Storage Structures for Storm

Complex Manhole: S3, DS/PN: S1.002

Cellular Storage

Invert Level (m)	71.250	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	47.5	47.5	0.400	47.5	59.1	0.401	0.0	59.1

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	9.5
Max Percolation (l/s)	13.2	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	71.650	Membrane Depth (mm)	130

Complex Manhole: S6, DS/PN: S1.004

Cellular Storage

Invert Level (m) 71.103 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	97.5	97.5	0.400	97.5	117.1	0.401	0.0	117.1

Porous Car Park

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 5.0
Membrane Percolation (mm/hr) 1000 Length (m) 19.5
Max Percolation (l/s) 27.1 Slope (1:X) 0.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 71.503 Membrane Depth (mm) 130

Complex Manhole: S9, DS/PN: S1.006

Cellular Storage

Invert Level (m) 70.939 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	110.0	110.0	0.400	110.0	131.6	0.401	0.0	131.6

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	22.0
Max Percolation (l/s)	30.6	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	71.339	Membrane Depth (mm)	130

Complex Manhole: S10, DS/PN: S1.007

Cellular Storage

Invert Level (m)	70.839	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	37.5	37.5	0.400	37.5	47.5	0.401	0.0	47.5

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	7.5
Max Percolation (l/s)	10.4	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	71.239	Membrane Depth (mm)	130

Complex Manhole: S13, DS/PN: S1.009

Cellular Storage

Invert Level (m)	70.722	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	37.5	37.5	0.400	37.5	47.5	0.401	0.0	47.5

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	7.5
Max Percolation (l/s)	10.4	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	71.122	Membrane Depth (mm)	130

Complex Manhole: S14, DS/PN: S1.010

Cellular Storage

Invert Level (m)	70.564	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Cellular Storage

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	65.0	65.0	0.800	65.0	93.8	0.801	0.0	93.8

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	13.0
Max Percolation (l/s)	18.1	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	71.364	Membrane Depth (mm)	130

Cellular Storage Manhole: S27, DS/PN: S6.007

Invert Level (m)	70.443	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	368.0	368.0	0.400	368.0	402.8	0.401	0.0	402.8

Complex Manhole: S29, DS/PN: S6.009

Cellular Storage

Invert Level (m) 70.368 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	25.0	25.0	0.800	25.0	33.0	0.801	0.0	33.0

Cellular Storage

Invert Level (m) 70.368 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	25.0	25.0	0.400	25.0	33.0	0.401	0.0	33.0

Porous Car Park

Infiltration Coefficient Base (m/hr) 0.00000
Membrane Percolation (mm/hr) 1000
Max Percolation (l/s) 6.9
Safety Factor 2.0
Porosity 0.30
Invert Level (m) 71.168
Width (m) 5.0
Length (m) 5.0
Slope (1:X) 0.0
Depression Storage (mm) 5
Evaporation (mm/day) 3
Membrane Depth (mm) 130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	6.9	Slope (1:X)	150.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	71.500	Membrane Depth (mm)	130

Complex Manhole: S18, DS/PN: S1.013

Cellular Storage

Invert Level (m)	70.037	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	150.0	150.0	0.800	150.0	234.8	0.801	0.0	234.8

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	50.0
Max Percolation (l/s)	69.4	Slope (1:X)	150.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	70.837	Membrane Depth (mm)	130

Manhole Headloss for Storm

PN	US/MH Name	US/MH Headloss
S1.000	S1	0.500
S1.001	S2	0.000
S1.002	S3	0.500
S2.000	S4	0.500
S1.003	S5	0.000
S1.004	S6	0.500
S3.000	S7	0.500
S1.005	S8	0.000
S1.006	S9	0.500
S1.007	S10	0.500
S4.000	S11	0.500
S1.008	S12	0.500
S1.009	S13	0.500
S1.010	S14	0.500
S1.011	S15	0.500
S5.000	S16	0.500
S1.012	S17	0.500
S6.000	S20	0.500
S6.001	S21	0.500
S6.002	S22	0.500
S6.003	S23	0.500
S6.004	S24	0.500
S6.005	S25	0.500
S6.006	S26	0.000
S6.007	S27	0.000
S6.008	S28	0.500
S6.009	S29	0.500
S1.013	S18	0.500

Manhole Headloss for Storm

PN	US/MH Name	US/MH Headloss
S1.014	S19	0.500

Volume Summary (Static)

Length Calculations based on Centre-Centre

Pipe Number	USMH Name	Manhole Volume (m³)	Pipe Volume (m³)	Storage Structure Volume (m³)	Total Volume (m³)
S1.000	S1	0.298	0.124	0.000	0.422
S1.001	S2	0.000	0.504	0.000	0.504
S1.002	S3	1.188	0.464	25.475	27.127
S2.000	S4	0.297	0.146	0.000	0.443
S1.003	S5	0.000	0.414	0.000	0.414
S1.004	S6	1.320	0.521	55.713	57.554
S3.000	S7	0.297	0.149	0.000	0.446
S1.005	S8	0.000	0.458	0.000	0.458
S1.006	S9	1.286	0.596	61.866	63.748
S1.007	S10	1.220	0.118	20.438	21.776
S4.000	S11	0.297	0.147	0.000	0.444
S1.008	S12	1.336	0.579	0.000	1.915
S1.009	S13	1.445	0.941	22.677	25.064
S1.010	S14	1.765	0.365	61.725	63.856
S1.011	S15	1.834	0.166	0.000	2.001
S5.000	S16	0.382	0.151	0.000	0.533
S1.012	S17	1.866	2.162	0.000	4.029
S6.000	S20	1.355	0.327	0.000	1.682
S6.001	S21	1.306	17.455	0.000	18.761
S6.002	S22	0.667	10.480	0.000	11.147
S6.003	S23	0.667	10.942	0.000	11.609
S6.004	S24	0.667	7.970	0.000	8.637
S6.005	S25	0.667	0.440	0.000	1.107
S6.006	S26	0.000	0.184	0.000	0.184
S6.007	S27	0.000	0.279	139.957	140.235

