SURFACE WATER AND FOUL WATER

DRAINAGE STRATEGY

for

OAKMERE HOMES

PROPOSED RESIDENTIAL DEVELOPMENT

on

LAND AT CHATBURN ROAD

CLITHEROE

APRIL 2020

REFORD

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CONTENTS

1. INTRODUCTION

1.1 This surface water and foul water drainage strategy has been produced on behalf of Oakmere Homes in support of a planning application for a proposed residential development comprising 17 dwellings on land adjacent Chatburn Road, Clitheroe. A location plan is included within Appendix A.

1.2 This drainage strategy describes the existing site conditions and proposed development. It assesses the potential impact of proposals on existing sewers and includes a proposed strategy for the provision of new drainage to serve the proposed development.

2. BASE INFORMATION

Existing site

2.1 The proposal relates to land (approx. 0.82 hectares) that lies to the north of Chatburn Road to the east of the centre of Clitheroe.

2.2 The existing site comprises grassland.

2.3 The adjacent site to the east has a planning permission for 30 residential dwellings, which has been granted by Ribble Valley Borough Council and is under construction.

2.4 A topographical survey has been carried out. The site has a fall to the north towards the watercourse that runs within the site and parallel to its northern boundary.

2.5 Access to the site is available from Chatburn Road.

Proposed development

2.6 The proposed development will comprise 17 residential dwellings. The masterplan is shown on drawing 068/P/01 accompanying the planning application.

Site geology

2.7 The online Soilscapes viewer has identified that the geology encountered will be slowly permeable seasonally wet acid loamy and clayey soils with impeded drainage. The ground is, therefore, not likely to be conducive to infiltration of surface water.

2.8 This is supported by a site investigation that has been carried out on the adjacent site. The exploratory holes encountered cohesive deposits of low permeability across the site and concluded that the use of soakaway drainage is not considered feasible at the site.

Understanding of existing drainage local to the site

2.9 Within the site and parallel to its northern boundary runs a watercourse that flows to the west and ultimately discharges into the River Ribble. The watercourse takes surface water runoff from the local area including the application site.

2.10 United Utilities sewer records show a public foul sewer flowing to the south within Chatburn Road that lies along the site's southern boundary. The sewer records are within Appendix B.

3. PROPOSED DRAINAGE STRATEGY

3.1 The proposed surface and foul water drainage layout is included within Appendix C.

Surface Water Drainage

3.2 In accordance with the National Standards for Sustainable Drainage, the drainage strategy should incorporate the use of Sustainable Drainage (SUDS) where possible. The approach promotes the use infiltration features in the first instance. If drainage cannot be achieved solely through infiltration due to site conditions or contamination risks, the preferred options are (in order of preference):

(i) a controlled discharge to a local waterbody or watercourse, or
(ii) a controlled discharge into the public sewer network (depending on availability and capacity).

3.3 The rate and volume of discharge should be restricted to the pre-development values as far as practicable.

Surface water drainage discharges from the developed site

3.4 The nature of the geology of the site means that infiltration back into the ground is not feasible. This is supported by a site investigation that has been carried out on the adjacent site. The exploratory holes encountered cohesive deposits of low permeability across the site and concluded that the use of soakaway drainage is not considered feasible at the site.

3.5 In line with common practice, surface water runoff from the proposed development should mimic those from the existing site. It is therefore intended that surface water runoff from the developed site will be attenuated and discharge into the watercourse that flows parallel to the northern boundary of the site.

3.6 The surface water flow from the development will be controlled such that the peak surface water runoff for the 1 in 1 and the 1 in 100 year rainfall events will not exceed the pre-development runoff rate for the same event, allowing surface water runoff generated by all rainfall events up to the 100 year critical rain storm plus 30% on

stored volumes to discharge into the watercourse. The additional 30% is to allow for climate change and has been included in the surface water volume.

3.7 To determine the restricted surface water discharge rates from the developed site, the pre-development runoff has been calculated using the 'Causeway Flow' programme. The calculations are based upon the developed area of the site of 0.68ha, having removed the area of public open space measured at 0.13ha. The pre-development discharge rates have been calculated as follows:

- Qbar 6.4 l/s
- Q1 5.6 l/s
- Q100 13.4 l/s

3.8 The following design criteria have been applied to the surface water drainage design:

- An additional 10% has been added to the residential areas when designing the pipe network to allow for development creep;
- The surface water drainage network has been designed such that the peak surface water runoff for the 1 in 1 and the 1 in 100 year rainfall event will not exceed the pre-development runoff rate for the same event.
- No flooding from sewers for 1 in 30 year.
- No risk of flooding to the site or downstream from the site between 1 in 1 year and up to 1 in 100 year plus 30% for climate change.

3.9 A preliminary surface water drainage design has been carried out for the proposed development. Attenuation will be provide within the development site using underground storage within the landscaping area in the northwest corner of the development site.

3.10 The surface water drainage design is included within Appendix D.

Foul Water Drainage

3.11 Foul water discharges from the site will be to the onsite foul pumping station located at the end of the access spine road within the adjacent site to the east and the foul water pumped to the public foul sewer that runs within Chatburn Road.

4. SUMMARY AND CONCLUSIONS

4.1 This surface water and foul water drainage strategy has been produced on behalf of Oakmere Homes in support of a planning application for a proposed residential development comprising 17 dwellings on land adjacent Chatburn Road, Clitheroe.

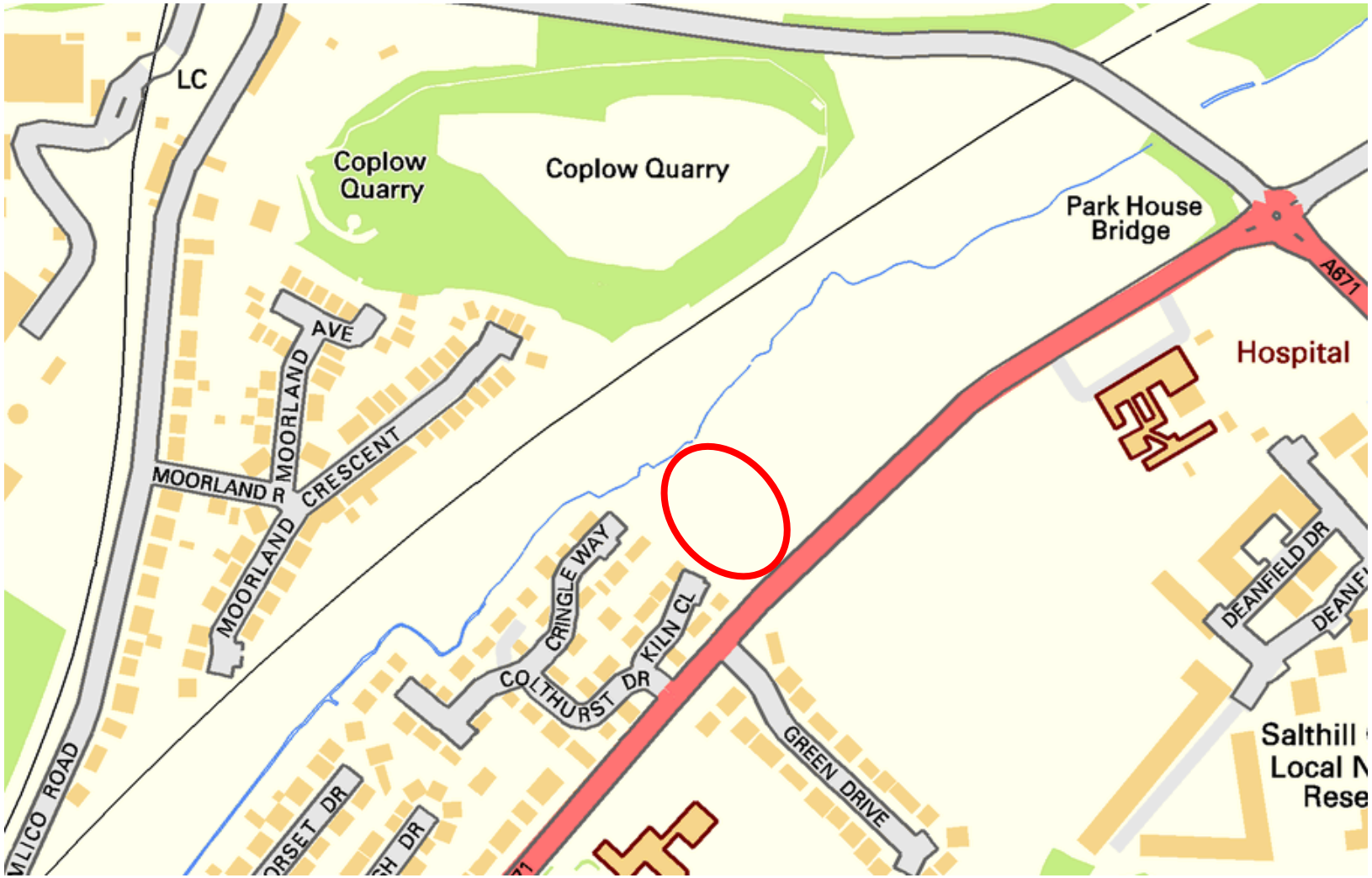
4.2 The nature of the local geology means that infiltration of surface water runoff back into the ground is not feasible on this site.

