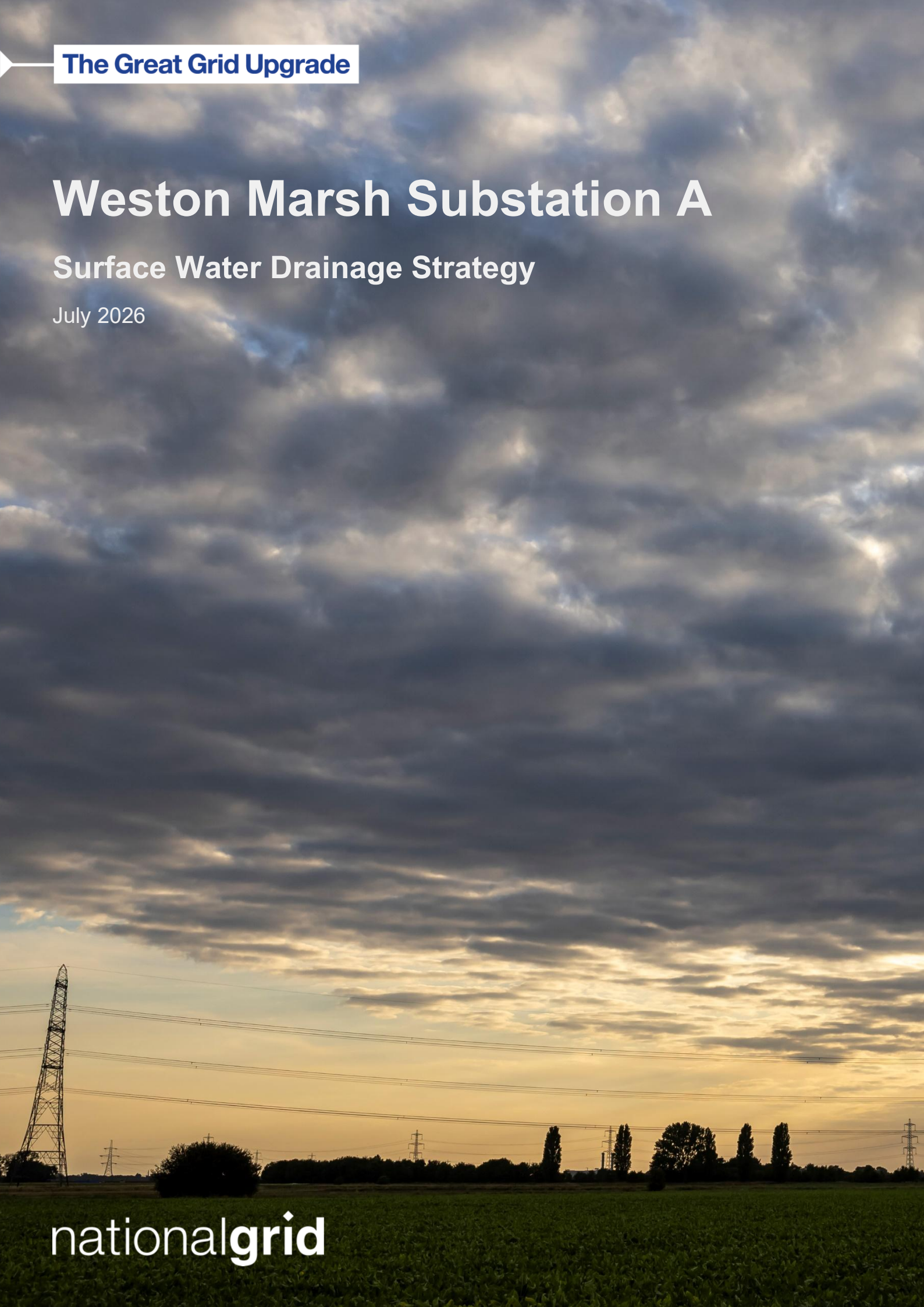
The Great Grid Upgrade

Weston Marsh Substation A

Surface Water Drainage Strategy

July 2026



nationalgrid

Weston Marsh Substation A
Document control

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July 2026	1.1	Final	Correction to stated substation dimensions and area

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Appendix C Drainage Calculations and Model Outputs

Greenfield runoff rate estimation tool

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

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

Project details

Date	10/03/2026
Calculated by	LS
Reference	WMA TCPA
Model version	2.2.3

Location

Site name	Weston Marsh A
Site location	Weston



Site easting (British National Grid)	529129
Site northing (British National Grid)	328488

Site details

Total site area (ha)	1 ha

Greenfield runoff

Method

Method	FEH statistical (2025)

FEH statistical (2025)

	My value		Map value
SAAR9120 (mm)	597 mm		
BFIHOST19scaled	0.682		
QMed-QBar conversion	1.124		1.124
QMed (l/s)	0.8 l/s		
QBar (FEH statistical 2025) (l/s)	1 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	FEH statistical (2025)
Flow rate 1 year (l/s)	0.8 l/s
Flow rate 2 year (l/s)	0.8 l/s
Flow rate 10 years (l/s)	1.6 l/s
Flow rate 30 years (l/s)	2.3 l/s
Flow rate 100 years (l/s)	3.4 l/s
Flow rate 200 years (l/s)	4.0 l/s

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

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.3) 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.

Surface water storage volume design tool

This is an estimation of the storage volume requirements that are needed 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). It is recommended that the total storage volume for the site is distributed across the site using multiple SuDS and that hydraulic modelling software is used to undertake and finalise the detailed design of the drainage system.

Project details

Date	10/03/2026
Calculated by	AM
Reference	Catchment A
Model version	2.2.3

Location

Site name	WMA
Site location	Weston



Site easting (British National Grid)	529107
Site northing (British National Grid)	328832

Site areas

Total site area (ha)	3.51	ha

Roof area

Total roof area (ha)	0	ha
Contributing roof area (ha)	0	ha
Non-contributing roof area (ha)	0	ha

Paved area

Total paved area (ha)	3.51	ha
Contributing paved area (ha)	3.51	ha
Non-contributing paved area (ha)	0	ha

Grass / vegetated area

Total grass / vegetated area (ha)	0	ha
Contributing grass / vegetated area (ha)	0	ha
Non-contributing grass / vegetated area (ha)	0	ha

Total area

Total contributing area (ha)	3.51	ha

Contributing areas with urban creep allowance

Urban creep allowance factor	+0% (no creep)

Storage design parameters

Storage base shape	Circular	
Storage design depth (m)	0.8	m
Storage side slope (1 in x)	1 in 3	
Storage voids ratio (%)	100% (all voids)	
Storage volume design return period (years)	1:100 years	

Discharge flow rate from the site

Method

Type of site	Greenfield
Specify the method	FEH statistical (2025)

FEH statistical (2025)

	My value		Map/default value
SAAR9120 (mm)	597 mm		
BFIHOST19scaled	0.682		
QMed (l/s)	3 l/s		
QMed-QBar conversion	1.124		1.124
Total area for greenfield runoff calculation (ha)	3.51 ha		3.51
QBar (l/s)	3.4 l/s		
Hydrological region	5		5
Return period (years)	Qbar (1:2.3 years)		
Growth curve factor	1		

Final discharge rate

Runoff calculation method	FEH statistical (2025)
Design flow rate (l/s)	3.4 l/s

Blockage risk

Specify the method	Flow rate
Minimum discharge flow rate to prevent blockage	2l/s

	My value		Calculated value
Design orifice diameter (mm)	42 mm		42
Flow rate of orifice (l/s)	3.26 l/s		

Rainfall and runoff

Rainfall input type	FEH22 CSV file
	Near Weston FEH_Point_Rainfall_FEH22_AM_524133_324594.csv
Distance from FEH location to site (km)	6.5 km
Climate change allowance factor	140%

Model results

- **Maximum discharge flow rate:** 3.3 (l/s)
- **Outflow orifice diameter:** 42 (mm)
- **Storage base diameter:** 88 (m)
- **Storage base area:** 6082 (m^2)
- **Storage total volume:** 5124 (m^3)
- **Storage total water volume:** 5124 (m^3)
- **Storm return periods run:** 1, 2, 10, 30, 100, 200 (years)
- **Storm durations run:** 15, 30, 60, 120, 180, 240, 360, 540, 720, 900, 1080, 1440, 1800, 2160, 2880, 3600, 4320, 5040, 5760 (minutes)

Return Period (years)	Critical Duration (minutes)	Peak Flow Rate (l/s)	Max Depth (m)	Max water volume (m^3)	Max storage volume (m^3)
1	5760	1.8	0.26	1594	1594
2	5760	2.0	0.30	1883	1883
10	5760	2.5	0.48	3042	3042
30	5760	2.8	0.61	3884	3884
100	5040	3.3	0.80	5124	5124
200	4320	3.5	0.94	6093	6093

Please note runoff estimation and storage volume estimation are subject to uncertainty. Storage volume results are therefore reported to the nearest 1 m^3 value, unless storage volumes are less than 10 m^3, in which case, storage volumes are provided to 1 decimal place.

Disclaimer

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HR Wallingford are not responsible for any rainfall data shared that is subject to licensing terms imposed by UK Centre for Ecology & Hydrology's Flood Estimation Handbook web service (https://fehweb.ceh.ac.uk/Home/Terms (https://fehweb.ceh.ac.uk/Home/Terms)).

Rainfall Depths

Rainfall depths (mm) with climate change

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
15	0.25	7.40	10.89	24.58	33.42	43.69	49.73
30	0.5	9.39	13.83	31.72	43.48	57.11	65.62
60	1	11.55	17.05	39.00	53.90	71.25	82.07
120	2	18.08	24.28	48.71	65.10	84.48	96.84
180	3	21.92	28.52	54.45	71.79	92.82	106.75
240	4	24.58	31.44	58.42	76.55	99.05	114.46
360	6	28.01	35.25	63.74	83.17	108.37	126.39
540	9	31.15	38.72	68.66	89.61	118.16	139.38
720	12	33.27	41.08	71.97	94.05	125.22	148.72
900	15	34.89	42.87	74.49	97.43	130.66	155.68
1080	18	36.23	44.35	76.54	100.14	135.03	161.18
1440	24	38.52	46.82	79.79	104.37	141.58	169.29
1800	30	40.44	48.89	82.45	107.63	146.15	174.73
2160	36	42.16	50.74	84.78	110.39	149.67	178.74
2880	48	45.28	54.07	88.90	115.00	154.92	184.32
3600	60	48.26	57.22	92.65	118.89	158.56	187.88
4320	72	51.08	60.19	96.12	122.39	161.57	190.68
5040	84	53.78	63.03	99.41	125.64	164.21	193.00
5760	96	56.43	65.80	102.56	128.69	166.60	195.02

Rainfall depths (mm) without climate change

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
15	0.25	5.29	7.78	17.56	23.87	31.21	35.52
30	0.5	6.70	9.88	22.66	31.06	40.79	46.87
60	1	8.25	12.18	27.86	38.50	50.89	58.62
120	2	12.91	17.34	34.79	46.50	60.34	69.17
180	3	15.66	20.37	38.89	51.28	66.30	76.25
240	4	17.56	22.46	41.73	54.68	70.75	81.76
360	6	20.01	25.18	45.53	59.41	77.41	90.28
540	9	22.25	27.66	49.04	64.01	84.40	99.56
720	12	23.77	29.34	51.41	67.18	89.44	106.23
900	15	24.92	30.62	53.21	69.59	93.33	111.20
1080	18	25.88	31.68	54.67	71.53	96.45	115.13
1440	24	27.51	33.44	56.99	74.55	101.13	120.92
1800	30	28.89	34.92	58.89	76.88	104.39	124.81

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
2160	**36**	30.12	36.24	60.56	78.85	106.91	127.67
2880	**48**	32.35	38.62	63.50	82.14	110.66	131.66
3600	**60**	34.47	40.87	66.18	84.92	113.26	134.20
4320	**72**	36.49	42.99	68.66	87.42	115.41	136.20
5040	**84**	38.42	45.02	71.01	89.74	117.29	137.86
5760	**96**	40.31	47.00	73.26	91.92	119.00	139.30

Surface water storage volume design tool

This is an estimation of the storage volume requirements that are needed 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). It is recommended that the total storage volume for the site is distributed across the site using multiple SuDS and that hydraulic modelling software is used to undertake and finalise the detailed design of the drainage system.

Project details

Date	10/03/2026
Calculated by	AM
Reference	Catchment B
Model version	2.2.3

Location

Site name	WMA
Site location	Weston



Site easting (British National Grid)	529107
Site northing (British National Grid)	328832

Site areas

Total site area (ha)	4.14	ha

Roof area

Total roof area (ha)	0.14	ha
Contributing roof area (ha)	0.14	ha
Non-contributing roof area (ha)	0	ha

Paved area

Total paved area (ha)	4	ha
Contributing paved area (ha)	4	ha
Non-contributing paved area (ha)	0	ha

Grass / vegetated area

Total grass / vegetated area (ha)	0	ha
Contributing grass / vegetated area (ha)	0	ha
Non-contributing grass / vegetated area (ha)	0	ha

Total area

Total contributing area (ha)	4.14	ha

Contributing areas with urban creep allowance

Urban creep allowance factor	+0% (no creep)

Storage design parameters

Storage base shape	Circular	
Storage design depth (m)	0.8	m
Storage side slope (1 in x)	1 in 3	
Storage voids ratio (%)	100% (all voids)	
Storage volume design return period (years)	1:100 years	

Discharge flow rate from the site

Method

Type of site	Greenfield
Specify the method	FEH statistical (2025)

FEH statistical (2025)

	My value		Map/default value
SAAR9120 (mm)	597 mm		
BFIHOST19scaled	0.682		
QMed (l/s)	3.5 l/s		
QMed-QBar conversion	1.124		1.124
Total area for greenfield runoff calculation (ha)	4.14 ha		4.14
QBar (l/s)	4 l/s		
Hydrological region	5		5
Return period (years)	Qbar (1:2.3 years)		
Growth curve factor	1		

Final discharge rate

Runoff calculation method	FEH statistical (2025)
Design flow rate (l/s)	4 l/s

Blockage risk

Specify the method	Flow rate
Minimum discharge flow rate to prevent blockage	2l/s

	My value		Calculated value
Design orifice diameter (mm)	46 mm		46
Flow rate of orifice (l/s)	3.9 l/s		

Rainfall and runoff

Rainfall input type	FEH22 CSV file
	Near Weston FEH_Point_Rainfall_FEH22_AM_524133_324594.csv
Distance from FEH location to site (km)	6.5 km
Climate change allowance factor	140%

Model results

- **Maximum discharge flow rate:** 3.9 (l/s)
- **Outflow orifice diameter:** 46 (mm)
- **Storage base diameter:** 96 (m)
- **Storage base area:** 7183 (m^2)
- **Storage total volume:** 6036 (m^3)
- **Storage total water volume:** 6036 (m^3)
- **Storm return periods run:** 1, 2, 10, 30, 100, 200 (years)
- **Storm durations run:** 15, 30, 60, 120, 180, 240, 360, 540, 720, 900, 1080, 1440, 1800, 2160, 2880, 3600, 4320, 5040, 5760 (minutes)

Return Period (years)	Critical Duration (minutes)	Peak Flow Rate (l/s)	Max Depth (m)	Max water volume (m^3)	Max storage volume (m^3)
1	5760	2.1	0.26	1879	1879
2	5760	2.3	0.30	2219	2219
10	5760	3.0	0.48	3583	3583
30	5760	3.4	0.61	4573	4573
100	5040	3.9	0.80	6036	6036
200	4320	4.2	0.94	7178	7178

Please note runoff estimation and storage volume estimation are subject to uncertainty. Storage volume results are therefore reported to the nearest 1 m^3 value, unless storage volumes are less than 10 m^3, in which case, storage volumes are provided to 1 decimal place.