Volume Summary (Static)

Pipe Number	USMH Name	Manhole Volume (m³)	Pipe Volume (m³)	Storage Structure Volume (m³)	Total Volume (m³)
S6.008	S28	2.492	0.308	0.000	2.799
S6.009	S29	1.767	0.392	35.506	37.665
S1.013	S18	2.838	0.142	181.621	184.601
S1.014	S19	1.934	1.619	0.000	3.553
Total		29.191	58.542	604.978	692.711

Volume Summary (Static)

Length Calculations based on True Length

Pipe Number	USMH Name	Manhole Volume (m³)	Pipe Volume (m³)	Storage Structure Volume (m³)	Total Volume (m³)
S1.000	S1	0.298	0.119	0.000	0.416
S1.001	S2	0.000	0.480	0.000	0.480
S1.002	S3	1.188	0.440	25.475	27.103
S2.000	S4	0.297	0.141	0.000	0.438
S1.003	S5	0.000	0.390	0.000	0.390
S1.004	S6	1.320	0.498	55.713	57.530
S3.000	S7	0.297	0.143	0.000	0.440
S1.005	S8	0.000	0.434	0.000	0.434
S1.006	S9	1.286	0.548	61.866	63.700
S1.007	S10	1.220	0.070	20.438	21.728
S4.000	S11	0.297	0.131	0.000	0.428
S1.008	S12	1.336	0.532	0.000	1.867
S1.009	S13	1.445	0.894	22.677	25.016
S1.010	S14	1.765	0.318	61.725	63.808
S1.011	S15	1.834	0.118	0.000	1.953
S5.000	S16	0.382	0.135	0.000	0.517
S1.012	S17	1.866	2.109	0.000	3.975
S6.000	S20	1.355	0.242	0.000	1.597
S6.001	S21	1.306	17.022	0.000	18.328
S6.002	S22	0.667	10.144	0.000	10.812
S6.003	S23	0.667	10.606	0.000	11.273
S6.004	S24	0.667	7.635	0.000	8.302
S6.005	S25	0.667	0.413	0.000	1.080
S6.006	S26	0.000	0.184	0.000	0.184
S6.007	S27	0.000	0.249	139.957	140.205

Volume Summary (Static)

Pipe Number	USMH Name	Manhole Volume (m³)	Pipe Volume (m³)	Storage Structure Volume (m³)	Total Volume (m³)
S6.008	S28	2.492	0.254	0.000	2.746
S6.009	S29	1.767	0.339	35.506	37.611
S1.013	S18	2.838	0.088	181.621	184.548
S1.014	S19	1.934	1.595	0.000	3.529
Total		29.191	56.269	604.978	690.437

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

Simulation Criteria

Areal Reduction Factor	1.000	Manhole Headloss Coeff (Global)	0.500	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Foul Sewage per hectare (l/s)	0.000	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Additional Flow - % of Total Flow	0.000	Flow per Person per Day (l/per/day)	0.000

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	9	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH	Data Type	Catchment
Return Period (years)	2	Cv (Summer)	0.750
FEH Rainfall Version	2013	Cv (Winter)	0.840
Site Location	GB 465150 155700 SU 65150 55700		

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160
Sensitivity flows(s) (%)	0

WARNING: Half Drain Time has not been calculated as the structure is too full.

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

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Maximum Vol (m³)	Discharge Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status

