP1	3.001	S4	0.0	0.000	0.000	0.0000	
15 minute summer	CP1	Orifice	S4	0.0				0.0
1440 minute winter	S8	1.010	S7	-10.7	0.374	-0.031	3.6781	
1440 minute winter	S7	1.011	S6	-8.3	0.382	-0.024	7.2608	
1440 minute winter	S6	1.012	S5	4.5	0.373	0.013	17.7279	
1440 minute winter	S5	1.013	S3	4.1	0.309	0.012	7.1940	
1440 minute winter	S4	3.002	S3	2.2	0.090	0.007	8.9528	
1440 minute winter	S3	1.014	S2	4.0	0.194	0.012	10.2102	
1440 minute winter	S2	1.015	S1HB	3.7	0.081	0.011	3.0325	
1440 minute winter	S1HB	1.016	S19	3.7	0.622	0.092	0.1129	
1440 minute winter	S19	1.017	MH6123	3.7	0.631	0.092	0.1601	584.8
15 minute summer	Cells 1	3.000	CP1	0.0	0.000	0.000	0.0000	
15 minute summer	Cells 2	2.000	CP2	0.0	0.000	0.000	0.0000	
15 minute summer	CP2	2.001	S6	0.0	0.000	0.000	0.0000	
15 minute summer	CP2	Orifice	S6	0.0				0.0

