Drainage and Levels Statement

For Development at Normanton Road,

Crowland, Lincolnshire

INFRASTRUCTURE DESIGN LTD

EST 2000

Consulting Engineers

Suite 44 Innovation Centre Airfield

Park

Leicester Road

Market Harborough

1279/000/01 Rev A - July 2025

INTRODUCTION

The site at Normanton Rd, Crowland is being put forward for development for a housing development. This report is intended as a strategy document to identify possible solutions for drainage aspects and to show how they would sit within the suggested development framework.

All detailed design aspects taking into account soil conditions, statutory body requirements and any planning conditions placed on the site at that time, will utilise this information as starting parameters.

STORM WATER DRAINAGE STRATEGY

The storm water drainage hierarchy as defined in Section 3, Part 3.2-3.4 of Part H of the Building Regulations, is shown below, in order of preference: -

1. Soakaway or other infiltration system where practicable
2. Discharge to watercourse
3. Discharge to sewers (where other forms of outlet are not practicable)

This hierarchy should be followed as a requirement to determine the best form of outfall to be used. The site investigation (BRD4519-OR2-A) has shown that groundwater levels are at approximately 1.5m depth, with the requirement of a minimum of 1m unsaturated zone, the site would not be suitable for traditional housing soakaways. Permeable paving, however, as it is higher would prove suitable, so drives will be constructed using permeable paving. The roads and houses on the site, at this stage, therefore has been analysed based on hierarchy 2. Sustainable Urban Drainage Techniques (SUDs) are to be incorporated into the design, in accordance with best practice, taking aspects from CIRIA C609 Sustainable Drainage Systems and CIRIA C753 SUDs Manual.

SITE TOPOGRAPHY AND GEOLOGY

The site topography is such that there is a slight fall from south to north on the site of approximately 0.5m.

The surface water designed for this scheme has considered the existing topography and previous uses of the site in respect of the potential runoff rates and strategies. It has been confirmed through investigation that the site is overlain generally with fine-grained soils in this southeastern area ranged from firm brown slightly gravelly sandy clay to stiff grey brown slightly gravelly slightly sandy clay, with the gravel content generally consisting of fine to medium sub-rounded to sub-angular flint.

DRAINAGE STRATEGY

(refer to drawing 1279-00-03 Planning Drainage Layout)

FOUL DRAINAGE

The site is intended to drain to the existing foul system within Normanton Road to the west. Due to levels the majority of the site will drain by gravity to a pumping station before outfalling into the existing system via a rising main.

SURFACE WATER DRAINAGE

The site has been designed to greenfield runoff rates as developed by HR Wallingford based on a development area, excluding POS outside of the development envelope, which would have no addition to the greenfield runoff rates for the development. The total impermeable site area contributing to the drainage outfall is Qbar of 4.8l/s was calculated and utilised for the design of the attenuation. All SW drainage to be modelled to take 1:100 year + 40% climate change storm plus an additional 10% for urban creep, to ensure the drainage is

contained within the system with no detriment to the households. Design calculations are appended to this document, which show no flooding under any of the modelled events.

SUDS

Use of SuDS to improve water quality and flow.

- ❖ The site has been assessed utilising the CIRIA Simple Index Approach:Tool spreadsheet, appended to this report.

- ❖ The main access road has been designed with a Filter Strip and Swale along its length to provide better treatment train for SW runoff from the roads (see table 1).

- ❖ The site drains via a network before outfalling to a detention basin. This then outfalls to the North Level IDB Brickfield Drain to the north, which when combined, provide sufficient treatment train to improve the water quality in line with the requirements of C753, see tables 1 and 2 below.

Table 1 – Summary Proposed runoff treatment – Main Access Road

Main Access road		Treatment Required[1]		Proposed Treatment individual indices[2]		
Pollution Hazard[1]	Low		Filter Strip	Road Side Swale	Pond	Combined
	Total suspended solids indices	0.5	0.4	0.5	0.70	>0.95 ok
	Metals indices	0.4	0.4	0.6	0.7	>0.95 ok
	Hydrocarbons indices	0.4	0.5	0.6	0.5	>0.95 ok

Notes: 1 - C753 table 26.2 2 - C753 table 26.3

Table 2 – Summary Proposed runoff treatment – Site wide

Roof & access road		Treatment Required[1]		Proposed Treatment individual indices[2]		
Pollution Hazard[1]	Low		Porous Paving	Pond	Combined	Status
	Total suspended solids indices	0.5	0.7	0.7	>0.95	Ok
	Metals indices	0.4	0.6	0.7	0.95	ok
	Hydrocarbons indices	0.4	0.7	0..5	0.95	ok

Notes: 1 - C753 table 26.2 2 - C753 table 26.3

LEVELS STRATEGY

Levels for the site are given within this document (refer to 1279-00-05), this shows that all FFLs are a minimum of 300mm above existing ground levels and in some cases greater, in order to help drain the site and also this in line with recommendations within the FRA for flood resilience etc.

MAINTENANCE REGIME

Maintenance information is given within this document.

CONCLUSION

In conclusion the presented scheme, by the use of SuDS techniques, such as Filter Strips, Swales, Porous Paving, Basins, offers a surface water drainage scheme which complies with current best practice, taking on board up to date information, and will not increase the risk of flooding for the site and neighbouring properties, and this has been modelled for all storm events upto and including a 1 in 100 year event with a 40% allowance for climate change plus 10% allowance for Urban Creep. There is also a specific scheme of maintenance that ensures these protective elements will continue to operate at optimum capacity throughout the lifetime of the development.

Likewise the foul scheme, being designed in accordance with the 'Design and Construction Guidance for foul and surface water sewers intended for adoption', will be suitable for and offered for adoption by suitable Drainage Authority, such as Anglian or a NAV.

Rob Hill BSc MCIHT

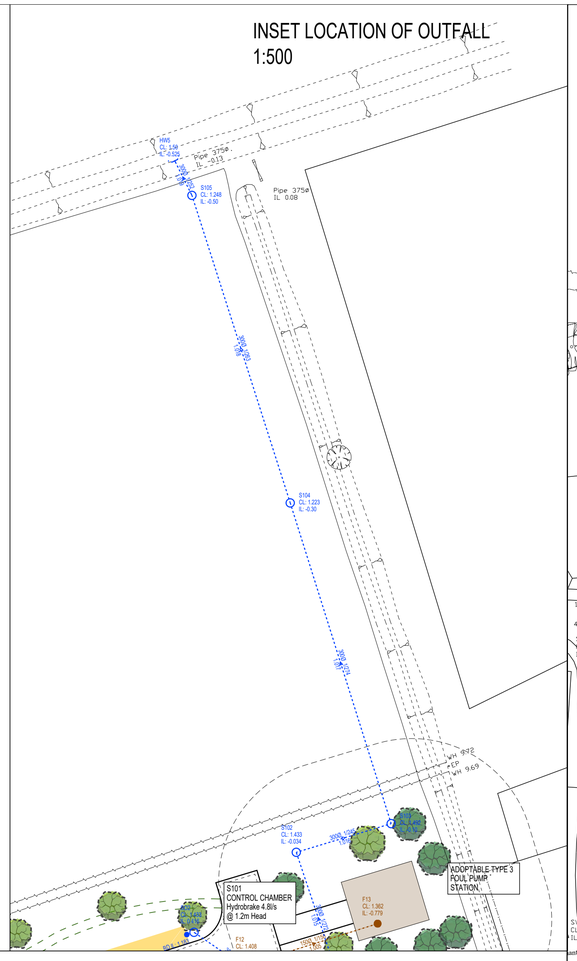
Director

Drainage Layout

KEY

- Private Swale 250mm deep (annotation shows invert level at node points within design - N** refers to node point within calculations)
- Highway Swale 250mm deep (annotation shows invert level at node points within design - N** refers to node point within calculations) — Swale connecting pipes to be generally 3000 unless otherwise stated
- Porous Paving (infiltration) (indicative to show bays - to cover whole parking drive)
- Private SW/FW Drainage System (indicative)
- Adoptable SW Drainage System
- F22 CL: 18.724 IL: 17.46 — Adoptable FW Drainage System

INSET LOCATION OF OUTFALL
1:500

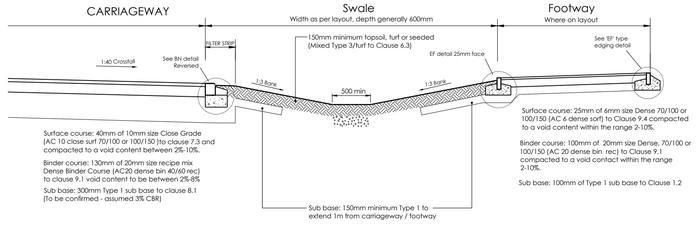






REVERSED BN KERB

EF EDGING



SWALE CONSTRUCTION DETAIL

ALLISON HOMES
Allison Homes East
Fleet House
Cygnet Road, Hampton
Peterborough
PE7 8FD

REV	DESCRIPTION	DATE
-	-	-

STATUS: Planning

SCALE : 1:500 @ A1
DATE : 11.07.25
DRAWN : IDL

TITLE : Drainage Strategy Layout

PROJECT : Normanton Road, Crowland

DRG. No: 1279-00-03 Rev B

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Tel 01858 411370

Levels Layout

KEY

All FFLs are minimum of 300mm above existing ground levels as part of Flood Protection Measures, all FFLs are generally 150mm above external ground levels

FFL FFL 101.05

Proposed Levels 100 / 99.00

All Front accesses have Level Threshold

Gardens generally no steeper than 1:20 (max 1:15 if required locally)
Survey shown in grey
FFLs +/- 450mm subject to detailed design

0m 50m

PUMPING STATION

ATTENUATION

ATTENUATION POND
TOP OF BANK 1.5m AOD
PERMANENT WATER LEVEL 0.1m AOD
BASE LEVEL -0.25m AOD

LAP

SHARED SURFACE (7.0M)

PRIMARY STREET (5.5M)

WILDLIFE CORRIDOR

N 53.86415107°
E 8.10380695°
Z 0m

311050 N
311000 N
310950 N
310900 N
310850 N

Silo

Sub Sta

Northol

Normanton Road

Johnbee Way

HARDLESTONE WALK

REV	DESCRIPTION	DATE
-	-	-

ALLISON HOMES
Allison Homes East
Fleet House
Cygnet Road, Hampton
Peterborough
PE7 8FD

STATUS: Planning

SCALE: 1:500 @ A1
DATE: 11.07.25
DRAWN: IDL

TITLE: Levels Strategy Layout

PROJECT: Normanton Road, Crowland

DRG. No: 1279-00-05 Rev A

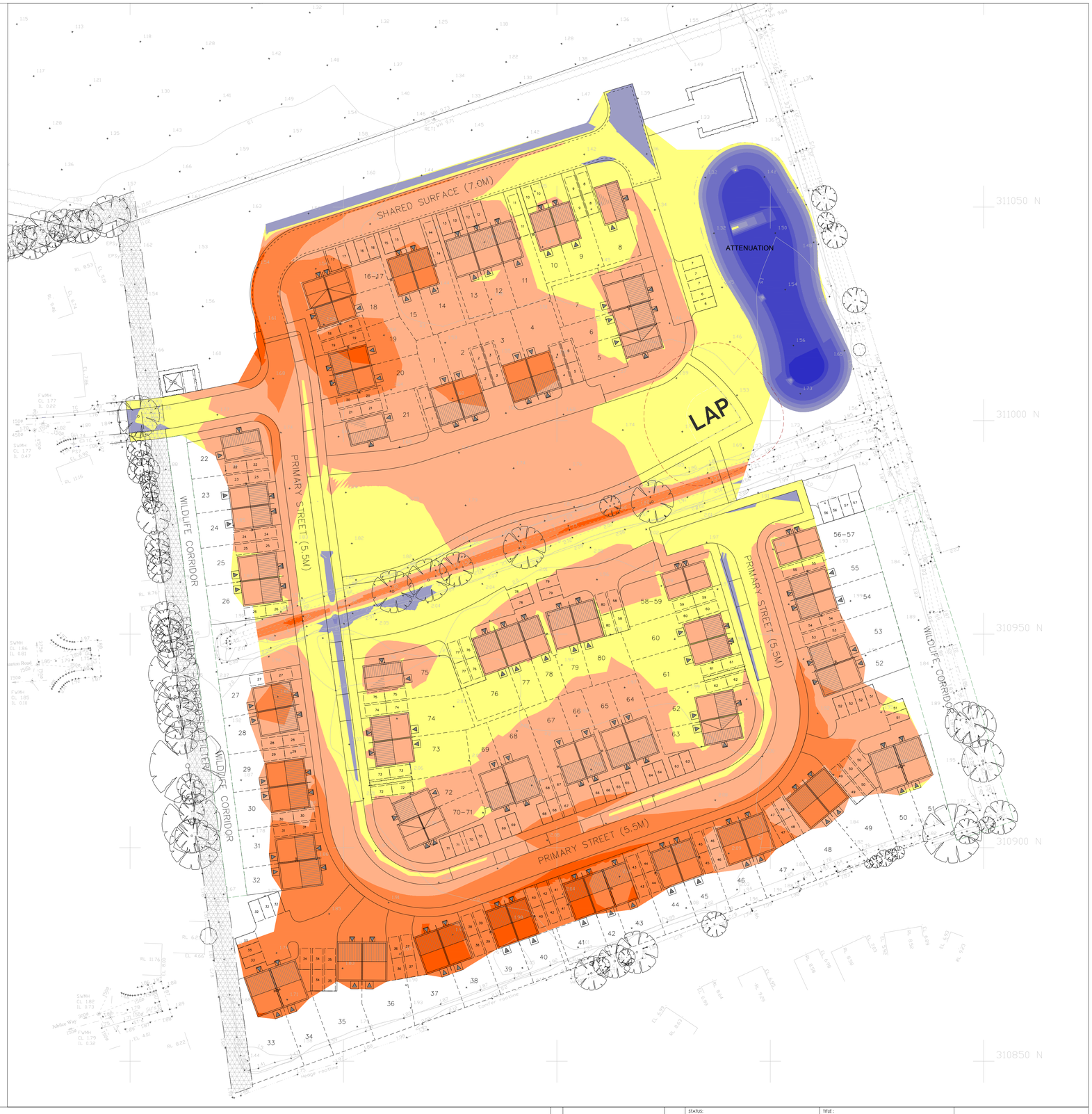
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Volume - Final Surface and Survey

Height Bands	Cut Volume	Fill Volume
Fill 0.9m - 1.2m	--	14.04m³
Fill 0.6m - 0.9m	--	681.97m³
Fill 0.3m - 0.6m	--	2901.71m³
Fill 0m - 0.3m	--	6276.79m³
Cut 0m - 0.3m	404.05m³	--
Cut 0.3m - 0.6m	320.21m³	--
Cut 0.6m - 0.9m	247.30m³	--
Cut 0.9m - 1.2m	165.54m³	--
Cut 1.2m - 1.5m	87.23m³	--
Cut 1.5m - 1.8m	2.24m³	--
Cut 1.8m - 2.1m	--	--
Cut 2.1m - 2.4m	--	--

Total Cut: 1226.58m³
Total Fill: 9874.51m³

Plan shows all units are more than 300mm (orange) above existing survey levels, and all gardens are above existing ground levels (yellow)



ALLISON HOMES
Allison Homes East
Fleet House
Cygnet Road, Hampton
Peterborough
PE7 8FD

REV	DESCRIPTION	DATE
-	-	-

STATUS: Planning

SCALE: 1:500 @ A1
DATE: 11.07.25
DRAWN: IDL

TITLE: Isopachtyes Layout

PROJECT: Normanton Road, Crowland

DRG. No: 1279-00-04

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Greenfield Runoff Rates and Drainage Calculations

Greenfield runoff rate estimation tool

www.uksuds.com | Greenfield runoff rate estimation tool (https://www.uksuds.com/)

hr wallingford

This is an estimation f 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	27/06/2025
Calculated by	Rob Hill
Reference	1279
Model version	2.0.1

Location

Site name	Cloot Drove
Site location	Crowland



© OpenStreetMap (https://www.openstreetmap.org/copyright) contributors.

Site easting	524585
Site northing	310948

Site details

Total site area (ha)	3.477 ha

Greenfield runoff

Method

Method	IH124

IH124

	My value	Map value	
SAAR (mm)	554 mm		554
How should SPR be derived?	WRAP soil type		
WRAP soil type	2		2
SPR	0.3		
QBar (IH124) (l/s)	4.8 l/s		

Growth curve factors

	My value	Map value	
Hydrological region	5		5
1 year growth factor	0.87		
2 year growth factor	0.89		
10 year growth factor	1.65		
30 year growth factor	2.45		
100 year growth factor	3.56		
200 year growth factor	4.21		

Results

Method	IH124
Flow rate 1 year (l/s)	4.2 l/s
Flow rate 2 year (l/s)	4.3 l/s
Flow rate 10 years (l/s)	8 l/s
Flow rate 30 years (l/s)	11.8 l/s
Flow rate 100 years (l/s)	17.2 l/s
Flow rate 200 years (l/s)	20.3 l/s

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.0.1) 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). 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.