Disclaimer

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Rainfall Depths

Rainfall depths (mm) with climate change

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
15	0.25	7.40	10.89	24.58	33.42	43.69	49.73
30	0.5	9.39	13.83	31.72	43.48	57.11	65.62
60	1	11.55	17.05	39.00	53.90	71.25	82.07
120	2	18.08	24.28	48.71	65.10	84.48	96.84
180	3	21.92	28.52	54.45	71.79	92.82	106.75
240	4	24.58	31.44	58.42	76.55	99.05	114.46
360	6	28.01	35.25	63.74	83.17	108.37	126.39
540	9	31.15	38.72	68.66	89.61	118.16	139.38
720	12	33.27	41.08	71.97	94.05	125.22	148.72
900	15	34.89	42.87	74.49	97.43	130.66	155.68
1080	18	36.23	44.35	76.54	100.14	135.03	161.18
1440	24	38.52	46.82	79.79	104.37	141.58	169.29
1800	30	40.44	48.89	82.45	107.63	146.15	174.73
2160	36	42.16	50.74	84.78	110.39	149.67	178.74
2880	48	45.28	54.07	88.90	115.00	154.92	184.32
3600	60	48.26	57.22	92.65	118.89	158.56	187.88
4320	72	51.08	60.19	96.12	122.39	161.57	190.68
5040	84	53.78	63.03	99.41	125.64	164.21	193.00
5760	96	56.43	65.80	102.56	128.69	166.60	195.02

Rainfall depths (mm) without climate change

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
15	0.25	5.29	7.78	17.56	23.87	31.21	35.52
30	0.5	6.70	9.88	22.66	31.06	40.79	46.87
60	1	8.25	12.18	27.86	38.50	50.89	58.62
120	2	12.91	17.34	34.79	46.50	60.34	69.17
180	3	15.66	20.37	38.89	51.28	66.30	76.25
240	4	17.56	22.46	41.73	54.68	70.75	81.76
360	6	20.01	25.18	45.53	59.41	77.41	90.28
540	9	22.25	27.66	49.04	64.01	84.40	99.56
720	12	23.77	29.34	51.41	67.18	89.44	106.23
900	15	24.92	30.62	53.21	69.59	93.33	111.20
1080	18	25.88	31.68	54.67	71.53	96.45	115.13
1440	24	27.51	33.44	56.99	74.55	101.13	120.92
1800	30	28.89	34.92	58.89	76.88	104.39	124.81

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
2160	**36**	30.12	36.24	60.56	78.85	106.91	127.67
2880	**48**	32.35	38.62	63.50	82.14	110.66	131.66
3600	**60**	34.47	40.87	66.18	84.92	113.26	134.20
4320	**72**	36.49	42.99	68.66	87.42	115.41	136.20
5040	**84**	38.42	45.02	71.01	89.74	117.29	137.86
5760	**96**	40.31	47.00	73.26	91.92	119.00	139.30

Surface water storage volume design tool

www.uksuds.com | Surface water storage volume design tool (https://www.uksuds.com/)

This is an estimation of the storage volume requirements that are needed 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). It is recommended that the total storage volume for the site is distributed across the site using multiple SuDS and that hydraulic modelling software is used to undertake and finalise the detailed design of the drainage system.

Project details

Date	10/03/2026
Calculated by	AM
Reference	Catchment C - road
Model version	2.2.3

Location

Site name	WMA
Site location	Weston



Site easting (British National Grid)	529107
Site northing (British National Grid)	328832

Site areas

Total site area (ha)	0.32	ha

Roof area

Total roof area (ha)	0	ha
Contributing roof area (ha)	0	ha
Non-contributing roof area (ha)	0	ha

Paved area

Total paved area (ha)	0.32	ha
Contributing paved area (ha)	0.32	ha
Non-contributing paved area (ha)	0	ha

Grass / vegetated area

Total grass / vegetated area (ha)	0	ha
Contributing grass / vegetated area (ha)	0	ha
Non-contributing grass / vegetated area (ha)	0	ha

Total area

Total contributing area (ha)	0.32	ha

Contributing areas with urban creep allowance

Urban creep allowance factor	+0% (no creep)

Storage design parameters

Storage base shape	Circular	
Storage design depth (m)	0.5	m
Storage side slope (1 in x)	1 in 3	
Storage voids ratio (%)	100% (all voids)	
Storage volume design return period (years)	1:100 years	

Discharge flow rate from the site

Method

Type of site	Greenfield
Specify the method	FEH statistical (2025)

FEH statistical (2025)

	My value		Map/default value
SAAR9120 (mm)	597 mm		
BFIHOST19scaled	0.682		
QMed (l/s)	0.3 l/s		
QMed-QBar conversion	1.124		1.124
Total area for greenfield runoff calculation (ha)	0.32 ha		0.32
QBar (l/s)	0.3 l/s		
Hydrological region	5		5
Return period (years)	Qbar (1:2.3 years)		
Growth curve factor	1		

Final discharge rate

Runoff calculation method	FEH statistical (2025)
Design flow rate (l/s)	0.3 l/s

Blockage risk

Specify the method	Flow rate
Minimum discharge flow rate to prevent blockage	1l/s

	My value		Calculated value
Design orifice diameter (mm)	26 mm		26
Flow rate of orifice (l/s)	0.99 l/s		

Rainfall and runoff

Rainfall input type	FEH22 CSV file
	Near Weston FEH_Point_Rainfall_FEH22_AM_524133_324594.csv
Distance from FEH location to site (km)	6.5 km
Climate change allowance factor	140%

Model results

- **Maximum discharge flow rate:** 1.0 (l/s)
- **Outflow orifice diameter:** 26 (mm)
- **Storage base diameter:** 30 (m)
- **Storage base area:** 724 (m^2)
- **Storage total volume:** 398 (m^3)
- **Storage total water volume:** 398 (m^3)
- **Storm return periods run:** 1, 2, 10, 30, 100, 200 (years)
- **Storm durations run:** 15, 30, 60, 120, 180, 240, 360, 540, 720, 900, 1080, 1440, 1800, 2160, 2880, 3600, 4320, 5040, 5760 (minutes)

Return Period (years)	Critical Duration (minutes)	Peak Flow Rate (l/s)	Max Depth (m)	Max water volume (m^3)	Max storage volume (m^3)
1	5760	0.5	0.14	100	100
2	2160	0.5	0.16	121	121
10	1440	0.7	0.28	214	214
30	1440	0.8	0.37	286	286
100	1800	1.0	0.50	398	398
200	1800	1.1	0.59	483	483

Please note runoff estimation and storage volume estimation are subject to uncertainty. Storage volume results are therefore reported to the nearest 1 m^3 value, unless storage volumes are less than 10 m^3, in which case, storage volumes are provided to 1 decimal place.

Disclaimer

This report was produced using the surface water storage volume design tool (2.2.3) 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 surface water storage volumes for the whole site based on a limiting discharge rate from the site. 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.

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Rainfall Depths

Rainfall depths (mm) with climate change

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
15	0.25	7.40	10.89	24.58	33.42	43.69	49.73
30	0.5	9.39	13.83	31.72	43.48	57.11	65.62
60	1	11.55	17.05	39.00	53.90	71.25	82.07
120	2	18.08	24.28	48.71	65.10	84.48	96.84
180	3	21.92	28.52	54.45	71.79	92.82	106.75
240	4	24.58	31.44	58.42	76.55	99.05	114.46
360	6	28.01	35.25	63.74	83.17	108.37	126.39
540	9	31.15	38.72	68.66	89.61	118.16	139.38
720	12	33.27	41.08	71.97	94.05	125.22	148.72
900	15	34.89	42.87	74.49	97.43	130.66	155.68
1080	18	36.23	44.35	76.54	100.14	135.03	161.18
1440	24	38.52	46.82	79.79	104.37	141.58	169.29
1800	30	40.44	48.89	82.45	107.63	146.15	174.73
2160	36	42.16	50.74	84.78	110.39	149.67	178.74
2880	48	45.28	54.07	88.90	115.00	154.92	184.32
3600	60	48.26	57.22	92.65	118.89	158.56	187.88
4320	72	51.08	60.19	96.12	122.39	161.57	190.68
5040	84	53.78	63.03	99.41	125.64	164.21	193.00
5760	96	56.43	65.80	102.56	128.69	166.60	195.02

Rainfall depths (mm) without climate change

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
15	0.25	5.29	7.78	17.56	23.87	31.21	35.52
30	0.5	6.70	9.88	22.66	31.06	40.79	46.87
60	1	8.25	12.18	27.86	38.50	50.89	58.62
120	2	12.91	17.34	34.79	46.50	60.34	69.17
180	3	15.66	20.37	38.89	51.28	66.30	76.25
240	4	17.56	22.46	41.73	54.68	70.75	81.76
360	6	20.01	25.18	45.53	59.41	77.41	90.28
540	9	22.25	27.66	49.04	64.01	84.40	99.56
720	12	23.77	29.34	51.41	67.18	89.44	106.23
900	15	24.92	30.62	53.21	69.59	93.33	111.20
1080	18	25.88	31.68	54.67	71.53	96.45	115.13
1440	24	27.51	33.44	56.99	74.55	101.13	120.92
1800	30	28.89	34.92	58.89	76.88	104.39	124.81

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
2160	**36**	30.12	36.24	60.56	78.85	106.91	127.67
2880	**48**	32.35	38.62	63.50	82.14	110.66	131.66
3600	**60**	34.47	40.87	66.18	84.92	113.26	134.20
4320	**72**	36.49	42.99	68.66	87.42	115.41	136.20
5040	**84**	38.42	45.02	71.01	89.74	117.29	137.86
5760	**96**	40.31	47.00	73.26	91.92	119.00	139.30

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	1	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.900	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	5.00	4.420	1800	529501.700	328629.917	2.100
2		4.420	1800	529416.778	328745.324	2.458
3	5.00	4.420	1800	529562.852	328679.158	2.358
4		4.420	1800	529479.406	328793.044	2.711
5		3.500	1800	529575.406	328867.514	2.182
HW1		3.500		529580.056	328903.718	2.299
HW2	5.00	3.740		529562.154	329008.839	2.645
OUTFALL		3.740	1800	529578.767	329028.619	2.697
9		4.420	1800	529537.407	328836.905	2.945

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	143.285	0.600	2.320	1.962	0.358	400.0	900	6.53	29.0
1.001	2	4	78.737	0.600	1.962	1.709	0.253	311.0	900	7.27	27.3
2.000	3	4	141.185	0.600	2.062	1.709	0.353	400.0	900	6.51	29.1
1.002	4	9	72.721	0.600	1.709	1.475	0.234	311.0	900	7.96	26.0
1.003	9	5	48.794	0.600	1.475	1.318	0.157	311.0	900	8.42	25.3
1.004	5	HW1	36.501	0.600	1.318	1.201	0.117	311.0	900	8.76	24.7
3.000	HW2	OUTFALL	25.831	0.600	1.095	1.043	0.052	500.0	750	5.35	32.5

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.560	992.5	126.7	1.200	1.558	1.342	0.0	215	1.090
1.001	1.771	1126.7	137.0	1.558	1.811	1.541	0.0	210	1.221
2.000	1.560	992.5	174.6	1.458	1.811	1.847	0.0	254	1.191
1.002	1.771	1126.7	296.9	1.811	2.045	3.508	0.0	313	1.506
1.003	1.771	1126.7	288.3	2.045	1.282	3.508	0.0	309	1.496
1.004	1.771	1126.7	281.9	1.282	1.399	3.508	0.0	305	1.485
3.000	1.244	549.7	0.0	1.895	1.947	0.000	0.0	0	0.000

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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	143.285	400.0	900	Circular	4.420	2.320	1.200	4.420	1.962	1.558
1.001	78.737	311.0	900	Circular	4.420	1.962	1.558	4.420	1.709	1.811
2.000	141.185	400.0	900	Circular	4.420	2.062	1.458	4.420	1.709	1.811
1.002	72.721	311.0	900	Circular	4.420	1.709	1.811	4.420	1.475	2.045
1.003	48.794	311.0	900	Circular	4.420	1.475	2.045	3.500	1.318	1.282
1.004	36.501	311.0	900	Circular	3.500	1.318	1.282	3.500	1.201	1.399
3.000	25.831	500.0	750	Circular	3.740	1.095	1.895	3.740	1.043	1.947

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	1800	Manhole	Adoptable	2	1800	Manhole	Adoptable
1.001	2	1800	Manhole	Adoptable	4	1800	Manhole	Adoptable
2.000	3	1800	Manhole	Adoptable	4	1800	Manhole	Adoptable
1.002	4	1800	Manhole	Adoptable	9	1800	Manhole	Adoptable
1.003	9	1800	Manhole	Adoptable	5	1800	Manhole	Adoptable
1.004	5	1800	Manhole	Adoptable	HW1		Junction	
3.000	HW2		Junction		OUTFALL	1800	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	529501.700	328629.917	4.420	2.100	1800	 0	1.000	2.320	900
2	529416.778	328745.324	4.420	2.458	1800	 1	1.000	1.962	900
						0	1.001	1.962	900
3	529562.852	328679.158	4.420	2.358	1800	 0	2.000	2.062	900
4	529479.406	328793.044	4.420	2.711	1800	 1	1.001	1.709	900
						2	2.000	1.709	900
						0	1.002	1.709	900
5	529575.406	328867.514	3.500	2.182	1800	 1	1.003	1.318	900
						0	1.004	1.318	900
HW1	529580.056	328903.718	3.500	2.299		 1	1.004	1.201	900
HW2	529562.154	329008.839	3.740	2.645		 0	3.000	1.095	750

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
OUTFALL	529578.767	329028.619	3.740	2.697	1800	1	3.000	1.043	750
9	529537.407	328836.905	4.420	2.945	1800	1	1.002	1.475	900
						0	1.003	1.475	900

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	0.900	Drain Down Time (mins)	2160	Check Discharge Volume	x
Winter CV	0.900	Additional Storage (m³/ha)	0.0		

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
10	0	0	0
30	0	0	0
30	35	0	0
100	0	0	0
100	40	0	0

Node HW2 Online Pump Control

Flap Valve	x	Design Depth (m)	0.800	Switch off depth (m)	0.001
Replaces Downstream Link	✓	Design Flow (l/s)	3.9		
Invert Level (m)	1.095	Switch on depth (m)	0.050		

Depth (m)	Flow (l/s)
0.800	3.900

Node HW2 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	106.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	1.095	Main Channel Slope (1:X)	1000.0
Safety Factor	2.0	Time to half empty (mins)	1020	Main Channel n	0.030

Inlets

HW1

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	3454.0	0.0	0.800	3972.1	0.0	1.100	4175.7	0.0

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Node 1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.120	Slope (1:X)	2500.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.300
Safety Factor	2.0	Width (m)	84.000	Inf Depth (m)	
Porosity	0.30	Length (m)	79.000		

Node 4 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.120	Slope (1:X)	2500.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.300
Safety Factor	2.0	Width (m)	116.000	Inf Depth (m)	
Porosity	0.30	Length (m)	79.000		

Node 9 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.120	Slope (1:X)	2500.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.300
Safety Factor	2.0	Width (m)	76.000	Inf Depth (m)	
Porosity	0.30	Length (m)	15.000		