4.3 Surface water runoff from the developed site will be attenuated and discharge into the watercourse that flows parallel to the northern boundary of the site. Attenuation will be provided by underground storage.

4.4 The surface water drainage network has been designed such that the peak surface water runoff for the 1 in 1 and the 1 in 100 year rainfall event will not exceed the pre-development runoff rate for the same event.

4.5 Foul water discharges from the site will be to the onsite foul pumping station located at the end of the access spine road within the adjacent site to the east and the foul water pumped to the public foul sewer that runs within Chatburn Road.

APPENDIX A



CHATBURN ROAD – LOCATION PLAN

APPENDIX B

Extract from Map of Public Sewers

The position of underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available.

The actual positions may be different from those shown on the plan and private pipes, sewers or drains may not be recorded.

United Utilities will not accept any liability for any damage caused by the actual positions being different from those shown.

United Utilities Water Limited 2014
The plan is based upon the Ordnance Survey Map with the sanction of the Controller of H.M. Stationery Office.Crown and United Utilities copyrights are reserved. Unauthorised reproduction will infringe these copyrights.

LEGEND

Water Course
Overflow Pipe
Sludge Main
Highway Drain

Combined	Surface Water	Foul	Abandoned	
				Public Sewer
				Private Sewer
				Section 104
				Rising Main

CHATBURN ROAD, CLITHEROE,

Printed By : Property Searches Date: 27/09/2016

DO NOT SCALE

Approximate Scale: 1:2500

United Utilities
helping life flow smoothly

APPENDIX C

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Rev	Date	Description	Drn	Chk	App
-	15.04.20	ORIGINAL ISSUE	SB	BF	BF

OAKMERE HOMES

CHATBURN ROAD SOUTH

DRAINAGE LAYOUT

PRELIMINARY

SCALE: 1:250 @A1 | REV -

19.664-500

REFORD

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APPENDIX D

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	75.0
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)	3.000
Ratio-R	0.200	Preferred Cover Depth (m)	0.500
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
1	0.002	5.00	89.150	100	0.600
2	0.002	5.00	89.150	450	0.752
3	0.006	5.00	88.750	100	0.600
4	0.006	5.00	88.750	450	0.752
5	0.003	5.00	88.750	100	0.600
6	0.003	5.00	88.750	450	1.005
7			88.450	1200	1.350
8	0.002	5.00	90.350	100	0.600
9	0.006	5.00	90.350	450	0.769
10	0.004	5.00	89.150	100	0.600
11	0.008	5.00	89.150	450	0.785
12	0.005	5.00	87.950	100	0.600
13	0.005	5.00	87.950	450	0.802
14	0.002	5.00	87.950	100	0.600
15	0.007	5.00	87.950	450	0.954
16	0.047	5.00	87.100	1200	1.350
17			86.300	1200	1.350
18	0.007	5.00	87.850	100	0.600
19	0.002	5.00	86.300	450	0.600
20	0.004	5.00	87.350	100	0.600
21	0.004	5.00	86.150	450	0.635
22	0.011	5.00	86.850	100	0.600
23	0.004	5.00	85.650	450	0.600
24	0.002	5.00	86.850	100	0.600
25	0.002	5.00	85.650	450	0.752
26	0.002	5.00	86.750	100	0.600
27	0.007	5.00	86.750	450	0.802
28	0.004	5.00	85.550	100	0.600
29	0.008	5.00	85.550	450	0.836
30	0.002	5.00	85.550	100	0.600
31	0.002	5.00	85.550	450	1.038
32	0.016	5.00	85.450	1200	1.425
33			84.900	1200	1.425
34	0.002	5.00	84.850	100	0.600
35	0.007	5.00	84.850	450	0.785
36	0.003	5.00	84.850	100	0.600
37	0.005	5.00	84.850	450	0.819
38	0.011	5.00	84.850	450	1.004
39	0.003	5.00	84.850	450	1.257
40	0.043	5.00	84.200	1200	1.425
41	0.003	5.00	84.850	100	0.600

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Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
42	0.005	5.00	84.850	450	0.836
43	0.002	5.00	84.850	100	0.600
44	0.007	5.00	84.850	450	0.802
45	0.008	5.00	84.850	100	0.600
46	0.005	5.00	84.850	450	1.038
47	0.008	5.00	84.400	1200	1.795
48			83.450	2400	1.590
49			82.500	1200	0.700
50			82.250	1200	0.500

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	1	2	9.000	0.600	88.550	88.398	0.152	59.2	100	5.15	48.7
1.001	2	4	12.000	0.600	88.398	87.998	0.400	30.0	100	5.29	48.3
2.000	3	4	9.000	0.600	88.150	87.998	0.152	59.2	100	5.15	48.7
1.002	4	6	15.000	0.600	87.998	87.745	0.253	59.3	100	5.54	47.5
3.000	5	6	9.000	0.600	88.150	87.745	0.405	22.2	100	5.09	48.9
1.003	6	7	4.000	0.600	87.745	87.150	0.595	6.7	100	5.56	47.5
1.004	7	16	13.000	0.600	87.100	85.750	1.350	9.6	150	5.63	47.3
4.000	8	9	10.000	0.600	89.750	89.581	0.169	59.2	100	5.17	48.6
4.001	9	11	10.000	0.600	89.581	88.365	1.216	8.2	100	5.23	48.5
5.000	10	11	11.000	0.600	88.550	88.365	0.185	59.5	100	5.18	48.6
4.002	11	13	11.000	0.600	88.365	87.148	1.217	9.0	100	5.30	48.2
6.000	12	13	12.000	0.600	87.350	87.148	0.202	59.4	100	5.20	48.5
4.003	13	15	9.000	0.600	87.148	86.996	0.152	59.2	100	5.45	47.8
7.000	14	15	12.000	0.600	87.350	86.996	0.354	33.9	100	5.15	48.7
4.004	15	16	7.000	0.600	86.996	85.800	1.196	5.9	100	5.48	47.7
1.005	16	17	14.000	0.600	85.750	84.950	0.800	17.5	150	5.73	47.0
1.006	17	32	15.000	0.600	84.950	84.100	0.850	17.6	150	5.83	46.7

