

Appendix 4

160 Aztec, Aztec West
Almondsbury
Bristol, BS32 4TU

3454 Long Ashton
GFRR



Date 25/02/2020 10:18
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Innovyze

Source Control 2016.1

ICP SUDS Mean Annual Flood

Input


Return Period (years)	100	Soil	0.450
Area (ha)	0.802	Urban	0.000
SAAR (mm)	900	Region Number	Region 8

Results 1/s

QBAR Rural	4.7
QBAR Urban	4.7

Q100 years 11.4

Q1 year	3.7
Q30 years	9.0
Q100 years	11.4

Cole Easdon		Page 1
160 Aztec, Aztec West Almondsbury Bristol, BS32 4TU		
Date 05/03/2020 17:01 File	Designed by zbell Checked by	

Innovyze Source Control 2016.1

Cascade Summary of Results for 3454 - Paving Area 1.SRCX


Upstream Structures **Outflow To** **Overflow To**

(None) 3454 - Cellular Storage.SRCX (None)

Half Drain Time : 539 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m ³)	Status
15 min Summer	54.858	0.268	0.0	0.7	0.7	21.8	O K
30 min Summer	54.948	0.358	0.0	0.8	0.8	29.4	O K
60 min Summer	55.040	0.450	0.0	0.9	0.9	37.2	O K
120 min Summer	55.124	0.534	0.0	0.9	0.9	44.4	O K
180 min Summer	55.162	0.572	0.0	1.0	1.0	47.6	O K
240 min Summer	55.181	0.591	0.0	1.0	1.0	49.2	O K
360 min Summer	55.197	0.607	0.0	1.0	1.0	50.5	O K
480 min Summer	55.201	0.611	0.0	1.0	1.0	50.9	Flood Risk
600 min Summer	55.202	0.612	0.0	1.0	1.0	51.0	Flood Risk
720 min Summer	55.201	0.611	0.0	1.0	1.0	50.9	Flood Risk
960 min Summer	55.193	0.603	0.0	1.0	1.0	50.2	O K
1440 min Summer	55.168	0.578	0.0	1.0	1.0	48.1	O K
2160 min Summer	55.122	0.532	0.0	0.9	0.9	44.2	O K
2880 min Summer	55.078	0.488	0.0	0.9	0.9	40.5	O K
4320 min Summer	55.004	0.414	0.0	0.8	0.8	34.1	O K
5760 min Summer	54.945	0.355	0.0	0.8	0.8	29.1	O K
7200 min Summer	54.899	0.309	0.0	0.7	0.7	25.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
15 min Summer	134.022	0.0	22.2	19
30 min Summer	89.997	0.0	30.2	33
60 min Summer	57.587	0.0	39.1	64
120 min Summer	35.493	0.0	48.6	122
180 min Summer	26.304	0.0	54.1	182
240 min Summer	21.147	0.0	58.1	242
360 min Summer	15.561	0.0	64.2	352
480 min Summer	12.496	0.0	68.8	404
600 min Summer	10.532	0.0	72.5	466
720 min Summer	9.153	0.0	75.6	528
960 min Summer	7.329	0.0	80.7	664
1440 min Summer	5.347	0.0	88.1	938
2160 min Summer	3.893	0.0	96.1	1344
2880 min Summer	3.103	0.0	101.9	1756
4320 min Summer	2.251	0.0	110.3	2512
5760 min Summer	1.790	0.0	116.3	3288
7200 min Summer	1.500	0.0	121.3	4032

160 Aztec, Aztec West Almondsbury Bristol, BS32 4TU	
Date 05/03/2020 17:01 File	Designed by zbell Checked by

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Cascade Summary of Results for 3454 - Paving Area 1.SRCX

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
8640 min Summer	54.862	0.272	0.0	0.7	0.7	22.1	O K
10080 min Summer	54.832	0.242	0.0	0.6	0.6	19.5	O K
15 min Winter	54.891	0.301	0.0	0.7	0.7	24.6	O K
30 min Winter	54.992	0.402	0.0	0.8	0.8	33.2	O K
60 min Winter	55.096	0.506	0.0	0.9	0.9	42.0	O K
120 min Winter	55.193	0.603	0.0	1.0	1.0	50.2	O K
180 min Winter	55.237	0.647	0.0	1.0	1.0	54.0	Flood Risk
240 min Winter	55.261	0.671	0.0	1.1	1.1	55.9	Flood Risk
360 min Winter	55.283	0.693	0.0	1.1	1.1	57.9	Flood Risk
480 min Winter	55.287	0.697	0.0	1.1	1.1	58.2	Flood Risk
600 min Winter	55.285	0.695	0.0	1.1	1.1	58.0	Flood Risk
720 min Winter	55.282	0.692	0.0	1.1	1.1	57.8	Flood Risk
960 min Winter	55.269	0.679	0.0	1.1	1.1	56.7	Flood Risk
1440 min Winter	55.229	0.639	0.0	1.0	1.0	53.3	Flood Risk
2160 min Winter	55.161	0.571	0.0	1.0	1.0	47.5	O K
2880 min Winter	55.097	0.507	0.0	0.9	0.9	42.1	O K
4320 min Winter	54.994	0.404	0.0	0.8	0.8	33.3	O K
5760 min Winter	54.917	0.327	0.0	0.7	0.7	26.7	O K
7200 min Winter	54.860	0.270	0.0	0.7	0.7	21.9	O K
8640 min Winter	54.816	0.226	0.0	0.6	0.6	18.2	O K
10080 min Winter	54.783	0.193	0.0	0.6	0.6	15.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
8640 min Summer	1.299	0.0	125.4	4752
10080 min Summer	1.150	0.0	128.8	5448
15 min Winter	134.022	0.0	25.0	19
30 min Winter	89.997	0.0	34.0	33
60 min Winter	57.587	0.0	44.0	62
120 min Winter	35.493	0.0	54.6	120
180 min Winter	26.304	0.0	60.8	178
240 min Winter	21.147	0.0	65.2	236
360 min Winter	15.561	0.0	72.1	346
480 min Winter	12.496	0.0	77.2	450
600 min Winter	10.532	0.0	81.4	486
720 min Winter	9.153	0.0	84.9	558
960 min Winter	7.329	0.0	90.6	712
1440 min Winter	5.347	0.0	98.7	1012
2160 min Winter	3.893	0.0	108.0	1448
2880 min Winter	3.103	0.0	114.5	1872
4320 min Winter	2.251	0.0	124.0	2676
5760 min Winter	1.790	0.0	130.9	3408
7200 min Winter	1.500	0.0	136.5	4176
8640 min Winter	1.299	0.0	141.2	4920
10080 min Winter	1.150	0.0	145.2	5640

160 Aztec, Aztec West
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Cascade Rainfall Details for 3454 - Paving Area 1.SRCX

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.300	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.094

Time (mins)	Area
From: To:	(ha)
0 4	0.094

Time Area Diagram

Total Area (ha) 0.000

Time (mins)	Area
From: To:	(ha)
0 4	0.000

160 Aztec, Aztec West
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Bristol, BS32 4TU



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Cascade Model Details for 3454 - Paving Area 1.SRCX

Storage is Online Cover Level (m) 55.500

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	11.8
Membrane Percolation (mm/hr)	1000	Length (m)	24.0
Max Percolation (l/s)	78.7	Slope (1:X)	1000.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	54.590	Cap Volume Depth (m)	0.700

Orifice Outflow Control

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 54.590

Cole Easdon		Page 1
160 Aztec, Aztec West Almondsbury Bristol, BS32 4TU		
Date 05/03/2020 17:01 File	Designed by zbell Checked by	

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Cascade Summary of Results for 3454 - Paving Area 2.SRCX

Upstream Structures **Outflow To** **Overflow To**


(None) 3454 - Cellular Storage.SRCX (None)