Node 4 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.120	Slope (1:X)	2500.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.300
Safety Factor	2.0	Width (m)	124.000	Inf Depth (m)	
Porosity	0.30	Length (m)	15.000		

Node 2 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.120	Slope (1:X)	2500.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.300
Safety Factor	2.0	Width (m)	84.000	Inf Depth (m)	
Porosity	0.30	Length (m)	79.000		

Node 3 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.120	Slope (1:X)	2500.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.300
Safety Factor	2.0	Width (m)	116.000	Inf Depth (m)	
Porosity	0.30	Length (m)	79.000		

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Results for 1 year Critical Storm Duration. Lowest mass balance: 84.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	12	2.359	0.039	5.2	0.0989	0.0000	OK
15 minute summer	1.000:50%	10	2.350	0.209	126.6	0.0000	0.0000	OK
15 minute summer	2	11	2.162	0.200	119.4	0.5102	0.0000	OK
15 minute summer	1.001:50%	12	2.052	0.217	136.0	0.4545	0.0000	OK
15 minute summer	3	11	2.144	0.082	12.9	0.2083	0.0000	OK
15 minute summer	2.000:50%	10	2.125	0.240	174.1	0.0000	0.0000	OK
15 minute summer	4	12	2.033	0.324	291.6	0.8257	0.0000	OK
15 minute summer	1.002:50%	12	1.920	0.328	299.8	0.0000	0.0000	OK
15 minute summer	5	13	1.624	0.306	298.4	0.7777	0.0000	OK
10080 minute summer	HW1	7140	1.431	0.230	9.6	0.0000	0.0000	OK
10080 minute summer	HW2	7140	1.431	0.336	5.4	0.0000	0.0000	OK
15 minute summer	OUTFALL	1	1.043	0.000	0.4	0.0000	0.0000	OK
15 minute summer	9	13	1.802	0.327	298.2	0.8326	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	1.000:50%	-5.2	-0.115	-0.005	4.2104	
15 minute summer	1	1.000	2	119.4	1.121	0.120	7.7118	
15 minute summer	2	1.001	1.001:50%	118.1	1.080	0.105	4.3351	
15 minute summer	2	1.001	4	134.0	0.836	0.119	6.3587	
15 minute summer	3	2.000	2.000:50%	-12.9	-0.188	-0.013	5.7338	
15 minute summer	3	2.000	4	162.5	1.039	0.164	11.8250	
15 minute summer	4	1.002	1.002:50%	290.9	1.403	0.258	7.5381	
15 minute summer	4	1.002	9	298.2	1.433	0.265	7.5700	
15 minute summer	5	1.004	HW1	297.9	3.737	0.264	3.5732	
10080 minute summer	HW1	Flow through Pond	HW2	5.4	0.006	0.000	1002.9457	
10080 minute summer	HW2	Pump	OUTFALL	1.6				755.2
15 minute summer	9	1.003	5	298.4	1.501	0.265	9.7020	

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Results for 2 year Critical Storm Duration. Lowest mass balance: 84.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	2.437	0.117	18.2	0.2987	0.0000	OK
15 minute summer	1.000:50%	11	2.414	0.273	217.0	0.0000	0.0000	OK
15 minute summer	2	12	2.231	0.269	198.9	0.6855	0.0000	OK
15 minute summer	1.001:50%	12	2.160	0.324	223.6	1.0162	0.0000	OK
15 minute summer	3	11	2.237	0.175	32.6	0.4454	0.0000	OK
15 minute summer	2.000:50%	11	2.219	0.333	298.6	0.0000	0.0000	OK
15 minute summer	4	12	2.153	0.444	493.3	1.1299	0.0000	OK
15 minute summer	1.002:50%	12	2.039	0.447	507.8	0.0000	0.0000	OK
15 minute summer	5	13	1.725	0.407	505.4	1.0358	0.0000	OK
10080 minute summer	HW1	7140	1.497	0.296	12.0	0.0000	0.0000	OK
10080 minute summer	HW2	7140	1.497	0.402	6.7	0.0000	0.0000	OK
15 minute summer	OUTFALL	1	1.043	0.000	0.6	0.0000	0.0000	OK
15 minute summer	9	13	1.919	0.444	503.3	1.1308	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	1.000:50%	-18.2	-0.246	-0.018	7.5431	
15 minute summer	1	1.000	2	198.9	1.253	0.200	11.3932	
15 minute summer	2	1.001	1.001:50%	198.1	1.130	0.176	7.1791	
15 minute summer	2	1.001	4	218.5	0.917	0.194	10.1768	
15 minute summer	3	2.000	2.000:50%	-32.6	-0.315	-0.033	10.5817	
15 minute summer	3	2.000	4	279.2	1.139	0.281	18.2780	
15 minute summer	4	1.002	1.002:50%	492.5	1.575	0.437	11.3734	
15 minute summer	4	1.002	9	503.3	1.615	0.447	11.3325	
15 minute summer	5	1.004	HW1	504.7	4.052	0.448	5.3614	
10080 minute summer	HW1	Flow through Pond	HW2	6.7	0.008	0.000	1244.5015	
10080 minute summer	HW2	Pump	OUTFALL	2.0				910.2
15 minute summer	9	1.003	5	505.4	1.713	0.449	14.3993	

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Results for 10 year Critical Storm Duration. Lowest mass balance: 84.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	2.602	0.282	56.3	0.7185	0.0000	OK
15 minute summer	1.000:50%	11	2.595	0.454	489.4	0.0000	0.0000	OK
15 minute summer	2	12	2.515	0.553	481.5	1.4084	0.0000	OK
15 minute summer	1.001:50%	12	2.495	0.660	500.4	4.2076	0.0000	OK
15 minute summer	3	12	2.493	0.431	67.4	1.0959	0.0000	OK
15 minute summer	2.000:50%	12	2.485	0.599	673.4	0.0000	0.0000	OK
15 minute summer	4	12	2.467	0.758	1036.7	1.9281	0.0000	OK
15 minute summer	1.002:50%	12	2.344	0.752	1053.1	0.0000	0.0000	OK
15 minute summer	5	13	1.946	0.628	1042.7	1.5982	0.0000	OK
10080 minute summer	HW1	7260	1.660	0.459	17.5	0.0000	0.0000	OK
10080 minute summer	HW2	7260	1.660	0.565	9.7	0.0000	0.0000	OK
15 minute summer	OUTFALL	1	1.043	0.000	1.0	0.0000	0.0000	OK
15 minute summer	9	12	2.204	0.729	1049.8	1.8557	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	1.000:50%	-56.3	-0.356	-0.057	17.1088	
15 minute summer	1	1.000	2	481.5	1.455	0.485	25.1688	
15 minute summer	2	1.001	1.001:50%	443.8	1.152	0.394	17.8523	
15 minute summer	2	1.001	4	504.4	0.951	0.448	21.0160	
15 minute summer	3	2.000	2.000:50%	-67.4	-0.367	-0.068	26.3914	
15 minute summer	3	2.000	4	607.1	1.327	0.612	35.9265	
15 minute summer	4	1.002	1.002:50%	1018.7	1.797	0.904	20.6491	
15 minute summer	4	1.002	9	1049.8	1.881	0.932	20.2977	
15 minute summer	5	1.004	HW1	1022.8	4.456	0.908	9.4590	
10080 minute summer	HW1	Flow through Pond	HW2	9.7	0.012	0.000	1855.5554	
10080 minute summer	HW2	Pump	OUTFALL	2.8				1285.8
15 minute summer	9	1.003	5	1042.7	2.044	0.925	24.8709	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 84.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	13	2.803	0.483	65.5	1.2304	0.0000	OK
15 minute summer	1.000:50%	12	2.767	0.626	668.4	0.0000	0.0000	OK
15 minute summer	2	12	2.750	0.788	607.2	2.0046	0.0000	OK
15 minute summer	1.001:50%	12	2.750	0.915	589.5	8.0939	0.0000	SURCHARGED
15 minute summer	3	12	2.936	0.874	94.3	2.2234	0.0000	OK
15 minute summer	2.000:50%	12	2.864	0.979	915.7	0.0000	0.0000	SURCHARGED
15 minute summer	4	12	2.711	1.002	1219.7	2.5506	0.0000	SURCHARGED
15 minute summer	1.002:50%	12	2.536	0.944	1289.6	0.0000	0.0000	SURCHARGED
15 minute summer	5	12	2.024	0.706	1284.4	1.7973	0.0000	OK
4320 minute winter	HW1	4200	1.767	0.566	26.6	0.0000	0.0000	OK
4320 minute winter	HW2	4200	1.767	0.672	14.3	0.0000	0.0000	OK
15 minute summer	OUTFALL	1	1.043	0.000	1.3	0.0000	0.0000	OK
15 minute summer	9	12	2.359	0.884	1301.3	2.2490	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	1.000:50%	68.9	0.395	0.069	29.1757	
15 minute summer	1	1.000	2	607.2	1.525	0.612	37.9293	
15 minute summer	2	1.001	1.001:50%	513.4	1.149	0.456	24.0572	
15 minute summer	2	1.001	4	606.6	1.080	0.538	24.9504	
15 minute summer	3	2.000	2.000:50%	-94.3	-0.357	-0.095	44.5554	
15 minute summer	3	2.000	4	788.3	1.418	0.794	44.7400	
15 minute summer	4	1.002	1.002:50%	1242.7	1.961	1.103	23.0447	
15 minute summer	4	1.002	9	1301.3	2.053	1.155	22.9962	
15 minute summer	5	1.004	HW1	1332.0	4.655	1.182	10.7742	
4320 minute winter	HW1	Flow through Pond	HW2	14.3	0.016	0.000	2262.7632	
4320 minute winter	HW2	Pump	OUTFALL	3.3				864.5
15 minute summer	9	1.003	5	1284.4	2.167	1.140	28.4194	

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Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 84.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	4.174	1.854	88.9	79.7015	0.0000	FLOOD RISK
15 minute summer	1.000:50%	12	4.158	2.017	1120.0	0.0000	0.0000	SURCHARGED
15 minute summer	2	12	4.106	2.144	1127.1	5.4575	0.0000	SURCHARGED
15 minute summer	1.001:50%	12	3.996	2.160	1175.2	45.1362	0.0000	SURCHARGED
15 minute summer	3	12	3.960	1.898	131.1	4.8307	0.0000	SURCHARGED
15 minute summer	2.000:50%	12	3.994	2.109	1318.6	0.0000	0.0000	SURCHARGED
15 minute summer	4	12	3.838	2.129	1942.6	5.4192	0.0000	SURCHARGED
15 minute summer	1.002:50%	12	3.378	1.786	2004.4	0.0000	0.0000	SURCHARGED
30 minute summer	5	20	2.205	0.887	1759.2	2.2575	0.0000	OK
10080 minute summer	HW1	7500	1.974	0.773	28.3	0.0000	0.0000	OK
10080 minute summer	HW2	7560	1.974	0.879	15.6	0.0000	0.0000	SURCHARGED
15 minute summer	OUTFALL	1	1.043	0.000	1.8	0.0000	0.0000	OK
15 minute summer	9	12	2.894	1.419	2005.8	3.6121	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 summer	1	1.000	1.000:50%	849.9	1.341	0.856	45.4048	
15 minute summer	1	1.000	2	1127.1	1.779	1.136	45.4048	
15 minute summer	2	1.001	1.001:50%	1135.3	1.791	1.008	24.9504	
15 minute summer	2	1.001	4	1245.0	1.965	1.105	24.9504	
15 minute summer	3	2.000	2.000:50%	-131.1	0.391	-0.132	44.7400	
15 minute summer	3	2.000	4	1354.0	2.137	1.364	44.7400	
15 minute summer	4	1.002	1.002:50%	1941.1	3.063	1.723	23.0447	
15 minute summer	4	1.002	9	2005.8	3.165	1.780	23.0447	
30 minute summer	5	1.004	HW1	1789.9	5.348	1.589	12.8592	
10080 minute summer	HW1	Flow through Pond	HW2	15.6	0.020	0.000	3074.6096	
10080 minute summer	HW2	Pump	OUTFALL	3.9				1919.8
15 minute summer	9	1.003	5	2008.9	3.170	1.783	30.4018	

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Results for 100 year Critical Storm Duration. Lowest mass balance: 84.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	4.133	1.813	140.9	9.8807	0.0000	FLOOD RISK
30 minute summer	1.000:50%	19	4.108	1.967	1090.7	0.0000	0.0000	SURCHARGED
15 minute summer	2	12	3.888	1.926	734.0	4.9021	0.0000	SURCHARGED
15 minute summer	1.001:50%	12	3.751	1.916	950.8	35.4855	0.0000	SURCHARGED
15 minute summer	3	12	3.906	1.844	126.4	4.6941	0.0000	SURCHARGED
15 minute summer	2.000:50%	12	3.864	1.978	1197.4	0.0000	0.0000	SURCHARGED
15 minute summer	4	12	3.673	1.964	1836.1	4.9978	0.0000	SURCHARGED
15 minute summer	1.002:50%	12	3.272	1.680	1925.0	0.0000	0.0000	SURCHARGED
15 minute summer	5	12	2.153	0.835	1939.1	2.1243	0.0000	OK
2880 minute winter	HW1	2820	1.962	0.761	50.1	0.0000	0.0000	OK
2880 minute winter	HW2	2820	1.962	0.867	26.3	0.0000	0.0000	SURCHARGED
15 minute summer	OUTFALL	1	1.043	0.000	1.6	0.0000	0.0000	OK
15 minute summer	9	12	2.837	1.362	1931.3	3.4669	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 summer	1	1.000	1.000:50%	204.6	0.436	0.206	45.4048	
15 minute summer	1	1.000	2	734.0	1.547	0.740	45.4048	
15 minute summer	2	1.001	1.001:50%	828.1	1.307	0.735	24.9504	
15 minute summer	2	1.001	4	954.3	1.506	0.847	24.9504	
15 minute summer	3	2.000	2.000:50%	-126.4	-0.356	-0.127	44.7400	
15 minute summer	3	2.000	4	1188.5	1.875	1.197	44.7400	
15 minute summer	4	1.002	1.002:50%	1863.6	2.941	1.654	23.0447	
15 minute summer	4	1.002	9	1931.3	3.048	1.714	23.0447	
15 minute summer	5	1.004	HW1	1949.9	5.464	1.731	12.5339	
2880 minute winter	HW1	Flow through Pond	HW2	26.3	0.024	0.000	3029.7659	
2880 minute winter	HW2	Pump	OUTFALL	3.9				882.2
15 minute summer	9	1.003	5	1939.1	3.060	1.721	30.4292	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 84.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	13	4.268	1.948	274.8	267.2388	0.0000	FLOOD RISK
15 minute winter	1.000:50%	14	4.350	2.209	1310.2	0.0000	0.0000	SURCHARGED
15 minute winter	2	11	4.141	2.179	1310.1	19.3262	0.0000	FLOOD RISK
30 minute summer	1.001:50%	18	4.110	2.274	1072.5	50.0226	0.0000	SURCHARGED
15 minute summer	3	12	4.159	2.097	468.2	68.6571	0.0000	FLOOD RISK
15 minute winter	2.000:50%	10	4.249	2.363	1573.1	0.0000	0.0000	SURCHARGED
30 minute summer	4	18	3.983	2.274	1996.8	5.7878	0.0000	SURCHARGED
30 minute summer	1.002:50%	18	3.508	1.916	2105.4	0.0000	0.0000	SURCHARGED
4320 minute winter	5	4260	2.270	0.952	48.8	2.4216	0.0000	SURCHARGED
4320 minute winter	HW1	4260	2.270	1.069	48.4	0.0000	0.0000	OK
4320 minute winter	HW2	4260	2.270	1.175	26.0	0.0000	0.0000	SURCHARGED
15 minute summer	OUTFALL	1	1.043	0.000	2.1	0.0000	0.0000	OK
30 minute summer	9	18	2.984	1.509	2108.7	3.8399	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	1	1.000	1.000:50%	1229.0	1.939	1.238	45.4048	
15 minute winter	1	1.000	2	1310.1	2.067	1.320	45.4048	
15 minute winter	2	1.001	1.001:50%	1317.8	2.080	1.170	24.9504	
15 minute winter	2	1.001	4	1381.5	2.180	1.226	24.9504	
15 minute summer	3	2.000	2.000:50%	594.5	0.938	0.599	44.7400	
15 minute summer	3	2.000	4	1766.2	2.787	1.780	44.7400	
30 minute summer	4	1.002	1.002:50%	2007.1	3.167	1.781	23.0447	
30 minute summer	4	1.002	9	2108.7	3.328	1.872	23.0447	
4320 minute winter	5	1.004	HW1	48.4	1.124	0.043	23.1334	
4320 minute winter	HW1	Flow through Pond	HW2	26.0	0.028	0.000	4283.5366	
4320 minute winter	HW2	Pump	OUTFALL	3.9				1152.5
30 minute summer	9	1.003	5	2110.9	3.331	1.874	30.7421	