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	1.003	7.9	0.3	0.500	0.652	0.002	0.0
1.001	1.414	11.1	0.5	0.652	0.652	0.004	0.0
2.000	1.003	7.9	0.8	0.500	0.652	0.006	0.0
1.002	1.002	7.9	2.1	0.652	0.905	0.016	0.0
3.000	1.645	12.9	0.4	0.500	0.905	0.003	0.0
1.003	3.001	23.6	2.8	0.905	1.200	0.022	0.0
1.004	3.266	57.7	2.8	1.200	1.200	0.022	0.0
4.000	1.003	7.9	0.3	0.500	0.669	0.002	0.0
4.001	2.712	21.3	1.1	0.669	0.685	0.008	0.0
5.000	1.001	7.9	0.5	0.500	0.685	0.004	0.0
4.002	2.586	20.3	2.6	0.685	0.702	0.020	0.0
6.000	1.001	7.9	0.7	0.500	0.702	0.005	0.0
4.003	1.003	7.9	3.9	0.702	0.854	0.030	0.0
7.000	1.329	10.4	0.3	0.500	0.854	0.002	0.0
4.004	3.217	25.3	5.0	0.854	1.200	0.039	0.0
1.005	2.419	42.7	13.8	1.200	1.200	0.108	0.0
1.006	2.409	42.6	13.7	1.200	1.200	0.108	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)	T of C (mins)	Rain (mm/hr)
8.000	18	19	11.000	0.600	87.250	85.700	1.550	7.1	100	5.06	49.0
8.001	19	21	11.000	0.600	85.700	85.515	0.185	59.5	100	5.25	48.4
9.000	20	21	11.000	0.600	86.750	85.515	1.235	8.9	100	5.07	48.9
8.002	21	23	11.000	0.600	85.515	85.050	0.465	23.7	100	5.36	48.1
10.000	22	23	11.000	0.600	86.250	85.050	1.200	9.2	100	5.07	48.9
8.003	23	25	9.000	0.600	85.050	84.898	0.152	59.2	100	5.51	47.6
11.000	24	25	11.000	0.600	86.250	84.898	1.352	8.1	100	5.07	48.9
8.004	25	32	11.000	0.600	84.898	84.150	0.748	14.7	100	5.60	47.4
12.000	26	27	12.000	0.600	86.150	85.948	0.202	59.4	100	5.20	48.5
12.001	27	29	13.000	0.600	85.948	84.714	1.234	10.5	100	5.29	48.3
13.000	28	29	14.000	0.600	84.950	84.714	0.236	59.3	100	5.23	48.4
12.002	29	31	12.000	0.600	84.714	84.512	0.202	59.4	100	5.49	47.7
14.000	30	31	12.000	0.600	84.950	84.512	0.438	27.4	100	5.14	48.7
12.003	31	32	4.000	0.600	84.512	84.150	0.362	11.0	100	5.52	47.6
1.007	32	33	9.000	0.600	84.025	83.475	0.550	16.4	225	5.88	46.6
1.008	33	40	20.000	0.600	83.475	82.775	0.700	28.6	225	6.01	46.2
15.000	34	35	11.000	0.600	84.250	84.065	0.185	59.5	100	5.18	48.6
15.001	35	38	13.000	0.600	84.065	83.846	0.219	59.4	100	5.40	47.9
16.000	36	37	13.000	0.600	84.250	84.031	0.219	59.4	100	5.22	48.5
16.001	37	38	11.000	0.600	84.031	83.846	0.185	59.5	100	5.40	47.9
15.002	38	39	15.000	0.600	83.846	83.593	0.253	59.3	100	5.65	47.2
15.003	39	40	8.000	0.600	83.593	82.900	0.693	11.5	100	5.71	47.1
1.009	40	47	17.000	0.600	82.775	82.605	0.170	100.0	225	6.23	45.7
17.000	41	42	14.000	0.600	84.250	84.014	0.236	59.3	100	5.23	48.4

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
8.000	2.920	22.9	0.9	0.500	0.500	0.007	0.0
8.001	1.001	7.9	1.2	0.500	0.535	0.009	0.0
9.000	2.605	20.5	0.5	0.500	0.535	0.004	0.0
8.002	1.594	12.5	2.2	0.535	0.500	0.017	0.0
10.000	2.568	20.2	1.5	0.500	0.500	0.011	0.0
8.003	1.003	7.9	4.1	0.500	0.652	0.032	0.0
11.000	2.726	21.4	0.3	0.500	0.652	0.002	0.0
8.004	2.025	15.9	4.6	0.652	1.200	0.036	0.0
12.000	1.001	7.9	0.3	0.500	0.702	0.002	0.0
12.001	2.394	18.8	1.2	0.702	0.736	0.009	0.0
13.000	1.002	7.9	0.5	0.500	0.736	0.004	0.0
12.002	1.001	7.9	2.7	0.736	0.938	0.021	0.0
14.000	1.480	11.6	0.3	0.500	0.938	0.002	0.0
12.003	2.338	18.4	3.2	0.938	1.200	0.025	0.0
1.007	3.250	129.2	23.4	1.200	1.200	0.185	0.0
1.008	2.457	97.7	23.2	1.200	1.200	0.185	0.0
15.000	1.001	7.9	0.3	0.500	0.685	0.002	0.0
15.001	1.001	7.9	1.2	0.685	0.904	0.009	0.0
16.000	1.001	7.9	0.4	0.500	0.719	0.003	0.0
16.001	1.001	7.9	1.0	0.719	0.904	0.008	0.0
15.002	1.002	7.9	3.6	0.904	1.157	0.028	0.0
15.003	2.287	18.0	4.0	1.157	1.200	0.031	0.0
1.009	1.307	52.0	32.1	1.200	1.570	0.259	0.0
17.000	1.002	7.9	0.4	0.500	0.736	0.003	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)	T of C (mins)	Rain (mm/hr)
17.001	42	46	12.000	0.600	84.014	83.812	0.202	59.4	100	5.43	47.8
18.000	43	44	12.000	0.600	84.250	84.048	0.202	59.4	100	5.20	48.5
18.001	44	46	13.000	0.600	84.048	83.812	0.236	55.1	100	5.41	47.9
19.000	45	46	16.000	0.600	84.250	83.812	0.438	36.5	100	5.21	48.5
17.002	46	47	8.000	0.600	83.812	82.730	1.082	7.4	100	5.48	47.7
1.010	47	48	20.000	0.600	82.605	81.860	0.745	26.8	225	6.36	45.3
1.011	48	49	10.000	0.600	81.860	81.800	0.060	166.7	225	6.52	44.9
1.012	49	50	8.000	0.600	81.800	81.750	0.050	160.0	225	6.65	44.6

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
17.001	1.001	7.9	1.0	0.736	0.938	0.008	0.0
18.000	1.001	7.9	0.3	0.500	0.702	0.002	0.0
18.001	1.040	8.2	1.2	0.702	0.938	0.009	0.0
19.000	1.280	10.1	1.1	0.500	0.938	0.008	0.0
17.002	2.861	22.5	3.9	0.938	1.570	0.030	0.0
1.010	2.535	100.8	36.5	1.570	1.365	0.297	0.0
1.011	1.010	40.1	36.1	1.365	0.475	0.297	0.0
1.012	1.031	41.0	35.9	0.475	0.275	0.297	0.0

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	89.150	0.600	100	0	1.000	88.550	100
2	89.150	0.752	450	1	1.000	88.398	100
				0	1.001	88.398	100
3	88.750	0.600	100	0	2.000	88.150	100
4	88.750	0.752	450	1	2.000	87.998	100
				2	1.001	87.998	100
				0	1.002	87.998	100
5	88.750	0.600	100	0	3.000	88.150	100
6	88.750	1.005	450	1	3.000	87.745	100
				2	1.002	87.745	100
				0	1.003	87.745	100
7	88.450	1.350	1200	1	1.003	87.150	100
				0	1.004	87.100	150

