

APPENDICES

Appendix A Topographic Survey

Appendix B British Geology Survey (BGS) Historic Borehole Records)



NGRC
BOREHOLE RECORDS
ADJUSTMENT FORM

QUARTER SHEET SU 60 NE

BH REGISTRATION NUMBER 238 - 244

RECORDS ENTERED AND HELD BY WALLINGFORD

BH REGISTRATION NUMBER(S)



Southern HS
Southern EA

K Wardle Water Wells
Borehole Record and Drilling Log

NN 990068
316
SUBONE
SU60/65

LOWER HARTLE GROUNDWATER INVESTIGATIONS STAGE 2 OVERVIEW

A: SITE DETAILS

Borehole drilled for	Portsmouth Water PLC	SITE 8
Location	Brambles Farm Industrial Estate Waterloooville	
NGR (8 fig)	SU 6750 0973	
Ground level (if known)		
Borehole drilled by	K Wardle Water Wells	
Date of drilling	December 1999 - January 2000	

B: CONSTRUCTION DETAILS

Borehole Datum (point from which all measurements of depth are taken e.g. G.L., flange, edge of chamber)

	G.L.	
Diameter drilled	diameter	depths
Preparation for Artesian	444.50 mm from	G.L. to 11 m/depth
	311.15 mm from	11 to 88.50 m/depth
	150.00 mm from	88.50 to 138.50 m/depth
	mm from	to m/depth

Casing material(type/size/depths)	diameter	depths
type		
Mild steel casing / welded / grouted	323.85 mm from	- 0.60 to 11.00 m/depth
Mild steel casing to BS 879 square thread	168.00 mm from	- 0.60 to 88.50 m/depth
flush butt joints / grouted	mm from	to m/depth
	mm from	to m/depth

Water struck at	Base of casing & below	m/depth below datum
Rest water level on completion	Artesian	m/depth below datum

C: TEST PUMPING DETAILS

Test Pumping datum (point from which all measurements of depth are taken e.g. G.L., flange, edge of chamber)

See Attached yield test results

Pump suction depth	m/below flange
Water level(start of test)	m/depth below datum
Water level(end of test)	m/depth below datum
Pumping rate	m/hr
For	hours
Recovery to	m/depth below datum
Within	
Date of measurements	

K Wardle Water Wells Borehole Record and Drilling Log

[illegible]



Lower Hamble Groundwater Investigations - Stage 2 - Overview

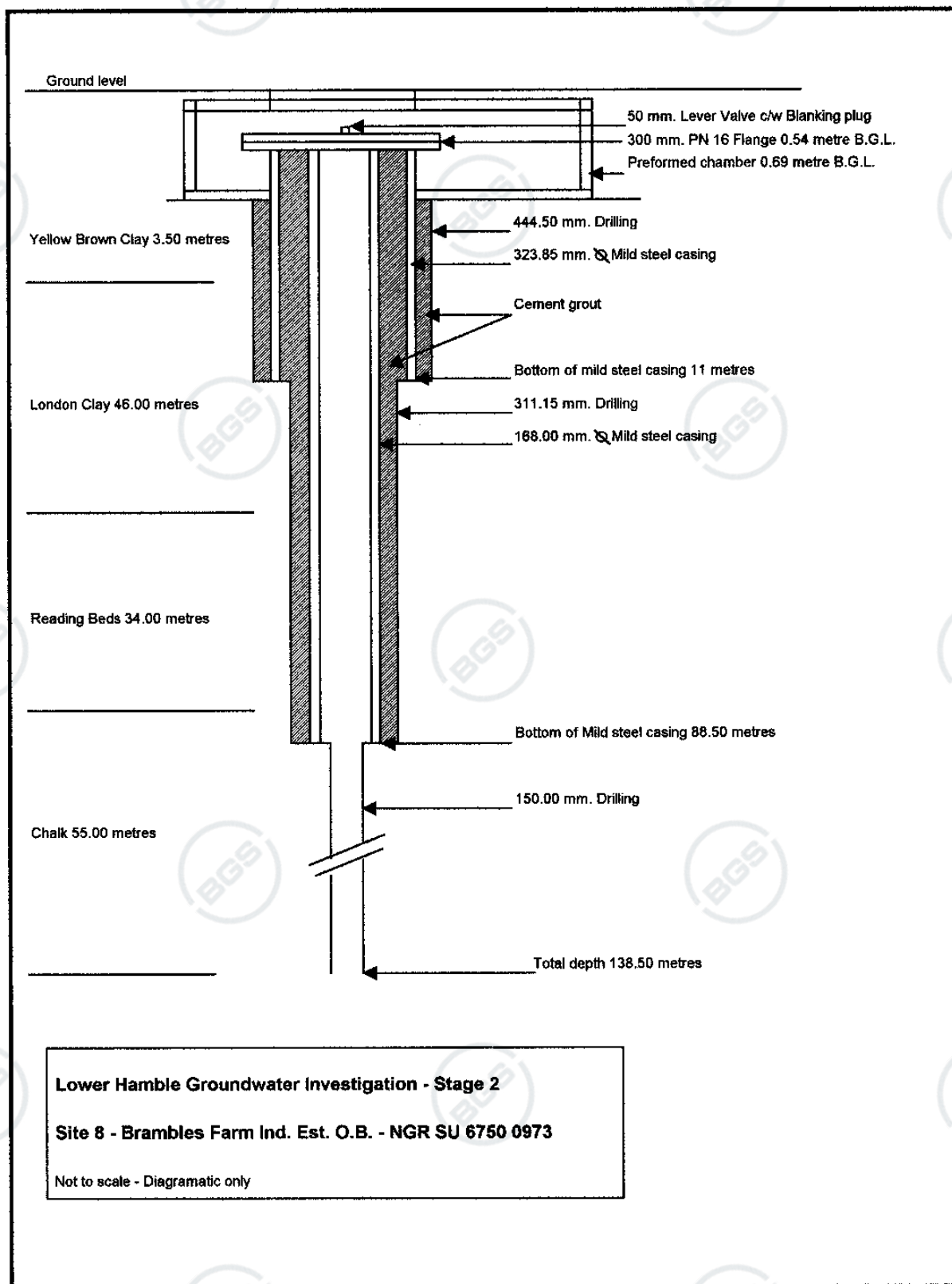
Site	NGR	Date of Construction	Total depth (m)	Chalk (m)	Tertiaries (m)	Casing (m)	Clearance pumping	Acidification	Yield testing
Site 1 - Newtown Church Road Newtown SU61/38 NN990061	SU 6120 1265	Tertiaries - Oct 99 Chalk - Feb 00	152.00	100 (105)	47.00	52.00	Date pumped: Feb/March 00 Pumping rate: 20 m ³ /hr Duration of pumping: 2 hrs *RWL 14.83m PWL 51m **RWL 14.83m PWL 28m (from top of table - 1.10 m A.G.L.)	Mar-00	Date tested: Mar 00 Pumping rate: 58 m ³ /hr Duration of test: 26 mins R.W.L. 14.83 m P.W.L. 26.10 m (from top of table - 1.10 m A.G.L.)
Site 2 - Denmead Forest Road Denmead SU61/39 NN990062	SU 6490 1170	Nov 99	137.70	95 (100)	37.70	42.70	Date pumped: Nov 99 Pumping rate: 20 m ³ /hr Duration of pumping: 2.5 hrs R.W.L. 16.20 m P.W.L. 35 m (from top of table - 1.10 A.G.L.)	1st = Nov - 99 2nd = Dec - 99	Date tested: Dec 99 Pumping rate: 36 m ³ /hr Duration of test: 5 hrs R.W.L. 18.20 m P.W.L. 74.30 m (from top of table - 1.10 A.G.L.)
Site 3a - Oak Tree Farm Soliers Lane Lower Upham SU51/77 NN990063	SU 623 187	Apr-00	180.00	101 (106)	54.00	59.00	Date pumped: April/May 00 Pumping rate: 20 m ³ /hr Duration of pumping: 1 hr *RWL 11.5m PWL 57m **RWL 11.15m PWL 13.15 (from G.L.)	May-00	Date tested: May 00 Pumping rate: 60 m ³ /hr Duration of test: 70 mins R.W.L. 11.5 m P.W.L. 19.5 m (from G.L.)
Site 4 - NW of Curridge Wangfield Farm Wangfield Lane Botley SU51/78 NN990064	SU 5230 1420	Apr-00 Borehole 1 = 41 metres Borehole 2 = 40 metres Both aborted							
Site 6a - Heylesbury Farm Wickham Road Wickham SU50/28 NN990066	SU 571 098	Feb-00	120.60	100 (108.6)	12.00	20.6 due to very weathered chalk	Date pumped: March 00 Pumping rate: 3 - 4 m ³ /hr Duration of pumping: 3 hrs R.W.L. 34.55 m P.W.L. 76.20 m (from top of table - 1.10 m A.G.L.)	Feb-00	
Site 7 - Sheepwash Lane Road Verge Sheepwash Lane Furzehill SU61/40 NN990067	SU 6548 1047	Jan-00	120.00	50 (55)	65.00	70.00	Drilled percussion - not required		Date tested: Feb 00 Pumping rate: 20 m ³ /hr Duration of test: 1 hr R.W.L. 3 m P.W.L. 10.5 m (from top of flange - 0.3 m A.G.L.)
Site 8 - Brambles Ind. Est. Road Verge Electra Ave. Brambles Farm Ind. Est. Waterlooville SU60/65 NN990068	SU 6750 0873	Dec 99 - Jan 00	138.50	50 (55)	83.50	88.50	Drilled percussion - not required N.B. - R.W.L. on completion of drilling 1.13 m (from top of flange - 0.78 m A.G.L.)		Date tested: Feb 00 Pumping rate: 20 m ³ /hr Duration of test: 4 hrs R.W.L. 1.13 m (from top of flange) P.W.L. 4.42 m Recovery within minutes then flowing artesian @ approx 6.14 m ³ /hr R.W.L. now 1.66 m A.G.L.