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	1.000
Ratio-R	0.450	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)	Rain (mm/hr)
1.000	PS17	PS18	36.805	0.600	2.000	1.775	0.225	163.6	225	Circular	5.60	50.0
1.001	PS18	PS12	22.496	0.600	1.775	1.175	0.600	37.5	225	Circular	5.78	50.0
2.000	PS11	PS12	26.867	0.600	1.425	1.250	0.175	153.5	150	Circular	5.55	50.0
1.002	PS12	PS13	16.861	0.600	1.175	1.100	0.075	225.0	225	Circular	6.10	50.0
1.003	PS13	PS14	31.521	0.600	1.100	0.950	0.150	210.1	225	Circular	6.69	50.0
1.004	PS14	PS34	19.603	0.600	0.875	0.775	0.100	196.0	300	Circular	6.98	50.0
1.005	PS34	PS15	20.950	0.600	0.775	0.675	0.100	209.5	300	Circular	7.30	50.0
3.000	PS16	PS15	17.345	0.600	1.350	0.825	0.525	33.0	150	Circular	5.16	50.0
1.006	PS15	S31	4.883	0.600	0.675	0.650	0.025	195.3	300	Circular	7.37	50.0
4.000	HS1	HS2	19.696	0.600	1.000	0.875	0.125	157.6	225	Circular	5.32	50.0
4.001	HS2	S31	23.938	0.600	0.875	0.725	0.150	159.6	225	Circular	5.70	50.0
1.007	S31	S32	5.345	0.600	0.650	0.625	0.025	213.8	300	Circular	7.46	50.0
5.000	N21	N22	16.284	0.030	2.392	2.277	0.115	141.6	250	Swale	5.34	50.0
5.001	N22	N23	5.987	0.030	2.277	2.224	0.053	113.0	250	Swale	5.46	50.0
5.002	N23	N24	7.580	0.030	2.224	2.157	0.067	113.1	250	Swale	5.60	50.0
5.003	N24	N25	7.461	0.030	2.157	2.091	0.066	113.0	250	Swale	5.74	50.0
5.004	N25	N26	42.627	0.030	2.091	1.802	0.289	147.5	250	Swale	6.65	50.0
5.005	N26	SO27	21.886	0.030	1.802	1.708	0.094	232.8	250	Swale	7.25	50.0
5.006	SO27	S32	13.410	0.600	0.700	0.625	0.075	178.8	300	Circular	7.44	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)
1.000	1.019	40.5	4.7	0.710	0.747	0.035	0.0
1.001	2.143	85.2	6.2	0.747	1.183	0.046	0.0
2.000	0.808	14.3	1.7	0.925	1.183	0.013	0.0
1.002	0.867	34.5	12.2	1.183	1.173	0.090	0.0
1.003	0.898	35.7	13.6	1.173	1.198	0.101	0.0
1.004	1.119	79.1	14.4	1.198	1.181	0.106	0.0
1.005	1.082	76.5	14.4	1.181	1.371	0.106	0.0
3.000	1.757	31.1	3.5	0.928	1.371	0.026	0.0
1.006	1.121	79.3	17.8	1.371	1.174	0.132	0.0
4.000	1.039	41.3	4.1	0.771	1.213	0.030	0.0
4.001	1.032	41.0	4.1	1.213	1.174	0.030	0.0
1.007	1.071	75.7	21.9	1.174	1.102	0.162	0.0
5.000	0.791	247.3	4.9	0.000	-0.001	0.036	0.0
5.001	0.886	276.9	9.9	-0.001	0.000	0.073	0.0
5.002	0.885	276.7	9.9	0.000	0.000	0.073	0.0
5.003	0.886	276.8	9.9	0.000	0.000	0.073	0.0
5.004	0.775	242.3	22.3	0.000	-0.001	0.165	0.0
5.005	0.617	192.9	22.3	-0.001	0.000	0.165	0.0
5.006	1.172	82.9	22.3	0.958	1.102	0.165	0.0

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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)	Link Type	T of C (mins)	Rain (mm/hr)
6.000	N11	N12	17.485	0.030	2.015	1.981	0.034	514.3	250	Swale	5.70	50.0
6.001	N12	N13	19.523	0.030	1.981	1.857	0.124	157.4	250	Swale	6.14	50.0
6.002	N13	S32	12.053	0.030	1.857	1.777	0.080	150.7	250	Swale	6.40	50.0
1.008	S32	S33	16.192	0.600	0.475	0.425	0.050	323.8	450	Circular	7.70	50.0
7.000	PS1	PS2	26.105	0.600	1.800	1.625	0.175	149.2	150	Circular	5.53	50.0
7.001	PS2	PS3	36.918	0.600	1.550	1.375	0.175	211.0	225	Circular	6.22	50.0
7.002	PS3	PS4	10.764	0.600	1.375	1.325	0.050	215.3	225	Circular	6.42	50.0
7.003	PS4	PS5	24.805	0.600	1.325	1.200	0.125	198.4	225	Circular	6.87	50.0
7.004	PS5	PS6	17.053	0.600	1.200	1.125	0.075	227.4	225	Circular	7.20	50.0
7.005	PS6	PS7	14.605	0.600	1.125	1.050	0.075	194.7	225	Circular	7.46	50.0
7.006	PS7	S33	31.714	0.600	1.050	0.650	0.400	79.3	225	Circular	7.82	50.0
9.000	PS24	PS25	32.527	0.600	1.500	1.150	0.350	92.9	150	Circular	5.52	50.0
9.001	PS25	S33	11.369	0.600	1.075	0.650	0.425	26.8	225	Circular	5.59	50.0
1.009	S33	S34	72.790	0.600	0.350	0.155	0.195	373.3	525	Circular	8.87	50.0
10.000	PS19	PS20	32.382	0.600	1.725	1.475	0.250	129.5	150	Circular	5.61	50.0
10.001	PS20	PS21	14.945	0.600	1.475	1.375	0.100	149.5	150	Circular	5.92	50.0
10.002	PS21	PS22	9.705	0.600	1.300	1.250	0.050	194.1	225	Circular	6.09	50.0
10.003	PS22	PS23	35.415	0.600	1.250	1.075	0.175	202.4	225	Circular	6.73	50.0
10.004	PS23	S36	9.204	0.600	1.075	1.000	0.075	122.7	225	Circular	6.86	50.0
11.000	N31	N32	34.124	0.030	2.419	2.192	0.227	150.3	250	Swale	5.74	50.0
11.001	N32	N33	9.422	0.030	2.192	2.107	0.085	110.8	250	Swale	5.92	50.0
11.002	N33	N34	8.442	0.030	2.107	2.033	0.074	114.1	250	Swale	6.08	50.0
11.003	N34	SO35	37.631	0.030	2.033	1.732	0.301	125.0	250	Swale	6.82	50.0
11.004	SO35	S36	4.551	0.600	0.600	0.580	0.020	227.6	300	Circular	6.89	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)
6.000	0.415	129.8	3.3	0.000	0.000	0.024	0.0
6.001	0.750	234.5	6.3	0.000	0.000	0.046	0.0
6.002	0.767	239.8	9.1	0.000	0.000	0.067	0.0
1.008	1.124	178.8	53.4	1.102	0.982	0.394	0.0
7.000	0.820	14.5	3.4	0.526	0.733	0.025	0.0
7.001	0.896	35.6	5.9	0.733	0.932	0.044	0.0
7.002	0.887	35.3	6.4	0.932	0.865	0.047	0.0
7.003	0.924	36.8	7.7	0.865	0.771	0.057	0.0
7.004	0.863	34.3	9.2	0.771	0.737	0.068	0.0
7.005	0.933	37.1	9.2	0.737	0.651	0.068	0.0
7.006	1.470	58.4	17.3	0.651	0.982	0.128	0.0
9.000	1.043	18.4	2.6	0.629	0.701	0.019	0.0
9.001	2.539	101.0	9.5	0.701	0.982	0.070	0.0
1.009	1.153	249.6	80.2	0.982	1.149	0.592	0.0
10.000	0.881	15.6	2.7	0.957	0.926	0.020	0.0
10.001	0.820	14.5	4.2	0.926	1.059	0.031	0.0
10.002	0.935	37.2	7.4	1.059	1.043	0.055	0.0
10.003	0.915	36.4	10.7	1.043	0.929	0.079	0.0
10.004	1.179	46.9	10.7	0.929	0.835	0.079	0.0
11.000	0.768	240.0	8.1	0.000	0.000	0.060	0.0
11.001	0.894	279.5	12.3	0.000	0.000	0.091	0.0
11.002	0.882	275.5	12.3	0.000	0.000	0.091	0.0
11.003	0.842	263.2	18.5	0.000	0.050	0.137	0.0
11.004	1.038	73.4	22.2	1.132	1.180	0.164	0.0

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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)	Link Type	T of C (mins)	Rain (mm/hr)
10.005	S36	S34	29.067	0.600	0.580	0.380	0.200	145.3	300	Circular	7.27	50.0
1.010	S34	HW1	25.886	0.600	0.155	0.100	0.055	470.7	525	Circular	9.29	50.0
12.000	PS33	PS32	18.720	0.600	0.792	0.605	0.187	100.1	100	Circular	5.41	50.0
12.001	PS32	PS31	4.573	0.600	0.605	0.559	0.046	99.4	100	Circular	5.50	50.0
12.002	PS31	HW2	24.233	0.600	0.509	0.197	0.312	77.7	150	Circular	5.86	50.0
13.000	N1	SO2	78.946	0.030	1.344	1.183	0.161	490.3	250	Swale	8.09	50.0
13.001	SO2	S11	16.025	0.600	0.416	0.350	0.066	242.8	300	Circular	8.36	50.0
14.000	PS26	PS27	33.707	0.600	1.151	0.825	0.326	103.4	150	Circular	5.57	50.0
14.001	PS27	PS28	29.021	0.600	0.750	0.560	0.190	152.7	225	Circular	6.03	50.0
14.002	PS28	PS29	14.020	0.600	0.560	0.467	0.093	150.8	225	Circular	6.25	50.0
14.003	PS29	S11	6.244	0.600	0.467	0.425	0.042	148.7	225	Circular	6.34	50.0
13.002	S11	S12	15.864	0.600	0.350	0.286	0.064	247.9	300	Circular	8.63	50.0
13.003	S12	HW3	16.157	0.600	0.286	0.220	0.066	244.8	300	Circular	8.90	50.0
1.014	HW4	S101	14.537	0.600	0.100	0.050	0.050	290.7	450	Circular	5.20	50.0
1.015	S101	S102	23.077	0.600	0.050	-0.034	0.084	274.7	300	Circular	5.61	0.0
1.016	S102	S103	17.634	0.600	-0.034	-0.098	0.064	275.5	300	Circular	5.92	0.0
1.017	S103	S104	101.217	0.600	-0.098	-0.466	0.368	275.0	300	Circular	7.71	0.0
1.018	S104	HW5	10.143	0.600	-0.466	-0.503	0.037	274.1	300	Circular	7.89	0.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
10.005	1.302	92.0	37.6	1.180	1.149	0.278	0.0
1.010	1.026	222.0	117.8	1.149	1.025	0.870	0.0
12.000	0.768	6.0	0.0	0.900	1.072	0.000	0.0
12.001	0.771	6.1	0.0	1.072	1.086	0.000	0.0
12.002	1.142	20.2	6.4	1.086	1.303	0.047	0.0
13.000	0.425	132.9	6.2	0.000	0.000	0.046	0.0
13.001	1.004	71.0	6.2	0.717	0.741	0.046	0.0
14.000	0.988	17.5	2.2	0.889	0.866	0.016	0.0
14.001	1.055	42.0	5.6	0.866	0.847	0.041	0.0
14.002	1.062	42.2	7.0	0.847	0.829	0.051	0.0
14.003	1.070	42.5	7.0	0.829	0.741	0.051	0.0
13.002	0.994	70.3	15.6	0.741	1.016	0.115	0.0
13.003	1.000	70.7	15.6	1.016	1.130	0.115	0.0
1.014	1.187	188.8	0.0	1.100	1.150	0.000	0.0
1.015	0.943	66.7	0.0	1.300	1.196	0.000	0.0
1.016	0.942	66.6	0.0	1.196	1.267	0.000	0.0
1.017	0.943	66.6	0.0	1.267	1.495	0.000	0.0
1.018	0.944	66.8	0.0	1.495	1.703	0.000	0.0

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Detailed
FSR Region	England and Wales	Skip Steady State	✓
M5-60 (mm)	20.000	Drain Down Time (mins)	1440
Ratio-R	0.450	Additional Storage (m³/ha)	0.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30

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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	40	0	0
100	40	6	0

Node S101 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	0.050	Product Number	CTL-SHE-0098-4800-1350-4800
Design Depth (m)	1.350	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	4.8	Min Node Diameter (mm)	1200

Node HW1 Online Orifice Control

Flap Valve	✓	Invert Level (m)	0.100	Discharge Coefficient	1.000
Replaces Downstream Link	x	Diameter (m)	0.600		

Node HW2 Online Orifice Control

Flap Valve	✓	Invert Level (m)	0.101	Discharge Coefficient	1.000
Replaces Downstream Link	x	Diameter (m)	0.225		

Node HW3 Online Orifice Control

Flap Valve	✓	Invert Level (m)	0.101	Discharge Coefficient	1.000
Replaces Downstream Link	x	Diameter (m)	0.375		

Node HW4 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	50.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	0.100	Main Channel Slope (1:X)	100000.0
Safety Factor	2.0	Time to half empty (mins)	774	Main Channel n	0.030

Inlets

HW1 | HW2 | HW3

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	451.1	0.0	0.400	593.6	0.0	0.800	1019.4	0.0	1.200	1195.6	0.0
0.100	485.4	0.0	0.500	630.7	0.0	0.900	1062.6	0.0	1.400	1287.0	0.0
0.200	520.9	0.0	0.600	668.5	0.0	1.000	1106.4	0.0			
0.300	556.9	0.0	0.700	976.7	0.0	1.100	1150.7	0.0			

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Results for 2 year Critical Storm Duration. Lowest mass balance: 99.52%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	PS17	10	2.063	0.063	6.6	0.0101	0.0000	OK
15 minute winter	PS18	11	1.823	0.048	8.5	0.0076	0.0000	OK
15 minute winter	PS11	11	1.466	0.041	2.4	0.0066	0.0000	OK
15 minute winter	PS12	11	1.291	0.116	16.5	0.0738	0.0000	OK
15 minute winter	PS13	11	1.217	0.117	18.4	0.0744	0.0000	OK
15 minute winter	PS14	11	0.979	0.104	19.0	0.0664	0.0000	OK
15 minute winter	PS34	12	0.878	0.103	18.9	0.1168	0.0000	OK
15 minute winter	PS16	10	1.391	0.041	4.9	0.0065	0.0000	OK
15 minute winter	PS15	12	0.814	0.139	23.0	0.1574	0.0000	OK
15 minute winter	HS1	10	1.058	0.058	5.7	0.0823	0.0000	OK
15 minute winter	HS2	11	0.932	0.057	5.6	0.0811	0.0000	OK
15 minute winter	S31	12	0.791	0.141	28.3	0.2024	0.0000	OK
15 minute winter	N21	10	2.431	0.039	6.9	0.0000	0.0000	OK
15 minute winter	N22	11	2.331	0.054	13.7	0.0000	0.0000	OK
15 minute winter	N23	11	2.279	0.055	13.5	0.0000	0.0000	OK
15 minute winter	N24	11	2.211	0.054	13.6	0.0000	0.0000	OK
15 minute summer	N25	10	2.183	0.092	28.6	0.0000	0.0000	OK
15 minute winter	N26	13	1.914	0.112	30.5	0.0000	0.0000	OK
15 minute winter	SO27	13	0.823	0.123	26.0	0.1764	0.0000	OK
15 minute winter	N11	11	2.059	0.044	4.5	0.0626	0.0000	OK
15 minute winter	N12	11	2.026	0.045	8.5	0.0504	0.0000	OK
15 minute winter	N13	12	1.919	0.062	11.9	0.0894	0.0000	OK
15 minute winter	S32	12	0.672	0.197	64.4	0.2815	0.0000	OK
15 minute winter	PS1	10	1.859	0.059	4.7	0.0093	0.0000	OK
15 minute winter	PS2	11	1.622	0.072	8.0	0.0204	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 winter	PS17	1.000	PS18	6.4	0.851	0.159	0.2803	
15 minute winter	PS18	1.001	PS12	8.5	0.651	0.099	0.3011	
15 minute winter	PS11	2.000	PS12	2.3	0.594	0.163	0.1056	
15 minute winter	PS12	1.002	PS13	16.5	0.801	0.477	0.3499	
15 minute winter	PS13	1.003	PS14	18.0	0.896	0.505	0.6362	
15 minute winter	PS14	1.004	PS34	18.9	0.883	0.238	0.4221	
15 minute winter	PS34	1.005	PS15	19.0	0.714	0.249	0.5600	
15 minute winter	PS16	3.000	PS15	4.8	1.259	0.155	0.0665	
15 minute winter	PS15	1.006	S31	23.1	0.716	0.292	0.1578	
15 minute winter	HS1	4.000	HS2	5.6	0.723	0.136	0.1535	
15 minute winter	HS2	4.001	S31	5.6	0.701	0.137	0.2031	
15 minute winter	S31	1.007	S32	28.4	0.938	0.375	0.1620	
15 minute winter	N21	5.000	N22	6.7	0.226	0.027	0.4875	
15 minute winter	N22	5.001	N23	13.5	0.370	0.049	0.2176	
15 minute winter	N23	5.002	N24	13.6	0.376	0.049	0.2734	
15 minute winter	N24	5.003	N25	13.5	0.264	0.049	0.3914	
15 minute summer	N25	5.004	N26	30.2	0.436	0.125	3.2423	
15 minute winter	N26	5.005	SO27	26.0	0.406	0.135	1.4488	
15 minute winter	SO27	5.006	S32	26.1	1.006	0.315	0.3477	
15 minute winter	N11	6.000	N12	4.4	0.157	0.034	0.4883	
15 minute winter	N12	6.001	N13	8.2	0.233	0.035	0.6901	
15 minute winter	N13	6.002	S32	11.4	0.362	0.047	0.3857	
15 minute winter	S32	1.008	S33	64.2	1.044	0.359	0.9970	
15 minute winter	PS1	7.000	PS2	4.5	0.722	0.312	0.1637	
15 minute winter	PS2	7.001	PS3	8.0	0.678	0.224	0.4362	