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Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
8	90.350	0.600	100	0	4.000	89.750	100
9	90.350	0.769	450	1	4.000	89.581	100
				0	4.001	89.581	100
10	89.150	0.600	100	0	5.000	88.550	100
11	89.150	0.785	450	1	5.000	88.365	100
				2	4.001	88.365	100
				0	4.002	88.365	100
12	87.950	0.600	100	0	6.000	87.350	100
13	87.950	0.802	450	1	6.000	87.148	100
				2	4.002	87.148	100
				0	4.003	87.148	100
14	87.950	0.600	100	0	7.000	87.350	100
15	87.950	0.954	450	1	7.000	86.996	100
				2	4.003	86.996	100
				0	4.004	86.996	100
16	87.100	1.350	1200	1	4.004	85.800	100
				2	1.004	85.750	150
				0	1.005	85.750	150
17	86.300	1.350	1200	1	1.005	84.950	150
				0	1.006	84.950	150
18	87.850	0.600	100	0	8.000	87.250	100
19	86.300	0.600	450	1	8.000	85.700	100
				0	8.001	85.700	100
20	87.350	0.600	100	0	9.000	86.750	100

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Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
21	86.150	0.635	450	1	9.000	85.515	100
				2	8.001	85.515	100
				0	8.002	85.515	100
22	86.850	0.600	100	0	10.000	86.250	100
23	85.650	0.600	450	1	10.000	85.050	100
				2	8.002	85.050	100
				0	8.003	85.050	100
24	86.850	0.600	100	0	11.000	86.250	100
25	85.650	0.752	450	1	11.000	84.898	100
				2	8.003	84.898	100
				0	8.004	84.898	100
26	86.750	0.600	100	0	12.000	86.150	100
27	86.750	0.802	450	1	12.000	85.948	100
				0	12.001	85.948	100
28	85.550	0.600	100	0	13.000	84.950	100
29	85.550	0.836	450	1	13.000	84.714	100
				2	12.001	84.714	100
				0	12.002	84.714	100
30	85.550	0.600	100	0	14.000	84.950	100
31	85.550	1.038	450	1	14.000	84.512	100
				2	12.002	84.512	100
				0	12.003	84.512	100
32	85.450	1.425	1200	1	12.003	84.150	100
				2	8.004	84.150	100
				3	1.006	84.100	150
				0	1.007	84.025	225
33	84.900	1.425	1200	1	1.007	83.475	225
				0	1.008	83.475	225

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Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
34	84.850	0.600	100	0	15.000	84.250	100
35	84.850	0.785	450	1	15.000	84.065	100
				0	15.001	84.065	100
36	84.850	0.600	100	0	16.000	84.250	100
37	84.850	0.819	450	1	16.000	84.031	100
				0	16.001	84.031	100
38	84.850	1.004	450	1	16.001	83.846	100
				2	15.001	83.846	100
				0	15.002	83.846	100
39	84.850	1.257	450	1	15.002	83.593	100
				0	15.003	83.593	100
40	84.200	1.425	1200	1	15.003	82.900	100
				2	1.008	82.775	225
				0	1.009	82.775	225
41	84.850	0.600	100	0	17.000	84.250	100
42	84.850	0.836	450	1	17.000	84.014	100
				0	17.001	84.014	100
43	84.850	0.600	100	0	18.000	84.250	100
44	84.850	0.802	450	1	18.000	84.048	100
				0	18.001	84.048	100
45	84.850	0.600	100	0	19.000	84.250	100
46	84.850	1.038	450	1	19.000	83.812	100
				2	18.001	83.812	100
				3	17.001	83.812	100
				0	17.002	83.812	100

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Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections		Link	IL (m)	Dia (mm)
47	84.400	1.795	1200		1	17.002	82.730	100
					2	1.009	82.605	225
					0	1.010	82.605	225
48	83.450	1.590	2400		1	1.010	81.860	225
					0	1.011	81.860	225
49	82.500	0.700	1200		1	1.011	81.800	225
					0	1.012	81.800	225
50	82.250	0.500	1200		1	1.012	81.750	225

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	Drain Down Time (mins)	240
Ratio-R	0.200	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	0	0	0
100	30	0	0

Node 48 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	81.860	Product Number	CTL-SHE-0104-5600-1500-5600
Design Depth (m)	1.500	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.6	Min Node Diameter (mm)	1200

Node 48 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	82.160	Product Number	CTL-SHE-0126-7800-1280-7800
Design Depth (m)	1.280	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	7.8	Min Node Diameter (mm)	1200

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Node 48 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	81.860
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	144

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	120.0	0.0	1.000	120.0	0.0	1.001	0.0	0.0

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Results for 1 year Critical Storm Duration. Lowest mass balance: 99.57%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	1	20	88.561	0.011	0.2	0.0008	0.0000	OK
30 minute winter	2	20	88.411	0.013	0.4	0.0028	0.0000	OK
15 minute winter	3	10	88.170	0.020	0.7	0.0041	0.0000	OK
15 minute winter	4	11	88.032	0.034	1.8	0.0108	0.0000	OK
15 minute winter	5	12	88.161	0.011	0.3	0.0011	0.0000	OK
15 minute winter	6	11	87.767	0.022	2.3	0.0049	0.0000	OK
15 minute winter	7	11	87.121	0.021	2.3	0.0232	0.0000	OK
30 minute winter	8	20	89.761	0.011	0.2	0.0008	0.0000	OK
15 minute winter	9	10	89.595	0.014	0.9	0.0044	0.0000	OK
15 minute winter	10	12	88.565	0.015	0.4	0.0022	0.0000	OK
15 minute winter	11	10	88.387	0.022	2.2	0.0080	0.0000	OK
15 minute winter	12	10	87.368	0.018	0.6	0.0032	0.0000	OK
15 minute winter	13	11	87.197	0.049	3.3	0.0139	0.0000	OK
30 minute summer	14	20	87.360	0.010	0.2	0.0007	0.0000	OK
15 minute winter	15	11	87.025	0.029	4.1	0.0087	0.0000	OK
15 minute winter	16	11	85.805	0.055	11.5	0.1005	0.0000	OK
15 minute winter	17	11	85.006	0.056	11.5	0.0630	0.0000	OK
15 minute winter	18	10	87.263	0.013	0.8	0.0031	0.0000	OK
15 minute winter	19	11	85.724	0.024	1.0	0.0053	0.0000	OK
15 minute winter	20	11	86.760	0.010	0.4	0.0014	0.0000	OK
15 minute winter	21	11	85.540	0.025	1.8	0.0072	0.0000	OK
30 minute summer	22	18	86.267	0.017	1.2	0.0062	0.0000	OK
15 minute winter	23	11	85.100	0.050	3.4	0.0145	0.0000	OK
30 minute summer	24	19	86.257	0.007	0.2	0.0005	0.0000	OK
15 minute winter	25	11	84.932	0.034	3.8	0.0072	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 summer	1	1.000	2	0.2	0.375	0.025	0.0048	
30 minute winter	2	1.001	4	0.4	0.314	0.036	0.0170	
15 minute winter	3	2.000	4	0.7	0.398	0.085	0.0153	
15 minute winter	4	1.002	6	1.7	0.939	0.215	0.0272	
15 minute winter	5	3.000	6	0.3	0.398	0.023	0.0078	
15 minute winter	6	1.003	7	2.3	1.844	0.098	0.0050	
15 minute winter	7	1.004	16	2.3	0.682	0.040	0.0474	
30 minute winter	8	4.000	9	0.2	0.388	0.025	0.0054	
15 minute winter	9	4.001	11	0.9	0.921	0.041	0.0096	
15 minute winter	10	5.000	11	0.4	0.420	0.051	0.0112	
15 minute winter	11	4.002	13	2.1	0.864	0.105	0.0278	
15 minute winter	12	6.000	13	0.6	0.245	0.071	0.0285	
15 minute winter	13	4.003	15	3.2	1.140	0.406	0.0254	
30 minute summer	14	7.000	15	0.2	0.212	0.019	0.0129	
15 minute winter	15	4.004	16	4.1	2.312	0.164	0.0125	
15 minute winter	16	1.005	17	11.5	1.955	0.270	0.0826	
15 minute winter	17	1.006	32	11.6	2.001	0.272	0.0868	
15 minute winter	18	8.000	19	0.8	0.918	0.034	0.0109	
15 minute winter	19	8.001	21	1.0	0.640	0.121	0.0163	
15 minute winter	20	9.000	21	0.4	0.488	0.020	0.0108	
15 minute winter	21	8.002	23	1.8	0.657	0.141	0.0299	
30 minute summer	22	10.000	23	1.2	0.863	0.059	0.0256	
15 minute winter	23	8.003	25	3.4	1.081	0.426	0.0280	
30 minute summer	24	11.000	25	0.2	0.210	0.009	0.0141	
15 minute winter	25	8.004	32	3.7	1.619	0.235	0.0254	