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.91%

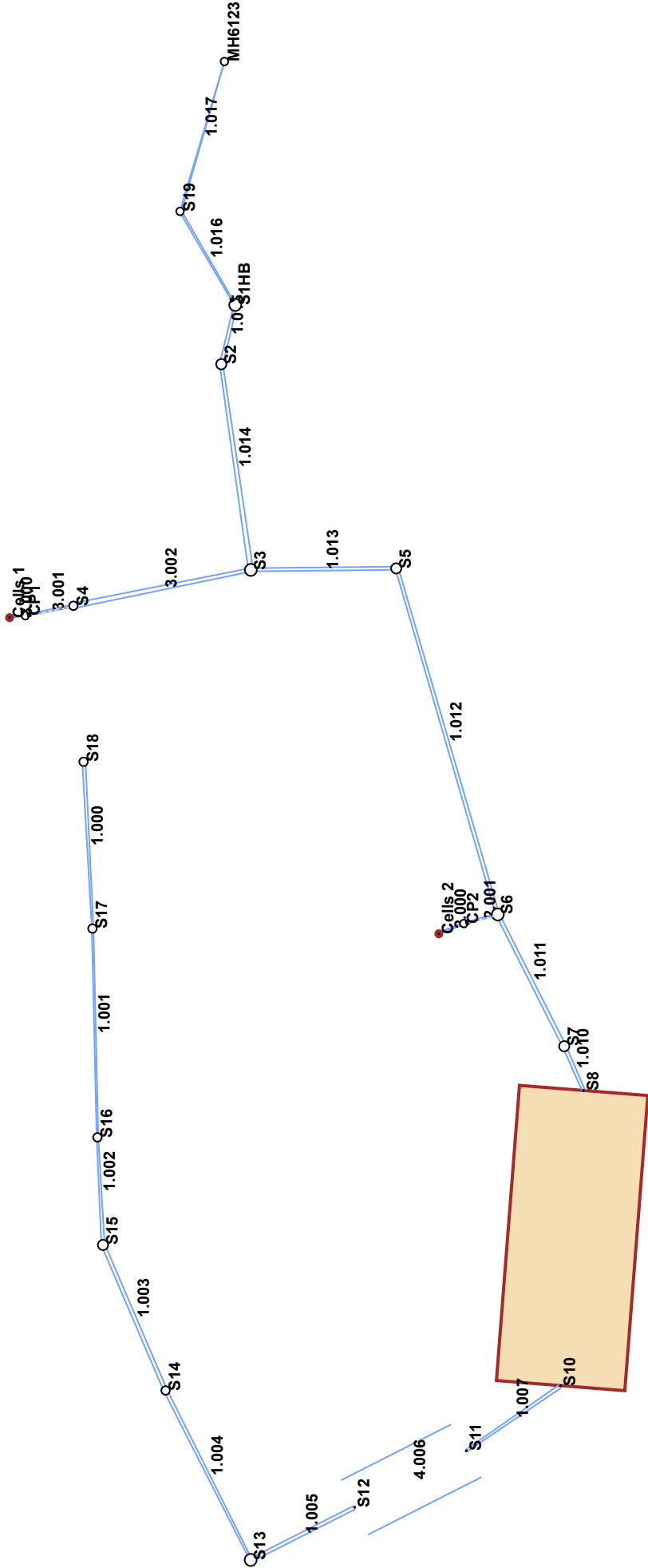
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S18	11	50.962	0.725	56.5	1.2807	0.0000	SURCHARGED
15 minute summer	S17	11	50.941	0.777	118.9	1.3727	0.0000	SURCHARGED
15 minute summer	S16	11	50.874	0.801	144.1	1.4147	0.0000	SURCHARGED
15 minute summer	S15	11	50.820	0.794	193.3	2.0212	0.0000	SURCHARGED
15 minute summer	S14	11	50.681	0.724	255.5	1.2797	0.0000	SURCHARGED
960 minute winter	S13	675	50.497	0.623	20.1	2.1590	0.0000	SURCHARGED
960 minute winter	S12	675	50.497	0.674	22.0	0.0000	0.0000	OK
960 minute winter	S11	675	50.497	0.729	23.0	0.0000	0.0000	SURCHARGED
960 minute winter	S10	675	50.497	0.945	23.9	0.0000	0.0000	OK
960 minute winter	CP1	1875	49.638	0.412	3.5	0.5894	0.0000	OK
960 minute winter	S8	675	50.497	1.083	23.6	0.0000	0.0000	SURCHARGED
960 minute winter	S7	675	50.497	1.116	22.3	2.8403	0.0000	SURCHARGED
960 minute winter	S6	675	50.497	1.181	17.8	4.0906	0.0000	SURCHARGED
960 minute winter	S5	675	50.497	1.338	9.5	3.4048	0.0000	SURCHARGED
960 minute winter	S4	675	50.497	1.322	4.1	2.3357	0.0000	SURCHARGED
960 minute winter	S3	675	50.497	1.402	8.8	4.8560	0.0000	SURCHARGED
960 minute winter	S2	675	50.497	1.492	5.0	3.7967	0.0000	SURCHARGED
960 minute winter	S1HB	675	50.497	1.519	3.9	5.2612	0.0000	FLOOD RISK
960 minute winter	S19	675	48.912	0.048	3.9	0.0682	0.0000	OK
960 minute winter	MH6123	675	48.748	0.047	3.9	0.0000	0.0000	OK
960 minute winter	Cells 1	2010	49.638	0.395	3.5	29.9997	0.0000	SURCHARGED
1440 minute winter	Cells 2	1950	49.793	0.401	12.4	246.6953	0.0000	SURCHARGED
1440 minute winter	CP2	1800	49.793	0.430	12.4	0.6152	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)
15 minute summer	S18	1.000	S17	51.3	0.504	0.319	4.6153	
15 minute summer	S17	1.001	S16	111.4	0.754	0.693	5.7707	
15 minute summer	S16	1.002	S15	144.1	0.909	0.897	2.9778	
15 minute summer	S15	1.003	S14	193.9	1.224	1.209	4.3876	
15 minute summer	S14	1.004	S13	251.1	1.585	1.560	5.2416	
960 minute winter	S13	1.005	S12	19.3	1.031	0.120	3.2397	
960 minute winter	S12	4.006	S11	20.4	0.304	0.001	41.6712	
960 minute winter	S11	1.007	S10	21.4	0.706	0.062	6.0862	
960 minute winter	S10	Flow through Pond	S8	10.7	0.040	0.000	769.2717	
960 minute winter	CP1	3.001	S4	-3.5	-0.613	-9.555	0.0498	
960 minute winter	CP1	Orifice	S4	0.0				0.0
960 minute winter	S8	1.010	S7	-22.1	0.429	-0.064	3.6781	
960 minute winter	S7	1.011	S6	-17.6	0.429	-0.051	7.2608	
960 minute winter	S6	1.012	S5	-9.4	0.374	-0.027	17.7279	
960 minute winter	S5	1.013	S3	-6.2	0.313	-0.018	7.1940	
960 minute winter	S4	3.002	S3	4.0	0.109	0.012	8.9528	
960 minute winter	S3	1.014	S2	4.8	0.302	0.014	10.2102	
960 minute winter	S2	1.015	S1HB	3.9	0.178	0.011	3.0325	
960 minute winter	S1HB	1.016	S19	3.9	0.629	0.096	0.1161	
960 minute winter	S19	1.017	MH6123	3.9	0.638	0.096	0.1646	505.9
960 minute winter	Cells 1	3.000	CP1	-3.5	-0.492	-0.086	0.1108	
1440 minute winter	Cells 2	2.000	CP2	-12.4	-0.939	-0.306	0.1886	
1440 minute winter	CP2	2.001	S6	-12.4	-0.847	-33.482	0.0906	
1440 minute winter	CP2	Orifice	S6	0.0				0.0