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Results for 2 year Critical Storm Duration. Lowest mass balance: 99.52%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	PS3	11	1.455	0.080	8.6	0.0227	0.0000	OK
15 minute winter	PS4	11	1.407	0.082	10.3	0.0232	0.0000	OK
15 minute winter	PS5	12	1.296	0.096	12.1	0.0270	0.0000	OK
15 minute winter	PS6	12	1.218	0.093	11.9	0.0264	0.0000	OK
15 minute winter	PS7	11	1.148	0.098	22.0	0.0277	0.0000	OK
15 minute winter	PS24	11	1.545	0.045	3.7	0.0072	0.0000	OK
15 minute winter	PS25	10	1.132	0.057	13.1	0.0163	0.0000	OK
15 minute winter	S33	12	0.572	0.222	96.0	0.3925	0.0000	OK
15 minute winter	PS19	10	1.775	0.050	3.8	0.0079	0.0000	OK
15 minute winter	PS20	11	1.542	0.067	5.7	0.0107	0.0000	OK
15 minute winter	PS21	11	1.387	0.087	9.9	0.0245	0.0000	OK
15 minute winter	PS22	11	1.350	0.100	14.2	0.0284	0.0000	OK
15 minute winter	PS23	11	1.167	0.092	14.3	0.0259	0.0000	OK
15 minute winter	N31	11	2.471	0.052	11.4	0.0000	0.0000	OK
15 minute winter	N32	11	2.253	0.061	16.5	0.0000	0.0000	OK
15 minute winter	N33	11	2.167	0.060	16.4	0.0000	0.0000	OK
15 minute winter	N34	12	2.118	0.085	24.4	0.0000	0.0000	OK
15 minute winter	SO35	12	0.758	0.158	26.3	0.2265	0.0000	OK
15 minute winter	S36	12	0.737	0.157	45.5	0.2246	0.0000	OK
15 minute winter	S34	13	0.448	0.293	140.3	0.5183	0.0000	OK
15 minute winter	HW1	13	0.337	0.237	140.7	0.0000	0.0000	OK
15 minute summer	PS33	1	0.792	0.000	0.0	0.0000	0.0000	OK
15 minute summer	PS32	1	0.605	0.000	0.0	0.0000	0.0000	OK
15 minute winter	PS31	10	0.580	0.071	8.9	0.0201	0.0000	OK
30 minute winter	HW2	43	0.305	0.205	6.7	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 winter	PS3	7.002	PS4	8.5	0.662	0.242	0.1388	
15 minute winter	PS4	7.003	PS5	10.2	0.704	0.279	0.3609	
15 minute winter	PS5	7.004	PS6	11.9	0.761	0.348	0.2690	
15 minute winter	PS6	7.005	PS7	12.0	0.766	0.324	0.2327	
15 minute winter	PS7	7.006	S33	21.5	1.343	0.369	0.5108	
15 minute winter	PS24	9.000	PS25	3.6	0.806	0.194	0.1445	
15 minute winter	PS25	9.001	S33	13.0	1.697	0.129	0.0873	
15 minute winter	S33	1.009	S34	95.3	0.918	0.382	7.6241	
15 minute winter	PS19	10.000	PS20	3.7	0.594	0.238	0.2054	
15 minute winter	PS20	10.001	PS21	5.6	0.754	0.388	0.1112	
15 minute winter	PS21	10.002	PS22	9.9	0.639	0.268	0.1513	
15 minute winter	PS22	10.003	PS23	14.3	0.889	0.394	0.5715	
15 minute winter	PS23	10.004	S36	14.2	0.988	0.302	0.1320	
15 minute winter	N31	11.000	N32	10.9	0.293	0.045	1.2825	
15 minute winter	N32	11.001	N33	16.4	0.402	0.059	0.3851	
15 minute winter	N33	11.002	N34	16.2	0.323	0.059	0.4387	
15 minute winter	N34	11.003	SO35	22.3	0.460	0.085	1.8519	
15 minute winter	SO35	11.004	S36	26.3	0.705	0.359	0.1706	
15 minute winter	S36	10.005	S34	45.8	1.276	0.498	1.0443	
15 minute winter	S34	1.010	HW1	138.8	1.269	0.625	2.8310	
15 minute winter	HW1	Flow through pond	HW4	136.4	0.178	0.070	79.1844	
15 minute summer	PS33	12.000	PS32	0.0	0.000	0.000	0.0000	
15 minute summer	PS32	12.001	PS31	0.0	0.000	0.000	0.0024	
15 minute winter	PS31	12.002	HW2	8.7	1.082	0.431	0.1948	
30 minute winter	HW2	Flow through pond	HW4	97.0	0.137	0.050	100.1242	

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Results for 2 year Critical Storm Duration. Lowest mass balance: 99.52%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	N1	23	1.399	0.055	6.5	0.0000	0.0000	OK
30 minute winter	SO2	23	0.461	0.045	3.4	0.0637	0.0000	OK
15 minute winter	PS26	11	1.193	0.042	3.1	0.0067	0.0000	OK
15 minute winter	PS27	10	0.815	0.065	7.6	0.0183	0.0000	OK
15 minute winter	PS28	11	0.635	0.075	9.4	0.0214	0.0000	OK
15 minute winter	PS29	11	0.545	0.078	9.4	0.0220	0.0000	OK
15 minute winter	S11	12	0.447	0.097	14.6	0.1393	0.0000	OK
15 minute winter	S12	12	0.382	0.096	14.6	0.1381	0.0000	OK
30 minute winter	HW3	44	0.305	0.205	12.2	0.0000	0.0000	OK
30 minute winter	HW4	43	0.306	0.206	97.0	0.0000	0.0000	OK
30 minute winter	S101	40	0.318	0.268	11.2	0.3829	0.0000	OK
30 minute winter	S102	44	0.021	0.055	4.7	0.0784	0.0000	OK
15 minute winter	S103	19	-0.045	0.053	4.5	0.0759	0.0000	OK
30 minute winter	S104	47	-0.411	0.055	4.6	0.0790	0.0000	OK
30 minute winter	HW5	47	-0.452	0.051	4.6	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	N1	13.000	SO2	3.4	0.159	0.026	1.7934	
30 minute winter	SO2	13.001	S11	3.4	0.377	0.049	0.1864	
15 minute winter	PS26	14.000	PS27	3.0	0.737	0.170	0.1361	
15 minute winter	PS27	14.001	PS28	7.6	0.719	0.180	0.3058	
15 minute winter	PS28	14.002	PS29	9.4	0.791	0.223	0.1669	
15 minute winter	PS29	14.003	S11	9.4	0.820	0.221	0.0715	
15 minute winter	S11	13.002	S12	14.6	0.746	0.208	0.3121	
15 minute winter	S12	13.003	HW3	14.5	0.773	0.206	0.3040	
30 minute winter	HW3	Flow through pond	HW4	97.0	0.137	0.050	100.1242	
30 minute winter	HW4	1.014	S101	11.2	0.421	0.060	1.2252	
30 minute winter	S101	Hydro-Brake®	S102	4.7				
30 minute winter	S102	1.016	S103	4.6	0.731	0.070	0.1511	
15 minute winter	S103	1.017	S104	4.5	0.642	0.068	0.8533	
30 minute winter	S104	1.018	HW5	4.6	0.554	0.069	0.0848	114.8

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.52%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	PS17	10	2.089	0.089	12.6	0.0142	0.0000	OK
15 minute winter	PS18	10	1.841	0.066	16.4	0.0105	0.0000	OK
15 minute winter	PS11	10	1.483	0.058	4.6	0.0091	0.0000	OK
15 minute winter	PS12	11	1.362	0.187	31.8	0.1189	0.0000	OK
15 minute winter	PS13	11	1.285	0.185	34.7	0.1178	0.0000	OK
15 minute winter	PS14	11	1.027	0.152	35.7	0.0968	0.0000	OK
15 minute winter	PS34	12	0.933	0.158	35.5	0.1791	0.0000	OK
15 minute winter	PS16	10	1.408	0.058	9.2	0.0092	0.0000	OK
15 minute winter	PS15	12	0.887	0.212	43.1	0.2396	0.0000	OK
15 minute winter	HS1	10	1.081	0.081	10.8	0.1157	0.0000	OK
15 minute winter	HS2	11	0.952	0.077	10.7	0.1103	0.0000	OK
15 minute winter	S31	12	0.859	0.209	52.9	0.2984	0.0000	OK
15 minute winter	N21	10	2.448	0.056	13.1	0.0000	0.0000	OK
15 minute winter	N22	10	2.355	0.078	26.2	0.0000	0.0000	OK
15 minute winter	N23	11	2.302	0.078	25.6	0.0000	0.0000	OK
15 minute winter	N24	11	2.234	0.077	25.8	0.0000	0.0000	OK
15 minute winter	N25	11	2.215	0.124	57.4	0.0000	0.0000	OK
15 minute winter	N26	12	1.954	0.152	56.9	0.0000	0.0000	OK
15 minute winter	SO27	12	0.889	0.189	52.5	0.2704	0.0000	OK
15 minute winter	N11	11	2.078	0.063	8.6	0.0896	0.0000	OK
15 minute winter	N12	11	2.045	0.064	16.2	0.0724	0.0000	OK
15 minute winter	N13	11	1.943	0.086	22.9	0.1231	0.0000	OK
15 minute winter	S32	12	0.791	0.316	127.2	0.4527	0.0000	OK
15 minute winter	PS1	10	1.886	0.086	8.9	0.0137	0.0000	OK
15 minute winter	PS2	10	1.653	0.103	15.3	0.0292	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 winter	PS17	1.000	PS18	12.4	1.021	0.306	0.4481	
15 minute winter	PS18	1.001	PS12	16.1	0.734	0.189	0.5056	
15 minute winter	PS11	2.000	PS12	4.5	0.584	0.314	0.2716	
15 minute winter	PS12	1.002	PS13	31.0	0.898	0.899	0.5923	
15 minute winter	PS13	1.003	PS14	33.9	1.061	0.951	1.0088	
15 minute winter	PS14	1.004	PS34	35.5	0.981	0.449	0.7195	
15 minute winter	PS34	1.005	PS15	35.7	0.785	0.467	0.9522	
15 minute winter	PS16	3.000	PS15	9.1	1.494	0.293	0.1062	
15 minute winter	PS15	1.006	S31	43.4	0.823	0.548	0.2575	
15 minute winter	HS1	4.000	HS2	10.7	0.860	0.258	0.2440	
15 minute winter	HS2	4.001	S31	10.5	0.732	0.256	0.4278	
15 minute winter	S31	1.007	S32	53.2	1.106	0.703	0.2570	
15 minute winter	N21	5.000	N22	12.8	0.273	0.052	0.7708	
15 minute winter	N22	5.001	N23	25.6	0.447	0.093	0.3437	
15 minute winter	N23	5.002	N24	25.8	0.452	0.093	0.4331	
15 minute winter	N24	5.003	N25	25.9	0.321	0.094	0.6145	
15 minute winter	N25	5.004	N26	56.9	0.501	0.235	5.2894	
15 minute winter	N26	5.005	SO27	52.5	0.514	0.272	2.3065	
15 minute winter	SO27	5.006	S32	52.1	1.190	0.629	0.5895	
15 minute winter	N11	6.000	N12	8.3	0.191	0.064	0.7641	
15 minute winter	N12	6.001	N13	15.8	0.290	0.067	1.0692	
15 minute winter	N13	6.002	S32	22.2	0.454	0.093	0.6008	
15 minute winter	S32	1.008	S33	126.5	1.144	0.708	1.8542	
15 minute winter	PS1	7.000	PS2	8.6	0.848	0.595	0.2664	
15 minute winter	PS2	7.001	PS3	15.2	0.789	0.427	0.7172	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.52%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	PS3	11	1.494	0.119	16.4	0.0337	0.0000	OK
15 minute winter	PS4	11	1.446	0.121	19.8	0.0341	0.0000	OK
15 minute winter	PS5	11	1.345	0.145	23.4	0.0411	0.0000	OK
15 minute winter	PS6	12	1.266	0.141	22.9	0.0400	0.0000	OK
15 minute winter	PS7	11	1.199	0.149	42.7	0.0422	0.0000	OK
15 minute winter	PS24	10	1.564	0.064	7.0	0.0102	0.0000	OK
15 minute winter	PS25	10	1.157	0.082	25.0	0.0232	0.0000	OK
15 minute winter	S33	13	0.720	0.370	188.6	0.6544	0.0000	OK
15 minute winter	PS19	10	1.796	0.071	7.2	0.0112	0.0000	OK
15 minute winter	PS20	11	1.577	0.102	11.0	0.0162	0.0000	OK
15 minute winter	PS21	11	1.433	0.133	19.0	0.0378	0.0000	OK
15 minute winter	PS22	11	1.401	0.151	27.3	0.0426	0.0000	OK
15 minute winter	PS23	11	1.211	0.136	27.3	0.0385	0.0000	OK
15 minute winter	N31	11	2.492	0.073	21.6	0.0000	0.0000	OK
15 minute winter	N32	11	2.279	0.087	31.7	0.0000	0.0000	OK
15 minute winter	N33	11	2.192	0.085	31.5	0.0000	0.0000	OK
15 minute winter	N34	12	2.151	0.118	46.9	0.0000	0.0000	OK
15 minute winter	SO35	12	0.869	0.269	51.9	0.3845	0.0000	OK
15 minute winter	S36	12	0.843	0.263	90.2	0.3758	0.0000	OK
15 minute winter	S34	13	0.617	0.462	272.0	0.8165	0.0000	OK
30 minute winter	HW1	43	0.473	0.373	223.3	0.0000	0.0000	OK
15 minute summer	PS33	1	0.792	0.000	0.0	0.0000	0.0000	OK
15 minute winter	PS32	11	0.617	0.012	0.2	0.0020	0.0000	OK
15 minute winter	PS31	10	0.617	0.108	16.9	0.0305	0.0000	OK
30 minute winter	HW2	43	0.473	0.372	12.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	PS3	7.002	PS4	16.4	0.763	0.465	0.2314	
15 minute winter	PS4	7.003	PS5	19.7	0.806	0.536	0.6049	
15 minute winter	PS5	7.004	PS6	22.9	0.864	0.668	0.4523	
15 minute winter	PS6	7.005	PS7	23.1	0.879	0.623	0.3936	
15 minute winter	PS7	7.006	S33	42.2	1.564	0.722	0.8557	
15 minute winter	PS24	9.000	PS25	6.8	0.957	0.367	0.2304	
15 minute winter	PS25	9.001	S33	24.9	2.006	0.246	0.1410	
15 minute winter	S33	1.009	S34	182.3	1.009	0.730	13.2542	
15 minute winter	PS19	10.000	PS20	7.1	0.686	0.453	0.3362	
15 minute winter	PS20	10.001	PS21	10.8	0.874	0.743	0.1839	
15 minute winter	PS21	10.002	PS22	19.0	0.719	0.510	0.2560	
15 minute winter	PS22	10.003	PS23	27.3	1.024	0.750	0.9436	
15 minute winter	PS23	10.004	S36	27.2	1.157	0.580	0.2162	
15 minute winter	N31	11.000	N32	20.8	0.355	0.086	2.0246	
15 minute winter	N32	11.001	N33	31.5	0.485	0.113	0.6125	
15 minute winter	N33	11.002	N34	31.4	0.390	0.114	0.6880	
15 minute winter	N34	11.003	SO35	44.3	0.569	0.168	2.9770	
15 minute winter	SO35	11.004	S36	52.3	0.795	0.713	0.3002	
15 minute winter	S36	10.005	S34	89.7	1.435	0.975	1.8126	
15 minute winter	S34	1.010	HW1	267.0	1.473	1.202	4.6633	
30 minute winter	HW1	Flow through pond	HW4	137.2	0.155	0.070	192.8389	
15 minute summer	PS33	12.000	PS32	0.0	0.000	0.000	0.0032	
15 minute winter	PS32	12.001	PS31	-0.2	0.174	-0.037	0.0117	
15 minute winter	PS31	12.002	HW2	16.3	1.242	0.808	0.3187	
30 minute winter	HW2	Flow through pond	HW4	137.2	0.155	0.070	192.8389	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.52%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	N1	22	1.427	0.083	12.5	0.0000	0.0000	OK
15 minute winter	SO2	12	0.501	0.085	7.7	0.1221	0.0000	OK
15 minute winter	PS26	10	1.211	0.060	5.9	0.0095	0.0000	OK
15 minute winter	PS27	10	0.843	0.093	14.6	0.0262	0.0000	OK
15 minute winter	PS28	11	0.670	0.110	18.0	0.0312	0.0000	OK
15 minute winter	PS29	11	0.580	0.113	18.0	0.0319	0.0000	OK
15 minute winter	S11	12	0.497	0.147	29.6	0.2100	0.0000	OK
30 minute winter	S12	45	0.473	0.187	24.7	0.2680	0.0000	OK
30 minute winter	HW3	43	0.473	0.372	24.8	0.0000	0.0000	OK
30 minute winter	HW4	42	0.473	0.373	137.2	0.0000	0.0000	OK
30 minute winter	S101	44	0.489	0.439	17.2	0.6286	0.0000	SURCHARGED
30 minute winter	S102	81	0.022	0.056	4.8	0.0797	0.0000	OK
15 minute winter	S103	17	-0.043	0.055	4.8	0.0786	0.0000	OK
30 minute winter	S104	88	-0.410	0.056	4.8	0.0806	0.0000	OK
30 minute winter	HW5	88	-0.451	0.052	4.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	N1	13.000	SO2	7.8	0.211	0.058	3.0793	
15 minute winter	SO2	13.001	S11	8.3	0.508	0.117	0.4064	
15 minute winter	PS26	14.000	PS27	5.7	0.879	0.325	0.2173	
15 minute winter	PS27	14.001	PS28	14.4	0.838	0.343	0.4997	
15 minute winter	PS28	14.002	PS29	18.0	0.918	0.426	0.2747	
15 minute winter	PS29	14.003	S11	18.0	0.969	0.424	0.1162	
15 minute winter	S11	13.002	S12	29.6	0.880	0.421	0.5360	
30 minute winter	S12	13.003	HW3	24.8	0.894	0.351	0.8856	
30 minute winter	HW3	Flow through pond	HW4	137.2	0.155	0.070	192.8389	
30 minute winter	HW4	1.014	S101	17.2	0.447	0.091	2.1662	
30 minute winter	S101	Hydro-Brake®	S102	4.8				
30 minute winter	S102	1.016	S103	4.8	0.751	0.072	0.1550	
15 minute winter	S103	1.017	S104	4.8	0.656	0.073	0.8943	
30 minute winter	S104	1.018	HW5	4.8	0.558	0.072	0.0873	219.7