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Results for 100 year +40% CC 2880 minute summer. 5040 minute analysis at 60 minute timestep. Mass balance: 99.97%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2880 minute summer	1	60	2.320	0.000	0.0	0.0000	0.0000	OK
2880 minute summer	1.000:50%	2940	2.266	0.125	40.4	0.0000	0.0000	OK
2880 minute summer	2	2940	2.266	0.304	40.4	0.7745	0.0000	OK
2880 minute summer	1.001:50%	2940	2.266	0.430	46.4	1.7911	0.0000	OK
2880 minute summer	3	2940	2.266	0.204	0.1	0.5200	0.0000	OK
2880 minute summer	2.000:50%	2940	2.266	0.380	55.6	0.0000	0.0000	OK
2880 minute summer	4	2940	2.266	0.557	102.0	1.4185	0.0000	OK
2880 minute summer	1.002:50%	2940	2.266	0.674	105.6	0.0000	0.0000	OK
2880 minute summer	5	2940	2.266	0.948	103.9	2.4139	0.0000	SURCHARGED
2880 minute summer	HW1	2940	2.266	1.065	102.9	0.0000	0.0000	OK
2880 minute summer	HW2	2940	2.266	1.171	53.6	0.0000	0.0000	SURCHARGED
2880 minute summer	OUTFALL	60	1.043	0.000	3.9	0.0000	0.0000	OK
2880 minute summer	9	2940	2.266	0.791	104.9	2.0142	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
2880 minute summer	1	1.000	1.000:50%	0.0	0.000	0.000	1.9087	
2880 minute summer	1	1.000	2	40.4	0.819	0.041	8.6609	
2880 minute summer	2	1.001	1.001:50%	40.4	0.826	0.036	9.6015	
2880 minute summer	2	1.001	4	46.4	0.653	0.041	14.0083	
2880 minute summer	3	2.000	2.000:50%	-0.1	-0.004	0.000	12.7976	
2880 minute summer	3	2.000	4	55.6	0.718	0.056	23.5446	
2880 minute summer	4	1.002	1.002:50%	102.0	1.085	0.091	16.7641	
2880 minute summer	4	1.002	9	104.9	1.029	0.093	20.0057	
2880 minute summer	5	1.004	HW1	102.9	1.212	0.091	23.1334	
2880 minute summer	HW1	Flow through Pond	HW2	53.6	0.042	0.000	4270.9424	
2880 minute summer	HW2	Pump	OUTFALL	3.9				924.3
2880 minute summer	9	1.003	5	103.9	0.845	0.092	29.8731	

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Results for 100 year +40% CC 2880 minute winter. 5040 minute analysis at 60 minute timestep. Mass balance: 99.97%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2880 minute winter	1	60	2.320	0.000	0.0	0.0000	0.0000	OK
2880 minute winter	1.000:50%	2880	2.269	0.128	27.2	0.0000	0.0000	OK
2880 minute winter	2	2880	2.269	0.307	27.2	0.7820	0.0000	OK
2880 minute winter	1.001:50%	2880	2.269	0.433	31.2	1.8155	0.0000	OK
2880 minute winter	3	2880	2.269	0.207	0.2	0.5275	0.0000	OK
2880 minute winter	2.000:50%	2880	2.269	0.383	37.4	0.0000	0.0000	OK
2880 minute winter	4	2880	2.269	0.560	68.6	1.4259	0.0000	OK
2880 minute winter	1.002:50%	2880	2.269	0.677	71.0	0.0000	0.0000	OK
2880 minute winter	5	2880	2.269	0.951	69.9	2.4211	0.0000	SURCHARGED
2880 minute winter	HW1	2880	2.269	1.068	69.2	0.0000	0.0000	OK
2880 minute winter	HW2	2880	2.269	1.174	36.5	0.0000	0.0000	SURCHARGED
2880 minute winter	OUTFALL	60	1.043	0.000	3.9	0.0000	0.0000	OK
2880 minute winter	9	2880	2.269	0.794	70.6	2.0215	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
2880 minute winter	1	1.000	1.000:50%	0.0	0.000	0.000	1.9758	
2880 minute winter	1	1.000	2	27.2	0.729	0.027	8.8177	
2880 minute winter	2	1.001	1.001:50%	27.2	0.736	0.024	9.7022	
2880 minute winter	2	1.001	4	31.2	0.600	0.028	14.1093	
2880 minute winter	3	2.000	2.000:50%	-0.2	-0.003	0.000	12.9673	
2880 minute winter	3	2.000	4	37.4	0.657	0.038	23.7249	
2880 minute winter	4	1.002	1.002:50%	68.6	0.985	0.061	16.8500	
2880 minute winter	4	1.002	9	70.6	0.967	0.063	20.0755	
2880 minute winter	5	1.004	HW1	69.2	1.261	0.061	23.1334	
2880 minute winter	HW1	Flow through Pond	HW2	36.5	0.025	0.000	4282.6831	
2880 minute winter	HW2	Pump	OUTFALL	3.9				931.5
2880 minute winter	9	1.003	5	69.9	0.863	0.062	29.9128	

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Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	1	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.900	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	5.00	4.420	1800	529185.384	328632.633	2.100
2		4.420	1800	529262.717	328689.362	2.352
3		4.420	1800	529280.798	328665.653	2.430
4		4.420	1800	529255.693	328646.689	2.513
5	5.00	4.420	1800	529338.737	328693.091	2.100
6		4.420	1800	529430.081	328569.251	2.505
7		4.420	1800	529357.996	328515.441	2.951
8		3.600	1800	529248.364	328434.712	2.570
HW1		3.540		529165.172	328438.226	2.779
HW2	5.00	3.700		529084.533	328500.376	3.023
OUTFALL		3.700	1800	529016.260	328498.797	3.194
14		4.420	1800	529305.998	328477.151	3.159

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	95.909	0.600	2.320	2.068	0.252	380.0	900	6.00	30.3
1.001	2	3	29.817	0.600	2.068	1.990	0.078	380.0	900	6.31	29.6
1.002	3	4	31.463	0.600	1.990	1.907	0.083	380.0	900	6.64	28.8
1.003	4	7	166.409	0.600	1.907	1.469	0.438	380.0	900	8.37	25.3
2.000	5	6	153.883	0.600	2.320	1.915	0.405	380.0	900	6.60	28.8
2.001	6	7	89.954	0.600	1.915	1.510	0.405	222.1	900	7.32	27.3
1.004	7	14	64.575	0.600	1.469	1.261	0.208	310.0	900	8.98	24.4
1.005	14	8	71.573	0.600	1.261	1.030	0.231	310.0	900	9.65	23.4
1.006	8	HW1	83.266	0.600	1.030	0.761	0.269	310.0	900	10.43	22.4

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.601	1018.5	16.4	1.200	1.452	0.166	0.0	78	0.613
1.001	1.601	1018.5	16.7	1.452	1.530	0.174	0.0	79	0.618
1.002	1.601	1018.5	25.0	1.530	1.613	0.267	0.0	95	0.696
1.003	1.601	1018.5	175.6	1.613	2.051	2.131	0.0	251	1.215
2.000	1.601	1018.5	172.0	1.200	1.605	1.834	0.0	248	1.209
2.001	2.098	1334.7	171.2	1.605	2.010	1.931	0.0	215	1.467
1.004	1.774	1128.5	328.1	2.051	2.259	4.142	0.0	331	1.549
1.005	1.774	1128.5	315.6	2.259	1.670	4.142	0.0	324	1.533
1.006	1.774	1128.5	302.1	1.670	1.879	4.142	0.0	316	1.515

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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)
3.000	HW2	OUTFALL	68.291	0.600	0.677	0.506	0.171	400.0	750	5.82	30.9

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
3.000	1.393	615.3	0.0	2.273	2.444	0.000	0.0	0	0.000

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	95.909	380.0	900	Circular	4.420	2.320	1.200	4.420	2.068	1.452
1.001	29.817	380.0	900	Circular	4.420	2.068	1.452	4.420	1.990	1.530
1.002	31.463	380.0	900	Circular	4.420	1.990	1.530	4.420	1.907	1.613
1.003	166.409	380.0	900	Circular	4.420	1.907	1.613	4.420	1.469	2.051
2.000	153.883	380.0	900	Circular	4.420	2.320	1.200	4.420	1.915	1.605
2.001	89.954	222.1	900	Circular	4.420	1.915	1.605	4.420	1.510	2.010
1.004	64.575	310.0	900	Circular	4.420	1.469	2.051	4.420	1.261	2.259
1.005	71.573	310.0	900	Circular	4.420	1.261	2.259	3.600	1.030	1.670
1.006	83.266	310.0	900	Circular	3.600	1.030	1.670	3.540	0.761	1.879
3.000	68.291	400.0	750	Circular	3.700	0.677	2.273	3.700	0.506	2.444

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	1800	Manhole	Adoptable	2	1800	Manhole	Adoptable
1.001	2	1800	Manhole	Adoptable	3	1800	Manhole	Adoptable
1.002	3	1800	Manhole	Adoptable	4	1800	Manhole	Adoptable
1.003	4	1800	Manhole	Adoptable	7	1800	Manhole	Adoptable
2.000	5	1800	Manhole	Adoptable	6	1800	Manhole	Adoptable
2.001	6	1800	Manhole	Adoptable	7	1800	Manhole	Adoptable
1.004	7	1800	Manhole	Adoptable	14	1800	Manhole	Adoptable
1.005	14	1800	Manhole	Adoptable	8	1800	Manhole	Adoptable
1.006	8	1800	Manhole	Adoptable	HW1		Junction	
3.000	HW2		Junction		OUTFALL	1800	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	529185.384	328632.633	4.420	2.100	1800	 0	1.000	2.320	900
2	529262.717	328689.362	4.420	2.352	1800	1	1.000	2.068	900
						 0	1.001	2.068	900
3	529280.798	328665.653	4.420	2.430	1800	 1	1.001	1.990	900
						0	1.002	1.990	900

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
4	529255.693	328646.689	4.420	2.513	1800	1	1.002	1.907	900
						0	1.003	1.907	900
5	529338.737	328693.091	4.420	2.100	1800	0	2.000	2.320	900
6	529430.081	328569.251	4.420	2.505	1800	1	2.000	1.915	900
						0	2.001	1.915	900
7	529357.996	328515.441	4.420	2.951	1800	1	1.003	1.469	900
						2	2.001	1.510	900
						0	1.004	1.469	900
8	529248.364	328434.712	3.600	2.570	1800	1	1.005	1.030	900
						0	1.006	1.030	900
HW1	529165.172	328438.226	3.540	2.779		1	1.006	0.761	900
HW2	529084.533	328500.376	3.700	3.023		0	3.000	0.677	750
OUTFALL	529016.260	328498.797	3.700	3.194	1800	1	3.000	0.506	750
14	529305.998	328477.151	4.420	3.159	1800	1	1.004	1.261	900
						0	1.005	1.261	900

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	0.900	Drain Down Time (mins)	480	Check Discharge Volume	x
Winter CV	0.900	Additional Storage (m³/ha)	0.0		

Storm Durations

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

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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
10	0	0	0
30	0	0	0
30	35	0	0
100	0	0	0
100	40	0	0

Node HW2 Online Pump Control

Flap Valve	x	Design Depth (m)	0.800	Switch off depth (m)	0.001
Replaces Downstream Link	✓	Design Flow (l/s)	3.4		
Invert Level (m)	0.677	Switch on depth (m)	0.100		

Depth (m)	Flow (l/s)
0.800	3.400

Node HW2 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	101.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	0.677	Main Channel Slope (1:X)	1000.0
Safety Factor	2.0	Time to half empty (mins)	0	Main Channel n	0.030

Inlets

HW1

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	3711.0	0.0	0.800	4247.4	0.0	1.100	4457.8	0.0

Node 6 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.120	Slope (1:X)	2500.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.300
Safety Factor	2.0	Width (m)	109.000	Inf Depth (m)	
Porosity	0.30	Length (m)	87.500		

Node 2 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.120	Slope (1:X)	5000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.300
Safety Factor	2.0	Width (m)	16.000	Inf Depth (m)	
Porosity	0.30	Length (m)	48.500		

Node 3 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.120	Slope (1:X)	5000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.300
Safety Factor	2.0	Width (m)	2.000	Inf Depth (m)	
Porosity	0.30	Length (m)	30.000		

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Node 4 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.120	Slope (1:X)	5000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.300
Safety Factor	2.0	Width (m)	28.000	Inf Depth (m)	
Porosity	0.30	Length (m)	30.000		

Node 7 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.120	Slope (1:X)	2500.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.300
Safety Factor	2.0	Width (m)	100.000	Inf Depth (m)	
Porosity	0.30	Length (m)	97.000		

Node 7 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.120	Slope (1:X)	5000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.300
Safety Factor	2.0	Width (m)	11.000	Inf Depth (m)	
Porosity	0.30	Length (m)	90.000		

Node 14 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.120	Slope (1:X)	5000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.300
Safety Factor	2.0	Width (m)	12.000	Inf Depth (m)	
Porosity	0.30	Length (m)	68.000		

Node 1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.120	Slope (1:X)	2500.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.300
Safety Factor	2.0	Width (m)	16.000	Inf Depth (m)	
Porosity	0.30	Length (m)	48.500		

Node 5 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.120	Slope (1:X)	2500.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.300
Safety Factor	2.0	Width (m)	109.000	Inf Depth (m)	
Porosity	0.30	Length (m)	87.500		

Node 4 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.120	Slope (1:X)	2500.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.300
Safety Factor	2.0	Width (m)	100.000	Inf Depth (m)	
Porosity	0.30	Length (m)	97.000		