NB Re: Denmead - Yield test did not prove a good supply - only advice given by Stan that there is a good supply at other location on site still to be investigated

N.B. Clearance pumping Newtown & Oak Tree Farm * = PWL prior to acidification ** = PWL after acidification

SU60/65

SU60/65



K Wardle Water Wells
Site 8 - Brambles Farm Ind. Est. - Yield Test

SU60/65.

[illegible]

Appendix C Southern Water Public Sewer Records

Appendix D Greenfield / Brownfield Run-off Calculations

Calculated by:

Stuart Burnett

Site name:

Land at Elletra Avenue

Site location:

Waterlooville

Site Details

Latitude:

50.88424° N

Longitude:

1.03961° W

Reference:

1473925140

Date:

Jun 17 2024 13:22

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.

Runoff estimation approach

IH124

Site characteristics

Total site area (ha):

4.10

Methodology

Q_{BAR} estimation method:

Calculate from SPR and SAAR

SPR estimation method:

Calculate from SOIL type

Notes

(1) Is $Q_{\text{BAR}} < 2.0 \text{ l/s/ha}$?

When Q_{BAR} is $< 2.0 \text{ l/s/ha}$ then limiting discharge rates are set at 2.0 l/s/ha .

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

(2) Are flow rates $< 5.0 \text{ l/s}$?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

Hydrological characteristics

	Default	Edited
SAAR (mm):	779	779
Hydrological region:	7	7
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

(3) Is $\text{SPR/SPRHOST} \leq 0.3$?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
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Q_{BAR} (l/s):	22.43	22.43
1 in 1 year (l/s):	19.07	19.07
1 in 30 years (l/s):	51.59	51.59
1 in 100 year (l/s):	71.56	71.56
1 in 200 years (l/s):	83.9	83.9

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at 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 www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of 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, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

	Bright Plan Civils Unit 2 West Barn Norton Lane Chichester PO20 3AF	File: D2263 Ex.Surface Water Drainage Network: Surface Water Drainage Stuart Burnett 15/08/2024	Page 1 D2263 Elletra Avenue Existing Run-off																																																																																																																																																																																																																																																								
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28		5.00	35.460	1200	467643.801	109912.416	1.500																																																																																																																																																																																																																																																				
27			35.480	1200	467660.270	109925.097	1.759																																																																																																																																																																																																																																																				
26	0.221	5.00	35.580	1200	467670.721	109908.770	2.082																																																																																																																																																																																																																																																				
25	0.353	5.00	35.560	1200	467689.725	109880.040	2.457																																																																																																																																																																																																																																																				
30		5.00	35.480	1200	467678.380	109832.448	1.500																																																																																																																																																																																																																																																				
24	0.324	5.00	35.600	1200	467709.222	109851.333	2.895																																																																																																																																																																																																																																																				
23	0.156	5.00	36.030	1200	467720.728	109833.574	3.568																																																																																																																																																																																																																																																				
22			36.350	1200	467727.144	109816.279	4.100																																																																																																																																																																																																																																																				
20		5.00	35.730	1200	467601.032	109850.328	1.500																																																																																																																																																																																																																																																				
19	0.440	5.00	35.170	1200	467626.668	109811.474	2.278																																																																																																																																																																																																																																																				
21		5.00	35.630	1200	467667.102	109822.813	1.500																																																																																																																																																																																																																																																				
18			34.880	1200	467631.512	109798.534	2.385																																																																																																																																																																																																																																																				
17			34.960	1200	467633.572	109793.907	2.611																																																																																																																																																																																																																																																				
16	0.032	5.00	35.380	1200	467640.363	109779.111	3.499																																																																																																																																																																																																																																																				
15			35.630	1200	467646.820	109771.338	4.039																																																																																																																																																																																																																																																				
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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)	Rain (mm/hr)
1.000	10	9	28.320	0.600	35.000	34.479	0.521	54.4	300	Circular	5.22	50.0
1.001	9	8	25.269	0.600	34.479	34.014	0.465	54.4	300	Circular	5.42	50.0
1.002	8	7	48.708	0.600	34.014	33.119	0.895	54.4	300	Circular	5.80	50.0
1.003	7	6	33.431	0.600	33.119	32.579	0.540	61.9	300	Circular	6.08	50.0
2.000	11	6	45.957	0.600	33.900	32.579	1.321	34.8	300	Circular	5.29	50.0
1.004	6	5	90.307	0.600	32.504	30.844	1.660	54.4	375	Circular	6.69	50.0
3.000	13	12	18.423	0.600	33.710	32.824	0.886	20.8	300	Circular	5.09	50.0
3.001	12	5	41.121	0.600	32.824	30.919	1.905	21.6	300	Circular	5.29	50.0
1.005	5	4	32.231	0.600	30.844	30.252	0.592	54.4	375	Circular	6.91	50.0
1.006	4	3	1.269	0.600	30.252	30.229	0.023	54.4	375	Circular	6.92	50.0
1.007	3	2	4.784	0.600	30.229	30.216	0.013	368.0	375	Circular	7.00	50.0
4.000	14	2	58.485	0.600	32.820	30.291	2.529	23.1	300	Circular	5.30	50.0
1.008	2	1	26.334	0.600	30.141	29.657	0.484	54.4	450	Circular	7.16	50.0
5.000	29	26	43.673	0.600	34.050	33.573	0.477	91.6	300	Circular	5.44	50.0
6.000	28	27	20.785	0.600	33.960	33.721	0.239	87.1	300	Circular	5.21	50.0
6.001	27	26	19.385	0.600	33.721	33.573	0.148	131.0	300	Circular	5.44	50.0
5.001	26	25	34.447	0.600	33.498	33.103	0.395	87.1	375	Circular	5.74	50.0
5.002	25	24	34.702	0.600	33.103	32.705	0.398	87.1	375	Circular	6.04	50.0
7.000	30	24	36.165	0.600	33.980	32.779	1.201	30.1	300	Circular	5.21	50.0
5.003	24	23	21.161	0.600	32.705	32.462	0.243	87.1	375	Circular	6.22	50.0
5.004	23	22	18.447	0.600	32.462	32.250	0.212	87.1	375	Circular	6.38	50.0
8.000	20	19	46.549	0.600	34.230	32.892	1.338	34.8	300	Circular	5.29	50.0
8.001	19	18	13.817	0.600	32.892	32.570	0.322	42.9	300	Circular	5.39	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	2.136	151.0	0.0	1.200	1.331	0.000	0.0
1.001	2.136	151.0	0.0	1.331	1.606	0.000	0.0
1.002	2.136	151.0	10.2	1.606	1.931	0.075	0.0
1.003	2.001	141.5	27.9	1.931	2.111	0.206	0.0
2.000	2.674	189.0	4.1	1.200	2.111	0.030	0.0
1.004	2.461	271.8	93.8	2.111	3.511	0.692	0.0
3.000	3.462	244.7	38.8	1.200	2.106	0.286	0.0
3.001	3.398	240.2	38.8	2.106	3.511	0.286	0.0
1.005	2.461	271.8	175.2	3.511	3.703	1.293	0.0
1.006	2.461	271.8	175.2	3.703	3.716	1.293	0.0
1.007	0.938	103.6	175.2	3.716	3.649	1.293	0.0
4.000	3.283	232.0	13.6	1.200	3.649	0.100	0.0
1.008	2.761	439.1	236.4	3.649	4.263	1.744	0.0
5.000	1.643	116.2	11.5	1.200	1.707	0.085	0.0
6.000	1.685	119.1	0.0	1.200	1.459	0.000	0.0
6.001	1.372	97.0	0.0	1.459	1.707	0.000	0.0
5.001	1.942	214.5	41.5	1.707	2.082	0.306	0.0
5.002	1.942	214.5	89.3	2.082	2.520	0.659	0.0
7.000	2.875	203.2	0.0	1.200	2.521	0.000	0.0
5.003	1.942	214.5	133.2	2.520	3.193	0.983	0.0
5.004	1.942	214.5	154.4	3.193	3.725	1.139	0.0
8.000	2.674	189.0	0.0	1.200	1.978	0.000	0.0
8.001	2.406	170.1	59.6	1.978	2.010	0.440	0.0



Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)	Rain (mm/hr)
9.000	21	18	43.083	0.600	34.130	32.570	1.560	27.6	300	Circular	5.24	50.0
8.002	18	17	5.065	0.600	32.495	32.349	0.146	34.8	375	Circular	5.41	50.0
8.003	17	16	16.280	0.600	32.349	31.956	0.393	41.4	375	Circular	5.51	50.0
8.004	16	15	10.105	0.600	31.881	31.591	0.290	34.8	450	Circular	5.56	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
9.000	3.003	212.3	0.0	1.200	2.010	0.000	0.0
8.002	3.080	340.2	59.6	2.010	2.236	0.440	0.0
8.003	2.822	311.7	59.6	2.236	3.049	0.440	0.0
8.004	3.455	549.5	64.0	3.049	3.589	0.472	0.0

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	28.320	54.4	300	Circular	36.500	35.000	1.200	36.110	34.479	1.331
1.001	25.269	54.4	300	Circular	36.110	34.479	1.331	35.920	34.014	1.606
1.002	48.708	54.4	300	Circular	35.920	34.014	1.606	35.350	33.119	1.931
1.003	33.431	61.9	300	Circular	35.350	33.119	1.931	34.990	32.579	2.111
2.000	45.957	34.8	300	Circular	35.400	33.900	1.200	34.990	32.579	2.111
1.004	90.307	54.4	375	Circular	34.990	32.504	2.111	34.730	30.844	3.511
3.000	18.423	20.8	300	Circular	35.210	33.710	1.200	35.230	32.824	2.106
3.001	41.121	21.6	300	Circular	35.230	32.824	2.106	34.730	30.919	3.511
1.005	32.231	54.4	375	Circular	34.730	30.844	3.511	34.330	30.252	3.703
1.006	1.269	54.4	375	Circular	34.330	30.252	3.703	34.320	30.229	3.716
1.007	4.784	368.0	375	Circular	34.320	30.229	3.716	34.240	30.216	3.649
4.000	58.485	23.1	300	Circular	34.320	32.820	1.200	34.240	30.291	3.649
1.008	26.334	54.4	450	Circular	34.240	30.141	3.649	34.370	29.657	4.263
5.000	43.673	91.6	300	Circular	35.550	34.050	1.200	35.580	33.573	1.707
6.000	20.785	87.1	300	Circular	35.460	33.960	1.200	35.480	33.721	1.459