Half Drain Time : 213 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m ³)	Status
15 min Summer	55.693	0.153	0.0	0.3	0.3	4.6	O K
30 min Summer	55.744	0.204	0.0	0.4	0.4	6.2	O K
60 min Summer	55.792	0.252	0.0	0.4	0.4	7.7	O K
120 min Summer	55.827	0.287	0.0	0.4	0.4	8.7	Flood Risk
180 min Summer	55.835	0.295	0.0	0.4	0.4	9.0	Flood Risk
240 min Summer	55.838	0.298	0.0	0.4	0.4	9.1	Flood Risk
360 min Summer	55.838	0.298	0.0	0.4	0.4	9.1	Flood Risk
480 min Summer	55.834	0.294	0.0	0.4	0.4	9.0	Flood Risk
600 min Summer	55.828	0.288	0.0	0.4	0.4	8.8	Flood Risk
720 min Summer	55.820	0.280	0.0	0.4	0.4	8.5	Flood Risk
960 min Summer	55.803	0.263	0.0	0.4	0.4	8.0	Flood Risk
1440 min Summer	55.771	0.231	0.0	0.4	0.4	7.0	O K
2160 min Summer	55.732	0.192	0.0	0.4	0.4	5.8	O K
2880 min Summer	55.703	0.163	0.0	0.3	0.3	4.9	O K
4320 min Summer	55.662	0.122	0.0	0.3	0.3	3.6	O K
5760 min Summer	55.635	0.095	0.0	0.2	0.2	2.8	O K
7200 min Summer	55.617	0.077	0.0	0.2	0.2	2.2	O K

Storm Event **Rain (mm/hr)** **Flooded Volume (m³)** **Discharge Volume (m³)** **Time-Peak (mins)**

15 min Summer	134.022	0.0	4.8	18
30 min Summer	89.997	0.0	6.6	33
60 min Summer	57.587	0.0	8.5	62
120 min Summer	35.493	0.0	10.6	120
180 min Summer	26.304	0.0	11.9	158
240 min Summer	21.147	0.0	12.8	188
360 min Summer	15.561	0.0	14.1	254
480 min Summer	12.496	0.0	15.1	322
600 min Summer	10.532	0.0	15.9	392
720 min Summer	9.153	0.0	16.6	460
960 min Summer	7.329	0.0	17.7	596
1440 min Summer	5.347	0.0	19.4	864
2160 min Summer	3.893	0.0	21.1	1236
2880 min Summer	3.103	0.0	22.3	1612
4320 min Summer	2.251	0.0	24.1	2336
5760 min Summer	1.790	0.0	25.3	3056
7200 min Summer	1.500	0.0	26.3	3752

Cole Easdon		Page 2
160 Aztec, Aztec West Almondsbury Bristol, BS32 4TU		
Date 05/03/2020 17:01 File	Designed by zbell Checked by	

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Cascade Summary of Results for 3454 - Paving Area 2.SRCX

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
8640 min Summer	55.604	0.064	0.0	0.2	0.2	1.8	O K
10080 min Summer	55.595	0.055	0.0	0.2	0.2	1.5	O K
15 min Winter	55.713	0.173	0.0	0.3	0.3	5.2	O K
30 min Winter	55.770	0.230	0.0	0.4	0.4	7.0	O K
60 min Winter	55.825	0.285	0.0	0.4	0.4	8.7	Flood Risk
120 min Winter	55.867	0.327	0.0	0.5	0.5	10.0	Flood Risk
180 min Winter	55.877	0.337	0.0	0.5	0.5	10.3	Flood Risk
240 min Winter	55.878	0.338	0.0	0.5	0.5	10.3	Flood Risk
360 min Winter	55.876	0.336	0.0	0.5	0.5	10.3	Flood Risk
480 min Winter	55.868	0.328	0.0	0.5	0.5	10.0	Flood Risk
600 min Winter	55.857	0.317	0.0	0.5	0.5	9.7	Flood Risk
720 min Winter	55.844	0.304	0.0	0.5	0.5	9.3	Flood Risk
960 min Winter	55.819	0.279	0.0	0.4	0.4	8.5	Flood Risk
1440 min Winter	55.773	0.233	0.0	0.4	0.4	7.1	O K
2160 min Winter	55.721	0.181	0.0	0.3	0.3	5.4	O K
2880 min Winter	55.683	0.143	0.0	0.3	0.3	4.3	O K
4320 min Winter	55.636	0.096	0.0	0.2	0.2	2.8	O K
5760 min Winter	55.610	0.070	0.0	0.2	0.2	2.0	O K
7200 min Winter	55.594	0.054	0.0	0.2	0.2	1.5	O K
8640 min Winter	55.584	0.044	0.0	0.2	0.2	1.2	O K
10080 min Winter	55.577	0.037	0.0	0.1	0.1	0.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
8640 min Summer	1.299	0.0	27.1	4496
10080 min Summer	1.150	0.0	27.7	5152
15 min Winter	134.022	0.0	5.4	18
30 min Winter	89.997	0.0	7.4	32
60 min Winter	57.587	0.0	9.6	60
120 min Winter	35.493	0.0	12.0	118
180 min Winter	26.304	0.0	13.4	172
240 min Winter	21.147	0.0	14.3	196
360 min Winter	15.561	0.0	15.9	272
480 min Winter	12.496	0.0	17.0	348
600 min Winter	10.532	0.0	17.9	422
720 min Winter	9.153	0.0	18.7	498
960 min Winter	7.329	0.0	20.0	638
1440 min Winter	5.347	0.0	21.8	910
2160 min Winter	3.893	0.0	23.7	1300
2880 min Winter	3.103	0.0	25.1	1672
4320 min Winter	2.251	0.0	27.1	2380
5760 min Winter	1.790	0.0	28.6	3112
7200 min Winter	1.500	0.0	29.7	3816
8640 min Winter	1.299	0.0	30.6	4496
10080 min Winter	1.150	0.0	31.4	5240

160 Aztec, Aztec West
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Bristol, BS32 4TU



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Cascade Rainfall Details for 3454 - Paving Area 2.SRCX

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.300	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.021

Time (mins)	Area
From:	To: (ha)
0	4 0.021

Time Area Diagram

Total Area (ha) 0.000

Time (mins)	Area
From:	To: (ha)
0	4 0.000

160 Aztec, Aztec West
Almondsbury
Bristol, BS32 4TU



Date 05/03/2020 17:01
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Cascade Model Details for 3454 - Paving Area 2.SRCX


Storage is Online Cover Level (m) 56.100

Porous Car Park Structure

Infiltration Coefficient Base (m/hr) 0.00000	Width (m) 8.0	
Membrane Percolation (mm/hr) 1000	Length (m) 13.0	
Max Percolation (l/s) 28.9	Slope (1:X) 1000.0	
Safety Factor 2.0	Depression Storage (mm) 5	
Porosity 0.30	Evaporation (mm/day) 3	
Invert Level (m) 55.540	Cap Volume Depth (m) 0.350	

Orifice Outflow Control

Diameter (m) 0.020 Discharge Coefficient 0.600 Invert Level (m) 55.540

Cole Easdon		Page 1
160 Aztec, Aztec West Almondsbury Bristol, BS32 4TU		
Date 05/03/2020 17:02 File	Designed by zbell Checked by	

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Cascade Summary of Results for 3454 - Paving Area 3.SRCX

Upstream Structures **Outflow To** **Overflow To**

(None) 3454 - Cellular Storage.SRCX (None)

Half Drain Time : 401 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m ³)	Status
15 min Summer	51.402	0.262	0.0	0.6	0.6	14.3	O K
30 min Summer	51.490	0.350	0.0	0.6	0.6	19.2	O K
60 min Summer	51.579	0.439	0.0	0.7	0.7	24.2	O K
120 min Summer	51.656	0.516	0.0	0.8	0.8	28.6	O K
180 min Summer	51.687	0.547	0.0	0.8	0.8	30.3	O K
240 min Summer	51.700	0.560	0.0	0.8	0.8	31.0	O K
360 min Summer	51.708	0.568	0.0	0.8	0.8	31.5	Flood Risk
480 min Summer	51.710	0.570	0.0	0.8	0.8	31.6	Flood Risk
600 min Summer	51.708	0.568	0.0	0.8	0.8	31.5	Flood Risk
720 min Summer	51.704	0.564	0.0	0.8	0.8	31.2	Flood Risk
960 min Summer	51.690	0.550	0.0	0.8	0.8	30.5	O K
1440 min Summer	51.655	0.515	0.0	0.8	0.8	28.5	O K
2160 min Summer	51.601	0.461	0.0	0.7	0.7	25.5	O K
2880 min Summer	51.554	0.414	0.0	0.7	0.7	22.8	O K
4320 min Summer	51.478	0.338	0.0	0.6	0.6	18.5	O K
5760 min Summer	51.421	0.281	0.0	0.6	0.6	15.3	O K
7200 min Summer	51.379	0.239	0.0	0.5	0.5	13.0	O K