84 North Street
Guildford
Surrey GU1 4AU

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

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Maximum Vol (m³)	Discharge Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1	30 minute 2 year Winter Q+0%	72.500	71.504	-0.093	0.000	0.31	0.015	4.320		3.8	OK
S1.001	S2	30 minute 2 year Winter Q+0%	72.450	71.372	-0.178	0.000	0.10	0.043	4.320		3.8	OK*
S1.002	S3	30 minute 2 year Winter Q+0%	72.300	71.299	-0.176	0.000	0.11	2.327	5.598	18	3.9	OK
S2.000	S4	30 minute 2 year Winter Q+0%	72.400	71.420	-0.080	0.000	0.44	0.018	8.664		7.7	OK
S1.003	S5	30 minute 2 year Winter Q+0%	72.345	71.256	-0.141	0.000	0.30	0.159	14.267		11.2	OK*
S1.004	S6	60 minute 2 year Winter Q+0%	72.270	71.180	-0.148	0.000	0.26	7.272	21.068	31	9.3	OK
S3.000	S7	30 minute 2 year Winter Q+0%	72.200	71.244	-0.056	0.000	0.72	0.025	10.532		9.3	OK
S1.005	S8	30 minute 2 year Winter Q+0%	72.150	71.117	-0.124	0.000	0.42	0.197	26.058		16.3	OK*
S1.006	S9	120 minute 2 year Summer Q+0%	72.076	71.038	-0.126	0.000	0.40	10.527	47.521	47	15.0	OK
S1.007	S10	120 minute 2 year Winter Q+0%	71.918	70.960	-0.104	0.000	0.56	4.585	56.268	50	15.2	OK
S4.000	S11	30 minute 2 year Winter Q+0%	72.050	71.094	-0.056	0.000	0.72	0.025	14.279		12.6	OK
S1.008	S12	120 minute 2 year Summer Q+0%	72.000	70.945	-0.099	0.000	0.60	0.181	72.851		22.4	OK
S1.009	S13	120 minute 2 year Summer Q+0%	72.000	70.845	-0.102	0.000	0.58	4.682	76.051	47	22.7	OK
S1.010	S14	120 minute 2 year Winter Q+0%	72.125	70.700	-0.089	0.000	0.66	8.775	89.092	48	22.8	OK
S1.011	S15	120 minute 2 year Winter Q+0%	72.125	70.672	-0.056	0.000	0.77	0.378	89.189		22.9	OK
S5.000	S16	30 minute 2 year Winter Q+0%	72.100	70.805	-0.095	0.000	0.29	0.014	7.812		6.9	OK
S1.012	S17	180 minute 2 year Winter Q+0%	72.125	70.658	-0.042	0.000	0.92	0.315	123.845		24.0	OK
S6.000	S20	30 minute 2 year Winter Q+0%	72.144	71.025	-0.221	0.000	0.16	0.083	8.306		7.3	OK
S6.001	S21	30 minute 2 year Winter Q+0%	72.083	70.972	-0.706	0.000	0.01	0.061	8.305		7.3	OK
S6.002	S22	15 minute 2 year Winter Q+0%	71.911	70.871	-0.635	0.000	0.03	0.517	14.954		19.7	OK
S6.003	S23	15 minute 2 year Winter Q+0%	71.813	70.843	-0.565	0.000	0.06	1.064	20.582		28.1	OK
S6.004	S24	15 minute 2 year Winter Q+0%	71.765	70.828	-0.532	0.000	0.19	1.862	26.176		36.3	OK
S6.005	S25	15 minute 2 year Winter Q+0%	71.743	70.723	-0.165	0.000	0.42	0.450	26.182		36.2	OK
S6.006	S26	15 minute 2 year Winter Q+0%	71.807	70.684	-0.134	0.000	0.59	0.419	26.129		36.3	OK*
S6.007	S27	360 minute 2 year Winter Q+0%	71.845	70.608	-0.085	0.000	0.22	57.830	81.128	137	6.5	OK*
S6.008	S28	360 minute 2 year Winter Q+0%	71.845	70.605	-0.055	0.000	0.25	0.454	105.872		9.1	OK

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

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Maximum Vol (m³)	Discharge Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)
S6.009	S29	360 minute 2 year Winter Q+0%	71.930	70.600	0.007	0.000	0.25	11.483	105.835	158	7.2
S1.013	S18	240 minute 2 year Winter Q+0%	71.930	70.596	0.047	0.000	0.58	82.665	200.056		16.5
S1.014	S19	240 minute 2 year Winter Q+0%	72.010	70.404	-0.121	0.000	0.44	0.139	200.341		16.5

PN	US/MH Name	Status
S6.009	S29	SURCHARGED
S1.013	S18	SURCHARGED
S1.014	S19	OK

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

Simulation Criteria

Areal Reduction Factor	1.000	Manhole Headloss Coeff (Global)	0.500	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Foul Sewage per hectare (l/s)	0.000	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Additional Flow - % of Total Flow	0.000	Flow per Person per Day (l/per/day)	0.000

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	9	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH	Data Type	Catchment
Return Period (years)	30	Cv (Summer)	0.750
FEH Rainfall Version	2013	Cv (Winter)	0.840
Site Location	GB 465150 155700 SU 65150 55700		

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160
Sensitivity flows(s) (%)	0, +35

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Maximum Vol (m³)	Discharge Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status