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	10	1200	Manhole	Adoptable	9	1200	Manhole	Adoptable
1.001	9	1200	Manhole	Adoptable	8	1200	Manhole	Adoptable
1.002	8	1200	Manhole	Adoptable	7	1200	Manhole	Adoptable
1.003	7	1200	Manhole	Adoptable	6	1350	Manhole	Adoptable
2.000	11	1200	Manhole	Adoptable	6	1350	Manhole	Adoptable
1.004	6	1350	Manhole	Adoptable	5	1350	Manhole	Adoptable
3.000	13	1200	Manhole	Adoptable	12	1200	Manhole	Adoptable
3.001	12	1200	Manhole	Adoptable	5	1350	Manhole	Adoptable
1.005	5	1350	Manhole	Adoptable	4	1350	Manhole	Adoptable
1.006	4	1350	Manhole	Adoptable	3	1350	Manhole	Adoptable
1.007	3	1350	Manhole	Adoptable	2	1350	Manhole	Adoptable
4.000	14	1200	Manhole	Adoptable	2	1350	Manhole	Adoptable
1.008	2	1350	Manhole	Adoptable	1	1350	Manhole	Adoptable
5.000	29	1200	Manhole	Adoptable	26	1200	Manhole	Adoptable
6.000	28	1200	Manhole	Adoptable	27	1200	Manhole	Adoptable



Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
6.001	19.385	131.0	300	Circular	35.480	33.721	1.459	35.580	33.573	1.707
5.001	34.447	87.1	375	Circular	35.580	33.498	1.707	35.560	33.103	2.082
5.002	34.702	87.1	375	Circular	35.560	33.103	2.082	35.600	32.705	2.520
7.000	36.165	30.1	300	Circular	35.480	33.980	1.200	35.600	32.779	2.521
5.003	21.161	87.1	375	Circular	35.600	32.705	2.520	36.030	32.462	3.193
5.004	18.447	87.1	375	Circular	36.030	32.462	3.193	36.350	32.250	3.725
8.000	46.549	34.8	300	Circular	35.730	34.230	1.200	35.170	32.892	1.978
8.001	13.817	42.9	300	Circular	35.170	32.892	1.978	34.880	32.570	2.010
9.000	43.083	27.6	300	Circular	35.630	34.130	1.200	34.880	32.570	2.010
8.002	5.065	34.8	375	Circular	34.880	32.495	2.010	34.960	32.349	2.236
8.003	16.280	41.4	375	Circular	34.960	32.349	2.236	35.380	31.956	3.049
8.004	10.105	34.8	450	Circular	35.380	31.881	3.049	35.630	31.591	3.589

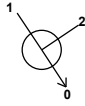
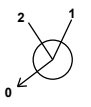
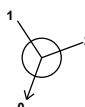
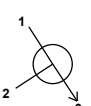
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
6.001	27	1200	Manhole	Adoptable	26	1200	Manhole	Adoptable
5.001	26	1200	Manhole	Adoptable	25	1200	Manhole	Adoptable
5.002	25	1200	Manhole	Adoptable	24	1200	Manhole	Adoptable
7.000	30	1200	Manhole	Adoptable	24	1200	Manhole	Adoptable
5.003	24	1200	Manhole	Adoptable	23	1200	Manhole	Adoptable
5.004	23	1200	Manhole	Adoptable	22	1200	Manhole	Adoptable
8.000	20	1200	Manhole	Adoptable	19	1200	Manhole	Adoptable
8.001	19	1200	Manhole	Adoptable	18	1200	Manhole	Adoptable
9.000	21	1200	Manhole	Adoptable	18	1200	Manhole	Adoptable
8.002	18	1200	Manhole	Adoptable	17	1200	Manhole	Adoptable
8.003	17	1200	Manhole	Adoptable	16	1200	Manhole	Adoptable
8.004	16	1200	Manhole	Adoptable	15	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
10	467551.706	109945.900	36.500	1.500	1200		0	1.000	35.000	300
9	467563.765	109920.276	36.110	1.631	1200		1	1.000	34.479	300
8	467574.349	109897.330	35.920	1.906	1200		0	1.001	34.479	300
7	467534.951	109868.689	35.350	2.231	1200		1	1.001	34.014	300
							0	1.002	34.014	300
							1	1.002	33.119	300
							0	1.003	33.119	300
11	467481.689	109888.256	35.400	1.500	1200		0	2.000	33.900	300

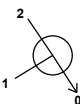
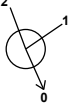


Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
6	467507.208	109850.035	34.990	2.486	1350	 1 2 0	2.000 1.003 1.004	32.579 32.579 32.504	300 300 375
13	467566.055	109828.185	35.210	1.500	1200	 0 0	3.000	33.710	300
12	467574.275	109811.697	35.230	2.406	1200	 1 0	3.000 3.001	32.824 32.824	300 300
5	467556.721	109774.511	34.730	3.886	1350	 2 1 0	3.001 1.004 1.005	30.919 30.844 30.844	300 375 375
4	467531.113	109754.939	34.330	4.078	1350	 1 0	1.005 1.006	30.252 30.252	375 375
3	467530.056	109754.236	34.320	4.091	1350	 1 0	1.006 1.007	30.229 30.229	375 375
14	467493.467	109801.460	34.320	1.500	1200	 0 0	4.000	32.820	300
2	467525.570	109752.574	34.240	4.099	1350	 1 2 0	4.000 1.007 1.008	30.291 30.216 30.141	300 375 450
1	467516.577	109727.823	34.370	4.713	1350	 1 0	1.008	29.657	450
29	467634.169	109884.868	35.550	1.500	1200	 0 0	5.000	34.050	300
28	467643.801	109912.416	35.460	1.500	1200	 0 0	6.000	33.960	300
27	467660.270	109925.097	35.480	1.759	1200	 1 0	6.000 6.001	33.721 33.721	300 300
26	467670.721	109908.770	35.580	2.082	1200	 1 2 0	6.001 5.000 5.001	33.573 33.573 33.498	300 300 375



Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
25	467689.725	109880.040	35.560	2.457	1200		1 5.001	33.103	375
						0	5.002	33.103	375
30	467678.380	109832.448	35.480	1.500	1200		0 7.000	33.980	300
24	467709.222	109851.333	35.600	2.895	1200		1 7.000	32.779	300
						2	5.002	32.705	375
						0	5.003	32.705	375
23	467720.728	109833.574	36.030	3.568	1200		1 5.003	32.462	375
						0	5.004	32.462	375
22	467727.144	109816.279	36.350	4.100	1200		1 5.004	32.250	375
20	467601.032	109850.328	35.730	1.500	1200		0 8.000	34.230	300
19	467626.668	109811.474	35.170	2.278	1200		1 8.000	32.892	300
						0	8.001	32.892	300
21	467667.102	109822.813	35.630	1.500	1200		0 9.000	34.130	300
18	467631.512	109798.534	34.880	2.385	1200		1 9.000	32.570	300
						2	8.001	32.570	300
						0	8.002	32.495	375
17	467633.572	109793.907	34.960	2.611	1200		1 8.002	32.349	375
						0	8.003	32.349	375
16	467640.363	109779.111	35.380	3.499	1200		1 8.003	31.956	375
						0	8.004	31.881	450
15	467646.820	109771.338	35.630	4.039	1200		1 8.004	31.591	450

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	19.500	Drain Down Time (mins)	1440
Ratio-R	0.346	Additional Storage (m³/ha)	0.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	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
30	0	0	0
100	0	0	0



Results for 1 year Critical Storm Duration. Lowest mass balance: 99.50%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	10	1	35.000	0.000	0.0	0.0000	0.0000	OK
15 minute summer	9	1	34.479	0.000	0.0	0.0000	0.0000	OK
15 minute winter	8	10	34.065	0.051	9.8	0.0574	0.0000	OK
15 minute winter	7	11	33.208	0.089	26.6	0.1008	0.0000	OK
15 minute winter	11	10	33.929	0.029	3.9	0.0334	0.0000	OK
15 minute winter	6	11	32.648	0.144	89.0	0.2060	0.0000	OK
15 minute winter	13	10	33.793	0.083	37.4	0.0938	0.0000	OK
15 minute winter	12	10	32.903	0.079	37.2	0.0893	0.0000	OK
15 minute winter	5	11	31.059	0.215	164.6	0.3075	0.0000	OK
15 minute winter	4	11	30.692	0.440	162.9	0.6292	0.0000	SURCHARGED
15 minute winter	3	11	30.628	0.399	162.9	0.5704	0.0000	SURCHARGED
15 minute winter	14	10	32.868	0.048	13.1	0.0540	0.0000	OK
15 minute winter	2	11	30.390	0.249	218.6	0.3559	0.0000	OK
15 minute winter	1	11	29.878	0.221	219.0	0.0000	0.0000	OK
15 minute winter	29	10	34.112	0.062	11.1	0.0703	0.0000	OK
15 minute summer	28	1	33.960	0.000	0.0	0.0000	0.0000	OK
15 minute summer	27	1	33.721	0.000	0.0	0.0000	0.0000	OK
15 minute winter	26	10	33.605	0.107	39.5	0.1210	0.0000	OK
15 minute winter	25	10	33.272	0.169	85.2	0.1912	0.0000	OK
15 minute summer	30	1	33.980	0.000	0.0	0.0000	0.0000	OK
15 minute winter	24	11	32.937	0.232	126.0	0.2628	0.0000	OK
15 minute winter	23	11	32.716	0.254	144.5	0.2878	0.0000	OK
15 minute winter	22	11	32.472	0.222	145.4	0.0000	0.0000	OK
15 minute summer	20	1	34.230	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	10	1.000	9	0.0	0.000	0.000	0.0000	
15 minute summer	9	1.001	8	0.0	0.000	0.000	0.0961	
15 minute winter	8	1.002	7	9.5	0.767	0.063	0.6164	
15 minute winter	7	1.003	6	26.0	1.518	0.184	0.5731	
15 minute winter	11	2.000	6	3.8	0.803	0.020	0.3609	
15 minute winter	6	1.004	5	87.1	1.699	0.321	4.7042	
15 minute winter	13	3.000	12	37.2	2.433	0.152	0.2820	
15 minute winter	12	3.001	5	36.9	1.994	0.154	0.9583	
15 minute winter	5	1.005	4	162.9	1.653	0.600	2.8294	
15 minute winter	4	1.006	3	162.9	1.477	0.600	0.1400	
15 minute winter	3	1.007	2	162.9	1.527	1.572	0.4878	
15 minute winter	14	4.000	2	12.9	1.587	0.056	0.7954	
15 minute winter	2	1.008	1	219.0	2.621	0.499	2.2001	105.0
15 minute winter	29	5.000	26	10.8	1.035	0.093	0.4539	
15 minute summer	28	6.000	27	0.0	0.000	0.000	0.0000	
15 minute summer	27	6.001	26	0.0	0.000	0.000	0.0344	
15 minute winter	26	5.001	25	39.0	1.061	0.182	1.2754	
15 minute winter	25	5.002	24	83.6	1.399	0.390	2.0724	
15 minute summer	30	7.000	24	0.0	0.000	0.000	0.6428	
15 minute winter	24	5.003	23	125.3	1.656	0.584	1.6012	
15 minute winter	23	5.004	22	145.4	1.969	0.678	1.3612	68.7
15 minute summer	20	8.000	19	0.0	0.000	0.000	0.6672	