Storm Event **Rain (mm/hr)** **Flooded Volume (m³)** **Discharge Volume (m³)** **Time-Peak (mins)**

15 min Summer	134.022	0.0	14.6	19
30 min Summer	89.997	0.0	20.0	33
60 min Summer	57.587	0.0	25.8	62
120 min Summer	35.493	0.0	32.0	122
180 min Summer	26.304	0.0	35.7	182
240 min Summer	21.147	0.0	38.3	240
360 min Summer	15.561	0.0	42.3	306
480 min Summer	12.496	0.0	45.4	366
600 min Summer	10.532	0.0	47.8	430
720 min Summer	9.153	0.0	49.9	498
960 min Summer	7.329	0.0	53.2	636
1440 min Summer	5.347	0.0	58.2	910
2160 min Summer	3.893	0.0	63.4	1316
2880 min Summer	3.103	0.0	67.2	1704
4320 min Summer	2.251	0.0	72.7	2464
5760 min Summer	1.790	0.0	76.7	3176
7200 min Summer	1.500	0.0	80.0	3896

Innovyze Source Control 2016.1

Cascade Summary of Results for 3454 - Paving Area 3.SRCX

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
8640 min Summer	51.346	0.206	0.0	0.5	0.5	11.1	O K
10080 min Summer	51.320	0.180	0.0	0.5	0.5	9.7	O K
15 min Winter	51.435	0.295	0.0	0.6	0.6	16.1	O K
30 min Winter	51.534	0.394	0.0	0.7	0.7	21.7	O K
60 min Winter	51.635	0.495	0.0	0.8	0.8	27.3	O K
120 min Winter	51.724	0.584	0.0	0.8	0.8	32.4	Flood Risk
180 min Winter	51.761	0.621	0.0	0.9	0.9	34.5	Flood Risk
240 min Winter	51.778	0.638	0.0	0.9	0.9	35.4	Flood Risk
360 min Winter	51.789	0.649	0.0	0.9	0.9	36.0	Flood Risk
480 min Winter	51.787	0.647	0.0	0.9	0.9	35.9	Flood Risk
600 min Winter	51.783	0.643	0.0	0.9	0.9	35.7	Flood Risk
720 min Winter	51.775	0.635	0.0	0.9	0.9	35.2	Flood Risk
960 min Winter	51.753	0.613	0.0	0.9	0.9	34.0	Flood Risk
1440 min Winter	51.699	0.559	0.0	0.8	0.8	31.0	O K
2160 min Winter	51.620	0.480	0.0	0.8	0.8	26.5	O K
2880 min Winter	51.553	0.413	0.0	0.7	0.7	22.7	O K
4320 min Winter	51.452	0.312	0.0	0.6	0.6	17.1	O K
5760 min Winter	51.382	0.242	0.0	0.5	0.5	13.2	O K
7200 min Winter	51.334	0.194	0.0	0.5	0.5	10.5	O K
8640 min Winter	51.299	0.159	0.0	0.4	0.4	8.5	O K
10080 min Winter	51.273	0.133	0.0	0.4	0.4	7.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
8640 min Summer	1.299	0.0	82.7	4664
10080 min Summer	1.150	0.0	85.0	5352
15 min Winter	134.022	0.0	16.5	18
30 min Winter	89.997	0.0	22.5	33
60 min Winter	57.587	0.0	29.0	62
120 min Winter	35.493	0.0	36.0	120
180 min Winter	26.304	0.0	40.1	176
240 min Winter	21.147	0.0	43.0	232
360 min Winter	15.561	0.0	47.5	338
480 min Winter	12.496	0.0	50.9	384
600 min Winter	10.532	0.0	53.7	458
720 min Winter	9.153	0.0	56.0	536
960 min Winter	7.329	0.0	59.8	690
1440 min Winter	5.347	0.0	65.3	982
2160 min Winter	3.893	0.0	71.2	1404
2880 min Winter	3.103	0.0	75.5	1812
4320 min Winter	2.251	0.0	81.8	2592
5760 min Winter	1.790	0.0	86.3	3296
7200 min Winter	1.500	0.0	90.0	4032
8640 min Winter	1.299	0.0	93.1	4752
10080 min Winter	1.150	0.0	95.8	5448

160 Aztec, Aztec West
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Cascade Rainfall Details for 3454 - Paving Area 3.SRCX

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.300	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.062

Time (mins)	Area
From:	To: (ha)
0	4 0.062

Time Area Diagram

Total Area (ha) 0.000

Time (mins)	Area
From:	To: (ha)
0	4 0.000

160 Aztec, Aztec West
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Cascade Model Details for 3454 - Paving Area 3.SRCX


Storage is Online Cover Level (m) 52.000

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	12.0
Membrane Percolation (mm/hr)	1000	Length (m)	15.6
Max Percolation (l/s)	52.0	Slope (1:X)	1000.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	51.140	Cap Volume Depth (m)	0.650

Orifice Outflow Control

Diameter (m) 0.023 Discharge Coefficient 0.600 Invert Level (m) 51.140

Cole Easdon		Page 1
160 Aztec, Aztec West Almondsbury Bristol, BS32 4TU		
Date 05/03/2020 17:02 File	Designed by zbell Checked by	

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Cascade Summary of Results for 3454 - Paving Area 4.SRCX

Upstream Structures **Outflow To** **Overflow To**

(None) 3454 - Cellular Storage.SRCX (None)

Half Drain Time : 378 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m ³)	Status
15 min Summer	50.949	0.139	0.0	0.3	0.3	7.8	O K
30 min Summer	50.996	0.186	0.0	0.4	0.4	10.7	O K
60 min Summer	51.044	0.234	0.0	0.4	0.4	13.6	O K
120 min Summer	51.086	0.276	0.0	0.5	0.5	16.1	Flood Risk
180 min Summer	51.102	0.292	0.0	0.5	0.5	17.1	Flood Risk
240 min Summer	51.108	0.298	0.0	0.5	0.5	17.4	Flood Risk
360 min Summer	51.113	0.303	0.0	0.5	0.5	17.7	Flood Risk
480 min Summer	51.115	0.305	0.0	0.5	0.5	17.8	Flood Risk
600 min Summer	51.114	0.304	0.0	0.5	0.5	17.8	Flood Risk
720 min Summer	51.111	0.301	0.0	0.5	0.5	17.6	Flood Risk
960 min Summer	51.104	0.294	0.0	0.5	0.5	17.2	Flood Risk
1440 min Summer	51.084	0.274	0.0	0.5	0.5	16.0	Flood Risk
2160 min Summer	51.055	0.245	0.0	0.4	0.4	14.2	O K
2880 min Summer	51.029	0.219	0.0	0.4	0.4	12.6	O K
4320 min Summer	50.987	0.177	0.0	0.4	0.4	10.2	O K
5760 min Summer	50.957	0.147	0.0	0.3	0.3	8.3	O K
7200 min Summer	50.935	0.125	0.0	0.3	0.3	7.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
15 min Summer	134.022	0.0	8.0	19
30 min Summer	89.997	0.0	11.1	33
60 min Summer	57.587	0.0	14.5	62
120 min Summer	35.493	0.0	18.1	122
180 min Summer	26.304	0.0	20.2	180
240 min Summer	21.147	0.0	21.7	240
360 min Summer	15.561	0.0	24.1	298
480 min Summer	12.496	0.0	25.8	360
600 min Summer	10.532	0.0	27.2	426
720 min Summer	9.153	0.0	28.4	492
960 min Summer	7.329	0.0	30.3	634
1440 min Summer	5.347	0.0	33.0	908
2160 min Summer	3.893	0.0	35.9	1300
2880 min Summer	3.103	0.0	38.0	1700
4320 min Summer	2.251	0.0	41.0	2460
5760 min Summer	1.790	0.0	43.0	3176
7200 min Summer	1.500	0.0	44.6	3896