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Results for 1 year Critical Storm Duration. Lowest mass balance: 99.57%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	26	20	86.161	0.011	0.2	0.0008	0.0000	OK
15 minute winter	27	10	85.964	0.016	1.0	0.0052	0.0000	OK
15 minute winter	28	12	84.965	0.015	0.4	0.0022	0.0000	OK
15 minute winter	29	11	84.753	0.039	2.3	0.0136	0.0000	OK
60 minute summer	30	34	84.959	0.009	0.2	0.0007	0.0000	OK
15 minute winter	31	11	84.539	0.027	2.6	0.0054	0.0000	OK
15 minute winter	32	11	84.087	0.062	19.6	0.0840	0.0000	OK
15 minute winter	33	11	83.543	0.068	19.6	0.0771	0.0000	OK
30 minute winter	34	20	84.261	0.011	0.2	0.0008	0.0000	OK
15 minute winter	35	10	84.089	0.024	1.0	0.0079	0.0000	OK
15 minute winter	36	12	84.263	0.013	0.3	0.0014	0.0000	OK
15 minute winter	37	10	84.053	0.022	0.9	0.0063	0.0000	OK
15 minute winter	38	11	83.892	0.046	3.0	0.0176	0.0000	OK
15 minute winter	39	11	83.623	0.030	3.3	0.0062	0.0000	OK
15 minute winter	40	11	82.899	0.124	27.4	0.2156	0.0000	OK
15 minute winter	41	12	84.263	0.013	0.3	0.0014	0.0000	OK
15 minute winter	42	10	84.036	0.022	0.9	0.0062	0.0000	OK
30 minute winter	43	20	84.261	0.011	0.2	0.0008	0.0000	OK
15 minute winter	44	10	84.071	0.023	1.0	0.0077	0.0000	OK
15 minute winter	45	10	84.270	0.020	0.9	0.0055	0.0000	OK
15 minute winter	46	11	83.838	0.026	3.3	0.0067	0.0000	OK
15 minute winter	47	10	82.707	0.102	31.4	0.1243	0.0000	OK
240 minute winter	48	164	82.124	0.264	11.5	31.3322	0.0000	SURCHARGED
240 minute winter	49	164	81.856	0.056	5.1	0.0635	0.0000	OK
240 minute winter	50	164	81.803	0.053	5.1	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)
30 minute winter	26	12.000	27	0.2	0.351	0.025	0.0072	
15 minute winter	27	12.001	29	1.0	0.566	0.052	0.0232	
15 minute winter	28	13.000	29	0.4	0.258	0.051	0.0249	
15 minute winter	29	12.002	31	2.2	0.977	0.279	0.0271	
60 minute summer	30	14.000	31	0.2	0.235	0.017	0.0114	
15 minute winter	31	12.003	32	2.6	1.589	0.142	0.0066	
15 minute winter	32	1.007	33	19.6	2.070	0.152	0.0855	
15 minute winter	33	1.008	40	19.7	1.214	0.201	0.3262	
30 minute winter	34	15.000	35	0.2	0.241	0.025	0.0100	
15 minute winter	35	15.001	38	0.9	0.396	0.121	0.0321	
15 minute winter	36	16.000	37	0.3	0.338	0.038	0.0124	
15 minute winter	37	16.001	38	0.8	0.363	0.108	0.0266	
15 minute winter	38	15.002	39	3.0	1.087	0.381	0.0416	
15 minute winter	39	15.003	40	3.3	1.700	0.184	0.0155	
15 minute winter	40	1.009	47	27.4	1.414	0.527	0.3363	
15 minute winter	41	17.000	42	0.3	0.338	0.038	0.0134	
15 minute winter	42	17.001	46	0.8	0.580	0.108	0.0176	
30 minute winter	43	18.000	44	0.2	0.245	0.025	0.0106	
15 minute winter	44	18.001	46	1.0	0.634	0.116	0.0195	
15 minute winter	45	19.000	46	0.9	0.636	0.086	0.0219	
15 minute winter	46	17.002	47	3.2	1.979	0.141	0.0128	
15 minute winter	47	1.010	48	31.8	2.891	0.315	0.2551	
240 minute winter	48	1.011	49	5.1	0.655	0.126	0.0774	
240 minute winter	49	1.012	50	5.1	0.683	0.124	0.0594	55.9