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.52%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	PS17	10	2.126	0.126	22.9	0.0200	0.0000	OK
15 minute winter	PS18	13	1.956	0.181	29.7	0.0288	0.0000	OK
15 minute winter	PS11	12	1.948	0.523	8.4	0.0832	0.0000	SURCHARGED
15 minute winter	PS12	13	1.918	0.743	56.2	0.4726	0.0000	SURCHARGED
15 minute winter	PS13	13	1.793	0.693	56.9	0.4407	0.0000	SURCHARGED
15 minute winter	PS14	13	1.526	0.651	55.3	0.4138	0.0000	SURCHARGED
15 minute winter	PS34	13	1.478	0.703	53.8	0.7948	0.0000	SURCHARGED
15 minute winter	PS16	13	1.502	0.152	16.8	0.0242	0.0000	SURCHARGED
15 minute winter	PS15	12	1.428	0.753	60.2	0.8514	0.0000	SURCHARGED
15 minute winter	HS1	13	1.428	0.428	19.6	0.6128	0.0000	SURCHARGED
15 minute winter	HS2	13	1.418	0.543	19.3	0.7765	0.0000	SURCHARGED
15 minute winter	S31	12	1.399	0.749	77.9	1.0714	0.0000	SURCHARGED
15 minute winter	N21	10	2.469	0.077	23.8	0.0000	0.0000	OK
15 minute winter	N22	10	2.386	0.109	47.7	0.0000	0.0000	OK
15 minute winter	N23	11	2.330	0.106	46.8	0.0000	0.0000	OK
15 minute winter	N24	11	2.275	0.118	46.8	0.0000	0.0000	OK
15 minute winter	N25	11	2.258	0.167	104.9	0.0000	0.0000	OK
15 minute winter	N26	12	2.000	0.198	103.8	0.0000	0.0000	OK
15 minute winter	SO27	12	1.508	0.808	98.7	1.1558	0.0000	SURCHARGED
15 minute winter	N11	11	2.102	0.087	15.7	0.1246	0.0000	OK
15 minute winter	N12	11	2.070	0.089	29.6	0.1005	0.0000	OK
15 minute winter	N13	11	1.972	0.115	41.9	0.1649	0.0000	OK
15 minute winter	S32	12	1.352	0.877	206.8	1.2550	0.0000	SURCHARGED
15 minute winter	PS1	12	2.074	0.274	16.2	0.0436	0.0000	SURCHARGED
15 minute winter	PS2	13	1.964	0.414	27.4	0.1171	0.0000	SURCHARGED

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 winter	PS17	1.000	PS18	22.5	1.195	0.556	0.9147	
15 minute winter	PS18	1.001	PS12	29.4	0.917	0.345	0.8330	
15 minute winter	PS11	2.000	PS12	7.8	0.582	0.546	0.4730	
15 minute winter	PS12	1.002	PS13	49.8	1.251	1.443	0.6706	
15 minute winter	PS13	1.003	PS14	51.8	1.315	1.452	1.2536	
15 minute winter	PS14	1.004	PS34	53.8	1.020	0.680	1.3804	
15 minute winter	PS34	1.005	PS15	52.4	0.758	0.685	1.4753	
15 minute winter	PS16	3.000	PS15	16.7	1.608	0.538	0.3053	
15 minute winter	PS15	1.006	S31	63.8	0.906	0.805	0.3439	
15 minute winter	HS1	4.000	HS2	19.3	0.992	0.468	0.7833	
15 minute winter	HS2	4.001	S31	20.5	0.743	0.501	0.9520	
15 minute winter	S31	1.007	S32	81.8	1.172	1.081	0.3764	
15 minute winter	N21	5.000	N22	23.4	0.323	0.095	1.1913	
15 minute winter	N22	5.001	N23	46.8	0.530	0.169	0.5290	
15 minute winter	N23	5.002	N24	46.8	0.505	0.169	0.7100	
15 minute winter	N24	5.003	N25	47.0	0.356	0.170	0.9985	
15 minute winter	N25	5.004	N26	103.8	0.572	0.428	8.0657	
15 minute winter	N26	5.005	SO27	98.7	0.626	0.512	3.5420	
15 minute winter	SO27	5.006	S32	97.4	1.384	1.176	0.9443	
15 minute winter	N11	6.000	N12	15.1	0.227	0.116	1.1751	
15 minute winter	N12	6.001	N13	29.0	0.352	0.124	1.6162	
15 minute winter	N13	6.002	S32	41.6	0.553	0.173	0.9199	
15 minute winter	S32	1.008	S33	205.9	1.299	1.152	2.5655	
15 minute winter	PS1	7.000	PS2	15.7	0.937	1.086	0.4596	
15 minute winter	PS2	7.001	PS3	27.0	0.874	0.759	1.4683	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.52%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	PS3	13	1.911	0.536	29.3	0.1516	0.0000	SURCHARGED
15 minute winter	PS4	13	1.886	0.561	33.5	0.1587	0.0000	SURCHARGED
15 minute winter	PS5	13	1.812	0.612	33.9	0.1731	0.0000	SURCHARGED
15 minute winter	PS6	12	1.738	0.613	34.8	0.1736	0.0000	SURCHARGED
15 minute winter	PS7	12	1.684	0.634	64.2	0.1795	0.0000	FLOOD RISK
15 minute winter	PS24	10	1.593	0.093	12.7	0.0148	0.0000	OK
15 minute winter	PS25	12	1.306	0.231	45.6	0.0653	0.0000	SURCHARGED
15 minute winter	S33	12	1.243	0.893	294.0	1.5771	0.0000	SURCHARGED
15 minute winter	PS19	12	2.135	0.410	13.2	0.0652	0.0000	SURCHARGED
15 minute winter	PS20	12	2.031	0.556	18.5	0.0884	0.0000	SURCHARGED
15 minute winter	PS21	12	1.914	0.614	31.3	0.1736	0.0000	SURCHARGED
15 minute winter	PS22	12	1.878	0.628	43.0	0.1777	0.0000	SURCHARGED
15 minute winter	PS23	12	1.663	0.588	39.4	0.1663	0.0000	SURCHARGED
15 minute winter	N31	10	2.520	0.101	39.3	0.0000	0.0000	OK
15 minute winter	N32	11	2.311	0.119	58.2	0.0000	0.0000	OK
15 minute winter	N33	11	2.225	0.118	57.6	0.0000	0.0000	OK
15 minute winter	N34	11	2.190	0.157	85.8	0.0000	0.0000	OK
15 minute winter	SO35	12	1.673	1.073	98.2	1.5348	0.0000	SURCHARGED
15 minute winter	S36	12	1.591	1.011	150.5	1.4466	0.0000	SURCHARGED
15 minute winter	S34	12	0.923	0.768	442.2	1.3573	0.0000	SURCHARGED
30 minute winter	HW1	44	0.726	0.626	384.0	0.0000	0.0000	OK
15 minute winter	PS33	12	0.924	0.132	2.7	0.0209	0.0000	SURCHARGED
15 minute winter	PS32	12	0.916	0.311	3.9	0.0494	0.0000	SURCHARGED
15 minute winter	PS31	11	0.921	0.412	30.8	0.1167	0.0000	SURCHARGED
30 minute winter	HW2	48	0.721	0.620	20.7	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 winter	PS3	7.002	PS4	26.9	0.802	0.763	0.4281	
15 minute winter	PS4	7.003	PS5	30.6	0.850	0.833	0.9865	
15 minute winter	PS5	7.004	PS6	34.8	0.904	1.013	0.6782	
15 minute winter	PS6	7.005	PS7	37.2	1.090	1.003	0.5809	
15 minute winter	PS7	7.006	S33	57.6	1.552	0.985	1.2613	
15 minute winter	PS24	9.000	PS25	12.3	1.105	0.668	0.4435	
15 minute winter	PS25	9.001	S33	45.2	2.260	0.447	0.4522	
15 minute winter	S33	1.009	S34	292.8	1.356	1.173	15.7250	
15 minute winter	PS19	10.000	PS20	11.8	0.754	0.756	0.5701	
15 minute winter	PS20	10.001	PS21	16.3	0.962	1.123	0.2631	
15 minute winter	PS21	10.002	PS22	27.9	0.740	0.750	0.3860	
15 minute winter	PS22	10.003	PS23	39.4	1.067	1.083	1.4085	
15 minute winter	PS23	10.004	S36	42.3	1.258	0.902	0.3661	
15 minute winter	N31	11.000	N32	38.0	0.419	0.158	3.1220	
15 minute winter	N32	11.001	N33	57.6	0.569	0.206	0.9557	
15 minute winter	N33	11.002	N34	57.4	0.463	0.208	1.0685	
15 minute winter	N34	11.003	SO35	82.0	0.678	0.311	4.6094	
15 minute winter	SO35	11.004	S36	95.6	1.357	1.303	0.3205	
15 minute winter	S36	10.005	S34	150.0	2.130	1.630	2.0469	
15 minute winter	S34	1.010	HW1	441.1	2.042	1.987	5.5889	
30 minute winter	HW1	Flow through pond	HW4	243.0	0.165	0.124	354.9795	
15 minute winter	PS33	12.000	PS32	-2.7	-0.341	-0.442	0.1465	
15 minute winter	PS32	12.001	PS31	4.0	0.531	0.668	0.0358	
15 minute winter	PS31	12.002	HW2	26.0	1.478	1.290	0.4266	
30 minute winter	HW2	Flow through pond	HW4	243.0	0.165	0.124	354.9795	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.52%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	N1	13	1.464	0.120	30.1	0.0000	0.0000	OK
30 minute winter	SO2	46	0.728	0.312	16.1	0.4459	0.0000	SURCHARGED
15 minute winter	PS26	10	1.236	0.085	10.7	0.0136	0.0000	OK
15 minute winter	PS27	10	0.883	0.133	26.7	0.0375	0.0000	OK
15 minute winter	PS28	11	0.727	0.167	32.9	0.0473	0.0000	OK
30 minute winter	PS29	46	0.727	0.260	25.4	0.0737	0.0000	SURCHARGED
30 minute winter	S11	46	0.727	0.377	47.9	0.5402	0.0000	SURCHARGED
30 minute winter	S12	46	0.727	0.441	47.6	0.6315	0.0000	SURCHARGED
30 minute winter	HW3	45	0.727	0.627	46.5	0.0000	0.0000	OK
30 minute winter	HW4	47	0.728	0.628	243.9	0.0000	0.0000	SURCHARGED
30 minute winter	S101	41	0.741	0.691	22.6	0.9887	0.0000	SURCHARGED
15 minute winter	S102	11	0.022	0.056	4.8	0.0805	0.0000	OK
15 minute summer	S103	16	-0.042	0.056	4.8	0.0795	0.0000	OK
15 minute summer	S104	274	-0.410	0.056	4.9	0.0806	0.0000	OK
15 minute summer	HW5	276	-0.451	0.052	4.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	N1	13.000	SO2	16.6	0.272	0.125	5.1506	
30 minute winter	SO2	13.001	S11	16.3	0.395	0.229	1.1285	
15 minute winter	PS26	14.000	PS27	10.3	1.021	0.590	0.3415	
15 minute winter	PS27	14.001	PS28	26.3	0.947	0.627	0.8038	
15 minute winter	PS28	14.002	PS29	32.7	1.034	0.775	0.4463	
30 minute winter	PS29	14.003	S11	25.3	1.051	0.594	0.2483	
30 minute winter	S11	13.002	S12	47.6	0.970	0.677	1.1171	
30 minute winter	S12	13.003	HW3	46.5	1.047	0.658	1.1378	
30 minute winter	HW3	Flow through pond	HW4	243.0	0.165	0.124	354.9795	
30 minute winter	HW4	1.014	S101	22.6	0.452	0.120	2.3033	
30 minute winter	S101	Hydro-Brake®	S102	4.8				
15 minute winter	S102	1.016	S103	4.8	0.831	0.072	0.1579	
15 minute summer	S103	1.017	S104	4.9	0.664	0.074	0.8969	
15 minute summer	S104	1.018	HW5	4.8	0.558	0.072	0.0873	277.6

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Results for 100 year +40% CC +6% A Critical Storm Duration. Lowest mass balance: 99.52%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	PS17	10	2.130	0.130	24.3	0.0207	0.0000	OK
15 minute winter	PS18	13	2.087	0.312	31.5	0.0495	0.0000	SURCHARGED
15 minute winter	PS11	13	2.081	0.656	8.9	0.1043	0.0000	SURCHARGED
15 minute winter	PS12	13	2.041	0.866	57.3	0.5508	0.0000	SURCHARGED
15 minute winter	PS13	13	1.912	0.812	59.8	0.5163	0.0000	SURCHARGED
15 minute winter	PS14	13	1.632	0.757	59.0	0.4814	0.0000	SURCHARGED
15 minute winter	PS34	13	1.582	0.807	51.0	0.9124	0.0000	SURCHARGED
15 minute winter	PS16	12	1.630	0.280	17.8	0.0445	0.0000	SURCHARGED
15 minute winter	PS15	13	1.526	0.851	61.7	0.9622	0.0000	SURCHARGED
15 minute winter	HS1	13	1.531	0.531	20.8	0.7600	0.0000	SURCHARGED
15 minute winter	HS2	13	1.514	0.639	24.6	0.9146	0.0000	SURCHARGED
15 minute winter	S31	13	1.490	0.840	81.5	1.2027	0.0000	SURCHARGED
15 minute winter	N21	10	2.471	0.079	25.2	0.0000	0.0000	OK
15 minute winter	N22	10	2.389	0.112	50.6	0.0000	0.0000	OK
15 minute winter	N23	11	2.333	0.109	49.7	0.0000	0.0000	OK
15 minute winter	N24	11	2.279	0.122	49.5	0.0000	0.0000	OK
15 minute winter	N25	11	2.263	0.172	111.2	0.0000	0.0000	OK
15 minute winter	N26	12	2.005	0.203	110.0	0.0000	0.0000	OK
15 minute winter	SO27	12	1.621	0.921	104.8	1.3180	0.0000	SURCHARGED
15 minute winter	N11	11	2.105	0.090	16.7	0.1287	0.0000	OK
15 minute winter	N12	11	2.073	0.092	31.4	0.1037	0.0000	OK
15 minute winter	N13	11	1.976	0.119	44.5	0.1696	0.0000	OK
15 minute winter	S32	12	1.441	0.966	213.7	1.3823	0.0000	SURCHARGED
15 minute winter	PS1	13	2.233	0.433	17.2	0.0689	0.0000	FLOOD RISK
15 minute winter	PS2	13	2.115	0.565	28.9	0.1598	0.0000	SURCHARGED

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 winter	PS17	1.000	PS18	23.9	1.206	0.591	1.1064	
15 minute winter	PS18	1.001	PS12	29.7	0.915	0.348	0.8947	
15 minute winter	PS11	2.000	PS12	8.8	0.583	0.616	0.4730	
15 minute winter	PS12	1.002	PS13	52.3	1.316	1.517	0.6706	
15 minute winter	PS13	1.003	PS14	55.3	1.396	1.548	1.2536	
15 minute winter	PS14	1.004	PS34	51.0	1.021	0.644	1.3804	
15 minute winter	PS34	1.005	PS15	54.8	0.778	0.716	1.4753	
15 minute winter	PS16	3.000	PS15	17.3	1.632	0.558	0.3054	
15 minute winter	PS15	1.006	S31	65.9	0.936	0.831	0.3439	
15 minute winter	HS1	4.000	HS2	21.0	1.006	0.508	0.7833	
15 minute winter	HS2	4.001	S31	18.7	0.747	0.456	0.9520	
15 minute winter	S31	1.007	S32	86.0	1.222	1.137	0.3764	
15 minute winter	N21	5.000	N22	24.8	0.328	0.100	1.2427	
15 minute winter	N22	5.001	N23	49.7	0.538	0.179	0.5523	
15 minute winter	N23	5.002	N24	49.5	0.509	0.179	0.7454	
15 minute winter	N24	5.003	N25	49.7	0.359	0.180	1.0466	
15 minute winter	N25	5.004	N26	110.0	0.578	0.454	8.4087	
15 minute winter	N26	5.005	SO27	104.8	0.638	0.543	3.6877	
15 minute winter	SO27	5.006	S32	104.1	1.479	1.257	0.9443	
15 minute winter	N11	6.000	N12	16.0	0.231	0.123	1.2267	
15 minute winter	N12	6.001	N13	30.8	0.359	0.131	1.6837	
15 minute winter	N13	6.002	S32	44.2	0.563	0.184	0.9594	
15 minute winter	S32	1.008	S33	215.4	1.359	1.205	2.5655	
15 minute winter	PS1	7.000	PS2	15.9	0.937	1.098	0.4596	
15 minute winter	PS2	7.001	PS3	29.1	0.879	0.818	1.4683	