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Cascade Summary of Results for 3454 - Paving Area 4.SRCX

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
8640 min Summer	50.917	0.107	0.0	0.3	0.3	5.9	O K
10080 min Summer	50.904	0.094	0.0	0.3	0.3	5.1	O K
15 min Winter	50.967	0.157	0.0	0.4	0.4	8.9	O K
30 min Winter	51.020	0.210	0.0	0.4	0.4	12.1	O K
60 min Winter	51.074	0.264	0.0	0.5	0.5	15.4	Flood Risk
120 min Winter	51.122	0.312	0.0	0.5	0.5	18.3	Flood Risk
180 min Winter	51.142	0.332	0.0	0.5	0.5	19.5	Flood Risk
240 min Winter	51.151	0.341	0.0	0.5	0.5	20.0	Flood Risk
360 min Winter	51.155	0.345	0.0	0.5	0.5	20.3	Flood Risk
480 min Winter	51.155	0.345	0.0	0.5	0.5	20.3	Flood Risk
600 min Winter	51.153	0.343	0.0	0.5	0.5	20.1	Flood Risk
720 min Winter	51.148	0.338	0.0	0.5	0.5	19.8	Flood Risk
960 min Winter	51.135	0.325	0.0	0.5	0.5	19.1	Flood Risk
1440 min Winter	51.105	0.295	0.0	0.5	0.5	17.3	Flood Risk
2160 min Winter	51.062	0.252	0.0	0.5	0.5	14.7	O K
2880 min Winter	51.026	0.216	0.0	0.4	0.4	12.5	O K
4320 min Winter	50.971	0.161	0.0	0.4	0.4	9.2	O K
5760 min Winter	50.935	0.125	0.0	0.3	0.3	7.0	O K
7200 min Winter	50.910	0.100	0.0	0.3	0.3	5.5	O K
8640 min Winter	50.892	0.082	0.0	0.2	0.2	4.4	O K
10080 min Winter	50.879	0.069	0.0	0.2	0.2	3.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
8640 min Summer	1.299	0.0	45.9	4592
10080 min Summer	1.150	0.0	47.0	5344
15 min Winter	134.022	0.0	9.1	18
30 min Winter	89.997	0.0	12.6	33
60 min Winter	57.587	0.0	16.4	62
120 min Winter	35.493	0.0	20.4	120
180 min Winter	26.304	0.0	22.8	176
240 min Winter	21.147	0.0	24.5	232
360 min Winter	15.561	0.0	27.1	336
480 min Winter	12.496	0.0	29.0	378
600 min Winter	10.532	0.0	30.6	454
720 min Winter	9.153	0.0	31.9	532
960 min Winter	7.329	0.0	34.1	684
1440 min Winter	5.347	0.0	37.2	978
2160 min Winter	3.893	0.0	40.5	1388
2880 min Winter	3.103	0.0	42.8	1788
4320 min Winter	2.251	0.0	46.2	2552
5760 min Winter	1.790	0.0	48.6	3288
7200 min Winter	1.500	0.0	50.5	4032
8640 min Winter	1.299	0.0	52.0	4752
10080 min Winter	1.150	0.0	53.3	5440

160 Aztec, Aztec West
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Cascade Rainfall Details for 3454 - Paving Area 4.SRCX

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.300	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.036

Time (mins)	Area
From: To: (ha)	
0 4	0.036

Time Area Diagram

Total Area (ha) 0.000

Time (mins)	Area
From: To: (ha)	
0 4	0.000

160 Aztec, Aztec West
Almondsbury
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Cascade Model Details for 3454 - Paving Area 4.SRCX


Storage is Online Cover Level (m) 51.370

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	11.8
Membrane Percolation (mm/hr)	1000	Length (m)	17.0
Max Percolation (l/s)	55.7	Slope (1:X)	1000.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	50.810	Cap Volume Depth (m)	0.350

Orifice Outflow Control

Diameter (m) 0.021 Discharge Coefficient 0.600 Invert Level (m) 50.810

Cole Easdon		Page 1
160 Aztec, Aztec West Almondsbury Bristol, BS32 4TU		
Date 05/03/2020 17:02 File	Designed by zbell Checked by	

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Cascade Summary of Results for 3454 - Paving Area 5.SRCX

Upstream Structures **Outflow To** **Overflow To**

(None) 3454 - Cellular Storage.SRCX (None)

Half Drain Time : 1375 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E (l/s)	Max Outflow (l/s)	Max Volume (m ³)	Status
15 min Summer	52.340	0.200	0.0	0.3	0.3	0.3	20.1	O K
30 min Summer	52.409	0.269	0.0	0.3	0.3	0.3	27.5	O K
60 min Summer	52.482	0.342	0.0	0.3	0.3	0.3	35.4	O K
120 min Summer	52.556	0.416	0.0	0.4	0.4	0.4	43.3	O K
180 min Summer	52.595	0.455	0.0	0.4	0.4	0.4	47.5	O K
240 min Summer	52.621	0.481	0.0	0.4	0.4	0.4	50.2	O K
360 min Summer	52.655	0.515	0.0	0.4	0.4	0.4	53.9	O K
480 min Summer	52.675	0.535	0.0	0.4	0.4	0.4	56.0	O K
600 min Summer	52.687	0.547	0.0	0.4	0.4	0.4	57.3	O K
720 min Summer	52.694	0.554	0.0	0.4	0.4	0.4	58.1	O K
960 min Summer	52.699	0.559	0.0	0.4	0.4	0.4	58.6	O K
1440 min Summer	52.699	0.559	0.0	0.4	0.4	0.4	58.6	O K
2160 min Summer	52.691	0.551	0.0	0.4	0.4	0.4	57.7	O K
2880 min Summer	52.677	0.537	0.0	0.4	0.4	0.4	56.2	O K
4320 min Summer	52.643	0.503	0.0	0.4	0.4	0.4	52.6	O K
5760 min Summer	52.607	0.467	0.0	0.4	0.4	0.4	48.8	O K
7200 min Summer	52.576	0.436	0.0	0.4	0.4	0.4	45.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
15 min Summer	134.022	0.0	16.5	19
30 min Summer	89.997	0.0	20.3	34
60 min Summer	57.587	0.0	35.4	64
120 min Summer	35.493	0.0	42.2	124
180 min Summer	26.304	0.0	45.7	182
240 min Summer	21.147	0.0	48.0	242
360 min Summer	15.561	0.0	51.2	362
480 min Summer	12.496	0.0	53.2	482
600 min Summer	10.532	0.0	54.6	602
720 min Summer	9.153	0.0	55.6	720
960 min Summer	7.329	0.0	56.6	916
1440 min Summer	5.347	0.0	56.6	1140
2160 min Summer	3.893	0.0	88.5	1532
2880 min Summer	3.103	0.0	91.6	1932
4320 min Summer	2.251	0.0	91.1	2764
5760 min Summer	1.790	0.0	107.3	3576
7200 min Summer	1.500	0.0	111.7	4392

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Cascade Summary of Results for 3454 - Paving Area 5.SRCX