84 North Street
Guildford
Surrey GU1 4AU

Date 19/12/2023 12:25
File 30Y 35CC 2210020 19122023 FINAL.MDX

Designed by Chris Gray
Checked by Jason Morgans

Causeway
Network 2020.1.3

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

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Maximum Vol (m³)	Discharge Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)
S1.000	S1	30 minute 30 year Winter Q+35%	72.500	71.597	0.000	0.000	1.05	0.041	14.701		13.0
S1.001	S2	60 minute 30 year Winter Q+35%	72.450	71.483	-0.067	0.000	0.29	0.199	18.684		11.1
S1.002	S3	60 minute 30 year Winter Q+35%	72.300	71.475	0.000	0.000	0.32	10.790	25.086	33	11.6
S2.000	S4	30 minute 30 year Winter Q+35%	72.400	71.623	0.123	0.000	1.50	0.076	29.485		26.0
S1.003	S5	120 minute 30 year Summer Q+35%	72.345	71.397	0.000	0.000	0.77	0.667	68.685		28.3
S1.004	S6	60 minute 30 year Winter Q+35%	72.270	71.448	0.120	0.000	0.50	32.734	73.137	42	18.3
S3.000	S7	30 minute 30 year Winter Q+35%	72.200	71.625	0.325	0.000	2.38	0.133	35.839		30.8
S1.005	S8	480 minute 30 year Winter Q+35%	72.150	71.241	0.000	0.000	0.45	0.923	201.839		17.5
S1.006	S9	120 minute 30 year Winter Q+35%	72.076	71.403	0.239	0.000	0.67	44.899	161.483	117	25.1
S1.007	S10	240 minute 30 year Winter Q+35%	71.918	71.382	0.318	0.000	0.78	17.026	203.877	151	21.1
S4.000	S11	30 minute 30 year Winter Q+35%	72.050	71.736	0.586	0.000	2.33	0.207	48.592		40.9
S1.008	S12	240 minute 30 year Winter Q+35%	72.000	71.384	0.340	0.000	0.91	0.834	294.412		33.9
S1.009	S13	240 minute 30 year Winter Q+35%	72.000	71.359	0.412	0.000	0.78	18.177	306.956	178	30.3
S1.010	S14	240 minute 30 year Winter Q+35%	72.125	71.341	0.552	0.000	0.60	49.739	321.860	176	20.7
S1.011	S15	240 minute 30 year Winter Q+35%	72.125	71.330	0.602	0.000	0.69	1.248	321.806		20.4
S5.000	S16	240 minute 30 year Winter Q+35%	72.100	71.329	0.429	0.000	0.35	0.162	49.576		8.4
S1.012	S17	240 minute 30 year Winter Q+35%	72.125	71.325	0.625	0.000	1.08	1.209	377.231		28.1
S6.000	S20	240 minute 30 year Winter Q+35%	72.144	71.322	0.076	0.000	0.19	0.420	52.718		9.1
S6.001	S21	240 minute 30 year Winter Q+35%	72.083	71.321	-0.357	0.000	0.01	0.680	52.715		9.1
S6.002	S22	240 minute 30 year Winter Q+35%	71.911	71.321	-0.185	0.000	0.04	11.619	124.355		21.4
S6.003	S23	240 minute 30 year Winter Q+35%	71.813	71.321	-0.087	0.000	0.06	8.771	171.049		29.5
S6.004	S24	240 minute 30 year Winter Q+35%	71.765	71.318	-0.042	0.000	0.19	10.071	218.109		37.7
S6.005	S25	240 minute 30 year Winter Q+35%	71.743	71.316	0.428	0.000	0.43	7.349	218.090		37.1
S6.006	S26	15 minute 30 year Summer Q+0%	71.807	70.818	0.000	0.000	1.23	0.769	57.458		75.5
S6.007	S27	480 minute 30 year Summer Q+35%	71.845	70.844	0.151	0.000	0.35	140.827	215.782	332	10.6
S6.008	S28	240 minute 30 year Winter Q+35%	71.845	71.308	0.648	0.000	0.50	1.784	266.249		18.2

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

PN	US/MH Name	Status
S1.000	S1	OK
S1.001	S2	OK*
S1.002	S3	OK
S2.000	S4	SURCHARGED
S1.003	S5	SURCHARGED*
S1.004	S6	SURCHARGED
S3.000	S7	SURCHARGED
S1.005	S8	SURCHARGED*
S1.006	S9	SURCHARGED
S1.007	S10	SURCHARGED
S4.000	S11	SURCHARGED
S1.008	S12	SURCHARGED
S1.009	S13	SURCHARGED
S1.010	S14	SURCHARGED
S1.011	S15	SURCHARGED
S5.000	S16	SURCHARGED
S1.012	S17	SURCHARGED
S6.000	S20	SURCHARGED
S6.001	S21	OK
S6.002	S22	OK
S6.003	S23	OK
S6.004	S24	OK
S6.005	S25	SURCHARGED
S6.006	S26	SURCHARGED*
S6.007	S27	SURCHARGED*

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

PN	US/MH Name	Status
S6.008	S28	SURCHARGED

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

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Maximum Vol (m³)	Discharge Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)
S6.009	S29	240 minute 30 year Winter Q+35%	71.930	71.301	0.708	0.000	0.41	30.816	265.795	295	11.9
S1.013	S18	240 minute 30 year Winter Q+35%	71.930	71.292	0.743	0.000	0.68	140.300	639.187	402	19.3
S1.014	S19	960 minute 30 year Winter Q+35%	72.010	70.414	-0.111	0.000	0.51	0.155	852.617		19.3

PN	US/MH Name	Status
S6.009	S29	SURCHARGED
S1.013	S18	SURCHARGED
S1.014	S19	OK

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

Simulation Criteria

Areal Reduction Factor	1.000	Manhole Headloss Coeff (Global)	0.500	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Foul Sewage per hectare (l/s)	0.000	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Additional Flow - % of Total Flow	0.000	Flow per Person per Day (l/per/day)	0.000

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	9	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH	Data Type	Catchment
Return Period (years)	100	Cv (Summer)	0.750
FEH Rainfall Version	2013	Cv (Winter)	0.840
Site Location	GB 465150 155700 SU 65150 55700		

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160
Sensitivity flows(s) (%)	0, +40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Maximum Vol (m³)	Discharge Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status

