

Appendix 6 – Outline Drainage Strategy

Land adjacent to 132 Havant Road, Hayling Island
Flood Risk Assessment

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Caversham Bridge House Waterman Place Reading RG1 8DN	132 Havant Road, Hayling Island, Outline Drainage Strategy	
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Micro Drainage	Network W.12.6	

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
1.000	13.800	0.088	156.8	0.083	4.00	0.0	0.600	o	150
2.000	7.000	0.070	100.0	0.018	4.00	0.0	0.600	o	150
1.001	8.800	0.088	100.0	0.045	0.00	0.0	0.600	o	150
1.002	5.000	0.050	100.0	0.000	0.00	0.0	0.600	o	150

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	1.350	0.083	0.0	0.80	14.1
2.000	1.500	0.018	0.0	1.00	17.8
1.001	1.262	0.146	0.0	1.00	17.8
1.002	1.174	0.146	0.0	1.00	17.8

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.002		2.210	1.124	1.100	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	30.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Storm Duration (mins)	30
Ratio R	0.350		

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Online Controls for Storm

Hydro-Brake® Manhole: 6, DS/PN: 1.002, Volume (m³): 1.2

Design Head (m) 0.440 Hydro-Brake® Type Md10 Invert Level (m) 1.174
Design Flow (l/s) 5.0 Diameter (mm) 73

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.9	1.200	8.1	3.000	12.9	7.000	19.7
0.200	3.3	1.400	8.8	3.500	13.9	7.500	20.4
0.300	4.1	1.600	9.4	4.000	14.9	8.000	21.0
0.400	4.7	1.800	10.0	4.500	15.8	8.500	21.7
0.500	5.3	2.000	10.5	5.000	16.6	9.000	22.3
0.600	5.8	2.200	11.0	5.500	17.4	9.500	22.9
0.800	6.6	2.400	11.5	6.000	18.2		
1.000	7.4	2.600	12.0	6.500	19.0		

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Storage Structures for Storm

Cellular Storage Manhole: 2, DS/PN: 1.000

Invert Level (m) 1.350 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	170.0	0.0	0.300	170.0	0.0
0.100	170.0	0.0	0.360	170.0	0.0
0.200	170.0	0.0	0.361	0.0	0.0

Cellular Storage Manhole: 6, DS/PN: 1.002

Invert Level (m) 1.174 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	80.0	0.0	0.300	80.0	0.0
0.100	80.0	0.0	0.360	80.0	0.0
0.200	80.0	0.0	0.361	0.0	0.0

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	120 Winter	1	0%	100/15 Winter				
2.000	15 Summer	1	0%	100/15 Summer				
1.001	15 Winter	1	0%	30/15 Summer				
1.002	240 Winter	1	0%	30/15 Summer				

PN	US/MH Name	Water		Flooded		Pipe		Status
		Level (m)	Surch'ed Depth (m)	Volume (m³)	Flow / Cap. (l/s)	O'flow (l/s)	Flow	
1.000	2	1.396	-0.104	0.000	0.20	0.0	2.6	OK
2.000	3	1.546	-0.104	0.000	0.21	0.0	3.2	OK
1.001	4	1.350	-0.062	0.000	0.64	0.0	10.0	OK
1.002	6	1.317	-0.007	0.000	0.19	0.0	2.6	OK

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surchage	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	120 Winter	30	0%	100/15 Winter				
2.000	15 Summer	30	0%	100/15 Summer				
1.001	15 Winter	30	0%	30/15 Summer				
1.002	120 Winter	30	0%	30/15 Summer				

PN	US/MH Name	Water		Flooded		Pipe		Status
		Level (m)	Surch'd Depth (m)	Volume (m³)	Flow / Cap. (l/s)	O'flow (l/s)	Flow (l/s)	
1.000	2	1.473	-0.027	0.000	0.38	0.0	4.9	OK
2.000	3	1.576	-0.074	0.000	0.51	0.0	7.8	OK
1.001	4	1.516	0.104	0.000	1.50	0.0	23.3	SURCHARGED
1.002	6	1.450	0.126	0.000	0.28	0.0	3.9	SURCHARGED

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 100
 Climate Change (%) 0

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	120 Winter	100	0%	100/60 Winter				
2.000	15 Summer	100	0%					
1.001	15 Summer	100	0%	100/15 Summer				
1.002	120 Winter	100	0%	100/15 Summer				

PN	US/MH Name	Water		Flooded		Pipe		Status
		Level (m)	Surch'd Depth (m)	Volume (m³)	Flow / Cap.	O'flow (l/s)	Flow (l/s)	
1.000	2	1.536	0.036	0.000	0.35	0.0	4.5	SURCHARGED
2.000	3	1.595	-0.055	0.000	0.67	0.0	10.2	OK
1.001	4	1.563	0.151	0.000	1.67	0.0	26.0	SURCHARGED
1.002	6	1.512	0.188	0.000	0.31	0.0	4.3	SURCHARGED

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Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
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Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surchage	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	240 Winter	100	+30%	100/15 Winter				
2.000	15 Winter	100	+30%	100/15 Summer				
1.001	240 Winter	100	+30%	30/15 Summer				
1.002	240 Winter	100	+30%	30/15 Summer				

PN	US/MH Name	Water		Flooded		Pipe		Status
		Level (m)	Surch'd Depth (m)	Volume (m³)	Flow / Cap. (l/s)	O'flow (l/s)	Flow (l/s)	
1.000	2	1.644	0.144	0.000	0.35	0.0	4.5	SURCHARGED
2.000	3	1.675	0.025	0.000	0.85	0.0	12.9	SURCHARGED
1.001	4	1.634	0.222	0.000	0.64	0.0	9.9	SURCHARGED
1.002	6	1.618	0.294	0.000	0.35	0.0	4.9	SURCHARGED