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
8640 min Summer	52.547	0.407	0.0	0.4	0.4	42.3	O K
10080 min Summer	52.521	0.381	0.0	0.4	0.4	39.5	O K
15 min Winter	52.365	0.225	0.0	0.3	0.3	22.8	O K
30 min Winter	52.442	0.302	0.0	0.3	0.3	31.1	O K
60 min Winter	52.524	0.384	0.0	0.4	0.4	39.9	O K
120 min Winter	52.608	0.468	0.0	0.4	0.4	48.8	O K
180 min Winter	52.652	0.512	0.0	0.4	0.4	53.6	O K
240 min Winter	52.681	0.541	0.0	0.4	0.4	56.7	O K
360 min Winter	52.721	0.581	0.0	0.5	0.5	61.0	Flood Risk
480 min Winter	52.745	0.605	0.0	0.5	0.5	63.6	Flood Risk
600 min Winter	52.761	0.621	0.0	0.5	0.5	65.2	Flood Risk
720 min Winter	52.771	0.631	0.0	0.5	0.5	66.3	Flood Risk
960 min Winter	52.780	0.640	0.0	0.5	0.5	67.3	Flood Risk
1440 min Winter	52.775	0.635	0.0	0.5	0.5	66.8	Flood Risk
2160 min Winter	52.763	0.623	0.0	0.5	0.5	65.5	Flood Risk
2880 min Winter	52.742	0.602	0.0	0.5	0.5	63.2	Flood Risk
4320 min Winter	52.691	0.551	0.0	0.4	0.4	57.7	O K
5760 min Winter	52.640	0.500	0.0	0.4	0.4	52.3	O K
7200 min Winter	52.594	0.454	0.0	0.4	0.4	47.4	O K
8640 min Winter	52.553	0.413	0.0	0.4	0.4	43.0	O K
10080 min Winter	52.517	0.377	0.0	0.4	0.4	39.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
8640 min Summer	1.299	0.0	115.2	5184
10080 min Summer	1.150	0.0	118.2	5952
15 min Winter	134.022	0.0	17.9	19
30 min Winter	89.997	0.0	21.9	33
60 min Winter	57.587	0.0	39.1	64
120 min Winter	35.493	0.0	46.2	122
180 min Winter	26.304	0.0	49.9	180
240 min Winter	21.147	0.0	52.3	240
360 min Winter	15.561	0.0	55.6	356
480 min Winter	12.496	0.0	57.8	472
600 min Winter	10.532	0.0	59.2	584
720 min Winter	9.153	0.0	60.2	698
960 min Winter	7.329	0.0	61.2	916
1440 min Winter	5.347	0.0	61.1	1210
2160 min Winter	3.893	0.0	98.3	1624
2880 min Winter	3.103	0.0	101.0	2100
4320 min Winter	2.251	0.0	99.8	2984
5760 min Winter	1.790	0.0	121.0	3856
7200 min Winter	1.500	0.0	126.0	4680
8640 min Winter	1.299	0.0	130.1	5456
10080 min Winter	1.150	0.0	133.5	6256

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Cascade Rainfall Details for 3454 - Paving Area 5.SRCX

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.300	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.088

Time (mins)	Area
From: To:	(ha)
0 4	0.088

Time Area Diagram

Total Area (ha) 0.000

Time (mins)	Area
From: To:	(ha)
0 4	0.000

160 Aztec, Aztec West
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Cascade Model Details for 3454 - Paving Area 5.SRCX


Storage is Online Cover Level (m) 53.000

Porous Car Park Structure

Infiltration Coefficient Base (m/hr) 0.00000	Width (m) 14.3	
Membrane Percolation (mm/hr) 1000	Length (m) 25.0	
Max Percolation (l/s) 99.3	Slope (1:X) 1000.0	
Safety Factor 2.0	Depression Storage (mm) 5	
Porosity 0.30	Evaporation (mm/day) 3	
Invert Level (m) 52.140	Cap Volume Depth (m) 0.650	

Orifice Outflow Control

Diameter (m) 0.017 Discharge Coefficient 0.600 Invert Level (m) 52.140

Cole Easdon		Page 1
160 Aztec, Aztec West Almondsbury Bristol, BS32 4TU		
Date 05/03/2020 17:03 File	Designed by zbell Checked by	

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Cascade Summary of Results for 3454 - Cellular Storage.SRCX

Upstream Structures	Outflow To	Overflow To
3454 - Paving Area 1.SRCX	(None)	(None)
3454 - Paving Area 2.SRCX		
3454 - Paving Area 3.SRCX		
3454 - Paving Area 4.SRCX		
3454 - Paving Area 5.SRCX		

Half Drain Time : 774 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m ³)	Status
15 min Summer	49.037	0.297	0.0	4.7	4.7	124.0	O K
30 min Summer	49.137	0.397	0.0	4.7	4.7	165.9	O K
60 min Summer	49.245	0.505	0.0	4.7	4.7	210.9	O K
120 min Summer	49.357	0.617	0.0	4.7	4.7	257.7	O K
180 min Summer	49.418	0.678	0.0	4.7	4.7	283.3	O K
240 min Summer	49.458	0.718	0.0	4.7	4.7	300.1	O K
360 min Summer	49.514	0.774	0.0	4.7	4.7	323.5	O K
480 min Summer	49.549	0.809	0.0	4.7	4.7	338.2	O K
600 min Summer	49.572	0.832	0.0	4.7	4.7	347.7	O K
720 min Summer	49.586	0.846	0.0	4.7	4.7	353.7	O K
960 min Summer	49.598	0.858	0.0	4.7	4.7	358.6	O K
1440 min Summer	49.581	0.841	0.0	4.7	4.7	351.7	O K
2160 min Summer	49.536	0.796	0.0	4.7	4.7	332.8	O K
2880 min Summer	49.491	0.751	0.0	4.7	4.7	313.9	O K
4320 min Summer	49.399	0.659	0.0	4.7	4.7	275.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
15 min Summer	134.022	0.0	183.9	19
30 min Summer	89.997	0.0	247.1	34
60 min Summer	57.587	0.0	334.4	64
120 min Summer	35.493	0.0	411.7	124
180 min Summer	26.304	0.0	456.9	184
240 min Summer	21.147	0.0	489.0	244
360 min Summer	15.561	0.0	538.0	364
480 min Summer	12.496	0.0	574.1	482
600 min Summer	10.532	0.0	602.5	602
720 min Summer	9.153	0.0	625.5	722
960 min Summer	7.329	0.0	658.2	962
1440 min Summer	5.347	0.0	652.3	1398
2160 min Summer	3.893	0.0	826.3	1748
2880 min Summer	3.103	0.0	874.3	2132
4320 min Summer	2.251	0.0	939.5	2940

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Cascade Summary of Results for 3454 - Cellular Storage.SRCX

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
5760 min Summer	49.278	0.538	0.0	4.7	4.7	224.8	O K
7200 min Summer	49.163	0.423	0.0	4.7	4.7	176.6	O K
8640 min Summer	49.074	0.334	0.0	4.7	4.7	139.8	O K
10080 min Summer	49.006	0.266	0.0	4.7	4.7	111.2	O K
15 min Winter	49.073	0.333	0.0	4.7	4.7	139.1	O K
30 min Winter	49.185	0.445	0.0	4.7	4.7	186.2	O K
60 min Winter	49.308	0.568	0.0	4.7	4.7	237.3	O K
120 min Winter	49.433	0.693	0.0	4.7	4.7	289.8	O K
180 min Winter	49.502	0.762	0.0	4.7	4.7	318.7	O K
240 min Winter	49.549	0.809	0.0	4.7	4.7	338.0	O K
360 min Winter	49.614	0.874	0.0	4.7	4.7	365.2	O K
480 min Winter	49.656	0.916	0.0	4.7	4.7	382.8	O K
600 min Winter	49.684	0.944	0.0	4.7	4.7	394.6	O K
720 min Winter	49.703	0.963	0.0	4.7	4.7	402.5	O K
960 min Winter	49.722	0.982	0.0	4.7	4.7	410.5	O K
1440 min Winter	49.716	0.976	0.0	4.7	4.7	407.8	O K
2160 min Winter	49.656	0.916	0.0	4.7	4.7	382.8	O K
2880 min Winter	49.595	0.855	0.0	4.7	4.7	357.4	O K
4320 min Winter	49.459	0.719	0.0	4.7	4.7	300.4	O K
5760 min Winter	49.269	0.529	0.0	4.7	4.7	221.0	O K
7200 min Winter	49.091	0.351	0.0	4.7	4.7	146.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
5760 min Summer	1.790	0.0	1013.3	3696
7200 min Summer	1.500	0.0	1058.9	4328
8640 min Summer	1.299	0.0	1097.2	5016
10080 min Summer	1.150	0.0	1129.3	5648
15 min Winter	134.022	0.0	206.2	19
30 min Winter	89.997	0.0	276.4	34
60 min Winter	57.587	0.0	374.5	64
120 min Winter	35.493	0.0	460.7	122
180 min Winter	26.304	0.0	511.0	182
240 min Winter	21.147	0.0	546.7	242
360 min Winter	15.561	0.0	600.8	360
480 min Winter	12.496	0.0	640.0	478
600 min Winter	10.532	0.0	669.6	596
720 min Winter	9.153	0.0	690.6	712
960 min Winter	7.329	0.0	700.2	942
1440 min Winter	5.347	0.0	671.5	1384
2160 min Winter	3.893	0.0	925.4	1868
2880 min Winter	3.103	0.0	978.8	2228
4320 min Winter	2.251	0.0	1051.2	3152
5760 min Winter	1.790	0.0	1137.3	3976
7200 min Winter	1.500	0.0	1188.8	4536