84 North Street
Guildford
Surrey GU1 4AU

Date 19/12/2023 11:42 | Designed by Chris Gray
File 100Y 40CC 2210020 19122023 FINAL.MDX | Checked by Jason Morgans
Causeway | Network 2020.1.3

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

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Maximum Vol (m³)	Discharge Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)
S1.000	S1	180 minute 100 year Winter Q+40%	72.500	71.963	0.366	0.000	0.62	0.145	33.459		7.6
S1.001	S2	480 minute 100 year Winter Q+40%	72.450	71.550	0.000	0.000	0.09	0.669	40.755		3.6
S1.002	S3	180 minute 100 year Winter Q+40%	72.300	71.958	0.483	0.000	0.24	23.732	45.098	148	8.6
S2.000	S4	180 minute 100 year Winter Q+40%	72.400	71.963	0.463	0.000	0.88	0.172	67.106		15.2
S1.003	S5	480 minute 100 year Winter Q+40%	72.345	71.397	0.000	0.000	0.32	1.282	136.741		11.9
S1.004	S6	180 minute 100 year Winter Q+40%	72.270	71.951	0.623	0.000	0.53	51.527	132.174	198	19.3
S3.000	S7	30 minute 100 year Winter Q+40%	72.200	71.988	0.688	0.000	3.16	0.235	48.191		41.0
S1.005	S8	15 minute 100 year Summer Q+0%	72.150	71.241	0.000	0.000	1.03	0.744	58.176		40.2
S1.006	S9	180 minute 100 year Winter Q+40%	72.076	71.933	0.769	0.000	0.67	62.989	235.648	258	24.8
S1.007	S10	180 minute 100 year Winter Q+40%	71.918	71.917	0.853	0.000	0.78	22.201	248.735	301	20.9
S4.000	S11	30 minute 100 year Winter Q+40%	72.050	72.053	0.903	2.996	2.86	3.290	64.901		50.1
S1.008	S12	180 minute 100 year Winter Q+40%	72.000	71.913	0.869	0.000	0.99	1.432	359.306		36.6
S1.009	S13	180 minute 100 year Winter Q+40%	72.000	71.889	0.942	0.000	0.82	24.523	374.672	327	32.0
S1.010	S14	180 minute 100 year Winter Q+40%	72.125	71.859	1.070	0.000	0.59	61.425	391.761	318	20.6
S1.011	S15	180 minute 100 year Winter Q+40%	72.125	71.842	1.114	0.000	0.67	1.827	391.656		19.8
S5.000	S16	180 minute 100 year Winter Q+40%	72.100	71.840	0.940	0.000	0.56	0.307	60.499		13.4
S1.012	S17	180 minute 100 year Winter Q+40%	72.125	71.833	1.133	0.000	1.29	1.784	459.216		33.7
S6.000	S20	240 minute 100 year Winter Q+40%	72.144	71.777	0.531	0.000	0.25	0.934	68.566		11.7
S6.001	S21	240 minute 100 year Winter Q+40%	72.083	71.776	0.098	0.000	0.02	1.196	68.565		11.5
S6.002	S22	240 minute 100 year Winter Q+40%	71.911	71.776	0.270	0.000	0.05	17.608	161.694		26.4
S6.003	S23	240 minute 100 year Winter Q+40%	71.813	71.777	0.369	0.000	0.07	10.788	222.478		36.3
S6.004	S24	240 minute 100 year Winter Q+40%	71.765	71.776	0.416	11.070	0.24	22.347	283.710		46.2
S6.005	S25	240 minute 100 year Winter Q+40%	71.743	71.776	0.888	32.788	0.51	41.085	283.477		44.3
S6.006	S26	15 minute 100 year Summer Q+0%	71.807	70.818	0.000	0.000	1.51	0.830	73.898		92.8
S6.007	S27	480 minute 100 year Summer Q+40%	71.845	70.844	0.151	0.000	0.52	141.238	280.942	504	15.5
S6.008	S28	240 minute 100 year Winter Q+40%	71.845	71.774	1.114	0.000	0.75	2.606	345.259		27.2

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

PN	US/MH Name	Status
S1.000	S1	SURCHARGED
S1.001	S2	SURCHARGED*
S1.002	S3	SURCHARGED
S2.000	S4	SURCHARGED
S1.003	S5	SURCHARGED*
S1.004	S6	SURCHARGED
S3.000	S7	FLOOD RISK
S1.005	S8	SURCHARGED*
S1.006	S9	FLOOD RISK
S1.007	S10	FLOOD RISK
S4.000	S11	FLOOD
S1.008	S12	FLOOD RISK
S1.009	S13	FLOOD RISK
S1.010	S14	FLOOD RISK
S1.011	S15	FLOOD RISK
S5.000	S16	FLOOD RISK
S1.012	S17	FLOOD RISK
S6.000	S20	SURCHARGED
S6.001	S21	SURCHARGED
S6.002	S22	FLOOD RISK
S6.003	S23	FLOOD RISK
S6.004	S24	FLOOD
S6.005	S25	FLOOD
S6.006	S26	SURCHARGED*
S6.007	S27	SURCHARGED*