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.57%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	1	19	88.567	0.017	0.5	0.0013	0.0000	OK
30 minute summer	2	19	88.418	0.020	1.0	0.0043	0.0000	OK
30 minute summer	3	18	88.181	0.031	1.6	0.0064	0.0000	OK
30 minute summer	4	18	88.055	0.057	4.2	0.0180	0.0000	OK
15 minute winter	5	11	88.167	0.017	0.8	0.0018	0.0000	OK
30 minute summer	6	18	87.782	0.037	5.8	0.0080	0.0000	OK
30 minute summer	7	18	87.132	0.032	5.8	0.0362	0.0000	OK
30 minute summer	8	19	89.767	0.017	0.5	0.0013	0.0000	OK
30 minute summer	9	18	89.602	0.021	2.1	0.0067	0.0000	OK
15 minute winter	10	10	88.575	0.025	1.1	0.0035	0.0000	OK
15 minute winter	11	10	88.400	0.035	5.3	0.0127	0.0000	OK
15 minute winter	12	10	87.378	0.028	1.4	0.0050	0.0000	OK
15 minute winter	13	11	87.260	0.112	8.1	0.0317	0.0000	SURCHARGED
30 minute summer	14	19	87.365	0.015	0.5	0.0011	0.0000	OK
15 minute winter	15	10	87.043	0.047	10.0	0.0143	0.0000	OK
15 minute winter	16	10	85.845	0.095	28.4	0.1740	0.0000	OK
15 minute winter	17	10	85.045	0.095	28.2	0.1080	0.0000	OK
15 minute winter	18	10	87.269	0.019	1.9	0.0047	0.0000	OK
15 minute winter	19	10	85.738	0.038	2.4	0.0087	0.0000	OK
15 minute winter	20	10	86.766	0.016	1.1	0.0022	0.0000	OK
15 minute winter	21	10	85.556	0.041	4.5	0.0118	0.0000	OK
15 minute winter	22	10	86.276	0.026	3.0	0.0098	0.0000	OK
15 minute winter	23	11	85.179	0.129	8.5	0.0376	0.0000	SURCHARGED
30 minute summer	24	18	86.261	0.011	0.5	0.0008	0.0000	OK
15 minute winter	25	11	84.955	0.057	8.9	0.0120	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 summer	1	1.000	2	0.5	0.494	0.063	0.0091	
30 minute summer	2	1.001	4	1.0	0.376	0.090	0.0342	
30 minute summer	3	2.000	4	1.6	0.490	0.203	0.0297	
30 minute summer	4	1.002	6	4.2	1.169	0.531	0.0538	
15 minute winter	5	3.000	6	0.8	0.489	0.062	0.0155	
30 minute summer	6	1.003	7	5.8	2.343	0.245	0.0099	
30 minute summer	7	1.004	16	5.8	0.819	0.100	0.0935	
30 minute summer	8	4.000	9	0.5	0.493	0.063	0.0105	
30 minute summer	9	4.001	11	2.1	1.175	0.099	0.0181	
15 minute winter	10	5.000	11	1.1	0.543	0.136	0.0218	
15 minute winter	11	4.002	13	5.3	1.029	0.261	0.0562	
15 minute winter	12	6.000	13	1.4	0.284	0.174	0.0576	
15 minute winter	13	4.003	15	7.6	1.324	0.968	0.0511	
30 minute summer	14	7.000	15	0.5	0.260	0.048	0.0258	
15 minute winter	15	4.004	16	10.0	2.870	0.396	0.0245	
15 minute winter	16	1.005	17	28.2	2.384	0.659	0.1653	
15 minute winter	17	1.006	32	27.9	2.463	0.655	0.1697	
15 minute winter	18	8.000	19	1.9	1.009	0.082	0.0210	
15 minute winter	19	8.001	21	2.4	0.812	0.300	0.0320	
15 minute winter	20	9.000	21	1.1	0.588	0.053	0.0211	
15 minute winter	21	8.002	23	4.5	0.777	0.357	0.0599	
15 minute winter	22	10.000	23	3.0	0.848	0.148	0.0519	
15 minute winter	23	8.003	25	7.9	1.273	1.007	0.0557	
30 minute summer	24	11.000	25	0.5	0.244	0.023	0.0271	
15 minute winter	25	8.004	32	8.9	2.008	0.557	0.0486	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.57%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	26	19	86.167	0.017	0.5	0.0013	0.0000	OK
15 minute winter	27	10	85.972	0.024	2.4	0.0081	0.0000	OK
15 minute winter	28	10	84.975	0.025	1.1	0.0035	0.0000	OK
15 minute winter	29	11	84.782	0.068	5.6	0.0237	0.0000	OK
30 minute summer	30	19	84.964	0.014	0.5	0.0011	0.0000	OK
15 minute winter	31	11	84.558	0.046	6.5	0.0091	0.0000	OK
15 minute winter	32	10	84.128	0.103	47.4	0.1403	0.0000	OK
15 minute winter	33	11	83.592	0.117	47.5	0.1320	0.0000	OK
30 minute summer	34	19	84.267	0.017	0.5	0.0013	0.0000	OK
15 minute winter	35	10	84.103	0.038	2.4	0.0127	0.0000	OK
15 minute winter	36	11	84.272	0.022	0.8	0.0023	0.0000	OK
15 minute winter	37	10	84.067	0.036	2.2	0.0101	0.0000	OK
15 minute winter	38	11	83.934	0.088	7.5	0.0334	0.0000	OK
15 minute winter	39	11	83.640	0.047	8.2	0.0098	0.0000	OK
15 minute winter	40	11	83.149	0.374	66.8	0.6482	0.0000	SURCHARGED
15 minute winter	41	11	84.272	0.022	0.8	0.0023	0.0000	OK
15 minute winter	42	10	84.050	0.036	2.2	0.0100	0.0000	OK
30 minute summer	43	19	84.267	0.017	0.5	0.0013	0.0000	OK
15 minute winter	44	10	84.085	0.037	2.4	0.0123	0.0000	OK
15 minute winter	45	10	84.282	0.032	2.2	0.0087	0.0000	OK
15 minute winter	46	10	83.856	0.044	8.1	0.0111	0.0000	OK
15 minute winter	47	11	82.769	0.164	75.9	0.1996	0.0000	OK
180 minute winter	48	128	82.399	0.539	29.0	63.8984	0.0000	SURCHARGED
180 minute winter	49	128	81.894	0.094	13.1	0.1067	0.0000	OK
180 minute winter	50	128	81.837	0.087	13.1	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)
30 minute summer	26	12.000	27	0.5	0.443	0.064	0.0138	
15 minute winter	27	12.001	29	2.4	0.682	0.126	0.0460	
15 minute winter	28	13.000	29	1.1	0.302	0.136	0.0500	
15 minute winter	29	12.002	31	5.5	1.208	0.705	0.0548	
30 minute summer	30	14.000	31	0.5	0.277	0.043	0.0245	
15 minute winter	31	12.003	32	6.6	2.001	0.358	0.0131	
15 minute winter	32	1.007	33	47.5	2.537	0.367	0.1729	
15 minute winter	33	1.008	40	47.5	1.379	0.487	0.6055	
30 minute summer	34	15.000	35	0.5	0.297	0.064	0.0194	
15 minute winter	35	15.001	38	2.4	0.473	0.300	0.0649	
15 minute winter	36	16.000	37	0.8	0.434	0.102	0.0244	
15 minute winter	37	16.001	38	2.2	0.432	0.274	0.0540	
15 minute winter	38	15.002	39	7.4	1.311	0.934	0.0823	
15 minute winter	39	15.003	40	8.2	1.824	0.454	0.0459	
15 minute winter	40	1.009	47	65.9	1.732	1.268	0.6010	
15 minute winter	41	17.000	42	0.8	0.434	0.102	0.0262	
15 minute winter	42	17.001	46	2.1	0.743	0.273	0.0347	
30 minute summer	43	18.000	44	0.5	0.303	0.064	0.0207	
15 minute winter	44	18.001	46	2.4	0.801	0.289	0.0383	
15 minute winter	45	19.000	46	2.2	0.808	0.217	0.0433	
15 minute winter	46	17.002	47	8.0	2.522	0.355	0.0253	
15 minute winter	47	1.010	48	76.3	3.146	0.757	0.6285	
180 minute winter	48	1.011	49	13.1	0.824	0.327	0.1592	
180 minute winter	49	1.012	50	13.1	0.879	0.320	0.1195	116.2