160 Aztec, Aztec West
 Almondsbury
 Bristol, BS32 4TU



Date 05/03/2020 17:03
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Cascade Summary of Results for 3454 - Cellular Storage.SRCX

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
8640 min Winter	48.976	0.236	0.0	4.7	4.7	98.7	O K
10080 min Winter	48.909	0.169	0.0	4.6	4.6	70.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
8640 min Winter	1.299	0.0	1232.0	5096
10080 min Winter	1.150	0.0	1268.4	5648

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Almondsbury
Bristol, BS32 4TU



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Cascade Rainfall Details for 3454 - Cellular Storage.SRCX

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.300	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram


Total Area (ha) 0.501

Time (mins)		Area
From:	To:	(ha)
0	4	0.501

Time Area Diagram

Total Area (ha) 0.000

Time (mins)		Area
From:	To:	(ha)
0	4	0.000

Cole Easdon		Page 5
160 Aztec, Aztec West Almondsbury Bristol, BS32 4TU		
Date 05/03/2020 17:03 File	Designed by zbell Checked by	

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Cascade Model Details for 3454 - Cellular Storage.SRCX

Storage is Online Cover Level (m) 50.760

Cellular Storage Structure

Invert Level (m) 48.740 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	440.0	440.0	1.100	0.0	548.0
1.000	440.0	548.0			

Hydro-Brake Optimum® Outflow Control

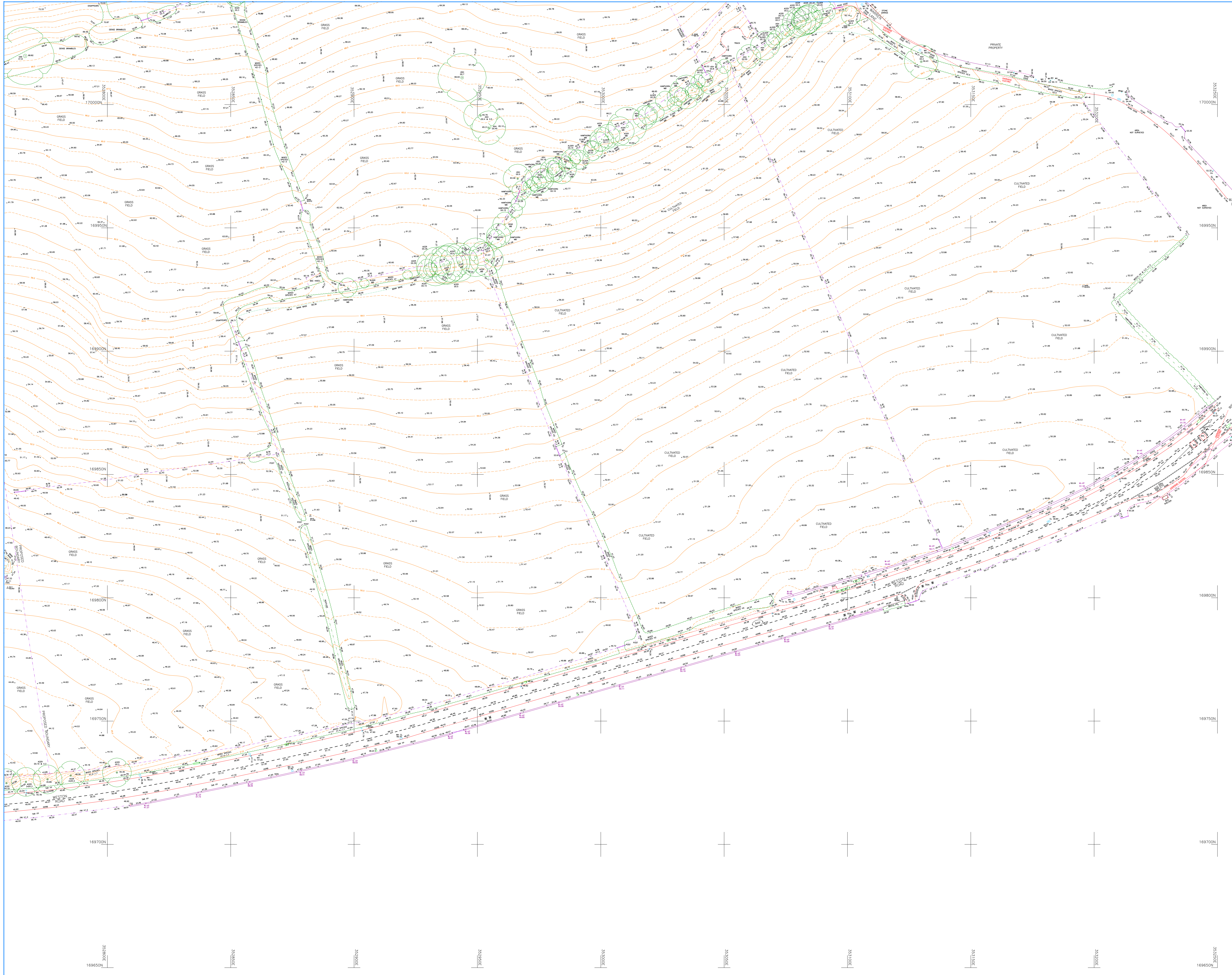
Unit Reference MD-SCL-0097-4700-1000-4700
 Design Head (m) 1.000
 Design Flow (l/s) 4.7
 Flush-Flo™ Calculated
 Objective Minimise blockage risk
 Application Surface
 Sump Available Yes
 Diameter (mm) 97
 Invert Level (m) 48.740
 Minimum Outlet Pipe Diameter (mm) 150
 Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	4.7	Kick-Flo®	0.567	3.6
Flush-Flo™	0.235	4.7	Mean Flow over Head Range	-	4.0

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.5	1.200	5.1	3.000	7.8	7.000	11.7
0.200	4.7	1.400	5.5	3.500	8.4	7.500	12.1
0.300	4.6	1.600	5.8	4.000	9.0	8.000	12.4
0.400	4.5	1.800	6.2	4.500	9.5	8.500	12.8
0.500	4.1	2.000	6.5	5.000	10.0	9.000	13.2
0.600	3.7	2.200	6.8	5.500	10.4	9.500	13.5
0.800	4.2	2.400	7.1	6.000	10.9		
1.000	4.7	2.600	7.3	6.500	11.3		

Appendix 5



Notes

- Survey Grid & Datum : Ordnance Survey National Grid and Level datum via OS Active GPS Network
- Survey contents correct as of date of survey and survey undertaken to agreed specification
- All critical dimensions to be checked prior to site works
- All levels shown are checked levels
- Drainage and Service covers : Covers buried or obscured at the time of the survey are not shown. Manholes have not been entered for safety reasons and all pipe diameters are estimated from the surface. Drainage pipe diameters are in millimetres, e.g. D100 means a 100mm diameter pipe. The flow type stated is based on visual evidence seen from the surface at the time of the survey. All internal manhole details should be confirmed by the contractor on the price to site works.
- Trees : For coniferous spatial trees the ground plotted an average value down to scale to the nearest metre. The minimum individual diameter surveyed is 0.15m at 1.5m up the trunk from the ground. Trunk diameters are not plotted to site. General species are only stated where noted. A qualified arboriculturist should be consulted for species type and condition. Heights (when requested) are approximate to the nearest metre.