Results for 1 year Critical Storm Duration. Lowest mass balance: 99.50%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	19	10	33.024	0.132	57.6	0.1490	0.0000	OK
15 minute summer	21	1	34.130	0.000	0.0	0.0000	0.0000	OK
15 minute winter	18	10	32.619	0.124	56.7	0.1408	0.0000	OK
15 minute winter	17	10	32.465	0.116	56.2	0.1308	0.0000	OK
15 minute winter	16	10	31.993	0.112	60.0	0.1262	0.0000	OK
15 minute winter	15	11	31.690	0.099	60.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	19	8.001	18	56.7	2.043	0.333	0.3836	
15 minute summer	21	9.000	18	0.0	0.000	0.000	0.1472	
15 minute winter	18	8.002	17	56.2	1.851	0.165	0.1538	
15 minute winter	17	8.003	16	56.1	2.061	0.180	0.4432	
15 minute winter	16	8.004	15	60.2	2.135	0.110	0.2850	28.5



Results for 2 year Critical Storm Duration. Lowest mass balance: 99.50%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	10	1	35.000	0.000	0.0	0.0000	0.0000	OK
15 minute summer	9	1	34.479	0.000	0.0	0.0000	0.0000	OK
15 minute winter	8	10	34.072	0.058	12.7	0.0653	0.0000	OK
15 minute winter	7	11	33.222	0.103	34.6	0.1161	0.0000	OK
15 minute winter	11	10	33.934	0.034	5.1	0.0379	0.0000	OK
15 minute winter	6	11	32.670	0.166	115.5	0.2375	0.0000	OK
15 minute winter	13	10	33.806	0.096	48.4	0.1081	0.0000	OK
15 minute winter	12	10	32.914	0.090	48.2	0.1019	0.0000	OK
15 minute winter	5	11	31.151	0.307	213.6	0.4392	0.0000	OK
15 minute winter	4	11	30.802	0.550	204.2	0.7874	0.0000	SURCHARGED
15 minute winter	3	11	30.702	0.473	203.6	0.6766	0.0000	SURCHARGED
15 minute winter	14	10	32.874	0.054	16.9	0.0612	0.0000	OK
15 minute winter	2	11	30.432	0.291	275.4	0.4167	0.0000	OK
15 minute winter	1	11	29.910	0.253	275.2	0.0000	0.0000	OK
15 minute winter	29	10	34.121	0.071	14.4	0.0803	0.0000	OK
15 minute summer	28	1	33.960	0.000	0.0	0.0000	0.0000	OK
15 minute summer	27	1	33.721	0.000	0.0	0.0000	0.0000	OK
15 minute winter	26	10	33.622	0.124	51.2	0.1398	0.0000	OK
15 minute winter	25	10	33.305	0.202	110.3	0.2282	0.0000	OK
15 minute summer	30	1	33.980	0.000	0.0	0.0000	0.0000	OK
15 minute winter	24	11	32.993	0.288	163.2	0.3260	0.0000	OK
15 minute winter	23	11	32.776	0.314	187.2	0.3553	0.0000	OK
15 minute winter	22	11	32.516	0.266	188.3	0.0000	0.0000	OK
15 minute summer	20	1	34.230	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	10	1.000	9	0.0	0.000	0.000	0.0000	
15 minute summer	9	1.001	8	0.0	0.000	0.000	0.1158	
15 minute winter	8	1.002	7	12.4	0.822	0.082	0.7483	
15 minute winter	7	1.003	6	33.8	1.628	0.239	0.6942	
15 minute winter	11	2.000	6	5.0	0.804	0.026	0.5112	
15 minute winter	6	1.004	5	112.9	1.708	0.415	6.4846	
15 minute winter	13	3.000	12	48.2	2.603	0.197	0.3414	
15 minute winter	12	3.001	5	47.8	1.940	0.199	1.5584	
15 minute winter	5	1.005	4	204.2	1.877	0.751	3.3338	
15 minute winter	4	1.006	3	203.6	1.847	0.749	0.1400	
15 minute winter	3	1.007	2	203.4	1.850	1.963	0.5076	
15 minute winter	14	4.000	2	16.7	1.550	0.072	1.1991	
15 minute winter	2	1.008	1	275.2	2.746	0.627	2.6377	136.3
15 minute winter	29	5.000	26	13.9	1.113	0.120	0.5460	
15 minute summer	28	6.000	27	0.0	0.000	0.000	0.0000	
15 minute summer	27	6.001	26	0.0	0.000	0.000	0.0645	
15 minute winter	26	5.001	25	50.5	1.112	0.235	1.5849	
15 minute winter	25	5.002	24	108.3	1.433	0.505	2.6054	
15 minute summer	30	7.000	24	0.0	0.000	0.000	0.9187	
15 minute winter	24	5.003	23	162.3	1.711	0.757	2.0053	
15 minute winter	23	5.004	22	188.3	2.057	0.878	1.6815	88.9
15 minute summer	20	8.000	19	0.0	0.000	0.000	0.8197	



Results for 2 year Critical Storm Duration. Lowest mass balance: 99.50%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	19	10	33.047	0.155	74.5	0.1748	0.0000	OK
15 minute summer	21	1	34.130	0.000	0.0	0.0000	0.0000	OK
15 minute winter	18	10	32.641	0.146	73.3	0.1648	0.0000	OK
15 minute winter	17	10	32.483	0.134	72.7	0.1513	0.0000	OK
15 minute winter	16	10	32.010	0.129	77.6	0.1460	0.0000	OK
15 minute winter	15	11	31.704	0.113	77.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	19	8.001	18	73.3	2.167	0.431	0.4678	
15 minute summer	21	9.000	18	0.0	0.000	0.000	0.2507	
15 minute winter	18	8.002	17	72.7	1.944	0.214	0.1895	
15 minute winter	17	8.003	16	72.5	2.197	0.233	0.5375	
15 minute winter	16	8.004	15	77.8	2.273	0.142	0.3464	36.8



Results for 30 year Critical Storm Duration. Lowest mass balance: 99.50%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	10	1	35.000	0.000	0.0	0.0000	0.0000	OK
15 minute summer	9	1	34.479	0.000	0.0	0.0000	0.0000	OK
15 minute winter	8	10	34.094	0.080	24.1	0.0900	0.0000	OK
15 minute winter	7	12	33.373	0.254	65.6	0.2869	0.0000	OK
15 minute winter	11	10	33.945	0.045	9.6	0.0513	0.0000	OK
15 minute winter	6	12	33.291	0.787	220.7	1.1267	0.0000	SURCHARGED
15 minute winter	13	10	33.846	0.136	91.7	0.1540	0.0000	OK
15 minute winter	12	11	32.980	0.156	91.6	0.1766	0.0000	OK
15 minute winter	5	12	32.591	1.747	365.5	2.5006	0.0000	SURCHARGED
15 minute winter	4	12	31.462	1.210	331.3	1.7312	0.0000	SURCHARGED
15 minute winter	3	12	31.194	0.965	333.0	1.3804	0.0000	SURCHARGED
15 minute winter	14	10	32.894	0.074	32.1	0.0843	0.0000	OK
15 minute winter	2	11	30.828	0.687	458.2	0.9832	0.0000	SURCHARGED
15 minute winter	1	11	30.112	0.455	453.8	0.0000	0.0000	OK
15 minute winter	29	12	34.149	0.099	27.3	0.1117	0.0000	OK
15 minute winter	28	12	34.161	0.201	17.2	0.2273	0.0000	OK
15 minute winter	27	12	34.146	0.425	33.5	0.4810	0.0000	SURCHARGED
15 minute winter	26	12	34.156	0.658	97.8	0.7447	0.0000	SURCHARGED
15 minute winter	25	11	34.071	0.968	175.6	1.0943	0.0000	SURCHARGED
15 minute summer	30	1	33.980	0.000	0.0	0.0000	0.0000	OK
15 minute winter	24	11	33.737	1.032	268.7	1.1673	0.0000	SURCHARGED
15 minute winter	23	11	33.230	0.768	305.3	0.8681	0.0000	SURCHARGED
15 minute summer	22	10	32.605	0.355	293.0	0.0000	0.0000	OK
15 minute summer	20	1	34.230	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	10	1.000	9	0.0	0.000	0.000	0.0000	
15 minute summer	9	1.001	8	0.0	0.000	0.000	0.1826	
15 minute winter	8	1.002	7	23.6	0.993	0.156	1.8704	
15 minute winter	7	1.003	6	66.5	1.687	0.470	2.2393	
15 minute winter	11	2.000	6	9.5	0.795	0.050	1.7690	
15 minute winter	6	1.004	5	190.8	1.760	0.702	9.9606	
15 minute winter	13	3.000	12	91.6	3.000	0.374	0.6051	
15 minute winter	12	3.001	5	87.4	2.027	0.364	2.2095	
15 minute winter	5	1.005	4	331.3	3.004	1.219	3.5550	
15 minute winter	4	1.006	3	333.0	3.020	1.225	0.1400	
15 minute winter	3	1.007	2	334.6	3.034	3.228	0.5277	
15 minute winter	14	4.000	2	31.8	1.555	0.137	2.4573	
15 minute winter	2	1.008	1	453.8	2.951	1.034	4.1724	258.3
15 minute winter	29	5.000	26	27.0	1.213	0.232	1.9783	
15 minute winter	28	6.000	27	-17.2	-0.307	-0.144	1.2533	
15 minute winter	27	6.001	26	-33.5	-0.638	-0.346	1.3651	
15 minute winter	26	5.001	25	113.5	1.180	0.529	3.7994	
15 minute winter	25	5.002	24	176.7	1.602	0.824	3.8275	
15 minute summer	30	7.000	24	0.0	0.000	0.000	1.2734	
15 minute winter	24	5.003	23	260.7	2.364	1.216	2.3340	
15 minute winter	23	5.004	22	303.8	2.755	1.417	2.0141	166.6
15 minute summer	20	8.000	19	0.0	0.000	0.000	1.3911	