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

PN	US/MH Name	Status
S6.008	S28	FLOOD RISK

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

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Maximum Vol (m³)	Discharge Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)
S6.009	S29	180 minute 100 year Winter Q+40%	71.930	71.772	1.179	0.000	0.73	36.790	283.378	430	21.1
S1.013	S18	180 minute 100 year Winter Q+40%	71.930	71.770	1.221	0.000	0.68	177.049	716.537	483	19.3
S1.014	S19	600 minute 100 year Winter Q+0%	72.010	70.414	-0.111	0.000	0.51	0.155	714.986		19.3

PN	US/MH Name	Status
S6.009	S29	FLOOD RISK
S1.013	S18	FLOOD RISK
S1.014	S19	OK

Appendix L

Drainage Management and Maintenance Plan

Lindenwood,
Chineham Business Park, Basingstoke

Drainage Management & Maintenance Plan

For

Aviemore Trustee Ltd

motion

Document Control Sheet

Lindenwood,
Chineham Business Park, Basingstoke

Aviemore Trustee Ltd

This document has been issued and amended as follows:

Date	Issue	Prepared by	Approved by
8th December 2023	Final	Laura Jagiela	Chris Gray
19th December 2023	Final B	Chris Gray	Chris Gray

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Contents

1.0 Introduction

1.1 This document sets out the principles for the long-term management and maintenance of the proposed surface water drainage system at Lindenwood, Chineham Business Park, Basingstoke.

1.2 The purpose of this document is to ensure that the site management company or their agents have a robust inspection and maintenance plan going forwards. This ensures the optimum operation of the surface water drainage system and that it will be continually maintained for the lifetime of the development. This will contribute to reducing the risk of surface water flooding both on- and off-site.

1.3 All those responsible for maintenance should follow relevant health and safety legislation for all activities listed within this report (including lone working, if relevant). Method statements and risk assessments should always be undertaken and made available, if requested.

1.4 This document has been produced by Motion on behalf of their client, Aviemore Trustee Ltd. This document describes the typical management and maintenance tasks that are known at the outline design stage (maintenance frequencies and typical tasks, for example). These have been drawn from industry guidance such as CIRIA C753 - The SuDS Manual – and manufacturer's own guidance.

1.5 Maintenance is considered as a construction activity under the CDM Regulations 2015. Under the CDM Regulations, it is a requirement that a competent person be appointed to carry out a required role. CDM defines a competent person as an individual with sufficient knowledge of the specific tasks to be undertaken, as well as sufficient experience and ability to carry out their duties in relation to the task in a way that secures health and safety on site.

1.6 In recognition of the requirements of the CDM Regulations 2015, this surface water management and maintenance plan expects that the maintenance work will be carried out by a competent person who must have prior knowledge of the drainage components and SuDS systems on site.

1.7 There are limitations on what this document can prescribe at this time. At this stage this document cannot name the specific individuals who will carry out the maintenance and what equipment is to be used. Related to this, this document is unable to provide method statements for exactly how maintenance practices will be carried out. These can only be determined at the time of the maintenance being carried out and the exact maintenance need. Therefore, this is to be the responsibility of the site management company and/or the individuals carrying out the work. We urge those who are carrying out the maintenance to record this information and make it available to the Local Planning Authority (LPA), if required to do so. This drainage management and maintenance plan needs to be a living document that is owned and maintained by the adopting site management company.

2.0 Maintenance Categories

2.1 There are three categories of maintenance activities referred to in this report. These are:

Regular maintenance (including inspections and monitoring)

- Regular maintenance consists of basic tasks done on a frequent and predictable schedule, including inspections, vegetation management, and litter, silt and debris removal.

Occasional maintenance

- Occasional maintenance comprises tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the routine tasks (sediment removal is an example).

Remedial maintenance

- Remedial maintenance comprises of intermittent tasks that may be required to rectify faults associated with the system. The likelihood of faults can be minimised by correct installation, regular inspection and timely maintenance. Where remedial work is found to be necessary, it is likely to be due to site-specific characteristics or unforeseen events and, as such, timings are difficult to predict.
- This document should be read in conjunction with the design drawings of the drainage system, so that the location and type of each feature can be recognised and understood.

3.0 The Surface Water Drainage System

3.1 The proposed surface water drainage system is made up of a number of components. These include:

- Permeable paving
- Geocellular attenuation storage
- Attenuation Basins
- Catchpit manholes/silt traps
- Hydrobrake Flow Control / Up-Flo Filter
- Water Butts
- Manholes
- Pipes.

3.2 All components should be installed in accordance with the manufacturer's instructions and to the levels/arrangement as defined on the designer's drawings. Not doing so will invalidate any warranty provided by the manufacturer.

3.3 All maintenance and cleaning must be carried out in accordance with manufacturer's recommendations and by competent and suitably qualified staff, as defined in the CDM regulations 2015.

4.0 General Maintenance Principles

4.1 All surface water drainage systems, whether piped gravity systems, Sustainable Drainage Systems (SuDS), or flow control devices and pumps, require regular maintenance to keep them working at optimum efficiency and capacity. The maintenance of the surface water drainage system on the development should be carried out alongside other regular maintenance tasks on site.

4.2 Timely and adequate maintenance will increase the lifespan of all the drainage components. Inadequate maintenance will do the reverse. Therefore, the projected lifespan and anticipated replacement date of each drainage component cannot be forecast at the time of this document being produced.

4.3 The site management company and/or their agents are responsible for the maintenance of the surface water drainage system.