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.79%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S18	11	51.936	1.699	82.0	3.0014	0.0000	FLOOD RISK
15 minute summer	S17	11	51.914	1.750	173.9	3.0924	0.0000	FLOOD RISK
15 minute summer	S16	11	51.779	1.706	220.5	3.0143	0.0000	FLOOD RISK
15 minute summer	S15	11	51.642	1.616	291.9	4.1127	0.0000	SURCHARGED
15 minute summer	S14	11	51.332	1.375	377.2	2.4301	0.0000	SURCHARGED
15 minute summer	S13	11	50.736	0.862	428.8	2.9843	0.0000	SURCHARGED
960 minute summer	S12	600	50.612	0.789	48.9	0.0000	0.0000	OK
960 minute summer	S11	600	50.612	0.844	49.8	0.0000	0.0000	SURCHARGED
960 minute summer	S10	600	50.611	1.060	50.4	0.0000	0.0000	OK
720 minute summer	CP1	450	50.658	1.432	28.9	2.0493	0.0000	SURCHARGED
960 minute summer	S8	600	50.612	1.198	53.8	0.0000	0.0000	SURCHARGED
960 minute summer	S7	600	50.612	1.231	52.6	3.1319	0.0000	SURCHARGED
960 minute summer	S6	600	50.611	1.295	54.7	4.4854	0.0000	SURCHARGED
720 minute summer	S5	450	50.630	1.471	30.8	3.7443	0.0000	FLOOD RISK
720 minute summer	S4	450	50.641	1.466	28.9	2.5908	0.0000	SURCHARGED
720 minute summer	S3	450	50.633	1.538	26.1	5.3275	0.0000	SURCHARGED
720 minute summer	S2	450	50.616	1.611	19.0	4.1011	0.0000	FLOOD RISK
720 minute summer	S1HB	450	50.612	1.634	13.4	5.6612	0.0000	FLOOD RISK
960 minute summer	S19	600	48.912	0.048	4.0	0.0694	0.0000	OK
960 minute summer	MH6123	600	48.749	0.048	4.0	0.0000	0.0000	OK
720 minute summer	Cells 1	450	50.658	1.415	28.4	91.2380	0.0000	SURCHARGED
1440 minute winter	Cells 2	1440	50.532	1.140	33.4	701.9413	0.0000	SURCHARGED
1440 minute winter	CP2	1440	50.532	1.169	33.5	1.6731	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)
15 minute summer	S18	1.000	S17	75.6	0.499	0.470	4.6153	
15 minute summer	S17	1.001	S16	171.4	1.082	1.067	5.7707	
15 minute summer	S16	1.002	S15	217.7	1.374	1.355	2.9778	
15 minute summer	S15	1.003	S14	287.9	1.817	1.795	4.3876	
15 minute summer	S14	1.004	S13	375.0	2.367	2.330	5.2416	
15 minute summer	S13	1.005	S12	424.0	2.676	2.642	3.2397	
960 minute summer	S12	4.006	S11	43.8	0.297	0.001	54.6575	
960 minute summer	S11	1.007	S10	44.6	0.671	0.130	6.0862	
960 minute summer	S10	Flow through Pond	S8	36.8	0.043	0.002	882.9570	
720 minute summer	CP1	3.001	S4	-28.9	-1.045	-78.010	0.3262	
720 minute summer	CP1	Orifice	S4	13.6				38.9
960 minute summer	S8	1.010	S7	-52.3	0.439	-0.152	3.6781	
960 minute summer	S7	1.011	S6	45.7	0.432	0.133	7.2608	
960 minute summer	S6	1.012	S5	-24.3	0.360	-0.071	17.7279	
720 minute summer	S5	1.013	S3	-22.0	0.357	-0.064	7.1940	
720 minute summer	S4	3.002	S3	-23.8	0.131	-0.069	8.9528	
720 minute summer	S3	1.014	S2	17.7	0.192	0.052	10.2102	
720 minute summer	S2	1.015	S1HB	13.4	0.073	0.039	3.0325	
720 minute summer	S1HB	1.016	S19	4.0	0.634	0.099	0.1189	
960 minute summer	S19	1.017	MH6123	4.0	0.644	0.099	0.1687	524.3
720 minute summer	Cells 1	3.000	CP1	-28.4	-0.997	-0.701	0.1108	
1440 minute winter	Cells 2	2.000	CP2	-33.4	-1.267	-0.823	0.1886	
1440 minute winter	CP2	2.001	S6	-33.5	-1.067	-90.295	0.1933	
1440 minute winter	CP2	Orifice	S6	1.5				109.6