Results for 30 year Critical Storm Duration. Lowest mass balance: 99.50%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	19	10	33.140	0.248	141.0	0.2803	0.0000	OK
15 minute summer	21	1	34.130	0.000	0.0	0.0000	0.0000	OK
15 minute winter	18	10	32.716	0.221	138.6	0.2504	0.0000	OK
15 minute winter	17	10	32.546	0.197	137.3	0.2229	0.0000	OK
15 minute winter	16	11	32.070	0.189	147.2	0.2134	0.0000	OK
15 minute winter	15	11	31.748	0.157	147.6	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	19	8.001	18	138.6	2.445	0.815	0.7806	
15 minute summer	21	9.000	18	0.0	0.000	0.000	0.6922	
15 minute winter	18	8.002	17	137.3	2.174	0.404	0.3200	
15 minute winter	17	8.003	16	137.5	2.551	0.441	0.8777	
15 minute winter	16	8.004	15	147.6	2.636	0.269	0.5666	69.7



Results for 100 year Critical Storm Duration. Lowest mass balance: 99.50%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	10	1	35.000	0.000	0.0	0.0000	0.0000	OK
15 minute winter	9	13	34.645	0.166	39.2	0.1881	0.0000	OK
15 minute winter	8	12	34.744	0.730	46.3	0.8253	0.0000	SURCHARGED
15 minute winter	7	12	34.577	1.458	93.0	1.6494	0.0000	SURCHARGED
15 minute winter	11	12	34.529	0.629	64.3	0.7113	0.0000	SURCHARGED
15 minute winter	6	12	34.454	1.950	267.2	2.7907	0.0000	SURCHARGED
15 minute winter	13	12	34.175	0.465	118.7	0.5263	0.0000	SURCHARGED
15 minute winter	12	12	33.989	1.165	111.2	1.3181	0.0000	SURCHARGED
15 minute winter	5	12	33.602	2.758	387.3	3.9466	0.0000	SURCHARGED
15 minute winter	4	12	32.023	1.771	391.5	2.5341	0.0000	SURCHARGED
15 minute winter	3	12	31.649	1.420	392.9	2.0327	0.0000	SURCHARGED
15 minute winter	14	10	32.905	0.085	41.5	0.0960	0.0000	OK
15 minute winter	2	11	31.151	1.010	556.7	1.4455	0.0000	SURCHARGED
30 minute winter	1	17	30.112	0.455	491.3	0.0000	0.0000	OK
15 minute winter	29	12	35.281	1.231	54.1	1.3922	0.0000	FLOOD RISK
15 minute winter	28	12	35.175	1.215	0.8	1.3746	0.0000	FLOOD RISK
15 minute winter	27	12	35.196	1.475	69.8	1.6686	0.0000	FLOOD RISK
15 minute winter	26	12	35.214	1.716	118.4	1.9408	0.0000	SURCHARGED
15 minute winter	25	12	35.078	1.975	242.8	2.2342	0.0000	SURCHARGED
15 minute winter	30	11	34.568	0.588	14.0	0.6650	0.0000	SURCHARGED
15 minute winter	24	12	34.487	1.782	358.0	2.0159	0.0000	SURCHARGED
15 minute winter	23	12	33.630	1.168	389.6	1.3213	0.0000	SURCHARGED
15 minute summer	22	9	32.605	0.355	374.5	0.0000	0.0000	OK
15 minute summer	20	1	34.230	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	10	1.000	9	0.0	0.000	0.000	0.0000	
15 minute winter	9	1.001	8	-39.2	-0.796	-0.260	1.3963	
15 minute winter	8	1.002	7	49.6	1.036	0.328	3.4300	
15 minute winter	7	1.003	6	99.2	1.662	0.701	2.3542	
15 minute winter	11	2.000	6	-52.6	0.802	-0.278	3.2363	
15 minute winter	6	1.004	5	212.4	1.926	0.782	9.9606	
15 minute winter	13	3.000	12	111.2	3.047	0.454	1.2973	
15 minute winter	12	3.001	5	98.5	1.978	0.410	2.8957	
15 minute winter	5	1.005	4	391.5	3.550	1.440	3.5550	
15 minute winter	4	1.006	3	392.9	3.563	1.446	0.1400	
15 minute winter	3	1.007	2	394.4	3.576	3.805	0.5277	
15 minute winter	14	4.000	2	41.1	1.606	0.177	2.5375	
15 minute winter	2	1.008	1	549.8	3.470	1.252	4.1715	332.5
15 minute winter	29	5.000	26	32.4	1.254	0.279	3.0754	
15 minute winter	28	6.000	27	12.1	0.182	0.102	1.4637	
15 minute winter	27	6.001	26	-69.8	-1.119	-0.720	1.3651	
15 minute winter	26	5.001	25	125.3	1.155	0.584	3.7994	
15 minute winter	25	5.002	24	231.4	2.098	1.079	3.8275	
15 minute winter	30	7.000	24	15.1	-0.227	0.074	2.5467	
15 minute winter	24	5.003	23	339.0	3.074	1.581	2.3340	
15 minute winter	23	5.004	22	391.5	3.550	1.825	2.0141	215.1
15 minute summer	20	8.000	19	0.0	0.000	0.000	1.6390	



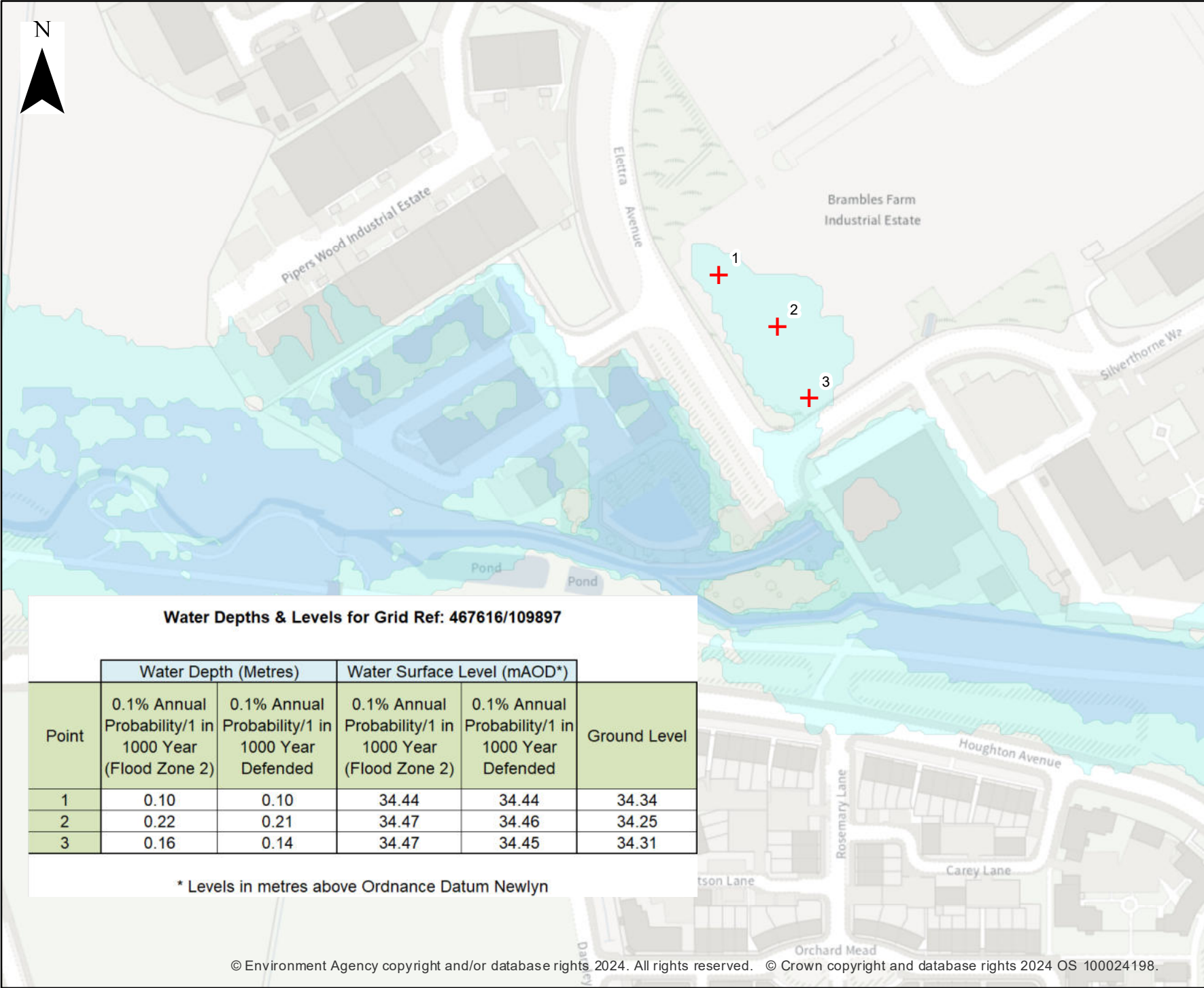
Results for 100 year Critical Storm Duration. Lowest mass balance: 99.50%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	19	11	33.371	0.479	182.6	0.5422	0.0000	SURCHARGED
15 minute summer	21	1	34.130	0.000	0.0	0.0000	0.0000	OK
15 minute winter	18	11	32.761	0.266	175.4	0.3004	0.0000	OK
15 minute winter	17	11	32.583	0.234	176.7	0.2651	0.0000	OK
15 minute winter	16	11	32.103	0.222	190.1	0.2509	0.0000	OK
15 minute winter	15	11	31.771	0.180	190.5	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	19	8.001	18	175.4	2.491	1.031	0.9730	
15 minute summer	21	9.000	18	0.0	0.000	0.000	0.9594	
15 minute winter	18	8.002	17	176.7	2.264	0.519	0.3948	
15 minute winter	17	8.003	16	177.6	2.689	0.570	1.0750	
15 minute winter	16	8.004	15	190.5	2.784	0.347	0.6919	90.6