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Results for 100 year Critical Storm Duration. Lowest mass balance: 99.57%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	11	88.570	0.020	0.7	0.0015	0.0000	OK
15 minute winter	2	11	88.422	0.024	1.4	0.0051	0.0000	OK
15 minute winter	3	10	88.185	0.035	2.1	0.0073	0.0000	OK
15 minute winter	4	11	88.065	0.067	5.6	0.0215	0.0000	OK
15 minute winter	5	10	88.170	0.020	1.1	0.0021	0.0000	OK
15 minute winter	6	10	87.788	0.043	7.6	0.0094	0.0000	OK
15 minute winter	7	11	87.137	0.037	7.6	0.0416	0.0000	OK
15 minute winter	8	11	89.770	0.020	0.7	0.0015	0.0000	OK
15 minute winter	9	10	89.606	0.025	2.8	0.0077	0.0000	OK
30 minute summer	10	18	88.579	0.029	1.4	0.0040	0.0000	OK
15 minute winter	11	10	88.405	0.040	7.0	0.0146	0.0000	OK
15 minute winter	12	12	87.388	0.038	1.8	0.0066	0.0000	OK
15 minute winter	13	11	87.382	0.234	10.5	0.0663	0.0000	SURCHARGED
15 minute winter	14	11	87.368	0.018	0.7	0.0013	0.0000	OK
15 minute winter	15	12	87.047	0.051	12.5	0.0156	0.0000	OK
15 minute winter	16	10	85.864	0.114	36.0	0.2091	0.0000	OK
15 minute winter	17	11	85.067	0.117	35.8	0.1326	0.0000	OK
15 minute winter	18	10	87.272	0.022	2.5	0.0054	0.0000	OK
15 minute winter	19	10	85.745	0.045	3.2	0.0102	0.0000	OK
30 minute summer	20	18	86.768	0.018	1.4	0.0025	0.0000	OK
30 minute summer	21	18	85.564	0.049	5.9	0.0139	0.0000	OK
15 minute winter	22	10	86.280	0.030	3.9	0.0112	0.0000	OK
30 minute summer	23	19	85.308	0.258	10.9	0.0754	0.0000	SURCHARGED
15 minute winter	24	11	86.262	0.012	0.7	0.0009	0.0000	OK
30 minute summer	25	19	84.965	0.067	11.3	0.0142	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	1	1.000	2	0.7	0.546	0.089	0.0116	
15 minute winter	2	1.001	4	1.4	0.403	0.126	0.0424	
15 minute winter	3	2.000	4	2.1	0.516	0.264	0.0363	
15 minute winter	4	1.002	6	5.5	1.236	0.696	0.0663	
15 minute winter	5	3.000	6	1.1	0.515	0.084	0.0194	
15 minute winter	6	1.003	7	7.6	2.501	0.321	0.0121	
15 minute winter	7	1.004	16	7.6	0.858	0.131	0.1154	
15 minute winter	8	4.000	9	0.7	0.543	0.089	0.0130	
15 minute winter	9	4.001	11	2.8	1.267	0.131	0.0222	
30 minute summer	10	5.000	11	1.4	0.590	0.178	0.0262	
15 minute winter	11	4.002	13	6.9	1.095	0.340	0.0593	
15 minute winter	12	6.000	13	1.8	0.298	0.226	0.0633	
15 minute winter	13	4.003	15	9.5	1.408	1.205	0.0533	
15 minute winter	14	7.000	15	0.7	0.310	0.067	0.0294	
15 minute winter	15	4.004	16	12.4	2.961	0.493	0.0326	
15 minute winter	16	1.005	17	35.8	2.462	0.838	0.2043	
15 minute winter	17	1.006	32	36.0	2.562	0.845	0.2103	
15 minute winter	18	8.000	19	2.5	1.153	0.108	0.0259	
15 minute winter	19	8.001	21	3.1	0.874	0.397	0.0393	
30 minute summer	20	9.000	21	1.4	0.626	0.068	0.0260	
30 minute summer	21	8.002	23	5.8	0.876	0.466	0.0638	
15 minute winter	22	10.000	23	3.9	0.999	0.192	0.0538	
30 minute summer	23	8.003	25	10.1	1.382	1.286	0.0603	
15 minute winter	24	11.000	25	0.7	0.279	0.033	0.0337	
30 minute summer	25	8.004	32	11.4	2.113	0.714	0.0591	

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Results for 100 year Critical Storm Duration. Lowest mass balance: 99.57%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	26	11	86.170	0.020	0.7	0.0015	0.0000	OK
15 minute winter	27	10	85.976	0.028	3.2	0.0093	0.0000	OK
30 minute summer	28	18	84.979	0.029	1.4	0.0040	0.0000	OK
15 minute winter	29	11	84.798	0.084	7.3	0.0294	0.0000	OK
15 minute winter	30	11	84.967	0.017	0.7	0.0013	0.0000	OK
15 minute winter	31	11	84.567	0.055	8.6	0.0108	0.0000	OK
15 minute winter	32	11	84.143	0.118	61.2	0.1603	0.0000	OK
15 minute winter	33	11	83.648	0.173	61.2	0.1955	0.0000	OK
15 minute winter	34	11	84.270	0.020	0.7	0.0015	0.0000	OK
15 minute winter	35	10	84.109	0.044	3.2	0.0148	0.0000	OK
15 minute winter	36	10	84.275	0.025	1.1	0.0027	0.0000	OK
15 minute winter	37	10	84.072	0.041	2.9	0.0116	0.0000	OK
15 minute winter	38	12	84.053	0.207	9.8	0.0783	0.0000	SURCHARGED
15 minute winter	39	12	83.659	0.066	9.6	0.0137	0.0000	OK
15 minute winter	40	11	83.344	0.569	84.1	0.9873	0.0000	SURCHARGED
15 minute winter	41	10	84.275	0.025	1.1	0.0027	0.0000	OK
15 minute winter	42	10	84.056	0.042	2.9	0.0116	0.0000	OK
15 minute winter	43	11	84.270	0.020	0.7	0.0015	0.0000	OK
15 minute winter	44	10	84.092	0.044	3.2	0.0146	0.0000	OK
15 minute winter	45	10	84.286	0.036	2.8	0.0099	0.0000	OK
30 minute summer	46	17	83.861	0.049	10.2	0.0125	0.0000	OK
30 minute summer	47	20	82.845	0.240	94.6	0.2933	0.0000	SURCHARGED
180 minute winter	48	132	82.590	0.730	36.4	86.4862	0.0000	SURCHARGED
360 minute winter	49	224	81.895	0.095	13.3	0.1077	0.0000	OK
360 minute winter	50	224	81.838	0.088	13.3	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	26	12.000	27	0.7	0.494	0.089	0.0174	
15 minute winter	27	12.001	29	3.2	0.721	0.168	0.0568	
30 minute summer	28	13.000	29	1.4	0.314	0.178	0.0617	
15 minute winter	29	12.002	31	7.2	1.244	0.915	0.0683	
15 minute winter	30	14.000	31	0.7	0.299	0.060	0.0313	
15 minute winter	31	12.003	32	8.6	2.124	0.469	0.0162	
15 minute winter	32	1.007	33	61.2	2.524	0.474	0.2424	
15 minute winter	33	1.008	40	60.5	1.565	0.619	0.7252	
15 minute winter	34	15.000	35	0.7	0.328	0.089	0.0244	
15 minute winter	35	15.001	38	3.1	0.486	0.399	0.0724	
15 minute winter	36	16.000	37	1.1	0.472	0.136	0.0297	
15 minute winter	37	16.001	38	2.8	0.441	0.357	0.0598	
15 minute winter	38	15.002	39	8.7	1.313	1.100	0.1000	
15 minute winter	39	15.003	40	9.6	1.858	0.536	0.0533	
15 minute winter	40	1.009	47	82.6	2.083	1.590	0.6609	
15 minute winter	41	17.000	42	1.1	0.468	0.136	0.0323	
15 minute winter	42	17.001	46	2.8	0.824	0.354	0.0407	
15 minute winter	43	18.000	44	0.7	0.331	0.089	0.0265	
15 minute winter	44	18.001	46	3.1	0.894	0.382	0.0454	
15 minute winter	45	19.000	46	2.8	0.892	0.276	0.0499	
30 minute summer	46	17.002	47	10.3	2.641	0.459	0.0437	
30 minute summer	47	1.010	48	94.3	2.593	0.935	0.7954	
180 minute winter	48	1.011	49	13.3	0.828	0.332	0.1613	
360 minute winter	49	1.012	50	13.3	0.883	0.326	0.1210	193.4