4.4 Construction activities can create and discharge significant quantities of sediment that will quickly clog the surface water drainage system. Therefore, construction-stage sediment removal is required immediately post-construction. This may require several cleans of the system during the first year after installation. The construction site manager should assess this and carry out cleaning as necessary.

4.5 Catchpit manholes/silt traps will be specified upstream of the permeable paving. They will remove gross solids and the majority of silts. It is important that any debris build-up in the catchpit manholes/silt traps is removed at regular intervals. This will reduce the risk of the permeable paving becoming silted up. It will maintain its design capacity and function.

4.6 Cleaning should also take place after large storms when there have been increased surface water flows and visible entrainment and deposition of debris.

4.7 An increased frequency of inspection and maintenance should be programmed into the autumn and winter months in acknowledgement that:

- Leaf fall from deciduous trees in autumn will result in an increased amount of leaf litter and an elevated blockage risk of drainage infrastructure.
- Increased rainfall during winter months will result in greater quantities of water moving through the drainage system and a greater input of silt and other debris.

4.8 Table 4.1, below, gives an overview of typical maintenance tasks and the frequency with which they need to be undertaken. Section 5 – Inspection and Maintenance Frequency of Components – will assign typical maintenance frequencies and tasks to the specific components used within the surface water drainage system used at Lindenwood.

Table 4.1: Typical maintenance tasks and frequencies

Activity	Indicative Frequency	Typical Tasks
Routine/regular maintenance	Monthly to annually	▸ Litter picking ▸ Silt removal ▸ Inspection of all inlets, outlets and control structures ▸ Weed removal and invasive plant control
Occasional maintenance	Annually up to 25 years	▸ Silt control around components ▸ Vegetation management around components ▸ Sweeping of pavement areas to remove surface silt ▸ Silt removal from catchpits, cellular storage structures
Remedial maintenance	As required	▸ Inlet/outlet repairs ▸ Erosion repairs ▸ Reinstatement of edgings ▸ Reinstatement following pollution ▸ Removal of silt build-up and leaf litter after storms ▸ Repair of vandalism ▸ Replacement of any blocked filter ▸ membranes/materials

5.0 Inspection and Maintenance Frequency of Components

5.1 Table 5.1 below lists each of the components used within the site's surface water drainage system. It suggests an indicative maintenance frequency for each component and ascribes typical maintenance tasks to them.

5.2 This list is not exhaustive, nor is it prescriptive. As mentioned in Section 3, additional, unscheduled maintenance may be required following adverse weather conditions or after autumn leaf falls. Additional maintenance tasks may be required to adequately clean and maintain individual components.

5.3 The list of components should be cross-referenced with the designer's drawings so that the location of each component can be identified.

5.4 It is the responsibility of the site management company and/or their agents to ensure that all necessary maintenance activities are carried out in a timely manner and that the design performance of each drainage component is preserved.

5.5 If there is any uncertainty regarding the correct and safe methods of cleaning, or what equipment should be used, the manufacturer should be consulted.

Table 5.1: Maintenance Frequency and Task for Drainage Components

Activity	Indicative Frequency	Anticipated Tasks
Pipes	As required	▸ Identify any pipes that may not be operating properly and employ a competent, qualified contractor to inspect using CCTV. ▸ If the pipe is blocked with silt or debris, the pipe should be jetted clean from an upstream access point. All silt and debris should be captured and removed at a downstream access point. ▸ Inspect once clean. ▸ If any other defects are encountered (cracks, displaced joints, root ingress), appropriate solutions should be discussed with a competent and qualified contractor. These services are usually provided by the same companies that offer CCTV surveys and pipe jetting services.
Manholes	Annually	▸ Inspect/identify any damage or areas that are not operating correctly ▸ Remove silt, litter, leaves and other detritus. ▸ Inspect once clean.
Catchpit Manholes / Silt Traps	Twice a year, before and after autumn/winter	▸ Inspect/identify any damage or areas that are not operating correctly ▸ Remove silt, litter, leaves and other detritus. ▸ Inspect once clean.
Geocellular Crates	Every three months for the first year, then annually thereafter	▸ Contact manufacturer for instruction on approved and safe inspection and maintenance practices ▸ Inspect/identify any areas that are not operating correctly ▸ Remove debris from catchment surface

		▸ Remove sediment from pre-treatment structures ▸ Check for silt build-up and flush and remove as required (in accordance with manufacturer's instructions). ▸ Inspect once clean. ▸ See Table 21.3 of CIRIA C753 for more information. ▸ Most geocellular units have a 60 year creep limited life expectancy, so they should be planned for replacement by 2081 (approx.).
Hydrobrake / Up-Flo Filter chambers	Every three months for the first year, then annually thereafter	▸ Contact manufacturer for instruction on approved and safe inspection and maintenance practices. ▸ Inspect and check functionality. Remove any detritus as required. ▸ Inspect once clean.
Water Butts	Annually in Autumn to Winter	▸ Remove falling leaves and seeds from guttering or those that have found their way into the water butt. ▸ Water may stagnate slightly. If so, use a water butt cleaning disc into the tank. ▸ In autumn and winter, drain water off every 10 days (or less) to make sure that water butts don't overflow and that water is kept moving. This will stop larvae and flies from using the water butt. ▸ Use safe products such as vinegar to clean the outside of the tank and the inside of the lid and be careful not to contaminate water with chemicals. ▸ At least once a year, completely empty the water butt and scrub it out with warm soapy water and then rinse thoroughly. This is best done at a time when the water butt is already nearly empty (end of summer) or when it can readily refill (winter).
Permeable paving	Once a year after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations.	▸ Agitate surface by means of mechanical sweeping or vacuuming to ensure no vegetation or moss is allowed to establish and grow in the joints. ▸ Mechanical sweeping of paviours and refilling of joints with the correct aggregate need only be carried out at intervals of 5 years or so ▸ Remove weeds from the surface through the application of glyphosate-based weed killers ▸ Stabilise and mow contributing and adjacent areas. ▸ Inspect once clean. ▸ See Table 20.15 of CIRIA C753 for more information. ▸ Permeable paving has a nominal 25 year lifespan, if correctly and regularly maintained.