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APPENDIX J: SURFACE WATER RUN-OFF CALCULATIONS

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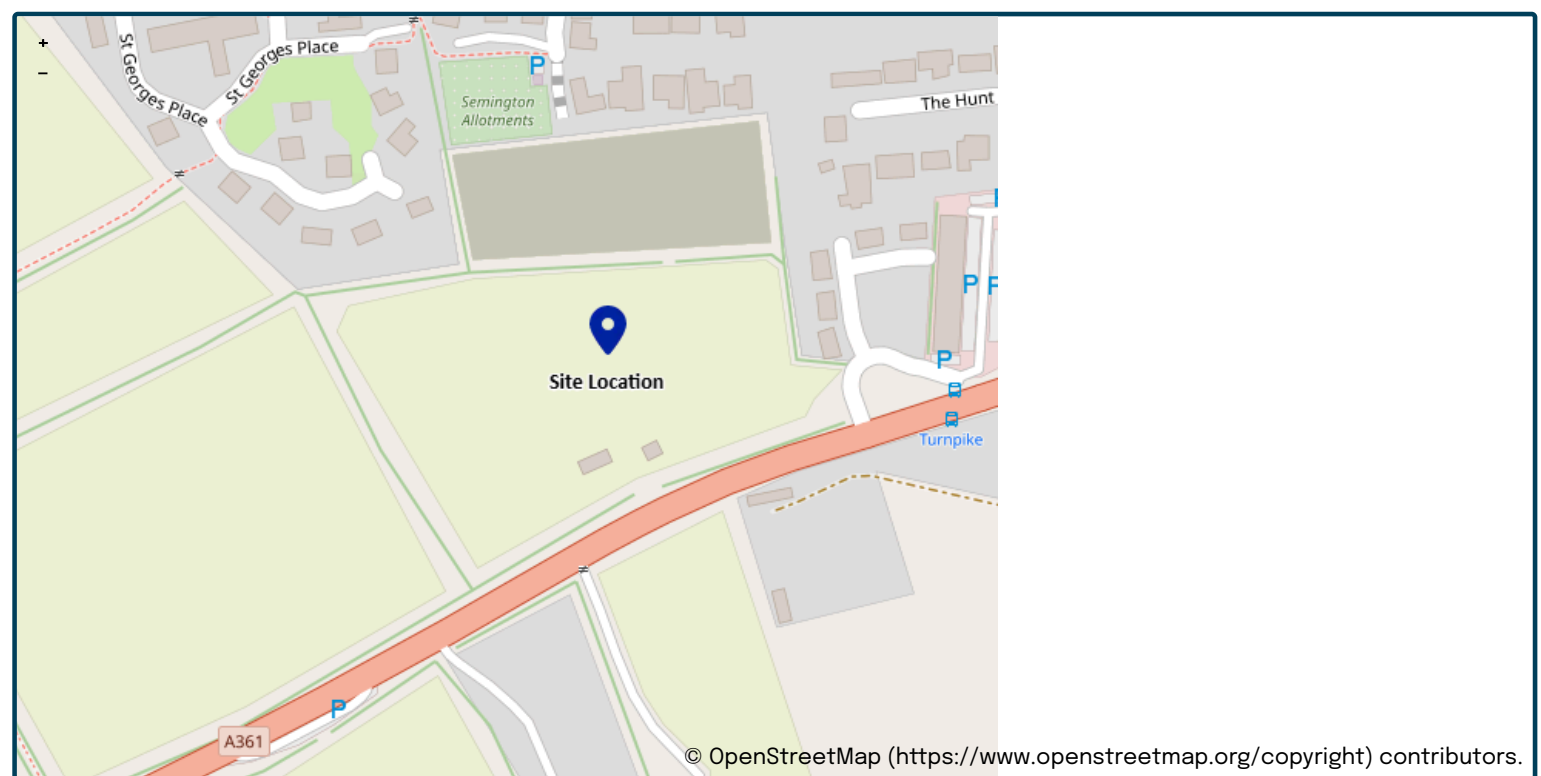
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	15/10/2025
Calculated by	SM
Reference	HYD1097
Model version	2.2.1

Location

Site name	Turnpike Close
Site location	Semington



Site easting (British National Grid)	389474
Site northing (British National Grid)	160114

Site details

Total site area (ha)	1	ha
----------------------	--------------------------------	----

Greenfield runoff

Method

Method	FEH statistical (2025)
--------	------------------------

FEH statistical (2025)

	<u>My value</u>	<u>Map value</u>
SAAR9120 (mm)	733	mm
BFIHOST19scaled	0.499	
QMed-QBar conversion	1.075	☒ 1.075
QMed (l/s)	3.1	l/s
QBar (FEH statistical 2025) (l/s)	3.3	l/s

Growth curve factors

	<u>My value</u>	<u>Map value</u>
Hydrological region	8	☒ 8
1 year growth factor	0.78	
2 year growth factor	0.93	
10 year growth factor	1.49	
30 year growth factor	1.95	
100 year growth factor	2.43	
200 year growth factor	2.78	

Results

Method	FEH statistical (2025)	
Flow rate 1 year (l/s)	2.6	l/s
Flow rate 2 year (l/s)	3.1	l/s
Flow rate 10 years (l/s)	4.9	l/s
Flow rate 30 years (l/s)	6.4	l/s
Flow rate 100 years (l/s)	8.0	l/s
Flow rate 200 years (l/s)	9.1	l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent ‘zero’ figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.1) developed by HR Wallingford and available at uksuds.com (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at [uksuds.com/terms-conditions](https://www.uksuds.com/terms-conditions) (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

SURFACE WATER RUN-OFF CALCULATION SHEET



Development	Turnpike Close, Semington
Project No.	HYD1097

Revision	C	Completed by	SM
Date	07/08/2026	Checked by	HB

Areas			
Total Site	2.156	ha	
Development Area ¹	1.750	ha	
Existing Impermeable		ha	
Existing Impermeable ²		ha	
Existing Pervious	2.156	ha	
Existing Pervious ²	0.000	ha	
Proposed total Impermeable	0.963	ha	55%
10% Urban Creep	1.138	ha	65%

Catchment Characteristics			
SAAR	733	mm	*SAAR9120.
SPR	0.388		*Estimated using BFI19Scaled.
BFI	0.499		*BFI19Scaled.
i_1	18.1	mm/hr	d_1 24.1 mm
i_{30}	35.0	mm/hr	d_{30} 52.1 mm
i_{100}	45.9	mm/hr	d_{100} 67.0 mm