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Results for 100 year +30% CC Critical Storm Duration. Lowest mass balance: 99.57%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	11	88.573	0.023	0.9	0.0017	0.0000	OK
15 minute winter	2	11	88.425	0.027	1.8	0.0058	0.0000	OK
15 minute winter	3	10	88.190	0.040	2.7	0.0084	0.0000	OK
15 minute winter	4	11	88.081	0.083	7.2	0.0265	0.0000	OK
15 minute winter	5	10	88.172	0.022	1.4	0.0024	0.0000	OK
15 minute winter	6	11	87.795	0.050	9.8	0.0110	0.0000	OK
15 minute winter	7	11	87.142	0.042	9.7	0.0472	0.0000	OK
15 minute winter	8	11	89.773	0.023	0.9	0.0017	0.0000	OK
15 minute winter	9	10	89.609	0.028	3.6	0.0088	0.0000	OK
30 minute summer	10	18	88.583	0.033	1.8	0.0046	0.0000	OK
15 minute winter	11	10	88.412	0.047	9.1	0.0170	0.0000	OK
15 minute winter	12	12	87.535	0.185	2.3	0.0323	0.0000	SURCHARGED
15 minute winter	13	12	87.519	0.371	12.5	0.1054	0.0000	SURCHARGED
15 minute winter	14	11	87.370	0.020	0.9	0.0015	0.0000	OK
15 minute winter	15	12	87.053	0.057	15.1	0.0174	0.0000	OK
15 minute winter	16	12	86.131	0.381	45.4	0.6960	0.0000	SURCHARGED
15 minute winter	17	13	85.266	0.316	41.0	0.3579	0.0000	SURCHARGED
15 minute winter	18	10	87.275	0.025	3.2	0.0061	0.0000	OK
15 minute winter	19	10	85.752	0.052	4.1	0.0117	0.0000	OK
30 minute summer	20	18	86.770	0.020	1.8	0.0028	0.0000	OK
30 minute summer	21	19	85.608	0.093	7.6	0.0265	0.0000	OK
15 minute winter	22	10	86.284	0.034	5.0	0.0127	0.0000	OK
30 minute summer	23	19	85.473	0.423	13.7	0.1235	0.0000	FLOOD RISK
15 minute winter	24	11	86.264	0.014	0.9	0.0011	0.0000	OK
30 minute summer	25	20	84.980	0.082	14.1	0.0173	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	1	1.000	2	0.9	0.587	0.114	0.0138	
15 minute winter	2	1.001	4	1.8	0.415	0.162	0.0522	
15 minute winter	3	2.000	4	2.7	0.548	0.340	0.0444	
15 minute winter	4	1.002	6	7.1	1.274	0.899	0.0818	
15 minute winter	5	3.000	6	1.4	0.544	0.107	0.0235	
15 minute winter	6	1.003	7	9.7	2.649	0.413	0.0147	
15 minute winter	7	1.004	16	9.8	0.813	0.169	0.1404	
15 minute winter	8	4.000	9	0.9	0.582	0.114	0.0156	
15 minute winter	9	4.001	11	3.6	1.350	0.168	0.0268	
30 minute summer	10	5.000	11	1.8	0.629	0.229	0.0316	
15 minute winter	11	4.002	13	9.0	1.366	0.443	0.0628	
15 minute winter	12	6.000	13	2.7	0.351	0.340	0.0939	
15 minute winter	13	4.003	15	11.5	1.642	1.456	0.0560	
15 minute winter	14	7.000	15	0.9	0.345	0.086	0.0337	
15 minute winter	15	4.004	16	15.0	2.893	0.593	0.0435	
15 minute winter	16	1.005	17	41.0	2.474	0.959	0.2465	
15 minute winter	17	1.006	32	39.6	2.566	0.931	0.2641	
15 minute winter	18	8.000	19	3.2	1.145	0.139	0.0310	
15 minute winter	19	8.001	21	4.1	0.892	0.515	0.0602	
30 minute summer	20	9.000	21	1.8	0.653	0.088	0.0475	
30 minute summer	21	8.002	23	7.0	0.956	0.560	0.0848	
15 minute winter	22	10.000	23	5.0	1.004	0.247	0.0559	
30 minute summer	23	8.003	25	12.5	1.631	1.587	0.0661	
15 minute winter	24	11.000	25	0.9	0.356	0.042	0.0405	
30 minute summer	25	8.004	32	13.9	2.165	0.874	0.0807	

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Results for 100 year +30% CC Critical Storm Duration. Lowest mass balance: 99.57%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	26	11	86.173	0.023	0.9	0.0017	0.0000	OK
15 minute winter	27	10	85.980	0.032	4.1	0.0106	0.0000	OK
30 minute summer	28	18	84.983	0.033	1.8	0.0046	0.0000	OK
30 minute summer	29	19	84.895	0.181	9.3	0.0633	0.0000	SURCHARGED
15 minute winter	30	11	84.969	0.019	0.9	0.0014	0.0000	OK
30 minute summer	31	20	84.579	0.067	10.1	0.0133	0.0000	OK
30 minute summer	32	20	84.396	0.371	70.8	0.5036	0.0000	SURCHARGED
30 minute summer	33	20	84.175	0.700	68.5	0.7919	0.0000	SURCHARGED
15 minute winter	34	11	84.273	0.023	0.9	0.0017	0.0000	OK
30 minute summer	35	21	84.256	0.191	4.0	0.0644	0.0000	SURCHARGED
15 minute winter	36	10	84.278	0.028	1.4	0.0031	0.0000	OK
30 minute summer	37	21	84.250	0.219	3.5	0.0615	0.0000	SURCHARGED
30 minute summer	38	21	84.231	0.385	10.7	0.1455	0.0000	SURCHARGED
30 minute summer	39	21	83.957	0.364	10.3	0.0754	0.0000	SURCHARGED
30 minute summer	40	20	83.773	0.998	89.8	1.7312	0.0000	SURCHARGED
15 minute winter	41	10	84.278	0.028	1.4	0.0031	0.0000	OK
15 minute winter	42	10	84.062	0.048	3.7	0.0135	0.0000	OK
15 minute winter	43	11	84.273	0.023	0.9	0.0017	0.0000	OK
15 minute winter	44	10	84.099	0.051	4.1	0.0170	0.0000	OK
15 minute winter	45	10	84.292	0.042	3.7	0.0115	0.0000	OK
15 minute winter	46	11	83.869	0.057	13.6	0.0145	0.0000	OK
240 minute winter	47	176	83.408	0.803	40.2	0.9798	0.0000	SURCHARGED
240 minute winter	48	176	83.392	1.532	40.0	120.9881	0.0000	FLOOD RISK
240 minute winter	49	124	81.895	0.095	13.3	0.1077	0.0000	OK
240 minute winter	50	124	81.838	0.088	13.3	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	26	12.000	27	0.9	0.528	0.114	0.0208	
15 minute winter	27	12.001	29	4.1	0.736	0.216	0.0647	
30 minute summer	28	13.000	29	1.8	0.319	0.229	0.0702	
30 minute summer	29	12.002	31	8.5	1.238	1.082	0.0805	
15 minute winter	30	14.000	31	0.9	0.328	0.077	0.0373	
30 minute summer	31	12.003	32	10.1	2.155	0.547	0.0268	
30 minute summer	32	1.007	33	68.5	2.568	0.530	0.3579	
30 minute summer	33	1.008	40	66.3	1.666	0.678	0.7954	
15 minute winter	34	15.000	35	0.9	0.342	0.115	0.0504	
30 minute summer	35	15.001	38	3.3	0.511	0.425	0.1017	
15 minute winter	36	16.000	37	1.4	0.490	0.174	0.0624	
30 minute summer	37	16.001	38	3.1	0.462	0.390	0.0861	
30 minute summer	38	15.002	39	9.0	1.287	1.150	0.1174	
30 minute summer	39	15.003	40	12.7	2.127	0.706	0.0626	
30 minute summer	40	1.009	47	86.9	2.185	1.672	0.6761	
15 minute winter	41	17.000	42	1.4	0.495	0.174	0.0390	
15 minute winter	42	17.001	46	3.6	0.872	0.458	0.0500	
15 minute winter	43	18.000	44	0.9	0.350	0.114	0.0320	
15 minute winter	44	18.001	46	4.0	0.949	0.494	0.0553	
15 minute winter	45	19.000	46	3.6	0.960	0.362	0.0607	
15 minute winter	46	17.002	47	13.4	2.483	0.598	0.0497	
240 minute winter	47	1.010	48	40.0	1.937	0.397	0.7954	
240 minute winter	48	1.011	49	13.3	0.828	0.332	0.1613	
240 minute winter	49	1.012	50	13.3	0.883	0.326	0.1210	218.4

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