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Results for 100 year +40% CC +6% A Critical Storm Duration. Lowest mass balance: 99.52%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	PS3	13	2.056	0.681	31.5	0.1927	0.0000	SURCHARGED
15 minute winter	PS4	13	2.028	0.703	31.3	0.1990	0.0000	SURCHARGED
15 minute winter	PS5	13	1.948	0.748	35.9	0.2116	0.0000	FLOOD RISK
15 minute winter	PS6	13	1.863	0.738	35.1	0.2090	0.0000	FLOOD RISK
15 minute winter	PS7	12	1.806	0.756	67.3	0.2138	0.0000	FLOOD RISK
15 minute winter	PS24	10	1.597	0.097	13.5	0.0154	0.0000	OK
15 minute winter	PS25	12	1.410	0.335	48.3	0.0948	0.0000	SURCHARGED
15 minute winter	S33	12	1.323	0.973	308.9	1.7197	0.0000	SURCHARGED
15 minute winter	PS19	12	2.292	0.567	14.0	0.0901	0.0000	SURCHARGED
15 minute winter	PS20	12	2.181	0.706	19.6	0.1122	0.0000	SURCHARGED
15 minute winter	PS21	12	2.057	0.757	30.5	0.2142	0.0000	SURCHARGED
15 minute winter	PS22	12	2.019	0.769	44.1	0.2175	0.0000	SURCHARGED
15 minute winter	PS23	12	1.788	0.713	41.3	0.2017	0.0000	SURCHARGED
15 minute winter	N31	10	2.523	0.104	41.7	0.0000	0.0000	OK
15 minute winter	N32	11	2.315	0.123	61.7	0.0000	0.0000	OK
15 minute winter	N33	11	2.229	0.122	61.1	0.0000	0.0000	OK
15 minute winter	N34	11	2.194	0.161	91.0	0.0000	0.0000	OK
15 minute winter	SO35	12	1.803	1.203	104.4	1.7213	0.0000	FLOOD RISK
15 minute winter	S36	12	1.711	1.131	158.2	1.6189	0.0000	SURCHARGED
15 minute winter	S34	13	0.975	0.820	465.5	1.4490	0.0000	SURCHARGED
30 minute winter	HW1	49	0.754	0.654	406.2	0.0000	0.0000	OK
15 minute winter	PS33	12	0.992	0.200	2.4	0.0318	0.0000	SURCHARGED
15 minute winter	PS32	12	0.987	0.382	4.6	0.0608	0.0000	SURCHARGED
15 minute winter	PS31	12	0.984	0.475	32.6	0.1343	0.0000	SURCHARGED
30 minute winter	HW2	71	0.750	0.649	21.6	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	PS3	7.002	PS4	27.6	0.807	0.784	0.4281	
15 minute winter	PS4	7.003	PS5	31.4	0.853	0.855	0.9865	
15 minute winter	PS5	7.004	PS6	35.1	0.930	1.023	0.6782	
15 minute winter	PS6	7.005	PS7	37.3	1.176	1.006	0.5809	
15 minute winter	PS7	7.006	S33	59.2	1.567	1.014	1.2613	
15 minute winter	PS24	9.000	PS25	13.3	1.113	0.722	0.4496	
15 minute winter	PS25	9.001	S33	46.0	2.178	0.455	0.4522	
15 minute winter	S33	1.009	S34	307.9	1.425	1.234	15.7250	
15 minute winter	PS19	10.000	PS20	12.5	0.759	0.805	0.5701	
15 minute winter	PS20	10.001	PS21	17.3	0.982	1.194	0.2631	
15 minute winter	PS21	10.002	PS22	28.4	0.743	0.765	0.3860	
15 minute winter	PS22	10.003	PS23	41.3	1.069	1.134	1.4085	
15 minute winter	PS23	10.004	S36	42.5	1.238	0.908	0.3661	
15 minute winter	N31	11.000	N32	40.3	0.426	0.168	3.2569	
15 minute winter	N32	11.001	N33	61.1	0.577	0.219	1.0014	
15 minute winter	N33	11.002	N34	60.9	0.468	0.221	1.1184	
15 minute winter	N34	11.003	SO35	87.0	0.689	0.330	4.8165	
15 minute winter	SO35	11.004	S36	101.1	1.436	1.379	0.3205	
15 minute winter	S36	10.005	S34	157.6	2.238	1.713	2.0469	
15 minute winter	S34	1.010	HW1	464.8	2.152	2.094	5.5922	
30 minute winter	HW1	Flow through pond	HW4	256.5	0.168	0.131	377.6515	
15 minute winter	PS33	12.000	PS32	-2.4	-0.417	-0.400	0.1465	
15 minute winter	PS32	12.001	PS31	-4.6	-0.586	-0.757	0.0358	
15 minute winter	PS31	12.002	HW2	27.1	1.541	1.345	0.4266	
30 minute winter	HW2	Flow through pond	HW4	256.5	0.168	0.131	377.6515	

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Results for 100 year +40% CC +6% A Critical Storm Duration. Lowest mass balance: 99.52%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	N1	13	1.468	0.124	31.9	0.0000	0.0000	OK
30 minute winter	SO2	41	0.755	0.339	17.2	0.4857	0.0000	SURCHARGED
15 minute winter	PS26	10	1.239	0.088	11.3	0.0141	0.0000	OK
15 minute winter	PS27	10	0.888	0.138	28.3	0.0390	0.0000	OK
30 minute winter	PS28	46	0.755	0.195	27.1	0.0553	0.0000	OK
30 minute winter	PS29	46	0.755	0.288	27.0	0.0816	0.0000	SURCHARGED
30 minute winter	S11	41	0.755	0.405	50.8	0.5801	0.0000	SURCHARGED
30 minute winter	S12	45	0.755	0.469	50.4	0.6717	0.0000	SURCHARGED
30 minute winter	HW3	45	0.755	0.654	48.9	0.0000	0.0000	OK
30 minute winter	HW4	47	0.756	0.656	256.5	0.0000	0.0000	SURCHARGED
30 minute winter	S101	41	0.770	0.720	22.1	1.0307	0.0000	SURCHARGED
15 minute winter	S102	11	0.022	0.056	4.8	0.0808	0.0000	OK
15 minute winter	S103	15	-0.042	0.056	4.8	0.0795	0.0000	OK
15 minute summer	S104	333	-0.410	0.056	4.9	0.0806	0.0000	OK
15 minute summer	HW5	335	-0.451	0.052	4.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	N1	13.000	SO2	17.8	0.279	0.134	5.4127	
30 minute winter	SO2	13.001	S11	17.2	0.382	0.242	1.1285	
15 minute winter	PS26	14.000	PS27	10.9	1.033	0.624	0.3568	
15 minute winter	PS27	14.001	PS28	27.9	0.955	0.665	0.8440	
30 minute winter	PS28	14.002	PS29	27.0	1.001	0.638	0.5355	
30 minute winter	PS29	14.003	S11	26.8	1.058	0.629	0.2483	
30 minute winter	S11	13.002	S12	50.4	0.983	0.718	1.1171	
30 minute winter	S12	13.003	HW3	48.9	1.066	0.691	1.1378	
30 minute winter	HW3	Flow through pond	HW4	256.5	0.168	0.131	377.6515	
30 minute winter	HW4	1.014	S101	22.1	0.463	0.117	2.3033	
30 minute winter	S101	Hydro-Brake®	S102	4.8				
15 minute winter	S102	1.016	S103	4.8	0.819	0.072	0.1580	
15 minute winter	S103	1.017	S104	4.9	0.664	0.073	0.8969	
15 minute summer	S104	1.018	HW5	4.8	0.558	0.072	0.0873	293.9

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Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Additional Storage (m³/ha)	0.0
Summer CV	0.750	Skip Steady State	✓	Check Discharge Rate(s)	x
Winter CV	0.840	Drain Down Time (mins)	1440	Check Discharge Volume	x

Storm Durations

60	180	360	600	960	2880	10080
120	240	480	720	1440	5760	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	40	0	0
100	40	6	0

Node S101 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	0.050	Product Number	CTL-SHE-0098-4800-1350-4800
Design Depth (m)	1.350	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	4.8	Min Node Diameter (mm)	1200

Node HW1 Online Orifice Control

Flap Valve	✓	Invert Level (m)	0.100	Discharge Coefficient	1.000
Replaces Downstream Link	x	Diameter (m)	0.600		

Node HW2 Online Orifice Control

Flap Valve	✓	Invert Level (m)	0.101	Discharge Coefficient	1.000
Replaces Downstream Link	x	Diameter (m)	0.225		

Node HW3 Online Orifice Control

Flap Valve	✓	Invert Level (m)	0.101	Discharge Coefficient	1.000
Replaces Downstream Link	x	Diameter (m)	0.375		

Node HW4 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	50.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	0.100	Main Channel Slope (1:X)	100000.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.030

Inlets

HW1 | HW2 | HW3

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	451.1	0.0	0.400	593.6	0.0	0.800	1019.4	0.0	1.200	1195.6	0.0
0.100	485.4	0.0	0.500	630.7	0.0	0.900	1062.6	0.0	1.400	1287.0	0.0
0.200	520.9	0.0	0.600	668.5	0.0	1.000	1106.4	0.0			
0.300	556.9	0.0	0.700	976.7	0.0	1.100	1150.7	0.0			

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Results for 2 year Critical Storm Duration. Lowest mass balance: 99.11%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	PS17	33	2.042	0.042	2.9	0.0067	0.0000	OK
60 minute summer	PS18	33	1.807	0.032	3.8	0.0051	0.0000	OK
60 minute summer	PS11	33	1.453	0.028	1.1	0.0045	0.0000	OK
60 minute summer	PS12	33	1.248	0.073	7.4	0.0464	0.0000	OK
60 minute summer	PS13	34	1.174	0.074	8.2	0.0473	0.0000	OK
60 minute summer	PS14	34	0.943	0.068	8.6	0.0434	0.0000	OK
60 minute summer	PS34	35	0.842	0.067	8.5	0.0756	0.0000	OK
60 minute summer	PS16	33	1.377	0.027	2.1	0.0043	0.0000	OK
60 minute summer	PS15	35	0.761	0.086	10.4	0.0971	0.0000	OK
60 minute summer	HS1	33	1.038	0.038	2.5	0.0545	0.0000	OK
60 minute summer	HS2	34	0.913	0.038	2.5	0.0538	0.0000	OK
60 minute summer	S31	35	0.741	0.091	12.8	0.1295	0.0000	OK
60 minute summer	N21	33	2.416	0.024	3.0	0.0000	0.0000	OK
60 minute summer	N22	33	2.311	0.034	6.1	0.0000	0.0000	OK
60 minute summer	N23	33	2.259	0.035	6.0	0.0000	0.0000	OK
60 minute summer	N24	34	2.191	0.034	6.0	0.0000	0.0000	OK
60 minute summer	N25	34	2.148	0.057	13.4	0.0000	0.0000	OK
60 minute summer	N26	36	1.880	0.078	13.1	0.0000	0.0000	OK
60 minute summer	SO27	36	0.780	0.080	11.9	0.1149	0.0000	OK
60 minute summer	N11	33	2.043	0.028	2.0	0.0396	0.0000	OK
60 minute summer	N12	34	2.009	0.028	3.8	0.0318	0.0000	OK
60 minute summer	N13	35	1.900	0.043	5.3	0.0612	0.0000	OK
60 minute summer	S32	36	0.604	0.129	29.4	0.1840	0.0000	OK
60 minute summer	PS1	33	1.838	0.038	2.0	0.0060	0.0000	OK
60 minute summer	PS2	34	1.597	0.047	3.5	0.0133	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)
60 minute summer	PS17	1.000	PS18	2.9	0.675	0.071	0.1587	
60 minute summer	PS18	1.001	PS12	3.8	0.536	0.044	0.1643	
60 minute summer	PS11	2.000	PS12	1.1	0.476	0.075	0.0606	
60 minute summer	PS12	1.002	PS13	7.3	0.657	0.213	0.1895	
60 minute summer	PS13	1.003	PS14	8.2	0.726	0.229	0.3542	
60 minute summer	PS14	1.004	PS34	8.5	0.724	0.108	0.2313	
60 minute summer	PS34	1.005	PS15	8.5	0.604	0.111	0.2964	
60 minute summer	PS16	3.000	PS15	2.1	0.994	0.068	0.0366	
60 minute summer	PS15	1.006	S31	10.4	0.605	0.132	0.0842	
60 minute summer	HS1	4.000	HS2	2.5	0.574	0.061	0.0860	
60 minute summer	HS2	4.001	S31	2.4	0.568	0.060	0.1029	
60 minute summer	S31	1.007	S32	12.8	0.762	0.169	0.0899	
60 minute summer	N21	5.000	N22	3.0	0.173	0.012	0.2822	
60 minute summer	N22	5.001	N23	6.0	0.290	0.022	0.1249	
60 minute summer	N23	5.002	N24	6.0	0.291	0.022	0.1567	
60 minute summer	N24	5.003	N25	6.0	0.209	0.022	0.2187	
60 minute summer	N25	5.004	N26	13.1	0.293	0.054	1.9933	
60 minute summer	N26	5.005	SO27	11.9	0.313	0.062	0.8606	
60 minute summer	SO27	5.006	S32	11.9	0.816	0.143	0.1953	
60 minute summer	N11	6.000	N12	2.0	0.121	0.015	0.2839	
60 minute summer	N12	6.001	N13	3.7	0.171	0.016	0.4206	
60 minute summer	N13	6.002	S32	5.1	0.270	0.021	0.2334	
60 minute summer	S32	1.008	S33	29.4	0.842	0.165	0.5658	
60 minute summer	PS1	7.000	PS2	2.0	0.574	0.137	0.0902	
60 minute summer	PS2	7.001	PS3	3.5	0.546	0.097	0.2364	

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Results for 2 year Critical Storm Duration. Lowest mass balance: 99.11%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	PS3	34	1.426	0.051	3.8	0.0145	0.0000	OK
60 minute summer	PS4	34	1.378	0.053	4.6	0.0150	0.0000	OK
60 minute summer	PS5	34	1.261	0.061	5.3	0.0174	0.0000	OK
60 minute summer	PS6	35	1.184	0.059	5.3	0.0167	0.0000	OK
60 minute summer	PS7	34	1.114	0.064	9.9	0.0180	0.0000	OK
60 minute summer	PS24	33	1.530	0.030	1.6	0.0048	0.0000	OK
60 minute summer	PS25	33	1.113	0.038	5.8	0.0107	0.0000	OK
60 minute summer	S33	36	0.495	0.145	43.9	0.2565	0.0000	OK
60 minute summer	PS19	33	1.758	0.033	1.7	0.0053	0.0000	OK
60 minute summer	PS20	33	1.518	0.043	2.6	0.0069	0.0000	OK
60 minute summer	PS21	33	1.355	0.055	4.5	0.0155	0.0000	OK
60 minute summer	PS22	33	1.315	0.065	6.5	0.0185	0.0000	OK
60 minute summer	PS23	34	1.134	0.059	6.5	0.0168	0.0000	OK
60 minute summer	N31	33	2.452	0.033	4.9	0.0000	0.0000	OK
60 minute summer	N32	34	2.230	0.038	7.3	0.0000	0.0000	OK
60 minute summer	N33	34	2.145	0.038	7.3	0.0000	0.0000	OK
60 minute summer	N34	35	2.091	0.058	10.8	0.0000	0.0000	OK
60 minute summer	SO35	35	0.698	0.098	12.2	0.1409	0.0000	OK
60 minute summer	S36	35	0.680	0.100	21.1	0.1436	0.0000	OK
360 minute winter	S34	304	0.370	0.215	20.7	0.3799	0.0000	OK
360 minute winter	HW1	304	0.370	0.270	20.6	0.0000	0.0000	OK
60 minute summer	PS33	1	0.792	0.000	0.0	0.0000	0.0000	OK
60 minute summer	PS32	1	0.605	0.000	0.0	0.0000	0.0000	OK
60 minute summer	PS31	33	0.554	0.045	3.9	0.0129	0.0000	OK
360 minute winter	HW2	304	0.369	0.269	1.1	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)
60 minute summer	PS3	7.002	PS4	3.8	0.541	0.107	0.0748	
60 minute summer	PS4	7.003	PS5	4.5	0.572	0.123	0.1966	
60 minute summer	PS5	7.004	PS6	5.3	0.625	0.155	0.1454	
60 minute summer	PS6	7.005	PS7	5.3	0.615	0.143	0.1272	
60 minute summer	PS7	7.006	S33	9.9	1.088	0.169	0.2876	
60 minute summer	PS24	9.000	PS25	1.6	0.638	0.086	0.0805	
60 minute summer	PS25	9.001	S33	5.8	1.356	0.057	0.0484	
60 minute summer	S33	1.009	S34	43.5	0.750	0.174	4.2617	
60 minute summer	PS19	10.000	PS20	1.7	0.480	0.109	0.1154	
60 minute summer	PS20	10.001	PS21	2.5	0.610	0.174	0.0619	
60 minute summer	PS21	10.002	PS22	4.5	0.531	0.121	0.0824	
60 minute summer	PS22	10.003	PS23	6.5	0.725	0.177	0.3162	
60 minute summer	PS23	10.004	S36	6.4	0.804	0.137	0.0737	
60 minute summer	N31	11.000	N32	4.8	0.226	0.020	0.7295	
60 minute summer	N32	11.001	N33	7.3	0.312	0.026	0.2198	
60 minute summer	N33	11.002	N34	7.2	0.237	0.026	0.2620	
60 minute summer	N34	11.003	SO35	10.3	0.357	0.039	1.1005	
60 minute summer	SO35	11.004	S36	12.2	0.598	0.166	0.0927	
60 minute summer	S36	10.005	S34	21.1	1.048	0.229	0.5845	
360 minute winter	S34	1.010	HW1	20.2	0.589	0.091	2.5242	
360 minute winter	HW1	Flow through pond	HW4	14.4	0.026	0.007	134.4060	
60 minute summer	PS33	12.000	PS32	0.0	0.000	0.000	0.0000	
60 minute summer	PS32	12.001	PS31	0.0	0.000	0.000	0.0000	
60 minute summer	PS31	12.002	HW2	3.9	0.876	0.193	0.1077	
360 minute winter	HW2	Flow through pond	HW4	14.4	0.026	0.007	134.4060	