Run-off Rates (FEH Method)			
Pre-development			
Impermeable -----	1yr	0.0	l/s
	30yr	0.0	l/s
	100yr	0.0	l/s
	50mm/hr ³	0.0	l/s
Pervious ⁴ -----	1yr	4.6	l/s
	30yr	11.2	l/s
	100yr	14.0	l/s
	QBar ⁵	5.8	l/s
Total -----	1yr	4.6	l/s
	30yr	11.2	l/s
	100yr	14.0	l/s
Post-development (without control)			
Impermeable ⁶ -----	1yr	57.3	l/s
	30yr	110.7	l/s
	100yr+45%CC	210.2	l/s

Volumes			
Pre-development			
Impermeable -----	1yr	0.0	cu.m
	30yr	0.0	cu.m
	100yr	0.0	cu.m
Pervious ⁴ -----	1yr	169.4	cu.m
	30yr	353.6	cu.m
	100yr	488.6	cu.m
Total -----	1yr	169.4	cu.m
	30yr	353.6	cu.m
	100yr	488.6	cu.m
Post-development			
Impermeable ⁶ -----	1yr	274.4	cu.m
	30yr	592.2	cu.m
	100yr	761.8	cu.m

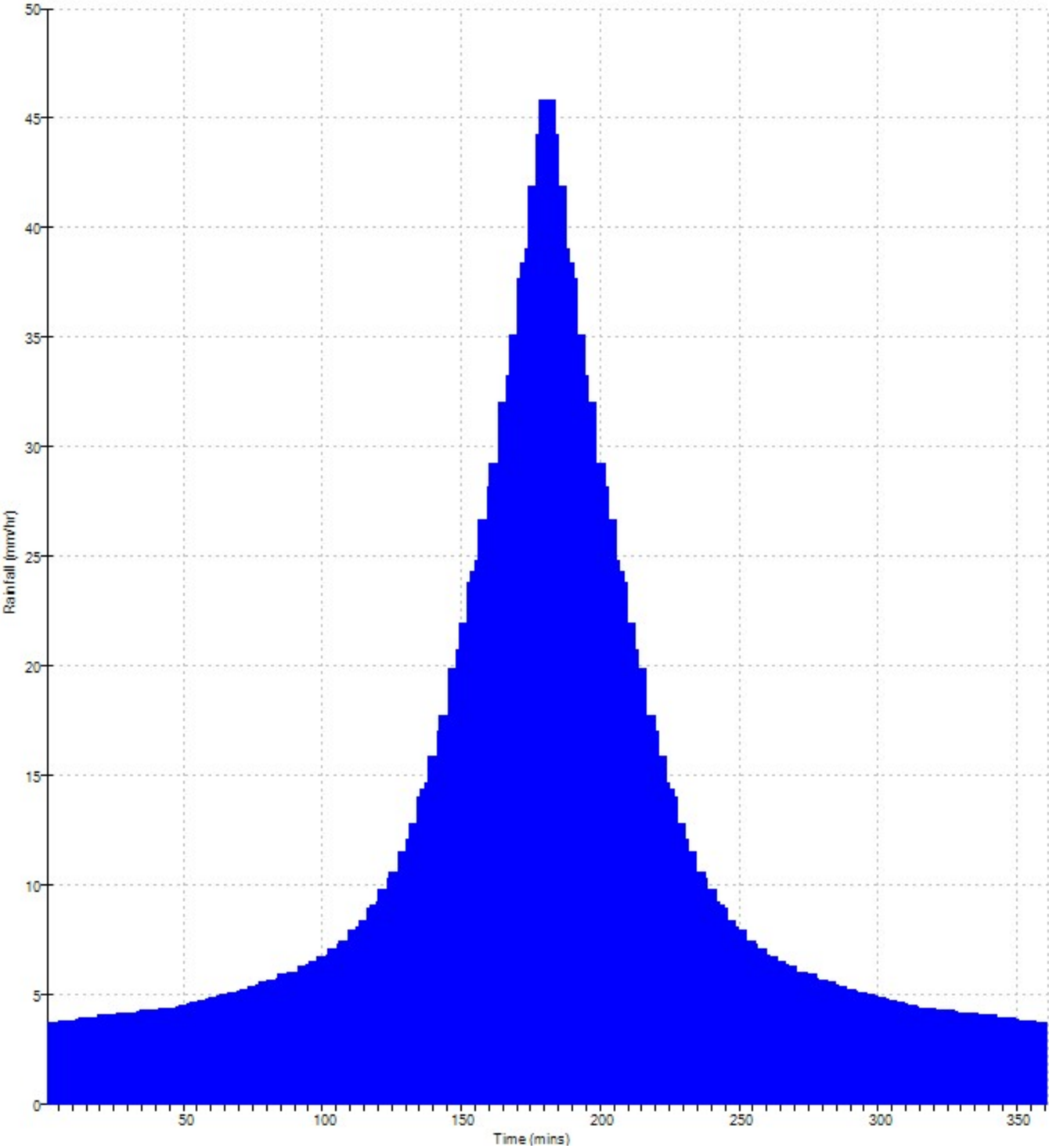
- 1/ The 'development area' removes areas of POS and/or landscaped areas of the wider site that are to remain as existing.
 2/ On occasion the existing impermeable area cannot be evidenced to connect and a reduction is applied.
 3/ 50mm/hr is used for BRegs calculations and often used by Water Companies when considering allowable post-development rates of discharge. (Rational Method)
 4/ The Greenfield rates and of run-off have been calculated using the UK SUDS Calculator
 5/ QBar is the estimated flood flow for the 2.33yr return period event and is often used as a post-development rate restriction.
 6/ Post-development run-off is only considered from the impermeable area when the proposed post-development impermeable area >50% in accordance with the EA Guidance Preliminary rainfall runoff management for developments [WS-074/A/TR1/1 rev E (2012).