		▸ When subjected to low level oil drips permeable paviours can continue to biodegrade hydrocarbons indefinitely. ▸ Major oil spills have the potential to contaminate the surface and the underlying crushed stone. In the event of a major oil spill, the area of block paviours and crushed stone that is affected should be removed, cleaned and reinstalled.

5.6 Upon completion of maintenance activities, a record should be kept of the work carried out. This should be retained and an annual maintenance report should be compiled, which should include the following:

- Observations resulting from inspections
- Maintenance and operation activities undertaken during the year
- Recommendations for inspections and maintenance programmes for the following year

5.7 On the next page is a table with suggested information should be recorded and included with the maintenance plan. As mentioned in the introduction to this document, this should be a living document and regularly updated, as required.

5.8 The Local Planning Authority Basingstoke and Deane Borough Council may request to check and sign off any maintenance activities. Therefore, it is the recommendation that the LPA is contacted prior to any scheduled routine maintenance. The table mentioned above and on the next page, as well as the annual maintenance report, should be offered to the LPA for their records and approval.

Date	Component requiring maintenance	Issues prompting maintenance	Scheduled maintenance (Y/N)	Maintenance carried out	Additional works required (Y/N). If yes, please detail	Next scheduled date of inspection and maintenance

Appendix M

Completed LLFA Surface Water Checklist

This document should be read in conjunction with the Surface Water Checklist Guidance document located on our website

SURFACE WATER SUBMITTED INFORMATION

Some applications have a considerable number of documents associated with them. To make sure we are reviewing the correct documentation, please ensure the following table is completed.

Document / Drawing Title	Document / Drawing Reference (and revision)
Flood Risk Assessment and Drainage Strategy	R03-frich4-FRA+DS-19.12.2023 B

PRE-APPLICATION / PREVIOUS PLANNING APPLICATIONS

If this site was subject to a previous planning application i.e. an outline application in relation to a wider strategic site, pre-application enquiry or if you are reliant on information previously submitted, please provide the relevant reference numbers below.

Planning / Pre-app Titles	Reference Number

ORDINARY WATERCOURSE CONSENTING – to be completed and signed by the applicant

I confirm that I have reviewed the site and there are no watercourses / ditches / flow routes that will be affected or amended by the works. I understand that works to any of these features without consent constitutes a criminal offence and breaches the Land Drainage Act 1991.

Or (delete as appropriate).

I confirm that I have reviewed the site and there are watercourses / ditches / flow routes that will be affected or amended by the works. I understand that these works require Ordinary Watercourse Consent under the Land Drainage Act 1991 and confirm that applications will be made for these works prior to works starting on site.

Name: CHRIS GRAY **Job Title:** PRINCIPAL ENGINEER

Signature: Chris Gray

15/01/2020

SURFACE WATER CHECKLIST

Site Name		Planning ref			
Ref	**SURFACE WATER REQUIREMENTS**	**PLANNING STAGE**		**SUBMISSSION CHECKLIST**	
		OUTLINE PLANNING	DETAILED PLANNING	Included Yes/Not	DOCUMENT Ref
	EXISTING INFORMATION	X	X		
1	Topographical Survey.	X	X	Yes	FRA+DS Appendix E
2	Existing Drainage	X	X	Yes	FRA+DS Appendix F
3	Discharge Rates and Volumes	X	X	Yes	FRA+DS Section 7 & Appendix K
4	Existing Overland Flow Paths	X	X	N/A	
5	Site Investigations	X	X	No	
	OUTLINE DRAINAGE STRATEGY				
6	Confirmation of a discharge location	X	X	Yes	FRA+DS Section 2
7	Outline Surface Water Calculations	X		Yes	FRA+DS Appendix K
8	Flood Risk Assessment / Drainage Strategy	X	X	Yes	FRA+DS Report
9	Potential Flood Risk	X	X	Yes	FRA+DS Section 4 and 5. Appendix C, D and H
10	Outline Drainage Layout Plan	X		Yes	FRA+DS Appendix J
	DETAILED DRAINAGE STRATEGY		X		
11	Detailed Drainage Assessment		X		
12	Detailed Drainage Layout Drawings		X		
13	Detailed Hydraulic Calculations		X	Yes	FRA+DS Appendix K
14	Water Treatment		X	Yes	FRA+DS Section 8
15	Exceedance Flows		X	Yes	FRA+DS Appendix J
16	Urban Creep		X	Yes	FRA+DS Section 9
17	Maintenance		X	Yes	FRA+DS Appendix L