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Results for 1 year Critical Storm Duration. Lowest mass balance: 76.63%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	1	2.320	0.000	0.0	0.0000	0.0000	OK
15 minute summer	1.000:50%	11	2.270	0.076	15.7	0.0000	0.0000	OK
15 minute summer	2	12	2.144	0.076	15.4	0.1942	0.0000	OK
15 minute summer	1.001:50%	12	2.107	0.078	15.5	0.0000	0.0000	OK
15 minute summer	3	12	2.068	0.078	15.5	0.1975	0.0000	OK
15 minute summer	1.002:50%	12	2.038	0.090	22.1	0.0817	0.0000	OK
15 minute summer	4	13	1.992	0.085	21.8	0.2176	0.0000	OK
15 minute summer	1.003:50%	11	1.938	0.250	185.0	0.0000	0.0000	OK
15 minute summer	5	12	2.369	0.049	8.0	0.1259	0.0000	OK
15 minute summer	2.000:50%	10	2.358	0.240	172.9	0.0000	0.0000	OK
15 minute summer	6	11	2.129	0.214	163.0	0.5456	0.0000	OK
15 minute summer	2.001:50%	11	1.928	0.215	172.6	0.4280	0.0000	OK
15 minute summer	7	12	1.830	0.361	354.1	0.9182	0.0000	OK
15 minute summer	1.004:50%	12	1.727	0.362	353.9	0.0000	0.0000	OK
15 minute summer	8	13	1.375	0.345	353.1	0.8782	0.0000	OK
10080 minute winter	HW1	7740	1.056	0.295	7.4	0.0000	0.0000	OK
10080 minute winter	HW2	7740	1.056	0.379	4.2	0.0000	0.0000	OK
15 minute summer	OUTFALL	1	0.506	0.000	0.0	0.0000	0.0000	OK
15 minute summer	14	12	1.618	0.357	352.5	0.9085	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	1.000:50%	0.0	0.000	0.000	0.6123	
15 minute summer	1	1.000	2	15.4	0.608	0.015	1.2200	
15 minute summer	2	1.001	1.001:50%	14.9	0.572	0.015	0.3881	
15 minute summer	2	1.001	3	15.5	0.590	0.015	0.3927	
15 minute summer	3	1.002	1.002:50%	15.2	0.530	0.015	0.4638	
15 minute summer	3	1.002	4	21.8	0.740	0.021	0.4847	
15 minute summer	4	1.003	1.003:50%	20.1	0.332	0.020	6.9524	
15 minute summer	4	1.003	7	182.8	1.054	0.180	15.5538	
15 minute summer	5	2.000	2.000:50%	-8.0	-0.139	-0.008	5.5939	
15 minute summer	5	2.000	6	163.0	1.312	0.160	9.5949	
15 minute summer	6	2.001	2.001:50%	163.8	1.422	0.123	5.2102	
15 minute summer	6	2.001	7	172.1	1.112	0.129	7.0827	
15 minute summer	7	1.004	1.004:50%	348.0	1.463	0.308	7.6829	
15 minute summer	7	1.004	14	352.5	1.492	0.312	7.6291	
15 minute summer	8	1.006	HW1	353.8	3.523	0.313	9.7702	
10080 minute winter	HW1	Flow through Pond	HW2	4.2	0.007	0.000	1254.5128	
10080 minute winter	HW2	Pump	OUTFALL	1.6				595.0
15 minute summer	14	1.005	8	353.1	1.548	0.313	16.3282	

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Results for 2 year Critical Storm Duration. Lowest mass balance: 76.63%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	1	2.320	0.000	0.0	0.0000	0.0000	OK
15 minute summer	1.000:50%	11	2.292	0.098	26.9	0.0000	0.0000	OK
15 minute summer	2	11	2.168	0.100	26.5	0.2555	0.0000	OK
15 minute summer	1.001:50%	12	2.132	0.103	26.8	0.0000	0.0000	OK
15 minute summer	3	12	2.097	0.107	26.9	0.2735	0.0000	OK
15 minute summer	1.002:50%	12	2.077	0.129	38.7	0.1683	0.0000	OK
15 minute summer	4	11	2.063	0.156	40.2	0.3976	0.0000	OK
15 minute summer	1.003:50%	12	2.024	0.336	319.8	0.0000	0.0000	OK
15 minute summer	5	11	2.462	0.142	24.2	0.3604	0.0000	OK
15 minute summer	2.000:50%	11	2.432	0.315	296.5	0.0000	0.0000	OK
15 minute summer	6	12	2.199	0.284	274.5	0.7221	0.0000	OK
15 minute summer	2.001:50%	12	2.004	0.292	288.7	0.7854	0.0000	OK
15 minute summer	7	12	1.966	0.497	592.2	1.2642	0.0000	OK
15 minute summer	1.004:50%	12	1.858	0.493	593.5	0.0000	0.0000	OK
15 minute summer	8	13	1.474	0.444	597.2	1.1308	0.0000	OK
10080 minute winter	HW1	7740	1.131	0.370	9.1	0.0000	0.0000	OK
10080 minute winter	HW2	7740	1.131	0.454	5.2	0.0000	0.0000	OK
15 minute summer	OUTFALL	1	0.506	0.000	0.5	0.0000	0.0000	OK
15 minute summer	14	13	1.745	0.484	592.1	1.2328	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	1.000:50%	0.0	0.000	0.000	0.8928	
15 minute summer	1	1.000	2	26.5	0.705	0.026	1.8144	
15 minute summer	2	1.001	1.001:50%	25.6	0.661	0.025	0.5792	
15 minute summer	2	1.001	3	26.9	0.666	0.026	0.6135	
15 minute summer	3	1.002	1.002:50%	26.9	0.596	0.026	0.7727	
15 minute summer	3	1.002	4	40.2	0.784	0.039	1.0018	
15 minute summer	4	1.003	1.003:50%	57.2	0.426	0.056	11.9178	
15 minute summer	4	1.003	7	305.5	1.164	0.300	23.8899	
15 minute summer	5	2.000	2.000:50%	-24.2	-0.279	-0.024	10.0484	
15 minute summer	5	2.000	6	274.5	1.502	0.270	14.1060	
15 minute summer	6	2.001	2.001:50%	276.4	1.584	0.207	7.8467	
15 minute summer	6	2.001	7	286.7	1.164	0.215	11.2415	
15 minute summer	7	1.004	1.004:50%	583.4	1.636	0.517	11.5343	
15 minute summer	7	1.004	14	592.1	1.688	0.525	11.3252	
15 minute summer	8	1.006	HW1	590.0	4.047	0.523	14.0359	
10080 minute winter	HW1	Flow through Pond	HW2	5.2	0.007	0.000	1552.5475	
10080 minute winter	HW2	Pump	OUTFALL	1.9				715.3
15 minute summer	14	1.005	8	597.2	1.811	0.529	23.6047	

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Results for 10 year Critical Storm Duration. Lowest mass balance: 76.63%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	15	2.355	0.035	2.5	0.0880	0.0000	OK
15 minute summer	1.000:50%	14	2.358	0.164	60.7	0.0000	0.0000	OK
15 minute summer	2	13	2.363	0.295	58.7	0.7498	0.0000	OK
15 minute summer	1.001:50%	13	2.389	0.360	49.9	0.0000	0.0000	OK
15 minute summer	3	12	2.344	0.354	89.2	0.9021	0.0000	OK
15 minute summer	1.002:50%	13	2.360	0.412	95.9	1.7146	0.0000	OK
15 minute summer	4	13	2.354	0.447	121.3	1.1375	0.0000	OK
15 minute summer	1.003:50%	12	2.335	0.647	679.5	0.0000	0.0000	OK
15 minute summer	5	10	2.654	0.334	72.1	0.8506	0.0000	OK
15 minute summer	2.000:50%	11	2.644	0.526	668.7	0.0000	0.0000	OK
15 minute summer	6	11	2.409	0.494	664.2	1.2561	0.0000	OK
15 minute summer	2.001:50%	12	2.342	0.629	669.9	3.6544	0.0000	OK
15 minute summer	7	12	2.317	0.848	1158.9	2.1575	0.0000	OK
15 minute summer	1.004:50%	12	2.186	0.821	1168.4	0.0000	0.0000	OK
15 minute summer	8	13	1.688	0.658	1148.6	1.6751	0.0000	OK
10080 minute summer	HW1	7860	1.318	0.557	20.8	0.0000	0.0000	OK
10080 minute summer	HW2	7860	1.318	0.641	11.3	0.0000	0.0000	OK
15 minute summer	OUTFALL	1	0.506	0.000	1.0	0.0000	0.0000	OK
15 minute summer	14	12	2.039	0.778	1163.1	1.9811	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	1.000:50%	-2.5	0.092	-0.002	1.9577	
15 minute summer	1	1.000	2	58.7	0.855	0.058	5.6724	
15 minute summer	2	1.001	1.001:50%	49.3	0.747	0.048	3.1073	
15 minute summer	2	1.001	3	89.2	0.722	0.088	3.4555	
15 minute summer	3	1.002	1.002:50%	86.4	0.712	0.085	4.0084	
15 minute summer	3	1.002	4	121.3	0.830	0.119	4.6945	
15 minute summer	4	1.003	1.003:50%	169.0	0.765	0.166	32.9685	
15 minute summer	4	1.003	7	567.5	1.299	0.557	46.0540	
15 minute summer	5	2.000	2.000:50%	-72.1	-0.386	-0.071	22.4339	
15 minute summer	5	2.000	6	664.2	1.792	0.652	28.5117	
15 minute summer	6	2.001	2.001:50%	636.1	1.705	0.477	18.6326	
15 minute summer	6	2.001	7	645.8	1.191	0.484	24.1236	
15 minute summer	7	1.004	1.004:50%	1145.6	1.868	1.015	19.7930	
15 minute summer	7	1.004	14	1163.1	1.954	1.031	19.2045	
15 minute summer	8	1.006	HW1	1181.5	4.633	1.047	22.9249	
10080 minute summer	HW1	Flow through Pond	HW2	11.3	0.011	0.000	2307.8171	
10080 minute summer	HW2	Pump	OUTFALL	2.7				1018.4
15 minute summer	14	1.005	8	1148.6	2.131	1.018	38.5560	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 76.63%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	13	2.767	0.447	72.6	1.1383	0.0000	OK
15 minute summer	1.000:50%	14	2.688	0.494	215.2	0.0000	0.0000	OK
15 minute summer	2	14	2.646	0.578	218.7	1.4698	0.0000	OK
15 minute summer	1.001:50%	13	2.631	0.602	226.2	0.0000	0.0000	OK
15 minute summer	3	12	2.623	0.633	254.6	1.6106	0.0000	OK
15 minute summer	1.002:50%	13	2.607	0.659	259.6	4.3896	0.0000	OK
15 minute summer	4	12	2.600	0.693	302.0	1.7634	0.0000	OK
15 minute summer	1.003:50%	12	2.584	0.896	924.0	0.0000	0.0000	OK
15 minute summer	5	11	2.767	0.447	88.0	1.1367	0.0000	OK
15 minute summer	2.000:50%	11	2.760	0.642	911.4	0.0000	0.0000	OK
15 minute summer	6	12	2.699	0.784	874.4	1.9960	0.0000	OK
15 minute summer	2.001:50%	12	2.643	0.930	798.7	7.9896	0.0000	SURCHARGED
15 minute summer	7	12	2.540	1.071	1297.0	2.7261	0.0000	SURCHARGED
15 minute summer	1.004:50%	12	2.360	0.995	1321.3	0.0000	0.0000	SURCHARGED
15 minute summer	8	12	1.731	0.701	1324.0	1.7831	0.0000	OK
10080 minute winter	HW1	8040	1.438	0.677	16.1	0.0000	0.0000	OK
10080 minute winter	HW2	8040	1.438	0.761	9.1	0.0000	0.0000	SURCHARGED
15 minute summer	OUTFALL	1	0.506	0.000	1.2	0.0000	0.0000	OK
15 minute summer	14	12	2.176	0.915	1321.0	2.3285	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 summer	1	1.000	1.000:50%	-72.6	-0.482	-0.071	15.8378	
15 minute summer	1	1.000	2	201.8	0.917	0.198	18.8411	
15 minute summer	2	1.001	1.001:50%	225.1	0.719	0.221	6.5173	
15 minute summer	2	1.001	3	248.7	0.756	0.244	6.8698	
15 minute summer	3	1.002	1.002:50%	-254.6	0.831	-0.250	7.6166	
15 minute summer	3	1.002	4	302.0	0.954	0.296	8.0202	
15 minute summer	4	1.003	1.003:50%	402.5	0.920	0.395	48.1354	
15 minute summer	4	1.003	7	664.7	1.345	0.653	52.7060	
15 minute summer	5	2.000	2.000:50%	-88.0	-0.392	-0.086	30.7068	
15 minute summer	5	2.000	6	874.4	1.876	0.859	40.7306	
15 minute summer	6	2.001	2.001:50%	752.5	1.731	0.564	27.4387	
15 minute summer	6	2.001	7	801.6	1.265	0.601	28.5052	
15 minute summer	7	1.004	1.004:50%	1290.3	2.036	1.143	20.4627	
15 minute summer	7	1.004	14	1321.0	2.085	1.171	20.4627	
15 minute summer	8	1.006	HW1	1317.0	4.745	1.167	24.5743	
10080 minute winter	HW1	Flow through Pond	HW2	9.1	0.010	0.000	2805.8171	
10080 minute winter	HW2	Pump	OUTFALL	3.2				1218.0
15 minute summer	14	1.005	8	1324.0	2.221	1.173	41.6346	

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Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 76.63%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	12	3.744	1.424	247.0	3.6252	0.0000	SURCHARGED
15 minute winter	1.000:50%	12	3.752	1.558	504.6	0.0000	0.0000	SURCHARGED
15 minute summer	2	13	3.759	1.691	553.2	4.3037	0.0000	SURCHARGED
15 minute summer	1.001:50%	13	3.775	1.746	536.1	0.0000	0.0000	SURCHARGED
15 minute summer	3	13	3.753	1.763	543.1	4.4864	0.0000	SURCHARGED
15 minute summer	1.002:50%	13	3.634	1.686	664.9	28.7349	0.0000	SURCHARGED
15 minute summer	4	13	3.602	1.695	636.7	4.3126	0.0000	SURCHARGED
15 minute summer	1.003:50%	13	3.446	1.758	1247.9	0.0000	0.0000	SURCHARGED
15 minute winter	5	11	4.004	1.684	74.9	4.2861	0.0000	SURCHARGED
15 minute winter	2.000:50%	11	3.834	1.717	1152.0	0.0000	0.0000	SURCHARGED
15 minute summer	6	11	3.485	1.570	1357.3	3.9958	0.0000	SURCHARGED
15 minute summer	2.001:50%	11	3.266	1.553	1269.9	22.2699	0.0000	SURCHARGED
15 minute summer	7	13	3.200	1.731	1696.0	4.4054	0.0000	SURCHARGED
15 minute summer	1.004:50%	13	2.891	1.526	1731.7	0.0000	0.0000	SURCHARGED
15 minute summer	8	13	1.858	0.828	1731.7	2.1064	0.0000	OK
10080 minute winter	HW1	9480	1.694	0.933	21.6	0.0000	0.0000	OK
10080 minute winter	HW2	9480	1.694	1.017	12.1	0.0000	0.0000	SURCHARGED
15 minute summer	OUTFALL	1	0.506	0.000	1.5	0.0000	0.0000	OK
15 minute summer	14	13	2.569	1.308	1734.0	3.3277	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	1	1.000	1.000:50%	-247.0	-0.794	-0.242	30.3926	
15 minute winter	1	1.000	2	-406.2	0.899	-0.399	30.3926	
15 minute summer	2	1.001	1.001:50%	-553.2	-0.903	-0.543	9.4483	
15 minute summer	2	1.001	3	-531.3	-0.841	-0.522	9.4483	
15 minute summer	3	1.002	1.002:50%	-543.1	-0.857	-0.533	9.9699	
15 minute summer	3	1.002	4	-605.2	-0.955	-0.594	9.9699	
15 minute summer	4	1.003	1.003:50%	-636.7	-1.009	-0.625	52.7325	
15 minute summer	4	1.003	7	1004.4	1.585	0.986	52.7325	
15 minute winter	5	2.000	2.000:50%	131.4	0.407	0.129	48.7638	
15 minute winter	5	2.000	6	1090.7	1.908	1.071	48.7638	
15 minute summer	6	2.001	2.001:50%	1207.9	1.906	0.905	28.5052	
15 minute summer	6	2.001	7	1075.3	1.697	0.806	28.5052	
15 minute summer	7	1.004	1.004:50%	1705.7	2.692	1.512	20.4627	
15 minute summer	7	1.004	14	1734.0	2.736	1.537	20.4627	
15 minute summer	8	1.006	HW1	1738.9	4.970	1.541	28.9271	
10080 minute winter	HW1	Flow through Pond	HW2	12.1	0.014	0.000	3903.4707	
10080 minute winter	HW2	Pump	OUTFALL	3.4				1386.2
15 minute summer	14	1.005	8	1731.7	2.733	1.535	44.5151	