NB. The catchment characteristics are from the FEH catchment, the UK SUDS Calculator and Microdrainage. |
 NB. The rainfall intensities and depths are calculated for the 6hr duration rainfall event (peak summer intensity)

Rainfall profile

Storm duration (mins) 360

FEH Data	
FEH Rainfall Version	2013
Site Location	GB 389474 160210 ST 89474 60210
Data Type	Point
Peak Intensity (mm/hr)	45.883
Ave. Intensity (mm/hr)	11.705
Return Period (years)	100.0



Betts Associates Ltd		Page 1
Old Marsh Farm Barns Welsh Road Sealand Flintshire CH5 2LY	Turnpike Close	
Date 19/11/2025	Designed by SM	
File	Checked by HB	
Micro Drainage		Source Control 2020.1

Greenfield Runoff Volume

FEH Data

Return Period (years)	2
Storm Duration (mins)	360
FEH Rainfall Version	2013
Site Location	GB 389474 160210 ST 89474 60210
Data Type	Point
Areal Reduction Factor	1.00
Area (ha)	1.750
SAAR (mm)	733
CWI	109.258
SPR Host	38.800
URBEXT (1990)	0.0000

Results

Percentage Runoff (%)	34.86
Greenfield Runoff Volume (m³)	169.356

Betts Associates Ltd		Page 1
Old Marsh Farm Barns	Turnpike Close	
Welsh Road		
Sealand Flintshire CH5 2LY		
Date 19/11/2025	Designed by SM	
File	Checked by HB	
Micro Drainage	Source Control 2020.1	

Greenfield Runoff Volume

FEH Data

Return Period (years)	30
Storm Duration (mins)	360
FEH Rainfall Version	2013
Site Location	GB 389474 160210 ST 89474 60210
Data Type	Point
Areal Reduction Factor	1.00
Area (ha)	1.750
SAAR (mm)	733
CWI	109.258
SPR Host	38.800
URBEXT (1990)	0.0000

Results

Percentage Runoff (%)	37.67
Greenfield Runoff Volume (m³)	353.602

Betts Associates Ltd		Page 1
Old Marsh Farm Barns	Turnpike Close	
Welsh Road		
Sealand Flintshire CH5 2LY		
Date 19/11/2025	Designed by Sm	
File	Checked by HB	
Micro Drainage	Source Control 2020.1	

Greenfield Runoff Volume

FEH Data

Return Period (years)	100
Storm Duration (mins)	360
FEH Rainfall Version	2013
Site Location	GB 389474 160210 ST 89474 60210
Data Type	Point
Areal Reduction Factor	1.00
Area (ha)	1.750
SAAR (mm)	733
CWI	109.258
SPR Host	38.800
URBEXT (1990)	0.0000