Legend of Abbreviations

UTL	Unable to Lift (Cover)
V	Valve (Unknown Type)
VP	Valve Post
Y	Yard Post
W	Water Level
WT	Water Level
W/W	Water Level
W/M	Water Level
W/O	Water Level
WV	Water Valve
WV	Water Valve

Survey Stations

Station	Easting	Northing	Level
G001	318034.717	170020.970	70.296
G002	317713.841	169990.009	61.424
G003	317573.174	170103.426	61.261
G004	317733.074	170113.183	54.839
G005	318177.499	169794.765	46.610
G006	317961.171	169800.730	49.942
G007	317701.096	169800.730	49.942
G008	317720.724	169825.420	50.056
G009	318094.786	169791.726	49.639
G010	318121.820	169976.276	51.679
G011	318195.479	169976.276	51.679
G012	318100.600	170013.127	48.844
G013	318091.034	170034.545	63.796
G014	318015.201	170034.545	63.796
G015	317946.391	169941.367	61.475
G016	317928.726	169813.128	51.686
G017	317759.579	169804.014	46.903
G018	317661.809	169716.081	44.509
G019	317608.206	169714.107	44.509
G020	317474.488	169761.114	41.103
G021	317424.638	169741.264	41.103
G022	317462.615	169794.664	44.415
G023	317424.638	169813.283	44.420
G024	317431.517	169811.143	43.787
G025	317417.013	169811.143	43.787
G026	317401.064	169835.177	45.776
G027	317461.724	169825.091	44.420
G028	317467.874	169799.183	43.913
G029	317424.638	169813.283	44.420
G030	317401.064	169849.270	48.112
G031	317401.064	169849.270	48.112
G032	317321.458	169813.111	44.519
G033	317270.178	169781.121	44.527
G034	317401.064	169781.121	44.527
G035	317360.681	169944.520	61.119
G036	317401.064	169813.283	44.420
G037	317401.064	169813.283	44.420
G038	317401.064	169813.283	44.420
G039	317401.064	169813.283	44.420
G040	317401.064	169813.283	44.420
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G042	317401.064	169813.283	44.420
G043	317401.064	169813.283	44.420
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G081	317401.064	169813.283	44.420
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G096	317401.064	169813.283	44.420
G097	317401.064	169813.283	44.420
G098	317401.064	169813.283	44.420
G099	317401.064	169813.283	44.420
G100	317401.064	169813.283	44.420

3022-11NOV14-01	3022-11NOV14-02
3022-11NOV14-03	3022-11NOV14-04

A D Horner Limited
 Land and Measured Building Surveyors

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 Worcestershire
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 PL21 9QP

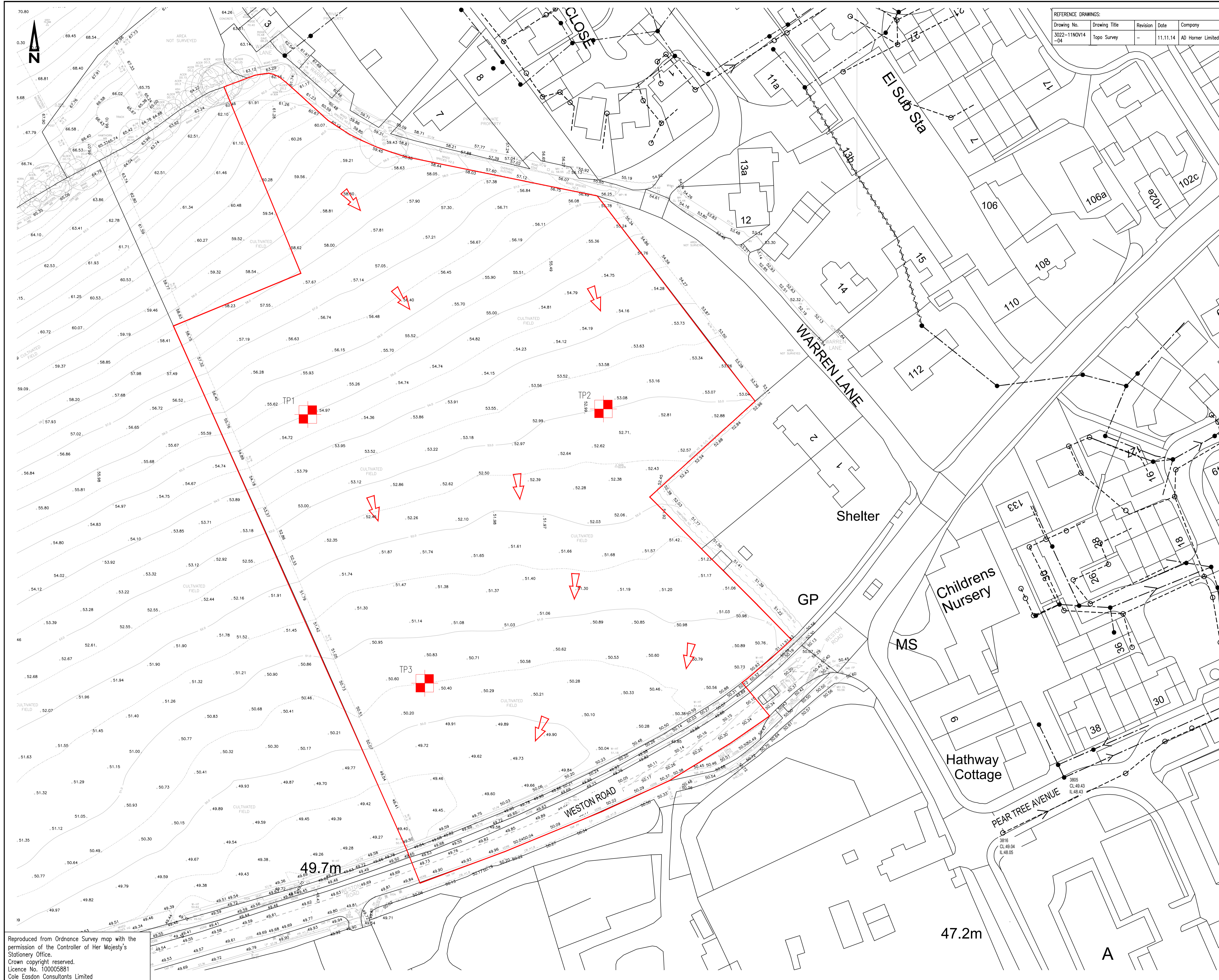
Telephone: 01386-555486 Telephone: 01752-837382

E-mail: enquires@adhorne.co.uk

Title	Gatcombe Farm and land off Weston Road & Warren Lane, Long Ashton, Bristol BS44 9QT		
Client	Long Ashton Land Company Limited		
Date	June 2011/November 2014	Drawing No.	3022-11NOV14-04
Plot scale	1 : 500 on A0 Sheet	Revision	
Digital scale	1 CAD unit = 1 metre		
Surveyed	DGCC / AD	Checked	RW
New kerb line and cycle line along south side of Weston Road added November 2014.			
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Appendix 6



REFERENCE DRAWINGS:				
Drawing No.	Drawing Title	Revision	Date	Company
3022-11NOV14-04	Topo Survey	-	11.11.14	AD Horner Limited

- KEY**
- Site Boundary (Area = 2.22ha)
 - Existing public surface water sewer and manhole
 - Existing public foul water sewer and manhole
 - TP3 Trial pit location
 - +52.38 Existing ground level
 - Existing contour
 - Existing overland flow route

- GENERAL NOTES**
1. All levels are in metres above Ordnance datum.
 2. Public sewer details based on Wessex Water records