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Results for 100 year Critical Storm Duration. Lowest mass balance: 76.63%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	12	3.925	1.605	217.6	4.0836	0.0000	SURCHARGED
15 minute summer	1.000:50%	12	3.833	1.639	541.6	0.0000	0.0000	SURCHARGED
15 minute summer	2	13	3.581	1.513	499.2	3.8496	0.0000	SURCHARGED
15 minute summer	1.001:50%	13	3.520	1.491	525.1	0.0000	0.0000	SURCHARGED
15 minute summer	3	13	3.466	1.476	565.1	3.7555	0.0000	SURCHARGED
15 minute summer	1.002:50%	13	3.468	1.519	650.7	23.3425	0.0000	SURCHARGED
15 minute summer	4	13	3.426	1.519	581.6	3.8664	0.0000	SURCHARGED
15 minute summer	1.003:50%	13	3.296	1.608	1208.7	0.0000	0.0000	SURCHARGED
15 minute summer	5	11	4.123	1.803	115.7	5.0122	0.0000	FLOOD RISK
15 minute summer	2.000:50%	11	3.888	1.770	1189.4	0.0000	0.0000	SURCHARGED
15 minute summer	6	11	3.450	1.535	1172.7	3.9054	0.0000	SURCHARGED
15 minute summer	2.001:50%	12	3.104	1.392	1347.1	17.8856	0.0000	SURCHARGED
15 minute summer	7	13	3.046	1.577	1637.0	4.0140	0.0000	SURCHARGED
15 minute summer	1.004:50%	13	2.756	1.391	1665.7	0.0000	0.0000	SURCHARGED
15 minute summer	8	12	1.830	0.800	1669.6	2.0349	0.0000	OK
4320 minute winter	HW1	4260	1.645	0.884	41.2	0.0000	0.0000	OK
4320 minute winter	HW2	4260	1.645	0.968	21.8	0.0000	0.0000	SURCHARGED
15 minute summer	OUTFALL	1	0.506	0.000	1.5	0.0000	0.0000	OK
15 minute summer	14	13	2.459	1.198	1667.6	3.0495	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 summer	1	1.000	1.000:50%	-217.6	-0.767	-0.214	30.3926	
15 minute summer	1	1.000	2	-438.8	0.906	-0.431	30.3926	
15 minute summer	2	1.001	1.001:50%	-499.2	-0.849	-0.490	9.4483	
15 minute summer	2	1.001	3	-520.4	-0.843	-0.511	9.4483	
15 minute summer	3	1.002	1.002:50%	-565.1	-0.894	-0.555	9.9699	
15 minute summer	3	1.002	4	-551.9	0.933	-0.542	9.9699	
15 minute summer	4	1.003	1.003:50%	-581.6	-0.938	-0.571	52.7325	
15 minute summer	4	1.003	7	939.7	1.483	0.923	52.7325	
15 minute summer	5	2.000	2.000:50%	142.1	0.379	0.140	48.7638	
15 minute summer	5	2.000	6	1172.7	1.919	1.151	48.7638	
15 minute summer	6	2.001	2.001:50%	1286.9	2.031	0.964	28.5052	
15 minute summer	6	2.001	7	1115.4	1.760	0.836	28.5052	
15 minute summer	7	1.004	1.004:50%	1640.7	2.589	1.454	20.4627	
15 minute summer	7	1.004	14	1667.6	2.631	1.478	20.4627	
15 minute summer	8	1.006	HW1	1667.8	4.959	1.478	28.1768	
4320 minute winter	HW1	Flow through Pond	HW2	21.8	0.028	0.000	3687.5525	
4320 minute winter	HW2	Pump	OUTFALL	3.4				623.2
15 minute summer	14	1.005	8	1669.6	2.638	1.479	43.9834	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 76.63%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	11	4.185	1.865	618.5	17.3316	0.0000	FLOOD RISK
30 minute winter	1.000:50%	28	4.238	2.044	697.4	0.0000	0.0000	SURCHARGED
30 minute winter	2	26	4.217	2.149	715.4	26.9077	0.0000	FLOOD RISK
15 minute winter	1.001:50%	12	4.240	2.211	817.3	0.0000	0.0000	SURCHARGED
15 minute winter	3	12	4.259	2.269	839.7	8.2221	0.0000	FLOOD RISK
30 minute winter	1.002:50%	31	4.361	2.413	1070.6	58.8614	0.0000	SURCHARGED
30 minute winter	4	25	4.190	2.283	1837.8	169.4713	0.0000	FLOOD RISK
30 minute summer	1.003:50%	19	4.150	2.462	1516.1	0.0000	0.0000	SURCHARGED
15 minute winter	5	13	4.194	1.874	405.5	167.2078	0.0000	FLOOD RISK
15 minute winter	2.000:50%	10	4.316	2.199	1562.1	0.0000	0.0000	SURCHARGED
30 minute summer	6	19	4.121	2.206	1354.6	5.7046	0.0000	FLOOD RISK
30 minute summer	2.001:50%	19	4.046	2.333	1429.9	50.2616	0.0000	SURCHARGED
30 minute summer	7	19	3.925	2.456	1912.3	6.2512	0.0000	SURCHARGED
30 minute summer	1.004:50%	19	3.525	2.160	1970.2	0.0000	0.0000	SURCHARGED
15 minute summer	8	12	2.188	1.158	1959.6	2.9463	0.0000	SURCHARGED
5760 minute winter	HW1	5640	2.000	1.239	44.3	0.0000	0.0000	OK
5760 minute winter	HW2	5640	2.000	1.323	23.7	0.0000	0.0000	SURCHARGED
15 minute summer	OUTFALL	1	0.506	0.000	2.0	0.0000	0.0000	OK
30 minute summer	14	19	3.100	1.839	1969.1	4.6812	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	1	1.000	1.000:50%	-618.5	-1.160	-0.607	30.3926	
15 minute winter	1	1.000	2	-712.7	-1.125	-0.700	30.3926	
30 minute winter	2	1.001	1.001:50%	878.4	1.386	0.862	9.4483	
30 minute winter	2	1.001	3	941.2	1.485	0.924	9.4483	
15 minute winter	3	1.002	1.002:50%	-839.7	-1.325	-0.824	9.9699	
15 minute winter	3	1.002	4	-924.8	-1.459	-0.908	9.9699	
30 minute winter	4	1.003	1.003:50%	1371.0	2.163	1.346	52.7325	
30 minute winter	4	1.003	7	1534.8	2.422	1.507	52.7325	
15 minute winter	5	2.000	2.000:50%	998.1	1.575	0.980	48.7638	
15 minute winter	5	2.000	6	1333.9	2.105	1.310	48.7638	
30 minute summer	6	2.001	2.001:50%	1350.8	2.132	1.012	28.5052	
30 minute summer	6	2.001	7	1280.3	2.020	0.959	28.5052	
30 minute summer	7	1.004	1.004:50%	1911.1	3.016	1.694	20.4627	
30 minute summer	7	1.004	14	1969.1	3.107	1.745	20.4627	
15 minute summer	8	1.006	HW1	1959.5	4.797	1.736	31.8883	
5760 minute winter	HW1	Flow through Pond	HW2	23.7	0.025	0.000	5256.3984	
5760 minute winter	HW2	Pump	OUTFALL	3.4				870.0
30 minute summer	14	1.005	8	1964.2	3.100	1.741	45.3611	

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Results for 100 year +40% CC 2880 minute summer. 3360 minute analysis at 60 minute timestep. Mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2880 minute summer	1	60	2.320	0.000	0.0	0.0000	0.0000	OK
2880 minute summer	1.000:50%	1500	2.239	0.045	5.0	0.0000	0.0000	OK
2880 minute summer	2	1500	2.113	0.045	5.0	0.1152	0.0000	OK
2880 minute summer	1.001:50%	1500	2.075	0.046	5.2	0.0000	0.0000	OK
2880 minute summer	3	1500	2.036	0.046	5.2	0.1162	0.0000	OK
2880 minute summer	1.002:50%	1500	2.005	0.057	8.0	0.0325	0.0000	OK
2880 minute summer	4	2940	1.985	0.078	8.0	0.1987	0.0000	OK
2880 minute summer	1.003:50%	2940	1.985	0.297	64.1	0.0000	0.0000	OK
2880 minute summer	5	60	2.320	0.000	0.0	0.0000	0.0000	OK
2880 minute summer	2.000:50%	1500	2.258	0.140	55.2	0.0000	0.0000	OK
2880 minute summer	6	1500	2.039	0.124	55.2	0.3145	0.0000	OK
2880 minute summer	2.001:50%	3000	1.983	0.271	58.1	0.6770	0.0000	OK
2880 minute summer	7	2940	1.985	0.516	122.2	1.3140	0.0000	OK
2880 minute summer	1.004:50%	2940	1.987	0.622	124.6	0.0000	0.0000	OK
2880 minute summer	8	2940	1.987	0.957	123.4	2.4348	0.0000	SURCHARGED
2880 minute summer	HW1	2940	1.985	1.224	121.5	0.0000	0.0000	OK
2880 minute summer	HW2	2940	1.985	1.308	62.2	0.0000	0.0000	SURCHARGED
2880 minute summer	OUTFALL	60	0.506	0.000	3.4	0.0000	0.0000	OK
2880 minute summer	14	2940	1.988	0.727	124.5	1.8496	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
2880 minute summer	1	1.000	1.000:50%	0.0	0.000	0.000	0.2781	
2880 minute summer	1	1.000	2	5.0	0.428	0.005	0.5605	
2880 minute summer	2	1.001	1.001:50%	5.0	0.417	0.005	0.1788	
2880 minute summer	2	1.001	3	5.2	0.431	0.005	0.1799	
2880 minute summer	3	1.002	1.002:50%	5.2	0.367	0.005	0.2229	
2880 minute summer	3	1.002	4	8.0	0.493	0.008	0.2715	
2880 minute summer	4	1.003	1.003:50%	8.0	0.203	0.008	8.6767	
2880 minute summer	4	1.003	7	64.1	0.738	0.063	23.2267	
2880 minute summer	5	2.000	2.000:50%	0.0	0.000	0.000	2.4139	
2880 minute summer	5	2.000	6	55.2	0.961	0.054	4.4238	
2880 minute summer	6	2.001	2.001:50%	55.2	1.052	0.041	4.0917	
2880 minute summer	6	2.001	7	58.1	0.900	0.044	11.1990	
2880 minute summer	7	1.004	1.004:50%	122.2	1.144	0.108	13.6209	
2880 minute summer	7	1.004	14	124.5	1.196	0.110	16.4041	
2880 minute summer	8	1.006	HW1	121.5	0.953	0.108	52.7718	
2880 minute summer	HW1	Flow through Pond	HW2	62.2	0.044	0.000	5191.1045	
2880 minute summer	HW2	Pump	OUTFALL	3.4				469.0
2880 minute summer	14	1.005	8	123.4	1.070	0.109	42.3135	

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Results for 100 year +40% CC 2880 minute winter. 3360 minute analysis at 60 minute timestep. Mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2880 minute winter	1	60	2.320	0.000	0.0	0.0000	0.0000	OK
2880 minute winter	1.000:50%	1500	2.232	0.038	3.4	0.0000	0.0000	OK
2880 minute winter	2	1500	2.106	0.038	3.4	0.0966	0.0000	OK
2880 minute winter	1.001:50%	1500	2.068	0.039	3.6	0.0000	0.0000	OK
2880 minute winter	3	1500	2.029	0.039	3.6	0.0987	0.0000	OK
2880 minute winter	1.002:50%	1500	1.996	0.047	5.5	0.0226	0.0000	OK
2880 minute winter	4	2880	1.988	0.081	5.5	0.2049	0.0000	OK
2880 minute winter	1.003:50%	2880	1.987	0.299	43.2	0.0000	0.0000	OK
2880 minute winter	5	60	2.320	0.000	0.0	0.0000	0.0000	OK
2880 minute winter	2.000:50%	1500	2.233	0.116	37.1	0.0000	0.0000	OK
2880 minute winter	6	1500	2.017	0.102	37.1	0.2596	0.0000	OK
2880 minute winter	2.001:50%	2820	1.985	0.272	39.1	0.6834	0.0000	OK
2880 minute winter	7	2880	1.988	0.519	82.3	1.3209	0.0000	OK
2880 minute winter	1.004:50%	2880	1.990	0.625	83.9	0.0000	0.0000	OK
2880 minute winter	8	2880	1.989	0.959	83.7	2.4417	0.0000	SURCHARGED
2880 minute winter	HW1	2880	1.988	1.227	82.4	0.0000	0.0000	OK
2880 minute winter	HW2	2880	1.988	1.311	42.6	0.0000	0.0000	SURCHARGED
2880 minute winter	OUTFALL	60	0.506	0.000	3.4	0.0000	0.0000	OK
2880 minute winter	14	2880	1.991	0.730	83.9	1.8567	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
2880 minute winter	1	1.000	1.000:50%	0.0	0.000	0.000	0.2115	
2880 minute winter	1	1.000	2	3.4	0.384	0.003	0.4241	
2880 minute winter	2	1.001	1.001:50%	3.4	0.373	0.003	0.1358	
2880 minute winter	2	1.001	3	3.6	0.389	0.004	0.1380	
2880 minute winter	3	1.002	1.002:50%	3.6	0.331	0.004	0.1712	
2880 minute winter	3	1.002	4	5.5	0.441	0.005	0.2904	
2880 minute winter	4	1.003	1.003:50%	5.5	0.183	0.005	8.8227	
2880 minute winter	4	1.003	7	43.2	0.662	0.042	23.4209	
2880 minute winter	5	2.000	2.000:50%	0.0	0.000	0.000	1.8308	
2880 minute winter	5	2.000	6	37.1	0.853	0.036	3.3458	
2880 minute winter	6	2.001	2.001:50%	37.1	0.935	0.028	4.1510	
2880 minute winter	6	2.001	7	39.1	0.845	0.029	11.2821	
2880 minute winter	7	1.004	1.004:50%	82.3	1.029	0.073	13.6968	
2880 minute winter	7	1.004	14	83.9	1.069	0.074	16.4730	
2880 minute winter	8	1.006	HW1	82.4	1.018	0.073	52.7718	
2880 minute winter	HW1	Flow through Pond	HW2	42.6	0.026	0.000	5202.7544	
2880 minute winter	HW2	Pump	OUTFALL	3.4				474.9
2880 minute winter	14	1.005	8	83.7	0.984	0.074	42.3842	