Appendix E Environment Agency Flood Risk Assessment Data (Product 4)

2011 River Wallington Model Flood Levels Centred on Grid Ref: 467616/109897



Flood Levels Map

Location (easting/northing)
467616/109897

Scale
1:2,000

Created
4th July 2024

Legend

- + Location Point
- flood_zone_3
- flood_zone_2

0 510 20 30 40 Meters

Flood risk assessment data

Location of site: 467600 / 109860 (shown as easting and northing coordinates)

Document created on: 3 July 2024

This information was previously known as a product 4.

Customer reference number: SSD/356629DP

Map showing the location that flood risk assessment data has been requested for.



How to use this information

You can use this information as part of a flood risk assessment for a planning application. To do this, you should include it in the appendix of your flood risk assessment.

We recommend that you work with a flood risk consultant to get your flood risk assessment.

Included in this document

In this document you'll find:

- how to find information about surface water and other sources of flooding
- information on the models used
- definitions for the terminology used throughout
- flood map for planning (rivers and the sea)
- historic flooding
- flood defences and attributes
- information to help you assess if there is a reduced flood risk from rivers and the sea because of defences
- modelled data
- information about strategic flood risk assessments
- information about this data
- information about flood risk activity permits
- help and advice

Surface water and other sources of flooding

Use the [long term flood risk service](#) to find out about the risk of flooding from:

- surface water
- ordinary watercourses
- reservoirs

Or you can contact your Lead Local Flood Authority for further information.

Your Lead Local Flood Authority is Havant.

For information about sewer flooding, contact the relevant water company for the area.

About the models used

Model name: River Wallington Mapping, 2011 (Defended)

Scenario(s): Defended fluvial

Date: 1 January 2011

This model contains the most relevant data for your area of interest.

Terminology used

Annual exceedance probability (AEP)

This refers to the probability of a flood event occurring in any year. The probability is expressed as a percentage. For example, a large flood which is calculated to have a 1% chance of occurring in any one year, is described as 1% AEP.

Metres above ordnance datum (mAOD)

All flood levels are given in metres above ordnance datum which is defined as the mean sea level at Newlyn, Cornwall.

Flood map for planning (rivers and the sea)

Your selected location is in flood zone 2.

Flood zone 3 shows the area at risk of flooding for an undefended flood event with a:

- 0.5% or greater probability of occurring in any year for flooding from the sea
- 1% or greater probability of occurring in any year for fluvial (river) flooding

Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- between a 0.1% and 0.5% probability of occurring in any year for flooding from the sea
- between a 0.1% and 1% probability of occurring in any year for fluvial (river) flooding

It's important to remember that the flood zones on this map:

- refer to the land at risk of flooding and do not refer to individual properties
- refer to the probability of river and sea flooding, ignoring the presence of defences
- do not take into account potential impacts of climate change

The flood zones are not currently being updated. The last update was in November 2023. Some of the flood zones may have changed, however all source data is included in the models below.



Flood map for planning

Location (easting/northing)
467600/109860

Scale
1:10,000

Created
3 Jul 2024

-  Selected area
-  Main river
-  Flood zone 3
-  Flood zone 2

Historic flooding

This map is an indicative outline of areas that have previously flooded. Remember that:

- our records are incomplete, so the information here is based on the best available data
- it is possible not all properties within this area will have flooded
- other flooding may have occurred that we do not have records for
- flooding can come from a range of different sources - we can only supply flood risk data relating to flooding from rivers or the sea

You can also contact your Lead Local Flood Authority or Internal Drainage Board to see if they have other relevant local flood information. Please note that some areas do not have an Internal Drainage Board.

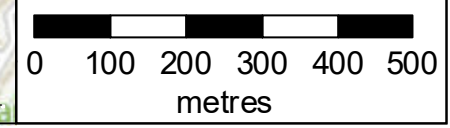
Your Lead Local Flood Authority is Havant.

[Download recorded flood outlines in GIS format](#)



Historic flood map
Location (easting/northing)
467600/109860
Scale
1:10,000
Created
3 Jul 2024

-  Selected area
-  Main river
- Date of flood event
 October, 2000



Historic flood event data

Start date	End date	Source of flood	Cause of flood	Affects location
9 October 2000	9 October 2000	unknown	unknown	No

Flood defences and attributes

The flood defences map shows the location of the flood defences present.

The flood defences data table shows the type of defences, their condition and the standard of protection. It shows the height above sea level of the top of the flood defence (crest level). The height is in mAOD which is the metres above the mean sea level at Newlyn, Cornwall.

It's important to remember that flood defence data may not be updated on a regular basis. The information here is based on the best available data.

Use this information:

- to help you assess if there is a reduced flood risk for this location because of defences
- with any information in the modelled data section to find out the impact of defences on flood risk



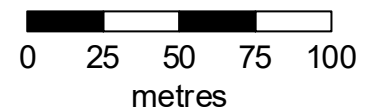
Flood defences

Location (easting/northing)
467600/109860

Scale
1:2,500

Created
3 Jul 2024

-  Selected area
-  Main river
-  Flood defence



Flood defences data

Label	Asset ID	Asset Type	Standard of protection (years)	Current condition	Downstream actual crest level (mAOD)	Upstream actual crest level (mAOD)	Effective crest level (mAOD)
1	102778	Embankment	5		37.38	34.80	
2	102779	Embankment	5		35.98	34.67	

Any blank cells show where a particular value has not been recorded for an asset.

Modelled data

This section provides details of different scenarios we have modelled and includes the following (where available):

- outline maps showing the area at risk from flooding in different modelled scenarios
- modelled node point map(s) showing the points used to get the data to model the scenarios and table(s) providing details of the flood risk for different return periods

Climate change

The climate change data included in the models may not include the latest [flood risk assessment climate change allowances](#). Where the new allowances are not available you will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding.

The Environment Agency will incorporate the new allowances into future modelling studies. For now, it's your responsibility to demonstrate that new developments will be safe in flood risk terms for their lifetime.

Modelled scenarios

The following scenarios are included:

- Defended modelled fluvial: risk of flooding from rivers where there are flood defences
- Defences removed modelled fluvial: risk of flooding from rivers where flood defences have been removed
- Defences removed climate change modelled fluvial: risk of flooding from rivers where flood defences have been removed, including estimated impact of climate change

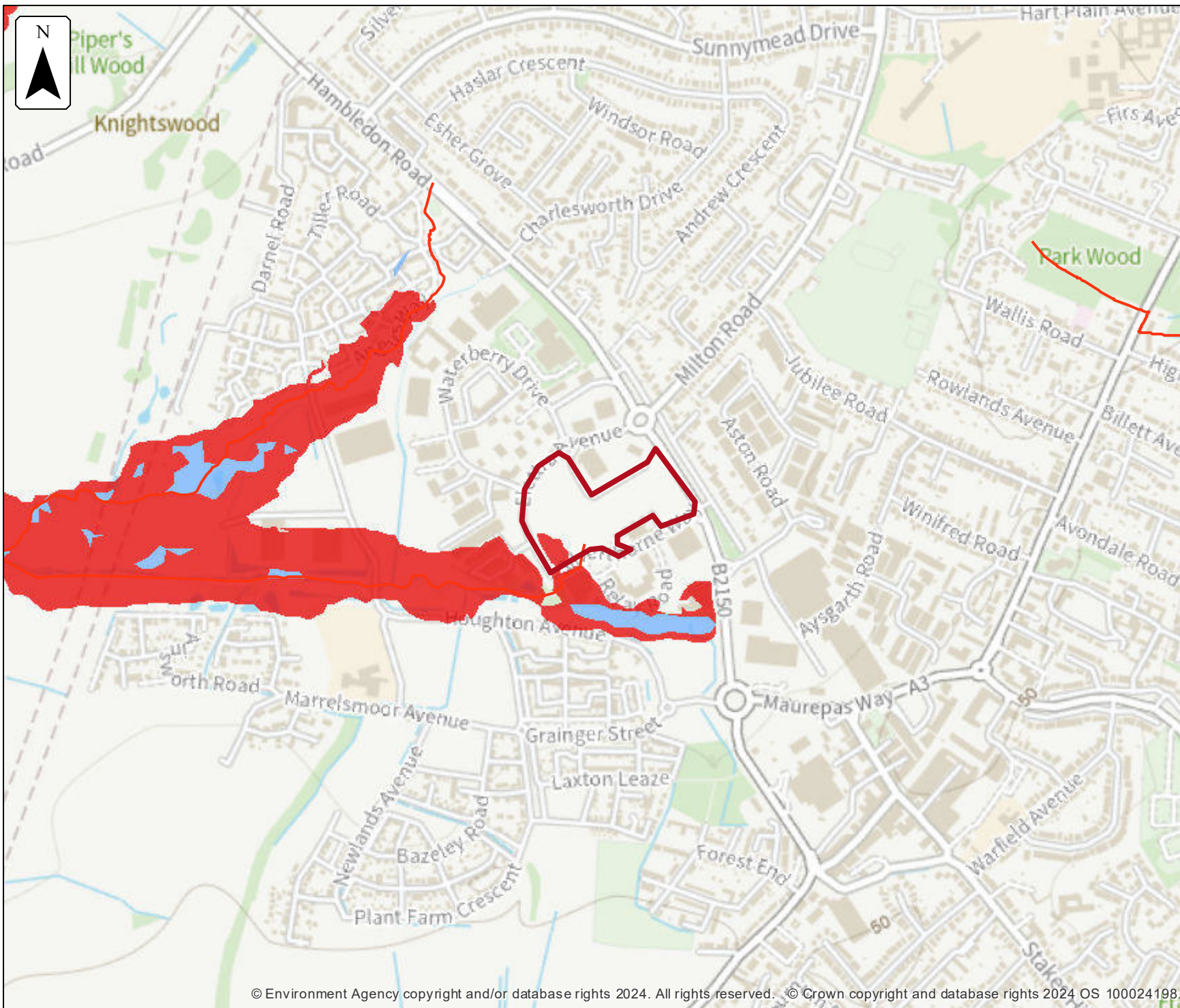
Information that's unavailable

This document does not contain:

- climate change modelled data

Please note that:

There is not any modelled climate change data for this location. This is because detailed modelling hasn't been carried out in this area. You will need to consider the latest flood risk assessment climate change allowances and factor in the new allowances to demonstrate the development will be safe from flooding.



Defended modelled fluvial extent

Location (easting/northing)
467600/109860

Scale Created
1:10,000 3 Jul 2024

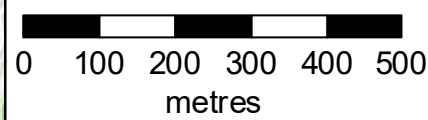
Model name
River Wallington Mapping, 2011

-  Selected area
-  Main river

Modelled flood extent

-  1% AEP
-  0.1% AEP

Flood extents may not be visible where they overlap other return periods





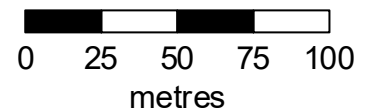
Defended modelled fluvial node locations

Location (easting/northing)
467600/109860

Scale Created
1:2,500 3 Jul 2024

Model name
**River Wallington
Mapping, 2011**

-  Selected area
-  Modelled location
-  Main river



Modelled node locations data

Defended

Label	Modelled location ID	Easting	Northing	5% AEP	2% AEP	1.33% AEP	1% AEP	0.1% AEP
				Level	Level	Level	Level	Level
1	241170	467410	109702	33.52	33.63	33.74	33.79	34.07
2	297728	467477	109688	33.61	33.71	33.84	33.91	34.20
3	62652	467486	109674	33.69	33.82	33.90	33.95	34.34
4	4741	467496	109690	33.63	33.71	33.82	33.87	34.01
5	194115	467524	109670	33.82	33.95	34.02	34.08	34.54
6	296157	467531	109705	33.68	33.76	33.87	33.92	34.49
7	135632	467540	109673	33.91	34.05	34.12	34.18	34.63
8	46024	467586	109673	34.17	34.29	34.36	34.41	34.71
9	20549	467627	109667	34.27	34.37	34.43	34.47	34.76
10	35551	467688	109660	34.50	34.54	34.57	34.60	34.87

Data in this table comes from the River Wallington Mapping, 2011 (Defended) model.
 Level values are shown in mAOD, and flow values are shown in cubic metres per second.
 Any blank cells show where a particular scenario has not been modelled for this location.
 If no level or flow data is available for a scenario, no table will be shown.

Defended

Label	Modelled location ID	Easting	Northing	5% AEP	2% AEP	1.33% AEP	1% AEP	0.1% AEP
				Flow	Flow	Flow	Flow	Flow
1	241170	467410	109702	6.86	7.85	9.62	10.65	19.10
2	297728	467477	109688	3.60	4.33	4.76	5.13	12.48
3	62652	467486	109674	3.65	4.60	5.16	5.63	9.62
4	4741	467496	109690	3.65	4.61	5.18	5.65	15.12
5	194115	467524	109670	3.65	4.60	5.16	5.63	8.54
6	296157	467531	109705	3.67	4.62	5.20	5.68	12.69
7	135632	467540	109673	3.65	4.59	5.16	5.63	7.73
8	46024	467586	109673	3.53	4.05	4.20	4.32	6.62
9	20549	467627	109667	3.57	4.15	4.42	4.65	7.67
10	35551	467688	109660	3.66	4.49	4.87	5.11	7.28

Data in this table comes from the River Wallington Mapping, 2011 (Defended) model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.
If no level or flow data is available for a scenario, no table will be shown.

Strategic flood risk assessments

We recommend that you check the relevant local authority's strategic flood risk assessment (SFRA) as part of your work to prepare a site specific flood risk assessment.

This should give you information about:

- the potential impacts of climate change in this catchment
- areas defined as functional floodplain
- flooding from other sources, such as surface water, ground water and reservoirs

Your Lead Local Flood Authority is Havant.

About this data

This data has been generated by strategic scale flood models and is not intended for use at the individual property scale. If you're intending to use this data as part of a flood risk assessment, please include an appropriate modelling tolerance as part of your assessment. The Environment Agency regularly updates its modelling. We recommend that you check the data provided is the most recent, before submitting your flood risk assessment.

Flood risk activity permits

Under the Environmental Permitting (England and Wales) Regulations 2016 some developments may require an environmental permit for flood risk activities from the Environment Agency. This includes any permanent or temporary works that are in, over, under, or nearby a designated main river or flood defence structure.

[Find out more about flood risk activity permits](#)

Help and advice

Contact the Solent and South Downs Environment Agency team at ssdenquiries@environment-agency.gov.uk for:

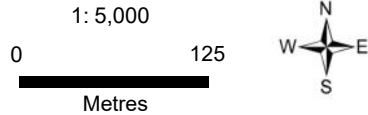
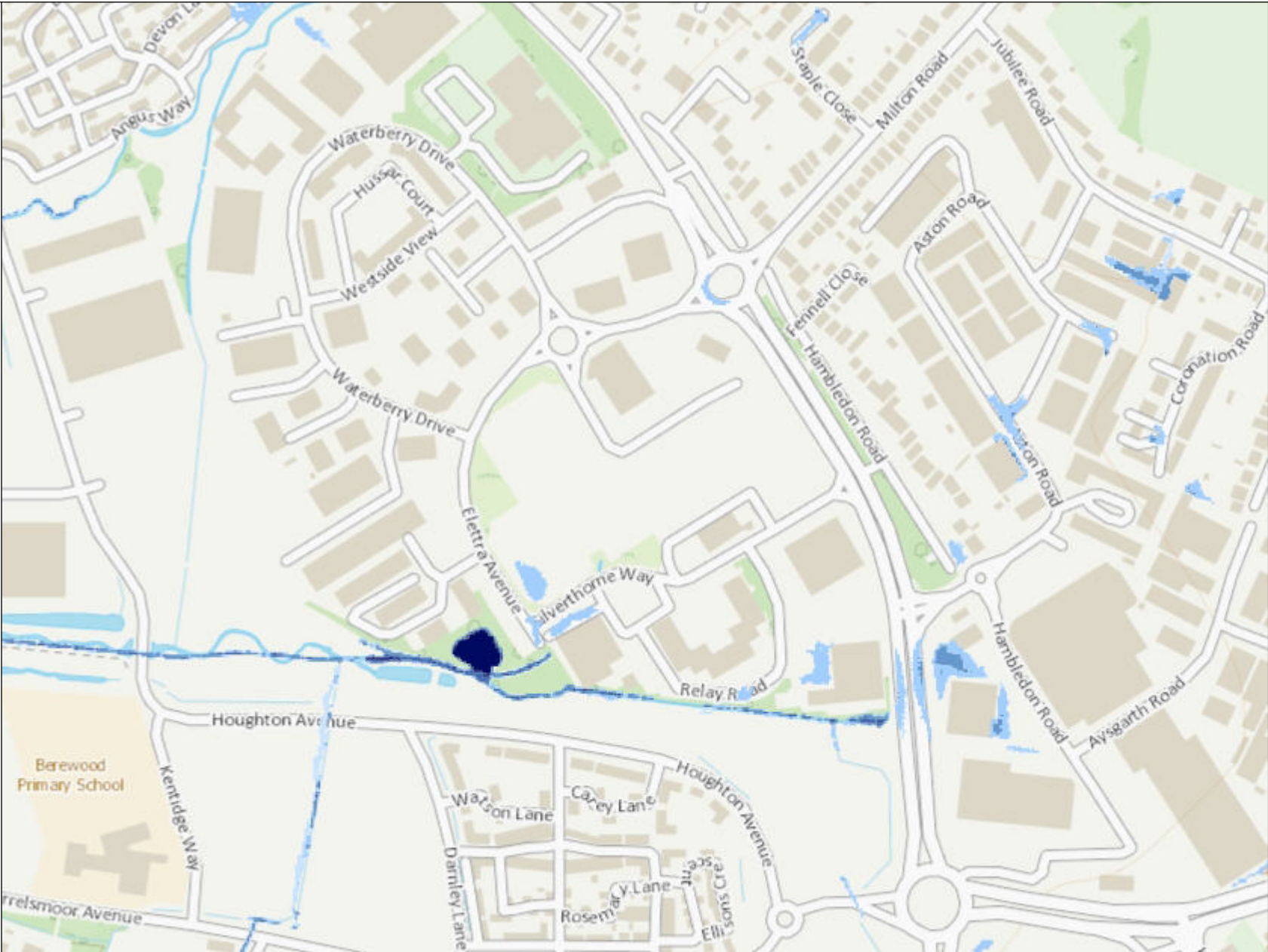
- [more information about getting a product 5, 6, 7 or 8](#)
- general help and advice about the site you're requesting data for