A	ZB	26.05.20	Site boundary amended
---	----	----------	-----------------------

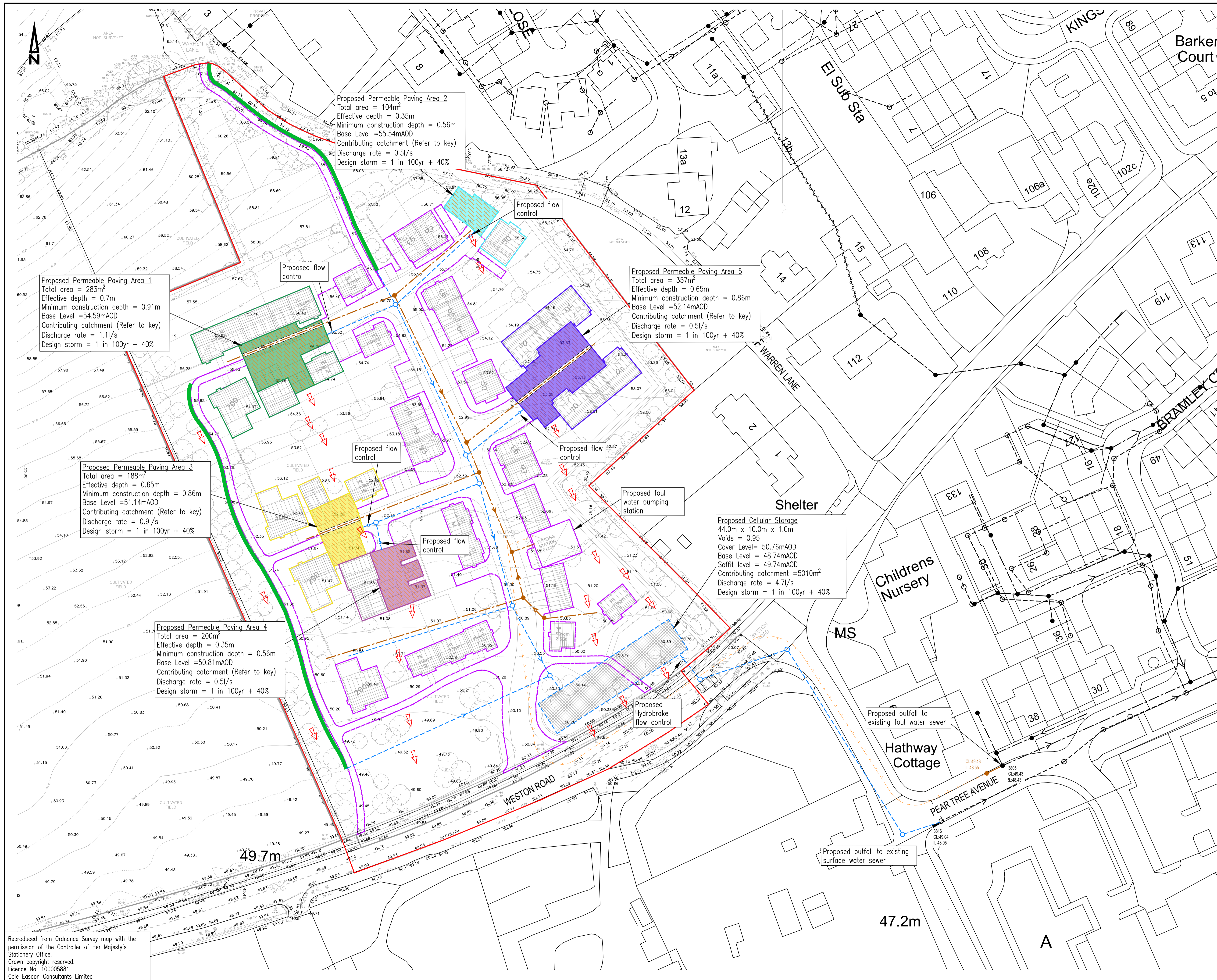
No.	By	Date	Revision Details
©	Copyright		
		160 AZTEC AZTEC WEST ALMONDSBURY BRISTOL BS32 4TU Tel : 01454 800474	
		Web Site : www.ColeEasdon.com E-mail : br@ColeEasdon.com	
Client			
Long Ashton Land Company Ltd			

Job Title
 Land South of Warren Lane
 Long Ashton
 Somerset

Drawing Title
 Existing Site Layout

Drawing Status					
FOR COMMENT	FOR PLANNING	FOR TENDER	FOR APPROVAL	FOR CONSTRUCTION	AS BUILT
CONSTRUCTION AT CLIENT / CONTRACTOR RISK					
Designed by	ZB	Drawn by	ZB	Checked by	DF
Date	March 2020	Scale	1:500 @ A1		
Dwg No.	3454/500	Rev.	A		

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Proposed Permeable Paving Area 2
 Total area = 104m²
 Effective depth = 0.35m
 Minimum construction depth = 0.56m
 Base Level = 55.54mAOD
 Contributing catchment (Refer to key)
 Discharge rate = 0.5l/s
 Design storm = 1 in 100yr + 40%

Proposed Permeable Paving Area 1
 Total area = 283m²
 Effective depth = 0.7m
 Minimum construction depth = 0.91m
 Base Level = 54.59mAOD
 Contributing catchment (Refer to key)
 Discharge rate = 1.1l/s
 Design storm = 1 in 100yr + 40%

Proposed Permeable Paving Area 5
 Total area = 357m²
 Effective depth = 0.65m
 Minimum construction depth = 0.86m
 Base Level = 52.14mAOD
 Contributing catchment (Refer to key)
 Discharge rate = 0.5l/s
 Design storm = 1 in 100yr + 40%

Proposed Permeable Paving Area 3
 Total area = 188m²
 Effective depth = 0.65m
 Minimum construction depth = 0.86m
 Base Level = 51.14mAOD
 Contributing catchment (Refer to key)
 Discharge rate = 0.9l/s
 Design storm = 1 in 100yr + 40%

Proposed Permeable Paving Area 4
 Total area = 200m²
 Effective depth = 0.35m
 Minimum construction depth = 0.56m
 Base Level = 50.81mAOD
 Contributing catchment (Refer to key)
 Discharge rate = 0.5l/s
 Design storm = 1 in 100yr + 40%

Proposed Cellular Storage
 44.0m x 10.0m x 1.0m
 Voids = 0.95
 Cover Level = 50.76mAOD
 Base Level = 48.74mAOD
 Soffit level = 49.74mAOD
 Contributing catchment = 5010m²
 Discharge rate = 4.7l/s
 Design storm = 1 in 100yr + 40%

Drawing No.	Drawing Title	Revision	Date	Company
18071-NP-xx-x x-DR-A-0001	Proposed Site Layout	9	29.01.20	Nash Partnership
3022-11NOV14-04	Topo Survey	-	11.11.14	AD Horner Limited

- KEY**
- Site Boundary (Area = 2.22ha)
 - - - Existing public surface water sewer and manhole
 - - - Existing public foul water sewer and manhole
 - ~ ~ ~ Existing abandoned sewer
 - - - Proposed surface water sewer and manhole
 - - - Proposed surface foul sewer and manhole
 - - - Proposed foul rising main
 - Proposed impermeable area (Area = 8020m² including 10% urban creep)
 - Proposed tanked permeable paving
 - Area 1
Contributing catchment = 937.1m²
 - Area 2
Contributing catchment = 207.1m²
 - Area 3
Contributing catchment = 622.7m²
 - Area 4
Contributing catchment = 363.4m²
 - Area 5
Contributing catchment = 879.5m²
 - Proposed conveyance swale
 - Proposed service corridor
 - Proposed cellular storage
 - ⇨ Design exceedance route

- GENERAL NOTES**
- All levels are in metres above Ordnance datum.
 - Public sewer details based on Wessex Water records
 - Connection to public sewer subject to Wessex Water approval
 - This drainage strategy is indicative only and is subject to detailed design

A	ZB	26.05.20	Site boundary amended
---	----	----------	-----------------------

No.	By	Date	Revision Details
1	ZB	26.05.20	Site boundary amended

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Client: Long Ashton Land Company Ltd

Job Title: Land South of Warren Lane
 Long Ashton
 Somerset

Drawing Title: Proposed Drainage Layout

Drawing Status:					
FOR COMMENT	FOR PLANNING	FOR TENDER	FOR APPROVAL	FOR CONSTRUCTION	AS BUILT
CONSTRUCTION AT CLIENT / CONTRACTOR RISK					
Designed by: ZB	Drawn by: ZB	Checked by: DF	Date: February 2020		
Scale: 1:500 @ A1		Dwg No: 3454/501			
Rev: A					

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