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Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	1	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.900	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.310	5.00	4.420		529169.727	328654.097	0.800
2			4.140		529096.008	328751.596	0.764
3			4.140		529083.961	328762.307	0.796
4			3.650		528892.040	328864.807	0.810
End of swale 1			3.570		528876.343	328873.191	0.697
6			3.570		528871.671	328854.758	0.811
End of swale 2			3.890		528810.983	328723.149	1.421
Outfall 2			3.570	1500	528871.301	328873.801	0.707
Outfall 1			3.890	1500	528806.408	328717.407	1.431

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	122.232	0.030	3.620	3.376	0.244	500.0	800	7.49	26.9
1.001	2	3	16.120	0.030	3.376	3.344	0.032	500.0	800	7.82	26.3
1.002	3	4	217.577	0.030	3.344	2.909	0.435	500.0	800	12.25	20.5
1.003	4	End of swale 1	17.796	0.030	2.909	2.873	0.036	500.0	800	12.61	20.1
2.000	4	6	22.713	0.030	2.840	2.795	0.045	500.0	800	5.46	32.1
2.001	6	End of swale 2	144.927	0.030	2.759	2.469	0.290	500.0	800	8.41	25.3
1.004	End of swale 1	Outfall 2	5.000	0.030	2.873	2.863	0.010	500.0	625	12.80	19.9
2.002	End of swale 2	Outfall 1	5.000	0.030	2.469	2.459	0.010	500.0	625	8.61	25.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	0.818	1800.2	34.7	0.000	-0.036	0.397	0.0	146	0.301
1.001	0.818	1800.2	35.0	-0.036	-0.004	0.409	0.0	147	0.302
1.002	0.818	1800.2	38.4	-0.004	-0.059	0.578	0.0	154	0.309
1.003	0.818	1800.2	39.8	-0.059	-0.103	0.609	0.0	156	0.311
2.000	0.818	1800.2	0.0	0.010	-0.025	0.000	0.0	0	0.000
2.001	0.818	1800.2	0.0	0.011	0.621	0.000	0.0	0	0.000
1.004	0.432	132.7	39.5	0.072	0.082	0.609	0.0	233	0.377
2.002	0.432	132.7	0.0	0.796	0.806	0.000	0.0	0	0.000

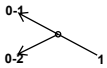
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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	122.232	500.0	800	Swale	4.420	3.620	0.000	4.140	3.376	-0.036
1.001	16.120	500.0	800	Swale	4.140	3.376	-0.036	4.140	3.344	-0.004
1.002	217.577	500.0	800	Swale	4.140	3.344	-0.004	3.650	2.909	-0.059
1.003	17.796	500.0	800	Swale	3.650	2.909	-0.059	3.570	2.873	-0.103
2.000	22.713	500.0	800	Swale	3.650	2.840	0.010	3.570	2.795	-0.025
2.001	144.927	500.0	800	Swale	3.570	2.759	0.011	3.890	2.469	0.621
1.004	5.000	500.0	625	Circular	3.570	2.873	0.072	3.570	2.863	0.082
2.002	5.000	500.0	625	Circular	3.890	2.469	0.796	3.890	2.459	0.806

Link	US Node	Node Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	Junction	2		Junction	
1.001	2	Junction	3		Junction	
1.002	3	Junction	4		Junction	
1.003	4	Junction	End of swale 1		Junction	
2.000	4	Junction	6		Junction	
2.001	6	Junction	End of swale 2		Junction	
1.004	End of swale 1	Junction	Outfall 2	1500	Manhole	Adoptable
2.002	End of swale 2	Junction	Outfall 1	1500	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	529169.727	328654.097	4.420	0.800					
						0	1.000	3.620	800
2	529096.008	328751.596	4.140	0.764			1.000	3.376	800
						0	1.001	3.376	800
3	529083.961	328762.307	4.140	0.796			1.001	3.344	800
						0	1.002	3.344	800
4	528892.040	328864.807	3.650	0.810			1.002	2.909	800
						0-1	1.003	2.909	800
						0-2	2.000	2.840	800
End of swale 1	528876.343	328873.191	3.570	0.697			1.003	2.873	800
						0	1.004	2.873	625
6	528871.671	328854.758	3.570	0.811			2.000	2.795	800
						0	2.001	2.759	800
End of swale 2	528810.983	328723.149	3.890	1.421			2.001	2.469	800
						0	2.002	2.469	625

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
Outfall 2	528871.301	328873.801	3.570	0.707	1500	1	1.004	2.863	625
Outfall 1	528806.408	328717.407	3.890	1.431	1500	1	2.002	2.459	625

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	x	1 year (l/s)	0.0
Rainfall Events	Singular	Drain Down Time (mins)	240	2 year (l/s)	0.0
Summer CV	0.900	Additional Storage (m³/ha)	20.0	30 year (l/s)	0.0
Winter CV	0.900	Starting Level (m)		100 year (l/s)	0.0
Analysis Speed	Detailed	Check Discharge Rate(s)	✓	Check Discharge Volume	x

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
10	0	0	0
30	0	0	0
30	35	0	0
100	0	0	0
100	40	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.95
Greenfield Method	IH124	Growth Factor 100 year	2.48
Positively Drained Area (ha)		Betterment (%)	0
SAAR (mm)		QBar	
Soil Index	1	Q 1 year (l/s)	
SPR	0.10	Q 2 year (l/s)	
Region	1	Q 30 year (l/s)	
Growth Factor 1 year	0.85	Q 100 year (l/s)	
Growth Factor 2 year	0.90		

Node End of swale 1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	2.873	Product Number	CTL-SHE-0047-1000-1000-1000
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	1.0	Min Node Diameter (mm)	1200

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Node End of swale 2 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	2.469	Product Number	CTL-SHE-0047-1000-1000-1000
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	1.0	Min Node Diameter (mm)	1200

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Results for 1 year Critical Storm Duration. Lowest mass balance: 90.36%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	3.754	0.134	29.2	1.0416	0.0000	OK
15 minute summer	1.000:50%	13	3.639	0.141	34.7	0.0000	0.0000	OK
30 minute summer	2	23	3.495	0.119	26.3	0.0000	0.0000	OK
30 minute summer	1.001:50%	24	3.476	0.116	24.5	0.0000	0.0000	OK
30 minute summer	3	26	3.460	0.116	24.4	0.0000	0.0000	OK
120 minute summer	1.002:50%	78	3.269	0.142	23.0	0.0000	0.0000	OK
600 minute winter	4	585	2.962	0.122	7.6	0.0000	0.0000	OK
600 minute winter	1.003:50%	570	2.962	0.071	0.5	0.0000	0.0000	OK
600 minute winter	End of swale 1	570	2.962	0.089	0.5	0.0000	0.0000	OK
600 minute winter	6	585	2.962	0.203	7.7	0.0000	0.0000	OK
600 minute winter	End of swale 2	585	2.962	0.493	7.1	0.0000	0.0000	OK
600 minute winter	Outfall 2	570	2.871	0.008	0.5	0.0000	0.0000	OK
15 minute summer	Outfall 1	84	2.471	0.012	0.8	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 summer	1	1.000	1.000:50%	27.5	0.293	0.015	6.0748	
15 minute summer	1	1.000	2	27.2	0.308	0.015	5.5173	
30 minute summer	2	1.001	1.001:50%	24.2	0.299	0.013	0.6626	
30 minute summer	2	1.001	3	24.4	0.376	0.014	0.6455	
30 minute summer	3	1.002	1.002:50%	20.0	0.263	0.011	8.3555	
30 minute summer	3	1.002	4	13.0	0.255	0.007	6.0197	
600 minute winter	4	1.003	1.003:50%	0.5	-0.043	0.000	0.2986	
600 minute winter	4	2.000	6	7.7	0.248	0.004	2.6108	
600 minute winter	4	1.003	End of swale 1	0.5	0.039	0.000	0.4226	
600 minute winter	End of swale 1	1.004	Outfall 2	0.5	0.159	0.004	0.0200	13.8
600 minute winter	6	2.001	End of swale 2	7.1	0.099	0.004	79.5138	
600 minute winter	End of swale 2	2.002	Outfall 1	0.8	0.183	0.006	0.0254	29.9

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Results for 2 year Critical Storm Duration. Lowest mass balance: 90.36%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	3.791	0.171	50.1	1.3283	0.0000	OK
15 minute summer	1.000:50%	13	3.683	0.185	61.9	0.0000	0.0000	OK
15 minute summer	2	15	3.533	0.157	50.8	0.0000	0.0000	OK
30 minute summer	1.001:50%	23	3.513	0.153	43.4	0.0000	0.0000	OK
30 minute summer	3	24	3.497	0.153	42.8	0.0000	0.0000	OK
120 minute summer	1.002:50%	76	3.305	0.179	36.5	0.0000	0.0000	OK
600 minute winter	4	585	3.032	0.192	10.1	0.0000	0.0000	OK
600 minute winter	1.003:50%	585	3.032	0.141	0.9	0.0000	0.0000	OK
600 minute winter	End of swale 1	585	3.032	0.159	0.8	0.0000	0.0000	OK
600 minute winter	6	585	3.032	0.273	10.1	0.0000	0.0000	OK
600 minute winter	End of swale 2	585	3.032	0.563	8.0	0.0000	0.0000	OK
600 minute winter	Outfall 2	585	2.874	0.011	0.8	0.0000	0.0000	OK
960 minute winter	Outfall 1	375	2.471	0.012	0.8	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 summer	1	1.000	1.000:50%	48.5	0.337	0.027	9.3522	
15 minute summer	1	1.000	2	50.8	0.366	0.028	8.6586	
15 minute summer	2	1.001	1.001:50%	45.2	0.368	0.025	1.0099	
15 minute summer	2	1.001	3	45.4	0.503	0.025	0.9817	
30 minute summer	3	1.002	1.002:50%	37.3	0.308	0.021	13.3589	
30 minute summer	3	1.002	4	26.1	0.316	0.015	9.8209	
600 minute winter	4	1.003	1.003:50%	0.8	-0.040	0.000	0.8755	
600 minute winter	4	2.000	6	10.1	0.260	0.006	4.8646	
600 minute winter	4	1.003	End of swale 1	0.8	0.039	0.000	1.0667	
600 minute winter	End of swale 1	1.004	Outfall 2	0.8	0.180	0.006	0.0247	24.5
600 minute winter	6	2.001	End of swale 2	8.0	0.094	0.004	106.2042	
600 minute winter	End of swale 2	2.002	Outfall 1	0.8	0.183	0.006	0.0254	32.0

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Results for 10 year Critical Storm Duration. Lowest mass balance: 90.36%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	3.866	0.246	113.1	1.9043	0.0000	OK
15 minute summer	1.000:50%	12	3.767	0.269	137.5	0.0000	0.0000	OK
15 minute summer	2	14	3.612	0.236	122.4	0.0000	0.0000	OK
15 minute summer	1.001:50%	15	3.592	0.232	115.7	0.0000	0.0000	OK
15 minute summer	3	15	3.576	0.232	112.5	0.0000	0.0000	OK
30 minute summer	1.002:50%	26	3.399	0.272	112.5	0.0000	0.0000	OK
600 minute winter	4	600	3.199	0.359	19.9	0.0000	0.0000	OK
600 minute winter	1.003:50%	600	3.199	0.308	1.8	0.0000	0.0000	OK
600 minute winter	End of swale 1	600	3.199	0.326	1.2	0.0000	0.0000	OK
600 minute winter	6	600	3.199	0.440	17.1	0.0000	0.0000	OK
600 minute winter	End of swale 2	600	3.199	0.730	10.6	0.0000	0.0000	SURCHARGED
120 minute summer	Outfall 2	120	2.875	0.012	0.8	0.0000	0.0000	OK
600 minute winter	Outfall 1	600	2.471	0.012	0.8	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 summer	1	1.000	1.000:50%	107.4	0.406	0.060	17.3003	
15 minute summer	1	1.000	2	122.4	0.467	0.068	16.6247	
15 minute summer	2	1.001	1.001:50%	113.4	0.484	0.063	1.9699	
15 minute summer	2	1.001	3	112.5	0.653	0.062	1.9564	
15 minute summer	3	1.002	1.002:50%	92.6	0.392	0.051	27.0990	
15 minute summer	3	1.002	4	74.2	0.426	0.041	20.3318	
600 minute winter	4	1.003	1.003:50%	0.8	-0.040	0.000	3.3285	
600 minute winter	4	2.000	6	17.1	0.265	0.009	13.0122	
600 minute winter	4	1.003	End of swale 1	1.2	0.039	0.001	3.6810	
600 minute winter	End of swale 1	1.004	Outfall 2	0.8	0.183	0.006	0.0255	29.2
600 minute winter	6	2.001	End of swale 2	10.6	0.114	0.006	187.8793	
600 minute winter	End of swale 2	2.002	Outfall 1	0.8	0.185	0.006	0.0259	36.3

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Results for 30 year Critical Storm Duration. Lowest mass balance: 90.36%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	3.902	0.282	153.7	2.1816	0.0000	OK
15 minute summer	1.000:50%	12	3.805	0.307	187.2	0.0000	0.0000	OK
15 minute summer	2	14	3.649	0.273	171.4	0.0000	0.0000	OK
15 minute summer	1.001:50%	14	3.630	0.270	161.7	0.0000	0.0000	OK
15 minute summer	3	15	3.613	0.269	158.1	0.0000	0.0000	OK
30 minute summer	1.002:50%	24	3.444	0.318	163.7	0.0000	0.0000	OK
960 minute winter	4	945	3.287	0.447	16.0	0.0000	0.0000	OK
960 minute winter	1.003:50%	945	3.287	0.396	1.4	0.0000	0.0000	OK
960 minute winter	End of swale 1	945	3.287	0.414	1.0	0.0000	0.0000	OK
960 minute winter	6	945	3.287	0.528	12.9	0.0000	0.0000	OK
960 minute winter	End of swale 2	945	3.287	0.818	7.4	0.0000	0.0000	SURCHARGED
600 minute winter	Outfall 2	330	2.875	0.012	0.8	0.0000	0.0000	OK
960 minute winter	Outfall 1	945	2.472	0.013	0.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	1.000:50%	146.3	0.433	0.081	21.7271	
15 minute summer	1	1.000	2	171.4	0.510	0.095	21.0248	
15 minute summer	2	1.001	1.001:50%	158.6	0.537	0.088	2.5473	
15 minute summer	2	1.001	3	158.1	0.701	0.088	2.5035	
15 minute summer	3	1.002	1.002:50%	132.3	0.420	0.074	36.2459	
15 minute summer	3	1.002	4	118.1	0.482	0.066	28.1560	
960 minute winter	4	1.003	1.003:50%	0.7	-0.050	0.000	5.2163	
960 minute winter	4	2.000	6	12.9	0.222	0.007	18.8203	
960 minute winter	4	1.003	End of swale 1	1.0	0.039	0.001	5.6534	
960 minute winter	End of swale 1	1.004	Outfall 2	0.8	0.183	0.006	0.0255	39.8
960 minute winter	6	2.001	End of swale 2	7.4	0.116	0.004	240.5098	
960 minute winter	End of swale 2	2.002	Outfall 1	0.9	0.187	0.007	0.0267	54.9