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Results for 2 year Critical Storm Duration. Lowest mass balance: 99.11%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	N1	40	1.385	0.041	3.1	0.0000	0.0000	OK
60 minute winter	SO2	40	0.451	0.035	2.0	0.0495	0.0000	OK
60 minute summer	PS26	34	1.179	0.028	1.3	0.0044	0.0000	OK
60 minute summer	PS27	33	0.793	0.043	3.4	0.0121	0.0000	OK
60 minute summer	PS28	34	0.609	0.049	4.2	0.0138	0.0000	OK
60 minute summer	PS29	34	0.517	0.050	4.2	0.0142	0.0000	OK
60 minute summer	S11	35	0.416	0.066	7.1	0.0949	0.0000	OK
360 minute winter	S12	304	0.370	0.084	2.7	0.1198	0.0000	OK
360 minute winter	HW3	304	0.369	0.269	2.7	0.0000	0.0000	OK
360 minute winter	HW4	304	0.370	0.270	14.4	0.0000	0.0000	OK
360 minute winter	S101	304	0.370	0.320	4.8	0.4577	0.0000	SURCHARGED
360 minute winter	S102	304	0.021	0.055	4.8	0.0793	0.0000	OK
360 minute winter	S103	304	-0.044	0.054	4.8	0.0768	0.0000	OK
360 minute winter	S104	312	-0.410	0.056	4.8	0.0802	0.0000	OK
360 minute winter	HW5	312	-0.452	0.051	4.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	N1	13.000	SO2	2.0	0.132	0.015	1.2673	
60 minute winter	SO2	13.001	S11	2.0	0.324	0.028	0.1174	
60 minute summer	PS26	14.000	PS27	1.3	0.580	0.074	0.0754	
60 minute summer	PS27	14.001	PS28	3.4	0.584	0.080	0.1679	
60 minute summer	PS28	14.002	PS29	4.2	0.646	0.098	0.0904	
60 minute summer	PS29	14.003	S11	4.2	0.660	0.098	0.0394	
60 minute summer	S11	13.002	S12	7.1	0.620	0.101	0.1822	
360 minute winter	S12	13.003	HW3	2.7	0.487	0.038	0.4139	
360 minute winter	HW3	Flow through pond	HW4	14.4	0.026	0.007	134.4060	
360 minute winter	HW4	1.014	S101	4.8	0.217	0.025	1.5973	
360 minute winter	S101	Hydro-Brake®	S102	4.8				
360 minute winter	S102	1.016	S103	4.8	0.544	0.071	0.1539	
360 minute winter	S103	1.017	S104	4.8	0.540	0.071	0.8903	
360 minute winter	S104	1.018	HW5	4.8	0.557	0.071	0.0866	212.6

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.11%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	PS17	33	2.075	0.075	8.9	0.0119	0.0000	OK
60 minute summer	PS18	33	1.831	0.056	11.7	0.0089	0.0000	OK
60 minute summer	PS11	33	1.474	0.049	3.3	0.0078	0.0000	OK
60 minute summer	PS12	33	1.319	0.144	22.9	0.0916	0.0000	OK
60 minute summer	PS13	34	1.245	0.145	25.4	0.0925	0.0000	OK
60 minute summer	PS14	34	1.002	0.127	26.6	0.0808	0.0000	OK
60 minute summer	PS34	34	0.902	0.127	26.6	0.1440	0.0000	OK
60 minute summer	PS16	33	1.398	0.048	6.6	0.0077	0.0000	OK
60 minute summer	PS15	34	0.849	0.174	32.8	0.1972	0.0000	OK
60 minute summer	HS1	33	1.068	0.068	7.7	0.0968	0.0000	OK
60 minute summer	HS2	33	0.940	0.065	7.7	0.0936	0.0000	OK
60 minute summer	S31	34	0.824	0.174	40.2	0.2495	0.0000	OK
60 minute summer	N21	33	2.438	0.046	9.3	0.0000	0.0000	OK
60 minute summer	N22	33	2.343	0.066	18.8	0.0000	0.0000	OK
60 minute summer	N23	33	2.290	0.066	18.8	0.0000	0.0000	OK
60 minute summer	N24	33	2.221	0.064	18.7	0.0000	0.0000	OK
60 minute summer	N25	34	2.196	0.105	41.9	0.0000	0.0000	OK
60 minute summer	N26	35	1.936	0.134	41.2	0.0000	0.0000	OK
60 minute summer	SO27	35	0.858	0.158	39.7	0.2262	0.0000	OK
60 minute summer	N11	33	2.068	0.053	6.1	0.0752	0.0000	OK
60 minute summer	N12	34	2.035	0.054	11.7	0.0609	0.0000	OK
60 minute summer	N13	34	1.932	0.075	16.9	0.1072	0.0000	OK
480 minute winter	S32	472	0.754	0.279	17.3	0.3994	0.0000	OK
60 minute summer	PS1	33	1.871	0.071	6.3	0.0112	0.0000	OK
60 minute summer	PS2	33	1.636	0.086	11.1	0.0243	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)
60 minute summer	PS17	1.000	PS18	8.9	0.932	0.220	0.3532	
60 minute summer	PS18	1.001	PS12	11.7	0.690	0.137	0.3886	
60 minute summer	PS11	2.000	PS12	3.3	0.591	0.231	0.1731	
60 minute summer	PS12	1.002	PS13	22.6	0.843	0.657	0.4536	
60 minute summer	PS13	1.003	PS14	25.3	0.983	0.709	0.8112	
60 minute summer	PS14	1.004	PS34	26.6	0.939	0.337	0.5570	
60 minute summer	PS34	1.005	PS15	26.5	0.749	0.346	0.7428	
60 minute summer	PS16	3.000	PS15	6.6	1.373	0.213	0.0834	
60 minute summer	PS15	1.006	S31	32.6	0.768	0.412	0.2074	
60 minute summer	HS1	4.000	HS2	7.7	0.787	0.186	0.1929	
60 minute summer	HS2	4.001	S31	7.7	0.691	0.187	0.3154	
60 minute summer	S31	1.007	S32	40.0	1.018	0.528	0.2099	
60 minute summer	N21	5.000	N22	9.3	0.248	0.038	0.6149	
60 minute summer	N22	5.001	N23	18.8	0.408	0.068	0.2750	
60 minute summer	N23	5.002	N24	18.7	0.414	0.068	0.3423	
60 minute summer	N24	5.003	N25	18.6	0.293	0.067	0.4843	
60 minute summer	N25	5.004	N26	41.2	0.411	0.170	4.3841	
60 minute summer	N26	5.005	SO27	39.7	0.469	0.206	1.9132	
60 minute summer	SO27	5.006	S32	39.7	1.116	0.479	0.4771	
60 minute summer	N11	6.000	N12	6.0	0.172	0.047	0.6134	
60 minute summer	N12	6.001	N13	11.5	0.259	0.049	0.8784	
60 minute summer	N13	6.002	S32	16.6	0.412	0.069	0.4952	
480 minute winter	S32	1.008	S33	17.3	0.732	0.097	1.8388	
60 minute summer	PS1	7.000	PS2	6.3	0.784	0.433	0.2092	
60 minute summer	PS2	7.001	PS3	11.1	0.731	0.311	0.5601	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.11%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	PS3	33	1.472	0.097	12.0	0.0275	0.0000	OK
60 minute summer	PS4	34	1.424	0.099	14.4	0.0280	0.0000	OK
60 minute summer	PS5	34	1.319	0.119	17.0	0.0336	0.0000	OK
60 minute summer	PS6	34	1.240	0.115	17.1	0.0327	0.0000	OK
60 minute summer	PS7	34	1.173	0.123	31.6	0.0347	0.0000	OK
60 minute summer	PS24	33	1.554	0.054	5.0	0.0086	0.0000	OK
60 minute summer	PS25	33	1.143	0.068	18.0	0.0193	0.0000	OK
480 minute winter	S33	472	0.753	0.403	26.0	0.7123	0.0000	OK
60 minute summer	PS19	33	1.784	0.059	5.1	0.0094	0.0000	OK
60 minute summer	PS20	33	1.557	0.082	7.9	0.0131	0.0000	OK
60 minute summer	PS21	33	1.407	0.107	13.9	0.0303	0.0000	OK
60 minute summer	PS22	33	1.372	0.122	20.0	0.0345	0.0000	OK
60 minute summer	PS23	34	1.186	0.111	19.9	0.0315	0.0000	OK
60 minute summer	N31	33	2.481	0.062	15.3	0.0000	0.0000	OK
60 minute summer	N32	33	2.265	0.073	23.1	0.0000	0.0000	OK
60 minute summer	N33	34	2.179	0.072	22.8	0.0000	0.0000	OK
60 minute summer	N34	34	2.136	0.103	34.2	0.0000	0.0000	OK
60 minute summer	SO35	34	0.809	0.209	39.7	0.2984	0.0000	OK
60 minute summer	S36	34	0.784	0.204	68.0	0.2918	0.0000	OK
480 minute winter	S34	480	0.752	0.597	37.2	1.0547	0.0000	SURCHARGED
480 minute winter	HW1	480	0.753	0.653	36.3	0.0000	0.0000	OK
60 minute summer	PS33	1	0.792	0.000	0.0	0.0000	0.0000	OK
480 minute winter	PS32	472	0.754	0.149	0.1	0.0236	0.0000	SURCHARGED
480 minute winter	PS31	472	0.754	0.245	2.1	0.0692	0.0000	SURCHARGED
480 minute winter	HW2	480	0.753	0.653	2.1	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)
60 minute summer	PS3	7.002	PS4	11.8	0.714	0.336	0.1786	
60 minute summer	PS4	7.003	PS5	14.4	0.756	0.391	0.4719	
60 minute summer	PS5	7.004	PS6	17.1	0.817	0.497	0.3560	
60 minute summer	PS6	7.005	PS7	17.0	0.807	0.459	0.3112	
60 minute summer	PS7	7.006	S33	31.6	1.473	0.541	0.6813	
60 minute summer	PS24	9.000	PS25	5.0	0.881	0.270	0.1838	
60 minute summer	PS25	9.001	S33	18.0	1.850	0.178	0.1105	
480 minute winter	S33	1.009	S34	24.9	0.498	0.100	14.3390	
60 minute summer	PS19	10.000	PS20	5.1	0.631	0.327	0.2637	
60 minute summer	PS20	10.001	PS21	7.8	0.817	0.540	0.1431	
60 minute summer	PS21	10.002	PS22	13.9	0.684	0.374	0.1970	
60 minute summer	PS22	10.003	PS23	19.9	0.960	0.547	0.7339	
60 minute summer	PS23	10.004	S36	19.9	1.076	0.424	0.1699	
60 minute summer	N31	11.000	N32	15.2	0.322	0.063	1.6155	
60 minute summer	N32	11.001	N33	22.8	0.442	0.082	0.4867	
60 minute summer	N33	11.002	N34	22.9	0.347	0.083	0.5667	
60 minute summer	N34	11.003	SO35	33.2	0.520	0.126	2.4352	
60 minute summer	SO35	11.004	S36	39.6	0.769	0.540	0.2350	
60 minute summer	S36	10.005	S34	67.8	1.389	0.737	1.4191	
480 minute winter	S34	1.010	HW1	35.5	0.658	0.160	5.5922	
480 minute winter	HW1	Flow through pond	HW4	23.4	0.035	0.012	375.8976	
60 minute summer	PS33	12.000	PS32	0.0	0.000	0.000	0.0000	
480 minute winter	PS32	12.001	PS31	-0.1	-0.038	-0.013	0.0358	
480 minute winter	PS31	12.002	HW2	2.1	0.574	0.104	0.4266	
480 minute winter	HW2	Flow through pond	HW4	23.4	0.035	0.012	375.8976	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.11%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	N1	37	1.427	0.083	11.7	0.0000	0.0000	OK
480 minute winter	SO2	480	0.754	0.338	2.0	0.4835	0.0000	SURCHARGED
60 minute summer	PS26	33	1.202	0.051	4.2	0.0080	0.0000	OK
60 minute summer	PS27	33	0.828	0.078	10.6	0.0220	0.0000	OK
480 minute winter	PS28	472	0.754	0.194	2.2	0.0548	0.0000	OK
480 minute winter	PS29	480	0.753	0.286	2.2	0.0810	0.0000	SURCHARGED
480 minute winter	S11	480	0.754	0.404	4.8	0.5778	0.0000	SURCHARGED
480 minute winter	S12	480	0.754	0.468	4.5	0.6703	0.0000	SURCHARGED
480 minute winter	HW3	464	0.752	0.652	4.2	0.0000	0.0000	OK
480 minute winter	HW4	480	0.754	0.654	23.4	0.0000	0.0000	SURCHARGED
480 minute winter	S101	480	0.754	0.704	5.0	1.0072	0.0000	SURCHARGED
60 minute summer	S102	41	0.022	0.056	4.8	0.0797	0.0000	OK
60 minute summer	S103	295	-0.044	0.054	4.8	0.0772	0.0000	OK
60 minute summer	S104	296	-0.410	0.056	4.8	0.0806	0.0000	OK
60 minute summer	HW5	298	-0.451	0.052	4.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	N1	13.000	SO2	7.8	0.212	0.059	3.1034	
480 minute winter	SO2	13.001	S11	1.8	0.295	0.026	1.1285	
60 minute summer	PS26	14.000	PS27	4.2	0.808	0.239	0.1740	
60 minute summer	PS27	14.001	PS28	10.6	0.778	0.252	0.3943	
480 minute winter	PS28	14.002	PS29	2.2	0.560	0.052	0.5338	
480 minute winter	PS29	14.003	S11	2.2	0.553	0.052	0.2483	
480 minute winter	S11	13.002	S12	4.5	0.519	0.064	1.1171	
480 minute winter	S12	13.003	HW3	4.2	0.484	0.059	1.1378	
480 minute winter	HW3	Flow through pond	HW4	23.4	0.035	0.012	375.8976	
480 minute winter	HW4	1.014	S101	5.0	0.221	0.027	2.3033	
480 minute winter	S101	Hydro-Brake®	S102	4.8				
60 minute summer	S102	1.016	S103	4.8	0.595	0.072	0.1550	
60 minute summer	S103	1.017	S104	4.8	0.586	0.072	0.8969	
60 minute summer	S104	1.018	HW5	4.8	0.558	0.072	0.0873	280.3