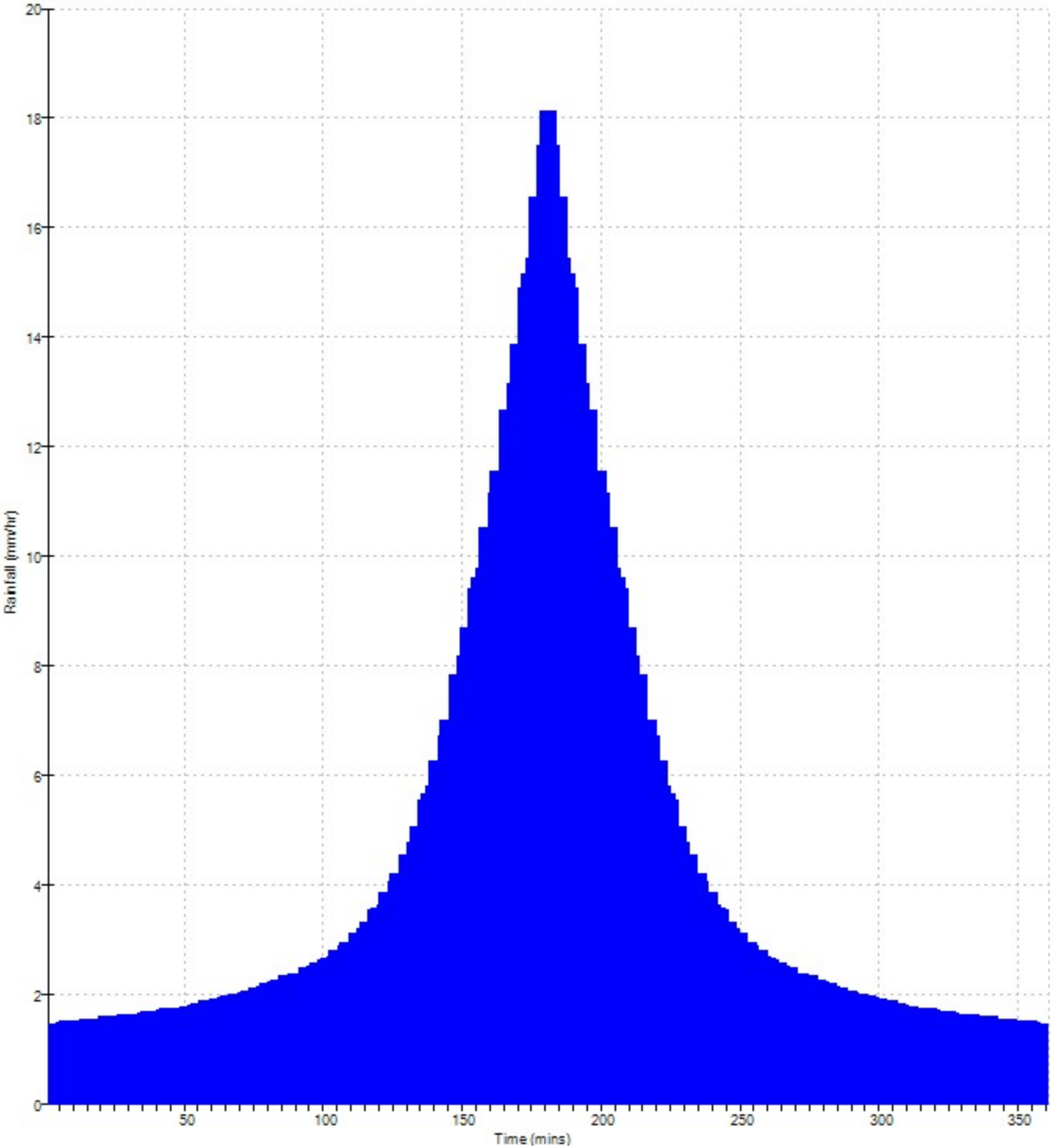
Results

Percentage Runoff (%)	39.76
Greenfield Runoff Volume (m³)	488.615

Rainfall profile

Storm duration (mins) 360

FEH Data	
FEH Rainfall Version	2013
Site Location	GB 389474 160210 ST 89474 60210
Data Type	Point
Peak Intensity (mm/hr)	18.135
Ave. Intensity (mm/hr)	4.626
Return Period (years)	2.0