Risk of Flooding from Surface Water Flood Depth 1 in 30 - Created 24/4/24



Legend

- Flood Depth 1 in 30
- Below 150mm
 - 150-300mm
 - 300-600mm
 - 600-900mm
 - 900-1200mm
 - Over 1200mm

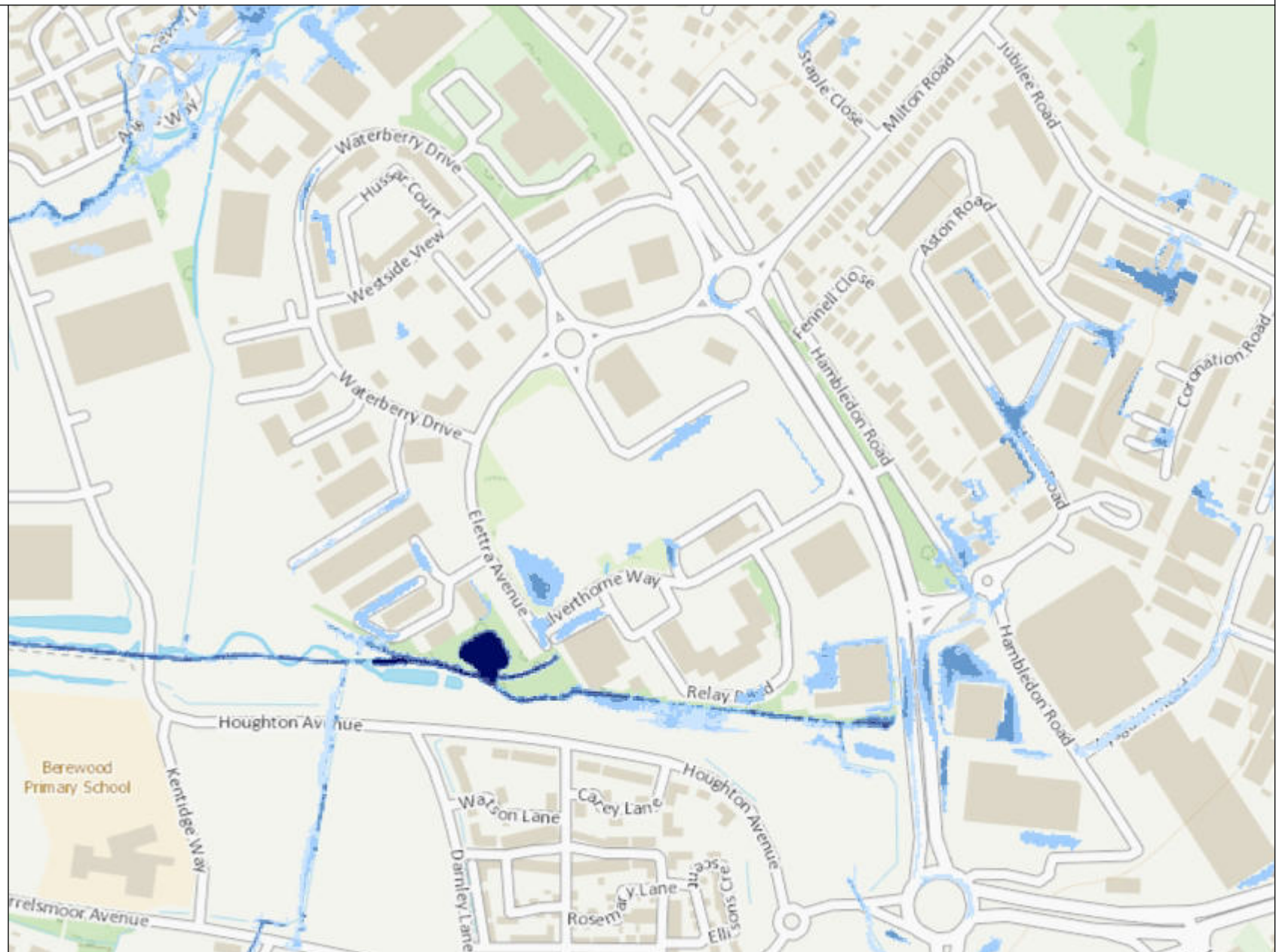


Risk of Flooding from Surface Water Flood Depth 1 in 100 - Created 24/4/24

Legend

Flood Depth 1 in 100

- Below 150mm
- 150-300mm
- 300-600mm
- 600-900mm
- 900-1200mm
- Over 1200mm



1:5,000

0 125
Metres

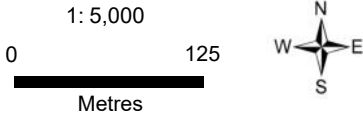
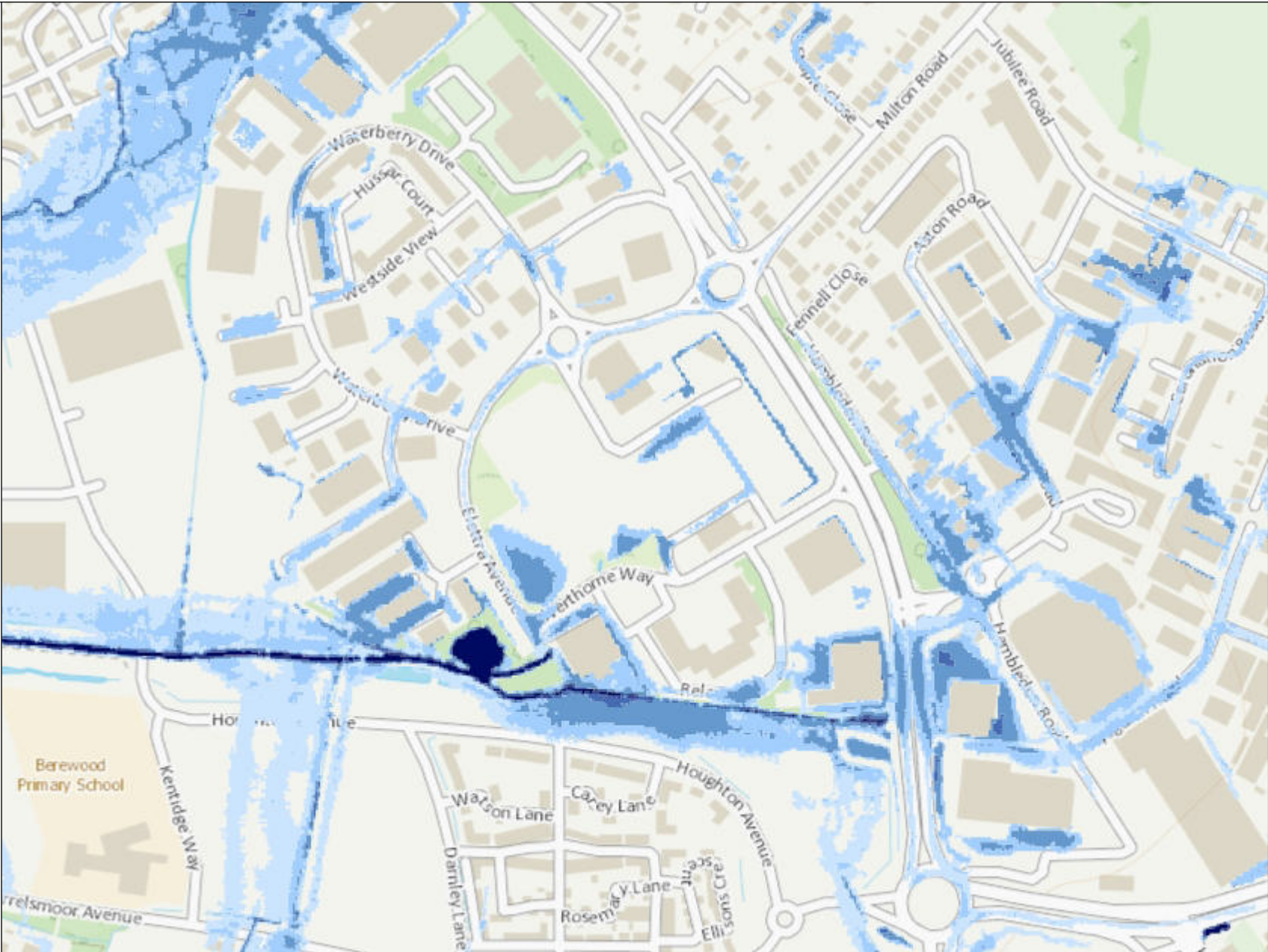


Risk of Flooding from Surface Water Flood Depth 1 in 1000 - Created 24/4/24



Legend

- Flood Depth 1 in 1000
- Below 150mm
 - 150-300mm
 - 300-600mm
 - 600-900mm
 - 900-1200mm
 - Over 1200mm





Appendix F Havant Borough Council Strategic Flood Risk Assessment (Local Plan Sites) Extract

Strategic Flood Risk Assessment (Local Plan Sites)

November 2018



Former BAE Systems Park – Site Ref: BD54

Basic Information



The Site: The site is located within the Brambles Business Park to the south of Elettra Avenue in Watlooville.

Site Area: 5.7ha

Allocation Proposal: Commercial / Leisure ('less vulnerable')

Flood Risk Information

Source / Pathway: The dominant source of flooding to this site will be fluvial flooding.

Level of Flood Risk: Currently, a small part in the south western corner of the site is affected by Flood Zones 2 and 3. The PUSH SFRA does not show any additional flood risk in the future.



Current Day Zones 2 & 3 vs Climate Change 2115. Source: EA Flood Map and PUSH SFRA

Sequential Approach - Can areas of flood risk be avoided?

Yes, the small area in the south western part of the site could be avoided.

If flood risk cannot be avoided, what is the preferred approach?

n/a

Conclusion on prospect of safe development in light of flood risk

Avoid area at risk of flooding; note flood risk in policy and stipulate that area must be avoided.

Implications for Local Plan 2036

Allocation acceptable.