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.11%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	PS17	33	2.104	0.104	16.5	0.0166	0.0000	OK
60 minute summer	PS18	33	1.852	0.077	21.7	0.0123	0.0000	OK
60 minute summer	PS11	35	1.606	0.181	6.0	0.0288	0.0000	SURCHARGED
60 minute summer	PS12	35	1.574	0.399	41.6	0.2538	0.0000	SURCHARGED
60 minute summer	PS13	35	1.471	0.371	44.6	0.2357	0.0000	SURCHARGED
60 minute summer	PS14	36	1.262	0.387	46.4	0.2461	0.0000	SURCHARGED
60 minute summer	PS34	36	1.226	0.451	46.2	0.5097	0.0000	SURCHARGED
60 minute summer	PS16	33	1.415	0.065	12.1	0.0103	0.0000	OK
60 minute summer	PS15	36	1.187	0.512	52.1	0.5786	0.0000	SURCHARGED
60 minute summer	HS1	35	1.192	0.192	14.1	0.2744	0.0000	OK
60 minute summer	HS2	36	1.180	0.305	14.2	0.4359	0.0000	SURCHARGED
960 minute winter	S31	945	1.174	0.524	7.3	0.7502	0.0000	SURCHARGED
60 minute summer	N21	33	2.457	0.065	17.1	0.0000	0.0000	OK
60 minute summer	N22	33	2.369	0.092	34.6	0.0000	0.0000	OK
60 minute summer	N23	33	2.315	0.091	34.5	0.0000	0.0000	OK
60 minute summer	N24	33	2.252	0.095	34.5	0.0000	0.0000	OK
60 minute summer	N25	33	2.234	0.143	77.4	0.0000	0.0000	OK
60 minute summer	N26	34	1.977	0.175	76.2	0.0000	0.0000	OK
60 minute summer	SO27	35	1.215	0.515	74.2	0.7364	0.0000	SURCHARGED
60 minute summer	N11	33	2.089	0.074	11.3	0.1062	0.0000	OK
60 minute summer	N12	33	2.057	0.076	21.7	0.0855	0.0000	OK
60 minute summer	N13	34	1.957	0.100	31.3	0.1436	0.0000	OK
960 minute winter	S32	945	1.174	0.699	17.7	1.0008	0.0000	SURCHARGED
60 minute summer	PS1	33	1.906	0.106	11.7	0.0169	0.0000	OK
60 minute summer	PS2	33	1.673	0.123	20.5	0.0347	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)
60 minute summer	PS17	1.000	PS18	16.5	1.104	0.407	0.5519	
60 minute summer	PS18	1.001	PS12	21.7	0.730	0.255	0.5823	
60 minute summer	PS11	2.000	PS12	6.2	0.592	0.437	0.4730	
60 minute summer	PS12	1.002	PS13	39.5	0.993	1.145	0.6706	
60 minute summer	PS13	1.003	PS14	43.9	1.133	1.231	1.2536	
60 minute summer	PS14	1.004	PS34	46.2	0.992	0.584	1.3804	
60 minute summer	PS34	1.005	PS15	41.5	0.764	0.543	1.4753	
60 minute summer	PS16	3.000	PS15	12.1	1.528	0.390	0.2161	
60 minute summer	PS15	1.006	S31	51.1	0.831	0.645	0.3439	
60 minute summer	HS1	4.000	HS2	14.2	0.924	0.344	0.7469	
60 minute summer	HS2	4.001	S31	13.7	0.697	0.333	0.9520	
960 minute winter	S31	1.007	S32	7.3	0.644	0.096	0.3764	
60 minute summer	N21	5.000	N22	17.1	0.295	0.069	0.9519	
60 minute summer	N22	5.001	N23	34.5	0.487	0.125	0.4245	
60 minute summer	N23	5.002	N24	34.5	0.477	0.125	0.5493	
60 minute summer	N24	5.003	N25	34.3	0.335	0.124	0.7774	
60 minute summer	N25	5.004	N26	76.2	0.497	0.315	6.6807	
60 minute summer	N26	5.005	SO27	74.2	0.574	0.385	2.9104	
60 minute summer	SO27	5.006	S32	73.8	1.138	0.890	0.9443	
60 minute summer	N11	6.000	N12	11.2	0.207	0.087	0.9491	
60 minute summer	N12	6.001	N13	21.4	0.320	0.091	1.3187	
60 minute summer	N13	6.002	S32	30.9	0.505	0.129	0.7508	
960 minute winter	S32	1.008	S33	17.3	0.674	0.097	2.5655	
60 minute summer	PS1	7.000	PS2	11.7	0.903	0.805	0.3372	
60 minute summer	PS2	7.001	PS3	20.5	0.831	0.575	0.9509	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.11%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	PS3	36	1.549	0.174	22.1	0.0491	0.0000	OK
60 minute summer	PS4	36	1.533	0.208	26.5	0.0589	0.0000	OK
60 minute summer	PS5	35	1.483	0.283	31.2	0.0802	0.0000	SURCHARGED
60 minute summer	PS6	35	1.432	0.307	30.5	0.0870	0.0000	SURCHARGED
60 minute summer	PS7	35	1.387	0.337	55.7	0.0953	0.0000	SURCHARGED
60 minute summer	PS24	33	1.576	0.076	9.1	0.0121	0.0000	OK
960 minute winter	PS25	930	1.172	0.097	3.3	0.0274	0.0000	OK
960 minute winter	S33	945	1.174	0.824	26.6	1.4556	0.0000	SURCHARGED
60 minute summer	PS19	33	1.809	0.084	9.5	0.0134	0.0000	OK
60 minute summer	PS20	33	1.607	0.132	14.6	0.0211	0.0000	OK
60 minute summer	PS21	35	1.480	0.180	25.6	0.0510	0.0000	OK
60 minute summer	PS22	35	1.459	0.209	36.8	0.0591	0.0000	OK
60 minute summer	PS23	35	1.317	0.242	36.4	0.0686	0.0000	SURCHARGED
60 minute summer	N31	33	2.505	0.086	28.3	0.0000	0.0000	OK
60 minute summer	N32	33	2.293	0.101	42.7	0.0000	0.0000	OK
60 minute summer	N33	34	2.206	0.099	42.3	0.0000	0.0000	OK
60 minute summer	N34	34	2.171	0.138	63.7	0.0000	0.0000	OK
60 minute summer	SO35	35	1.311	0.711	74.5	1.0172	0.0000	SURCHARGED
60 minute summer	S36	35	1.264	0.684	121.7	0.9788	0.0000	SURCHARGED
720 minute winter	S34	720	1.180	1.025	47.9	1.8109	0.0000	SURCHARGED
720 minute winter	HW1	720	1.172	1.072	48.6	0.0000	0.0000	OK
960 minute winter	PS33	945	1.175	0.383	0.1	0.0609	0.0000	SURCHARGED
960 minute winter	PS32	945	1.175	0.570	0.2	0.0906	0.0000	SURCHARGED
960 minute winter	PS31	945	1.175	0.666	2.2	0.1884	0.0000	SURCHARGED
960 minute winter	HW2	945	1.174	1.074	2.1	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)
60 minute summer	PS3	7.002	PS4	21.9	0.795	0.620	0.3835	
60 minute summer	PS4	7.003	PS5	26.1	0.832	0.711	0.9692	
60 minute summer	PS5	7.004	PS6	30.5	0.888	0.891	0.6782	
60 minute summer	PS6	7.005	PS7	30.7	0.881	0.826	0.5809	
60 minute summer	PS7	7.006	S33	53.7	1.592	0.919	1.2613	
60 minute summer	PS24	9.000	PS25	9.1	1.029	0.493	0.2871	
960 minute winter	PS25	9.001	S33	3.3	1.122	0.033	0.3190	
960 minute winter	S33	1.009	S34	25.7	0.395	0.103	15.7250	
60 minute summer	PS19	10.000	PS20	9.5	0.714	0.610	0.4313	
60 minute summer	PS20	10.001	PS21	14.3	0.938	0.991	0.2277	
60 minute summer	PS21	10.002	PS22	25.5	0.732	0.686	0.3522	
60 minute summer	PS22	10.003	PS23	36.4	1.064	1.002	1.3857	
60 minute summer	PS23	10.004	S36	34.1	1.210	0.728	0.3661	
60 minute summer	N31	11.000	N32	28.2	0.384	0.117	2.5135	
60 minute summer	N32	11.001	N33	42.3	0.526	0.151	0.7573	
60 minute summer	N33	11.002	N34	42.2	0.418	0.153	0.8696	
60 minute summer	N34	11.003	SO35	62.4	0.627	0.237	3.7984	
60 minute summer	SO35	11.004	S36	73.8	1.048	1.006	0.3205	
60 minute summer	S36	10.005	S34	120.7	1.714	1.312	2.0469	
720 minute winter	S34	1.010	HW1	47.6	0.681	0.214	5.5922	
720 minute winter	HW1	Flow through pond	HW4	30.0	0.030	0.015	812.5558	
960 minute winter	PS33	12.000	PS32	-0.1	-0.019	-0.015	0.1465	
960 minute winter	PS32	12.001	PS31	-0.2	-0.048	-0.028	0.0358	
960 minute winter	PS31	12.002	HW2	2.1	0.451	0.103	0.4266	
960 minute winter	HW2	Flow through pond	HW4	26.1	0.032	0.013	813.4456	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.11%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	N1	36	1.462	0.118	21.7	0.0000	0.0000	OK
960 minute winter	SO2	960	1.175	0.759	2.1	1.0868	0.0000	FLOOD RISK
60 minute summer	PS26	33	1.222	0.071	7.7	0.0113	0.0000	OK
720 minute winter	PS27	720	1.174	0.424	2.4	0.1199	0.0000	SURCHARGED
960 minute winter	PS28	960	1.174	0.614	2.5	0.1738	0.0000	SURCHARGED
960 minute winter	PS29	960	1.174	0.707	2.3	0.2002	0.0000	SURCHARGED
960 minute winter	S11	945	1.175	0.825	5.0	1.1799	0.0000	FLOOD RISK
960 minute winter	S12	945	1.176	0.890	4.9	1.2739	0.0000	SURCHARGED
720 minute winter	HW3	705	1.173	1.073	6.2	0.0000	0.0000	OK
960 minute winter	HW4	945	1.175	1.075	26.1	0.0000	0.0000	SURCHARGED
960 minute winter	S101	945	1.175	1.125	5.0	1.6103	0.0000	SURCHARGED
120 minute summer	S102	60	0.022	0.056	4.8	0.0797	0.0000	OK
60 minute summer	S103	1184	-0.044	0.054	4.8	0.0772	0.0000	OK
60 minute summer	S104	1185	-0.410	0.056	4.8	0.0806	0.0000	OK
60 minute summer	HW5	1187	-0.451	0.052	4.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	N1	13.000	SO2	16.0	0.269	0.121	5.0310	
960 minute winter	SO2	13.001	S11	2.0	0.248	0.029	1.1285	
60 minute summer	PS26	14.000	PS27	7.7	0.949	0.440	0.2727	
720 minute winter	PS27	14.001	PS28	2.4	0.509	0.057	1.1542	
960 minute winter	PS28	14.002	PS29	2.3	0.510	0.053	0.5576	
960 minute winter	PS29	14.003	S11	2.2	0.504	0.052	0.2483	
960 minute winter	S11	13.002	S12	4.9	0.451	0.070	1.1171	
960 minute winter	S12	13.003	HW3	4.9	0.401	0.069	1.1378	
720 minute winter	HW3	Flow through pond	HW4	30.0	0.030	0.015	812.5558	
960 minute winter	HW4	1.014	S101	5.0	0.220	0.026	2.3033	
960 minute winter	S101	Hydro-Brake®	S102	4.8				
120 minute summer	S102	1.016	S103	4.8	0.569	0.072	0.1549	
60 minute summer	S103	1.017	S104	4.8	0.612	0.072	0.8969	
60 minute summer	S104	1.018	HW5	4.8	0.558	0.072	0.0873	407.0

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Results for 100 year +40% CC +6% A Critical Storm Duration. Lowest mass balance: 99.11%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	PS17	33	2.108	0.108	17.5	0.0171	0.0000	OK
60 minute summer	PS18	33	1.854	0.079	23.0	0.0126	0.0000	OK
60 minute summer	PS11	35	1.738	0.313	6.4	0.0497	0.0000	SURCHARGED
60 minute summer	PS12	35	1.713	0.538	43.2	0.3424	0.0000	SURCHARGED
60 minute summer	PS13	35	1.600	0.500	46.8	0.3179	0.0000	SURCHARGED
60 minute summer	PS14	35	1.361	0.486	46.9	0.3090	0.0000	SURCHARGED
60 minute summer	PS34	36	1.319	0.544	45.4	0.6155	0.0000	SURCHARGED
60 minute summer	PS16	33	1.417	0.067	12.8	0.0107	0.0000	OK
60 minute summer	PS15	36	1.275	0.600	54.1	0.6782	0.0000	SURCHARGED
60 minute summer	HS1	36	1.277	0.277	15.0	0.3960	0.0000	SURCHARGED
60 minute summer	HS2	36	1.264	0.389	17.1	0.5560	0.0000	SURCHARGED
60 minute summer	S31	35	1.248	0.598	66.3	0.8553	0.0000	SURCHARGED
60 minute summer	N21	33	2.459	0.067	18.1	0.0000	0.0000	OK
60 minute summer	N22	33	2.372	0.095	36.6	0.0000	0.0000	OK
60 minute summer	N23	33	2.317	0.093	36.6	0.0000	0.0000	OK
60 minute summer	N24	33	2.256	0.099	36.5	0.0000	0.0000	OK
60 minute summer	N25	33	2.239	0.148	82.0	0.0000	0.0000	OK
60 minute summer	N26	34	1.982	0.180	80.8	0.0000	0.0000	OK
60 minute summer	SO27	35	1.309	0.609	78.7	0.8716	0.0000	SURCHARGED
60 minute summer	N11	33	2.092	0.077	12.0	0.1097	0.0000	OK
60 minute summer	N12	33	2.059	0.078	23.0	0.0883	0.0000	OK
60 minute summer	N13	34	1.960	0.103	33.2	0.1476	0.0000	OK
960 minute winter	S32	945	1.224	0.749	18.6	1.0713	0.0000	SURCHARGED
60 minute summer	PS1	33	1.911	0.111	12.4	0.0177	0.0000	OK
60 minute summer	PS2	36	1.692	0.142	21.7	0.0403	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)
60 minute summer	PS17	1.000	PS18	17.5	1.121	0.432	0.5760	
60 minute summer	PS18	1.001	PS12	23.0	0.743	0.270	0.5881	
60 minute summer	PS11	2.000	PS12	6.4	0.584	0.448	0.4730	
60 minute summer	PS12	1.002	PS13	41.4	1.041	1.200	0.6706	
60 minute summer	PS13	1.003	PS14	44.2	1.123	1.237	1.2536	
60 minute summer	PS14	1.004	PS34	45.4	0.994	0.574	1.3804	
60 minute summer	PS34	1.005	PS15	44.0	0.765	0.575	1.4753	
60 minute summer	PS16	3.000	PS15	12.8	1.551	0.412	0.2188	
60 minute summer	PS15	1.006	S31	54.2	0.827	0.685	0.3439	
60 minute summer	HS1	4.000	HS2	15.2	0.938	0.367	0.7833	
60 minute summer	HS2	4.001	S31	14.5	0.691	0.353	0.9520	
60 minute summer	S31	1.007	S32	67.2	1.091	0.888	0.3764	
60 minute summer	N21	5.000	N22	18.1	0.300	0.073	0.9917	
60 minute summer	N22	5.001	N23	36.6	0.495	0.132	0.4420	
60 minute summer	N23	5.002	N24	36.5	0.481	0.132	0.5760	
60 minute summer	N24	5.003	N25	36.3	0.338	0.131	0.8150	
60 minute summer	N25	5.004	N26	80.8	0.506	0.334	6.9519	
60 minute summer	N26	5.005	SO27	78.7	0.584	0.408	3.0317	
60 minute summer	SO27	5.006	S32	78.5	1.155	0.947	0.9443	
60 minute summer	N11	6.000	N12	11.9	0.211	0.092	0.9903	
60 minute summer	N12	6.001	N13	22.7	0.326	0.097	1.3714	
60 minute summer	N13	6.002	S32	32.8	0.514	0.137	0.7811	
960 minute winter	S32	1.008	S33	18.2	0.675	0.102	2.5655	
60 minute summer	PS1	7.000	PS2	12.4	0.917	0.853	0.3517	
60 minute summer	PS2	7.001	PS3	21.7	0.840	0.608	1.2225	

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Results for 100 year +40% CC +6% A Critical Storm Duration. Lowest mass balance: 99.11%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	PS3	36	1.658	0.283	23.4	0.0801	0.0000	SURCHARGED
60 minute summer	PS4	36	1.637	0.312	28.2	0.0884	0.0000	SURCHARGED
60 minute summer	PS5	35	1.582	0.382	31.5	0.1081	0.0000	SURCHARGED
60 minute summer	PS6	35	1.527	0.402	30.1	0.1137	0.0000	SURCHARGED
60 minute summer	PS7	35	1.480	0.430	58.8	0.1217	0.0000	SURCHARGED
60 minute summer	PS24	33	1.579	0.079	9.7	0.0126	0.0000	OK
960 minute winter	PS25	945	1.224	0.149	3.5	0.0423	0.0000	OK
960 minute winter	S33	945	1.224	0.874	27.9	1.5445	0.0000	SURCHARGED
60 minute summer	PS19	33	1.813	0.088	10.1	0.0139	0.0000	OK
60 minute summer	PS20	35	1.710	0.235	15.5	0.0374	0.0000	SURCHARGED
60 minute summer	PS21	35	1.609	0.309	27.1	0.0875	0.0000	SURCHARGED
60 minute summer	PS22	35	1.580	0.330	38.8	0.0934	0.0000	SURCHARGED
60 minute summer	PS23	35	1.410	0.335	37.5	0.0948	0.0000	SURCHARGED
60 minute summer	N31	33	2.508	0.089	30.0	0.0000	0.0000	OK
60 minute summer	N32	33	2.297	0.105	45.3	0.0000	0.0000	OK
60 minute summer	N33	34	2.209	0.102	44.9	0.0000	0.0000	OK
60 minute summer	N34	34	2.175	0.142	67.6	0.0000	0.0000	OK
60 minute summer	SO35	35	1.405	0.805	79.1	1.1515	0.0000	SURCHARGED
60 minute summer	S36	35	1.353	0.773	126.5	1.1056	0.0000	SURCHARGED
720 minute winter	S34	720	1.228	1.073	52.8	1.8963	0.0000	SURCHARGED
960 minute winter	HW1	960	1.224	1.124	41.2	0.0000	0.0000	OK
960 minute winter	PS33	945	1.227	0.435	0.1	0.0691	0.0000	SURCHARGED
960 minute winter	PS32	945	1.227	0.622	0.1	0.0989	0.0000	SURCHARGED
960 minute winter	PS31	945	1.227	0.718	2.3	0.2032	0.0000	SURCHARGED
960 minute winter	HW2	945	1.226	1.126	2.2	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)
60 minute summer	PS3	7.002	PS4	23.2	0.801	0.657	0.4281	
60 minute summer	PS4	7.003	PS5	26.1	0.836	0.709	0.9865	
60 minute summer	PS5	7.004	PS6	30.1	0.888	0.878	0.6782	
60 minute summer	PS6	7.005	PS7	30.6	0.891	0.825	0.5809	
60 minute summer	PS7	7.006	S33	55.4	1.604	0.949	1.2613	
60 minute summer	PS24	9.000	PS25	9.7	1.045	0.525	0.3014	
960 minute winter	PS25	9.001	S33	3.5	1.122	0.035	0.3851	
960 minute winter	S33	1.009	S34	27.2	0.401	0.109	15.7250	
60 minute summer	PS19	10.000	PS20	10.1	0.718	0.648	0.4540	
60 minute summer	PS20	10.001	PS21	15.1	0.935	1.043	0.2631	
60 minute summer	PS21	10.002	PS22	26.8	0.733	0.720	0.3860	
60 minute summer	PS22	10.003	PS23	37.5	1.067	1.029	1.4085	
60 minute summer	PS23	10.004	S36	36.0	1.196	0.768	0.3661	
60 minute summer	N31	11.000	N32	29.9	0.390	0.124	2.6231	
60 minute summer	N32	11.001	N33	44.9	0.535	0.161	0.7907	
60 minute summer	N33	11.002	N34	44.7	0.425	0.162	0.9059	
60 minute summer	N34	11.003	SO35	66.3	0.638	0.252	3.9632	
60 minute summer	SO35	11.004	S36	77.8	1.104	1.060	0.3205	
60 minute summer	S36	10.005	S34	125.2	1.778	1.361	2.0469	
720 minute winter	S34	1.010	HW1	53.6	0.685	0.241	5.5922	
960 minute winter	HW1	Flow through pond	HW4	26.5	0.032	0.014	873.0166	
960 minute winter	PS33	12.000	PS32	-0.1	-0.013	-0.014	0.1465	
960 minute winter	PS32	12.001	PS31	-0.1	-0.023	-0.024	0.0358	
960 minute winter	PS31	12.002	HW2	2.2	0.451	0.108	0.4266	
960 minute winter	HW2	Flow through pond	HW4	26.5	0.032	0.014	873.0166	