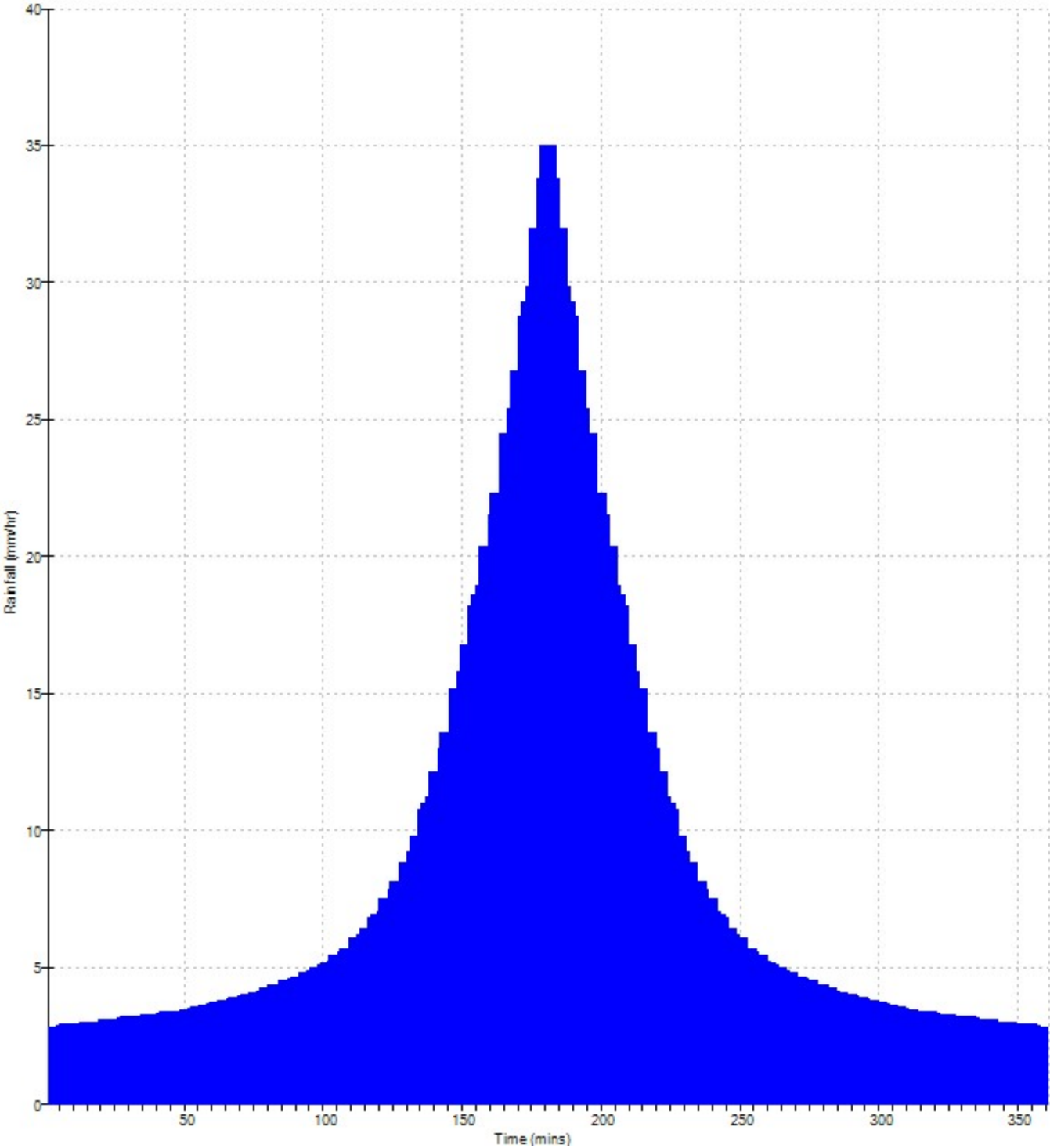


Betts Associates Ltd		Page 1
Old Marsh Farm Barns Welsh Road Sealand Flintshire CH5 2LY	Turnpike Close Semington	
Date 15/10/2025	Designed by SM	
File	Checked by KH	
Micro Drainage	Network 2020.1	

Rainfall profile

Storm duration (mins) 360

FEH Data	
FEH Rainfall Version	2013
Site Location	GB 389474 160210 ST 89474 60210
Data Type	Point
Peak Intensity (mm/hr)	35.046
Ave. Intensity (mm/hr)	8.940
Return Period (years)	30.0



APPENDIX K: WATER QUALITY ASSESSMENT - SIA

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Water quality management assessment - CIRIA SuDS Manual 'Simplified Index Approach'

Turnpike Close Semington

Pollution hazard indices from Table 26.2 'Pollution hazard indices for different land use classifications'
Mitigation indices from Table 26.3 'Indicative SuDS mitigation indices for discharges to surface waters'

v1.0 HYD1097

Description of area being served		Ref. no.	Category	Pollution type	Hazard index	Primary	Secondary	Tertiary	Total SuDS mitigation index	Assessment criteria	Acceptable (y/n)
Development surrounding Roads 3, 4 and 5											

Roof area	001	Residential roofs	Pollution hazard level	Very low	Permeable Surfacing	Swale	(factored by 0.5)	Detention Basin	(factored by 0.5)		
			Total suspended solids (TSS)	0.2	0.70	0.50	0.25	0.50	0.25	1.20	0.20
			Metals	0.2	0.60	0.60	0.30	0.50	0.25	1.15	y
			Hydrocarbons	0.05	0.70	0.60	0.30	0.60	0.30	1.30	y
Domestic Driveways	002	Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Pollution hazard level	Low	Permeable Surfacing	Swale	(factored by 0.5)	Detention Basin	(factored by 0.5)		
			Total suspended solids (TSS)	0.5	0.70	0.50	0.25	0.50	0.25	1.20	y
			Metals	0.4	0.60	0.60	0.30	0.50	0.25	1.15	y
			Hydrocarbons	0.4	0.70	0.60	0.30	0.60	0.30	1.30	y
Estate Roads	003	Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Pollution hazard level	Low	Bioretention	Swale	(factored by 0.5)	Detention Basin	(factored by 0.5)		
			Total suspended solids (TSS)	0.5	0.80	0.50	0.25	0.50	0.25	1.30	y
			Metals	0.4	0.80	0.60	0.30	0.50	0.25	1.35	y
			Hydrocarbons	0.4	0.80	0.60	0.30	0.60	0.30	1.40	y

Development surrounding Roads 1 and 2											
Roof area	001	Residential roofs	Pollution hazard level	Very low	Permeable Surfacing						
			Total suspended solids (TSS)	0.2	0.70					0.70	0.20
			Metals	0.2	0.60					0.60	0.20
			Hydrocarbons	0.05	0.70					0.70	0.05
Domestic Driveways	002	Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Pollution hazard level	Low	Permeable Surfacing						
			Total suspended solids (TSS)	0.5	0.70					0.70	0.50
			Metals	0.4	0.60					0.60	0.40
			Hydrocarbons	0.4	0.70					0.70	0.40
Estate Roads	003	Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Pollution hazard level	Low	Bioretention						
			Total suspended solids (TSS)	0.5	0.80					0.80	0.50
			Metals	0.4	0.80					0.80	0.40
			Hydrocarbons	0.4	0.80					0.80	0.40

APPENDIX L: NOTES OF LIMITATIONS

The data essentially comprised a study of available documented information from various sources together with discussions with relevant authorities and other interested parties. There may also be circumstances at the site that are not documented. The information reviewed is not exhaustive and has been accepted in good faith as providing representative and true data pertaining to site conditions. If additional information becomes available which might impact our conclusions, we request the opportunity to review the information, reassess the potential concerns, and modify our opinion if warranted.

It should be noted that any risks identified in this report are perceived risks based on the available information.

This report was prepared by Betts Hydro Ltd for the sole and exclusive use of the titled client in response to particular instructions. Any other parties using the information contained in this report do so at their own risk and any duty of care to those parties is excluded.

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