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Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 90.36%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	3.941	0.321	207.5	2.4889	0.0000	OK
15 minute summer	1.000:50%	12	3.847	0.349	253.3	0.0000	0.0000	OK
15 minute summer	2	13	3.689	0.313	235.7	0.0000	0.0000	OK
15 minute summer	1.001:50%	14	3.673	0.313	219.9	0.0000	0.0000	OK
15 minute summer	3	14	3.655	0.311	216.0	0.0000	0.0000	OK
30 minute summer	1.002:50%	23	3.491	0.365	231.8	0.0000	0.0000	OK
960 minute winter	4	945	3.401	0.561	21.5	0.0000	0.0000	OK
960 minute winter	1.003:50%	945	3.401	0.510	1.7	0.0000	0.0000	OK
960 minute winter	End of swale 1	945	3.401	0.528	1.1	0.0000	0.0000	OK
960 minute winter	6	945	3.401	0.642	17.1	0.0000	0.0000	OK
960 minute winter	End of swale 2	945	3.401	0.932	9.4	0.0000	0.0000	SURCHARGED
15 minute summer	Outfall 2	68	2.875	0.012	0.8	0.0000	0.0000	OK
960 minute winter	Outfall 1	960	2.473	0.014	0.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	1.000:50%	198.0	0.465	0.110	27.3348	
15 minute summer	1	1.000	2	235.7	0.555	0.131	26.3913	
15 minute summer	2	1.001	1.001:50%	215.7	0.581	0.120	3.2529	
15 minute summer	2	1.001	3	216.0	0.750	0.120	3.2352	
15 minute summer	3	1.002	1.002:50%	184.3	0.444	0.102	47.2196	
15 minute summer	3	1.002	4	179.1	0.537	0.099	37.8507	
960 minute winter	4	1.003	1.003:50%	0.7	-0.049	0.000	8.2543	
960 minute winter	4	2.000	6	17.1	0.216	0.010	27.8484	
960 minute winter	4	1.003	End of swale 1	1.1	0.039	0.001	8.8002	
960 minute winter	End of swale 1	1.004	Outfall 2	0.8	0.183	0.006	0.0255	39.7
960 minute winter	6	2.001	End of swale 2	9.4	0.131	0.005	318.1586	
960 minute winter	End of swale 2	2.002	Outfall 1	0.9	0.190	0.007	0.0276	57.8

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Results for 100 year Critical Storm Duration. Lowest mass balance: 90.36%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	3.937	0.317	201.0	2.4545	0.0000	OK
15 minute summer	1.000:50%	12	3.842	0.344	245.3	0.0000	0.0000	OK
15 minute summer	2	14	3.685	0.309	228.0	0.0000	0.0000	OK
15 minute summer	1.001:50%	14	3.668	0.308	213.0	0.0000	0.0000	OK
30 minute summer	3	22	3.651	0.307	195.3	0.0000	0.0000	OK
30 minute summer	1.002:50%	23	3.487	0.360	224.2	0.0000	0.0000	OK
960 minute winter	4	960	3.399	0.559	21.4	0.0000	0.0000	OK
960 minute winter	1.003:50%	960	3.399	0.508	1.7	0.0000	0.0000	OK
960 minute winter	End of swale 1	960	3.399	0.526	1.1	0.0000	0.0000	OK
960 minute winter	6	960	3.399	0.640	17.0	0.0000	0.0000	OK
960 minute winter	End of swale 2	960	3.399	0.930	9.4	0.0000	0.0000	SURCHARGED
60 minute winter	Outfall 2	43	2.875	0.012	0.8	0.0000	0.0000	OK
960 minute winter	Outfall 1	960	2.473	0.014	0.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	1.000:50%	191.8	0.462	0.107	26.6812	
15 minute summer	1	1.000	2	228.0	0.550	0.127	25.7458	
15 minute summer	2	1.001	1.001:50%	209.0	0.576	0.116	3.1710	
15 minute summer	2	1.001	3	209.1	0.746	0.116	3.1483	
30 minute summer	3	1.002	1.002:50%	177.9	0.407	0.099	48.7102	
30 minute summer	3	1.002	4	197.0	0.548	0.109	40.6163	
960 minute winter	4	1.003	1.003:50%	0.7	-0.049	0.000	8.1926	
960 minute winter	4	2.000	6	17.0	0.216	0.009	27.6678	
960 minute winter	4	1.003	End of swale 1	1.1	0.039	0.001	8.7365	
960 minute winter	End of swale 1	1.004	Outfall 2	0.8	0.183	0.006	0.0255	39.7
960 minute winter	6	2.001	End of swale 2	9.4	0.131	0.005	316.6406	
960 minute winter	End of swale 2	2.002	Outfall 1	0.9	0.190	0.007	0.0276	57.8

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 90.36%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	3.987	0.367	281.4	2.8428	0.0000	OK
15 minute summer	1.000:50%	12	3.893	0.395	342.9	0.0000	0.0000	OK
15 minute summer	2	13	3.738	0.362	323.1	0.0000	0.0000	OK
15 minute summer	1.001:50%	14	3.721	0.361	303.2	0.0000	0.0000	OK
15 minute summer	3	14	3.705	0.361	294.4	0.0000	0.0000	OK
30 minute summer	1.002:50%	23	3.544	0.418	332.1	0.0000	0.0000	OK
1440 minute winter	4	1410	3.537	0.697	18.6	0.0000	0.0000	OK
1440 minute winter	1.003:50%	1410	3.537	0.646	1.6	0.0000	0.0000	OK
1440 minute winter	End of swale 1	1410	3.537	0.664	1.1	0.0000	0.0000	FLOOD RISK
1440 minute winter	6	1410	3.537	0.778	14.7	0.0000	0.0000	OK
1440 minute winter	End of swale 2	1410	3.537	1.068	8.2	0.0000	0.0000	SURCHARGED
2160 minute summer	Outfall 2	960	2.875	0.012	0.8	0.0000	0.0000	OK
1440 minute winter	Outfall 1	1410	2.473	0.014	1.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	1.000:50%	267.9	0.500	0.149	34.4790	
15 minute summer	1	1.000	2	323.1	0.604	0.179	33.5124	
15 minute summer	2	1.001	1.001:50%	294.1	0.635	0.163	4.1597	
15 minute summer	2	1.001	3	294.4	0.791	0.164	4.1757	
15 minute summer	3	1.002	1.002:50%	260.9	0.476	0.145	61.6978	
15 minute summer	3	1.002	4	267.9	0.597	0.149	50.6889	
1440 minute winter	4	1.003	1.003:50%	0.8	-0.033	0.000	12.8308	
1440 minute winter	4	2.000	6	14.7	0.199	0.008	41.0667	
1440 minute winter	4	1.003	End of swale 1	1.1	0.020	0.001	13.5080	
1440 minute winter	End of swale 1	1.004	Outfall 2	0.8	0.183	0.006	0.0254	61.0
1440 minute winter	6	2.001	End of swale 2	8.2	0.091	0.005	426.6817	
1440 minute winter	End of swale 2	2.002	Outfall 1	1.0	0.193	0.008	0.0286	85.2

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Appendix D Drainage Strategy Layout Drawing

Catchment Ref.	Impermeable Area (Ha)	QBAR rate (l/s)	Proposed peak runoff rate (l/s)	QSE volume for 1% AEP +40CC (m^3)	Causeway Flow basin volume requirement for 1% AEP+40% CC (m^3)
Catchment A	3.51	3.51	3.4	5,124	4,270
Catchment B	4.14	4.14	3.9	6,036	5,191
Catchment C	0.317	0.317	1	398	n/a
Total	**7.97**	**7.97**	**8.3**	**11,558**	**n/a**

Available in sub-base gravel (m^3)	Provided in SuDS (m^3)*
6,105	5,500
	6,850
n/a	398
6,105	**12,748**

*This allocation reflects the design of the proposed drainage network and attenuation measures, which are intended to future-proof the development by accommodating sufficient storage volumes for potential substation upgrades in the future (increase in substation footprint resulting in larger areas being drained into the planned attenuation basins).

INDICATIVE OUTFALL INTO DIVERSION ROUTE

R11 NEW DRAIN

INDICATIVE ATTENUATION BASIN 1
VOLUME PROVIDED: 5,500m³
STORAGE DEPTH: 1.6m SUBJECT TO DETAILED DESIGN
FREEBOARD: 0.3m
SIDE SLOPE: 1 IN 3
LAND TAKE: 4,105m² + ALLOWANCE FOR 3m WIDE ACCESS

INDICATIVE IDB WATERCOURSE DIVERSION ROUTE

INDICATIVE SURFACE WATER PUMPING STATION SUBJECT TO IDB AGREEMENT

IDB DITCH 'NEW DRAIN' TO BE DIVERTED

DRAINAGE SPUR ADDED UNDER DCO SCOPE

INDICATIVE ROAD SWALE (CATCHMENT C)

CATCHMENT A

INDICATIVE PERMEABLE PAVING UNDER CAR PARK

INDICATIVE POLLUTION CONTROL AROUND DIESEL GENERATOR

INDICATIVE SURFACE WATER PUMPING STATION SUBJECT TO DETAILED DESIGN AND IDB AGREEMENT

ATTENUATION BASIN 2
VOLUME PROVIDED: 6,850m³
STORAGE DEPTH: 1.8m SUBJECT TO DETAILED DESIGN
FREEBOARD: 0.3m
SIDE SLOPE: 1 IN 3
LAND TAKE: 4,500m² + ALLOWANCE FOR 3m WIDE ACCESS

'WALPOLE B 2' BAY 400kV CABLES CONSTRUCTION SWATHE

CATCHMENT B

DRAINAGE SPUR ADDED UNDER DCO SCOPE

R20 WATERCOURSE

WESTON MARSH 400kV INTERCONNECTOR CABLES CONSTRUCTION SWATHE

R.J.400kV OVERHEAD LINE

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING SURFACE WATER DRAINAGE REPORT.
2. ALL LEVELS ARE TO ORDNANCE DATUM.
3. THIS DRAINAGE LAYOUT IS INDICATIVE ONLY IS SUBJECT TO DETAILED DESIGN.
4. THE FINAL DESIGN AND ANY DETAILS REQUIRES FURTHER SURVEYS AND INVESTIGATIONS TO ENSURE BUILDABILITY AND AVOIDANCE OF CLASHES WITH EXISTING BURIED SERVICES AND STRUCTURES ON SITE. THE FINAL LOCATIONS AND DETAILS OF THE PROPOSED BELOW AND ABOVE GROUND DRAINAGE SYSTEMS (FILTER DRAIN, CARRIER DRAINS, ATTENUATION SYSTEMS ETC) WILL BE SUBJECT TO CHANGES FOLLOWING SURVEYS AND DETAIL DESIGN.
5. DISCHARGE FROM THE PROPOSED DEVELOPMENT TO BE LIMITED TO GREENFIELD QBAR RATES. FINAL RATES AND VOLUMES SUBJECT TO CONFIRMATION AT DETAILED DESIGN.
6. THE USE OF PUMPED SYSTEM WILL BE CONFIRMED AT DETAILED DESIGN.

LEGEND:

SCHEME LAYERS

- ORDER LIMITS (RED LINE BOUNDARY)
- EXISTING WATER BODIES
- EXISTING WATERBODY TO BE DIVERTED
- DRAINED CATCHMENTS ABC
- PROPOSED SURFACE WATER DRAINAGE
- FUTURE EXPANSION (DCO)
- OVERHEAD LINE TOWER
- PROPOSED AREA FOR ENVIRONMENTAL MITIGATION
- EXCEEDANCE ROUTE

ASSOCIATED DRAWINGS/ DOCUMENTS

ORIGINATOR DRG. No.	DRG. TITLE

Rev	Description	Cnr'd	Chk'd	App'd	Date
P02	FOR PLANNING SUBMISSION	AJ	AM	SK	28.04.26
P01	FIRST ISSUE	CT	AM	NK	12.03.26

nationalgrid

Master Scheme No:	Sub-Scheme No:	Site:
10094	201881	WESTON MARSH A 400kV SUBSTATION

Scheme Name: GRIMSBY TO WALPOLE CONNECTION OPTIONS

Document Title: SURFACE WATER DRAINAGE LAYOUT FOR TCPA WESTON MARSH A 400kV SUBSTATION

Created by:	Date:	Checked by:	Date:	Approved by:	Date:
CT	12/03/26	AM	12/03/26	NK	12/03/26

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S.MAUND	LAY	**	A0	1 OF 1	P02

National Grid Document Number: PDD-100944-LAY-404

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Appendix E SuDS Maintenance Checklist

Table 1: SuDS Maintenance Inspection Checklist

GENERAL INFORMATION			
Site ID			
Site Location and co-ordinates (GIS if appropriate)			
Elements forming the SuDS scheme		Approved Drawing Reference(s)	
Inspection frequency		Approved Specification Reference	
Type of development		Specific purpose of any parts of the scheme (e.g. biodiversity, wildlife and visual aspects)	

	Inspection date				**Inspection date**			
	Details	**Y/N**	**Action required**	**Date Completed**	**Details**	**Y/N**	**Action required**	**Date Completed**
GENERAL INSPECTION ITEMS								
Is there any evidence of erosion, channelling, ponding (where not desirable) or other poor hydraulic performance?								
Is there any evidence of accidental spillages, oils, poor water quality, odours, nuisance insects?								
Have any health and safety risks been identified to either the public or maintenance operatives?								
Is there any deterioration in the surface of permeable or porous surfaces (e.g. rutting, spreading of blocks or signs of ponding water)?								

	Inspection date				Inspection date			
	Details	**Y/N**	**Action required**	**Date Completed**	**Details**	**Y/N**	**Action required**	**Date Completed**
SILT/SEDIMENT ACCUMULATION								
Is there any sediment accumulation at inlets (or other defined accumulation zones such as the surface of filter drains or infiltration basins and within proprietary devices)? If yes, state depth (mm) and extent Is removal required? If yes, state waste disposal requirements and confirm all waste management requirements have been complied with (consult Environment Agency or SEPA).								
Is surface clogging visible (potentially problematic where water has to soak into the underlying construction or ground (e.g. under-drained swale or infiltration basin)?								
Does permeable or porous surfacing require sweeping to remove silt?								
SYSTEM BLOCKAGES / LITTER BUILD UP								
Is there evidence of litter accumulation in the system? If yes, is this a blockage risk?								
Is there any evidence of any other clogging/blockage of outlets or drainage paths?								
VEGETATION								

	Inspection date				Inspection date			
	Details	**Y/N**	**Action required**	**Date Completed**	**Details**	**Y/N**	**Action required**	**Date Completed**
Is the vegetation condition satisfactory (density, weed growth, coverage etc.)? (Check against approved planting regime.)								
Does any part of the system require weeding / pruning / mowing? (Check against maintenance frequency stated in approved design.)								
Is there any evidence of invasive species becoming established? If yes, state action required.								
INFRASTRUCTURE								
Are any check dams or weirs in good condition?								
Is there evidence of any accidental damage to the system (e.g. wheel ruts?)								
Is there any evidence of cross connections or other unauthorised inflows?								
Is there any evidence of tampering with the flow controls?								
Are there any other matters that could affect the performance of the system in relation to the design objectives for hydraulic, water quality, biodiversity and visual aspects? (Specify.)								
OTHER OBSERVATIONS								
Information appended (e.g. photos)								

	Inspection date				Inspection date			
	Details	**Y/N**	**Action required**	**Date Completed**	**Details**	**Y/N**	**Action required**	**Date Completed**
SUITABILITY OF CURRENT MAINTENANCE REGIME								
Continue as current Increase maintenance Decrease maintenance								
NEXT INSPECTION								
Proposed date for next inspection								

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