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Results for 100 year +40% CC +6% A Critical Storm Duration. Lowest mass balance: 99.11%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	N1	36	1.465	0.121	23.0	0.0000	0.0000	OK
960 minute winter	SO2	945	1.226	0.810	2.3	1.1593	0.0000	FLOOD RISK
960 minute winter	PS26	945	1.226	0.075	0.8	0.0120	0.0000	OK
960 minute winter	PS27	945	1.226	0.476	2.0	0.1348	0.0000	SURCHARGED
960 minute winter	PS28	930	1.226	0.666	2.5	0.1884	0.0000	SURCHARGED
960 minute winter	PS29	945	1.225	0.758	2.2	0.2146	0.0000	FLOOD RISK
960 minute winter	S11	945	1.225	0.875	5.3	1.2528	0.0000	FLOOD RISK
960 minute winter	S12	960	1.227	0.941	5.2	1.3459	0.0000	SURCHARGED
960 minute winter	HW3	945	1.225	1.124	5.2	0.0000	0.0000	OK
960 minute winter	HW4	945	1.227	1.127	26.5	0.0000	0.0000	SURCHARGED
960 minute winter	S101	945	1.227	1.177	5.0	1.6843	0.0000	SURCHARGED
60 minute summer	S102	33	0.022	0.056	4.8	0.0797	0.0000	OK
60 minute summer	S103	1316	-0.044	0.054	4.8	0.0772	0.0000	OK
60 minute summer	S104	1316	-0.410	0.056	4.8	0.0806	0.0000	OK
60 minute summer	HW5	1318	-0.451	0.052	4.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	N1	13.000	SO2	17.1	0.275	0.129	5.2622	
960 minute winter	SO2	13.001	S11	2.2	0.254	0.031	1.1285	
960 minute winter	PS26	14.000	PS27	0.8	0.503	0.046	0.4455	
960 minute winter	PS27	14.001	PS28	2.0	0.485	0.047	1.1542	
960 minute winter	PS28	14.002	PS29	2.2	0.516	0.053	0.5576	
960 minute winter	PS29	14.003	S11	2.2	0.493	0.051	0.2483	
960 minute winter	S11	13.002	S12	5.2	0.445	0.074	1.1171	
960 minute winter	S12	13.003	HW3	5.2	0.399	0.073	1.1378	
960 minute winter	HW3	Flow through pond	HW4	26.5	0.032	0.014	873.0166	
960 minute winter	HW4	1.014	S101	5.0	0.207	0.026	2.3033	
960 minute winter	S101	Hydro-Brake®	S102	4.8				
60 minute summer	S102	1.016	S103	4.8	0.679	0.072	0.1550	
60 minute summer	S103	1.017	S104	4.8	0.618	0.072	0.8969	
60 minute summer	S104	1.018	HW5	4.8	0.558	0.072	0.0873	401.3

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SIA Toolkit

SIMPLE INDEX APPROACH: TOOL

HRW shall not be liable for any direct or indirect damage claim, loss, cost, expense or liability howsoever arising out of the use or impossibility to use the tools, even when HRW has been informed of the possibility of the same. The user hereby indemnifies HRW from and against any damage claim, loss, expense or liability resulting from any action taken against HRW that is related in any way to the use of the tool or any reliance made in respect of the output of such use by any person whatsoever. HRW does not guarantee that the tool's functions meet the requirements of any person, nor that the tool is free from errors.

1. The steps set out in the tool should be applied for each inflow or 'runoff area' (ie each impermeable surface area separately discharging to a SuDS component).

2. The supporting 'Design Conditions' stated by the tool must be fully considered and implemented in all cases.

3. Relevant design examples are included in the SuDS Manual Appendix C.

4. Each of the steps below are part of the process set out in the flowchart on Sheet 3.

5. Sheet 4 summarises the selections made below and indicates the acceptability of the proposed SuDS components.

DROP DOWN LIST — RELEVANT INPUTS NEED TO BE SELECTED FROM THESE LISTS, FOR EACH STEP

USER ENTRY — USER ENTRY CELLS ARE ONLY REQUIRED WHERE INDICATED BY THE TOOL

STEP 1: Determine the Pollution Hazard Index for the runoff area discharging to the proposed SuDS scheme

This step requires the user to select the appropriate land use type for the area from which the runoff is occurring

If the land use varies across the 'runoff area', either:

- use the land use type with the highest Pollution Hazard Index

- apply the approach for each of the land use types to determine whether the proposed SuDS design is sufficient for all. If it is not, consider collecting more hazardous runoff separately and providing additional treatment.

If the generic land use types suggested are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in the row below the drop down lists.

	Runoff Area Land Use Description	*Pollution Hazard*	*Pollution Hazard Indices* Total Suspended Solids	Metals	Hydrocarbons	*DESIGN CONDITIONS* 1	2
Select land use type from the drop down list (or 'Other' if none applicable): →	Low traffic roads (e.g. residential roads and general access roads, < 300 traffic movements/day)	Low	0.5	0.4	0.4		
If the generic land use types in the drop down list above are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in this row:							
	Landuse Pollution Hazard Index	**Low**	**0.5**	**0.4**	**0.4**		

STEP 2A: Determine the Pollution Mitigation Index for the proposed SuDS components

This step requires the user to select the proposed SuDS components that will be used to treat runoff - before it is discharged to a receiving surface waterbody or downstream infiltration component

If the runoff is discharged directly to an infiltration component, without upstream treatment, select 'None' for each of the 3 SuDS components and move to Step 2B

This step should be applied to evaluate the water quality protection provided by proposed SuDS components for discharges to receiving surface waters or downstream infiltration components (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

If you have fewer than 3 components, select 'None' for the components that are not required

If the proposed component is bespoke and/or a proprietary treatment product and not generically described by the suggested components, then 'Proprietary treatment system' or 'User defined indices' should be selected and a description of the component and agreed user defined indices should be entered in the rows below the drop down lists

	SuDS Component Description	*Pollution Mitigation Indices* Total Suspended Solids	Metals	Hydrocarbons	*DESIGN CONDITIONS* 1	2	3
Select SuDS Component 1 (i.e. the upstream SuDS component) from the drop down list: →	Filter strip	0.4	0.4	0.5	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B		
Select SuDS Component 2 (i.e. the second SuDS component in a series) from the drop down list: →	Swale	0.5	0.6	0.6	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B		
Select SuDS Component 3 (i.e. the third SuDS component in a series) from the drop down list: →	Pond or wetland	0.7	0.7	0.5	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B	Ponds/wetlands should be preceded by an upstream component(s) that trap(s) silt, or designed specifically to retain sediment in a separate zone, easily accessible for maintenance, such that the sediment will not be re-suspended in subsequent events	
If the proposed SuDS components are bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary treatment system' or 'User defined indices' and enter component descriptions and agreed user defined indices in these rows:							
	Aggregated Surface Water Pollution Mitigation Index	**>0.95**	**>0.95**	**>0.95**			

Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at ">0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).

Is the runoff now discharged to an infiltration component?

Yes ? Go to Step 2B
No ? Go to Step 2C

STEP 2B: Determine the Pollution Mitigation Index for the proposed Groundwater Protection

This step requires the user to select the type of groundwater protection that is either part of the SuDS component or that lies between the component and the groundwater

This step should be applied where a SuDS component is specifically designed to infiltrate runoff (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

'Groundwater protection' describes the proposed depth of soil or other material through which runoff will flow between the runoff surface and the underlying groundwater.

Where the discharge is to surface waters and risks to groundwater need not be considered, select 'None'

If the proposed groundwater protection is bespoke and/or a proprietary product and not generically described by the suggested measures, then a description of the protection and agreed user defined indices should be entered in the row below the drop down list

	Pollution Mitigation Indices Total Suspended Solids	Metals	Hydrocarbons	*DESIGN CONDITIONS* 1	2	3	4
Select type of groundwater protection from the drop down list: → None							
If the proposed groundwater protection is bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary product' or 'User defined indices' and enter a description of the protection and agreed user defined indices in this row:							
Groundwater Protection Pollution Mitigation Index	**0**	**0**	**0**				

STEP 2C: Determine the Combined Pollution Mitigation Indices for the Runoff Area

This is an automatic step which combines the proposed SuDS Pollution Mitigation Indices with any Groundwater Protection Pollution Mitigation Indices

	Combined Pollution Mitigation Indices Total Suspended Solids	Metals	Hydrocarbons
Combined Pollution Mitigation Indices for the Runoff Area	**>0.95**	**>0.95**	**>0.95**

Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at ">0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).

STEP 2D: Determine Sufficiency of Pollution Mitigation Indices for Selected SuDS Components

This is an automatic step which compares the Combined Pollution Mitigation Indices with the Land Use Hazard Indices, to determine whether the proposed components are sufficient to manage each pollutant category type

When the combined mitigation index exceeds the land use pollution hazard index, then the proposed components are considered sufficient in providing pollution risk mitigation.

In England and Wales, where the discharge is to protected surface waters or groundwater, an additional treatment component (ie over and above that required for standard discharges), or other equivalent protection, is required that provides environmental protection in the event of an unexpected pollution event or poor system performance. Protected surface waters are those designated for drinking water abstraction. In England and Wales, protected groundwater resources are defined as Source Protection Zone 1. In Northern Ireland, a more precautionary approach may be required and this should be checked with the environmental regulator on a site by site basis.

Sufficiency of Pollution Mitigation Indices Total Suspended Solids	Metals	Hydrocarbons	*DESIGN CONDITIONS* 1
Sufficient	**Sufficient**	**Sufficient**	Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see *Chapter 7 The SuDS design process*). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England

SIMPLE INDEX APPROACH: TOOL

HRW shall not be liable for any direct or indirect damage claim, loss, cost, expense or liability howsoever arising out of the use or impossibility to use the tools, even when HRW has been informed of the possibility of the same. The user hereby indemnifies HRW from and against any damage claim, loss, expense or liability resulting from any action taken against HRW that is related in any way to the use of the tool or any reliance made in respect of the output of such use by any person whatsoever. HRW does not guarantee that the tool's functions meet the requirements of any person, nor that the tool is free from errors.

1. The steps set out in the tool should be applied for each inflow or 'runoff area' (ie each impermeable surface area separately discharging to a SuDS component).

2. The supporting 'Design Conditions' stated by the tool must be fully considered and implemented in all cases.

3. Relevant design examples are included in the SuDS Manual Appendix C.

4. Each of the steps below are part of the process set out in the flowchart on Sheet 3.

5. Sheet 4 summarises the selections made below and indicates the acceptability of the proposed SuDS components.

DROP DOWN LIST — RELEVANT INPUTS NEED TO BE SELECTED FROM THESE LISTS, FOR EACH STEP

USER ENTRY — USER ENTRY CELLS ARE ONLY REQUIRED WHERE INDICATED BY THE TOOL

STEP 1: Determine the Pollution Hazard Index for the runoff area discharging to the proposed SuDS scheme

This step requires the user to select the appropriate land use type for the area from which the runoff is occurring

If the land use varies across the 'runoff area', either:

- use the land use type with the highest Pollution Hazard Index

- apply the approach for each of the land use types to determine whether the proposed SuDS design is sufficient for all. If it is not, consider collecting more hazardous runoff separately and providing additional treatment.

If the generic land use types suggested are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in the row below the drop down lists.

	Runoff Area Land Use Description	*Pollution Hazard*	*Pollution Hazard Indices* Total Suspended Solids	Metals	Hydrocarbons	*DESIGN CONDITIONS* 1	2
Select land use type from the drop down list (or 'Other' if none applicable): →	Low traffic roads (e.g. residential roads and general access roads, < 300 traffic movements/day)	Low	0.5	0.4	0.4		
If the generic land use types in the drop down list above are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in this row:							
	Landuse Pollution Hazard Index	**Low**	**0.5**	**0.4**	**0.4**		

STEP 2A: Determine the Pollution Mitigation Index for the proposed SuDS components

This step requires the user to select the proposed SuDS components that will be used to treat runoff - before it is discharged to a receiving surface waterbody or downstream infiltration component

If the runoff is discharged directly to an infiltration component, without upstream treatment, select 'None' for each of the 3 SuDS components and move to Step 2B

This step should be applied to evaluate the water quality protection provided by proposed SuDS components for discharges to receiving surface waters or downstream infiltration components (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

If you have fewer than 3 components, select 'None' for the components that are not required

If the proposed component is bespoke and/or a proprietary treatment product and not generically described by the suggested components, then 'Proprietary treatment system' or 'User defined indices' should be selected and a description of the component and agreed user defined indices should be entered in the rows below the drop down lists

	SuDS Component Description	*Pollution Mitigation Indices* Total Suspended Solids	Metals	Hydrocarbons	*DESIGN CONDITIONS* 1	2	3
Select SuDS Component 1 (i.e. the upstream SuDS component) from the drop down list: →	Pervious pavement (where the pavement is not designed as an infiltration component)	0.7	0.6	0.7	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B		
Select SuDS Component 2 (i.e. the second SuDS component in a series) from the drop down list: →	Pond or wetland	0.7	0.7	0.5	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B	Ponds/wetlands should be preceded by an upstream component(s) that trap(s) silt, or designed specifically to retain sediment in a separate zone, easily accessible for maintenance, such that the sediment will not be re-suspended in subsequent events	
Select SuDS Component 3 (i.e. the third SuDS component in a series) from the drop down list: →	None						
If the proposed SuDS components are bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary treatment system' or 'User defined indices' and enter component descriptions and agreed user defined indices in these rows:							
	Aggregated Surface Water Pollution Mitigation Index	**>0.95**	**0.95**	**0.95**			

Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at ">0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).

Is the runoff now discharged to an infiltration component?

Yes ? Go to Step 2B
No ? Go to Step 2C

STEP 2B: Determine the Pollution Mitigation Index for the proposed Groundwater Protection

This step requires the user to select the type of groundwater protection that is either part of the SuDS component or that lies between the component and the groundwater

This step should be applied where a SuDS component is specifically designed to infiltrate runoff (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

'Groundwater protection' describes the proposed depth of soil or other material through which runoff will flow between the runoff surface and the underlying groundwater.

Where the discharge is to surface waters and risks to groundwater need not be considered, select 'None'

If the proposed groundwater protection is bespoke and/or a proprietary product and not generically described by the suggested measures, then a description of the protection and agreed user defined indices should be entered in the row below the drop down list

	Pollution Mitigation Indices Total Suspended Solids	Metals	Hydrocarbons	*DESIGN CONDITIONS* 1	2	3	4
Select type of groundwater protection from the drop down list: → None							
If the proposed groundwater protection is bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary product' or 'User defined indices' and enter a description of the protection and agreed user defined indices in this row:							
Groundwater Protection Pollution Mitigation Index	**0**	**0**	**0**				

STEP 2C: Determine the Combined Pollution Mitigation Indices for the Runoff Area

This is an automatic step which combines the proposed SuDS Pollution Mitigation Indices with any Groundwater Protection Pollution Mitigation Indices

	Combined Pollution Mitigation Indices Total Suspended Solids	Metals	Hydrocarbons
Combined Pollution Mitigation Indices for the Runoff Area	**>0.95**	**0.95**	**0.95**

Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at ">0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).

STEP 2D: Determine Sufficiency of Pollution Mitigation Indices for Selected SuDS Components

This is an automatic step which compares the Combined Pollution Mitigation Indices with the Land Use Hazard Indices, to determine whether the proposed components are sufficient to manage each pollutant category type

When the combined mitigation index exceeds the land use pollution hazard index, then the proposed components are considered sufficient in providing pollution risk mitigation.

In England and Wales, where the discharge is to protected surface waters or groundwater, an additional treatment component (ie over and above that required for standard discharges), or other equivalent protection, is required that provides environmental protection in the event of an unexpected pollution event or poor system performance. Protected surface waters are those designated for drinking water abstraction. In England and Wales, protected groundwater resources are defined as Source Protection Zone 1. In Northern Ireland, a more precautionary approach may be required and this should be checked with the environmental regulator on a site by site basis.

Sufficiency of Pollution Mitigation Indices Total Suspended Solids	Metals	Hydrocarbons	*DESIGN CONDITIONS* 1
Sufficient	**Sufficient**	**Sufficient**	Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see *Chapter 7 The SuDS design process*). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England

Maintenance Regime

Detailed scheme for the ownership and scheduled maintenance

Surface Water Sewers

The principle means of surface water disposal from the development is by way of pipes, basins and swales.

Quarterly (by householders)

A system of regular inspections should be established, initially these inspections should be carried out in October and March, however, this may be modified to suit observations over time. Items to be observed and cleared are high levels of grit, leaves and other such detritus. The main aim of these inspections will be to prevent siltation of the system, which, if allowed to develop will reduce the effectiveness of the system.

The following elements should be inspected and cleaned as part of this preventative routine:

Chambers

Road gullies

Linear drainage channels/gullies located within communal areas.

Ponds/Swales

Ponds/ swales are to be maintained by either a Management Company or the highway authority. Their maintenance regime shall be as follows: -

- Inspections to identify any areas not operating correctly, eroded areas, pollution, blocked outlets, standing water, and reinstate design levels, repair eroded or damaged areas by returfing or reseeding.
- Collect and remove from site all extraneous rubbish that is detrimental to the operation or detract from the appearance of the site, including paper, bottles, cans and similar debris.
- Maintain grass height at no less than 100mm. Ensure that soil and grass does not become compacted. Do not cut during periods of drought or when ground conditions or grass is wet.
- Maintenance of the pond is to be carried out in the vicinity of the inlets and outlets, monthly during growing seasons, and at least once every two months within the remainder of the pond, or else as required.
- Maintenance of the swales are to be carried out monthly during growing seasons, or else as required.
- Remove sediment as it builds up, ensuring that design storage volumes are not reduced by more than 10%.
-

Headwalls

Headwalls are to be maintained by either a Management Company or adopting authority. Their maintenance regime shall be as follows: -

Initially the headwalls shall be inspected on a monthly basis. All extraneous material such as litter and rubble be removed and cleared. After this initial three months the Headwalls themselves are to be checked for structurally integrity on a six monthly inspection and any issues made good as per the original design drawings. Ensure water flows freely by removal of vegetation and siltation as necessary.