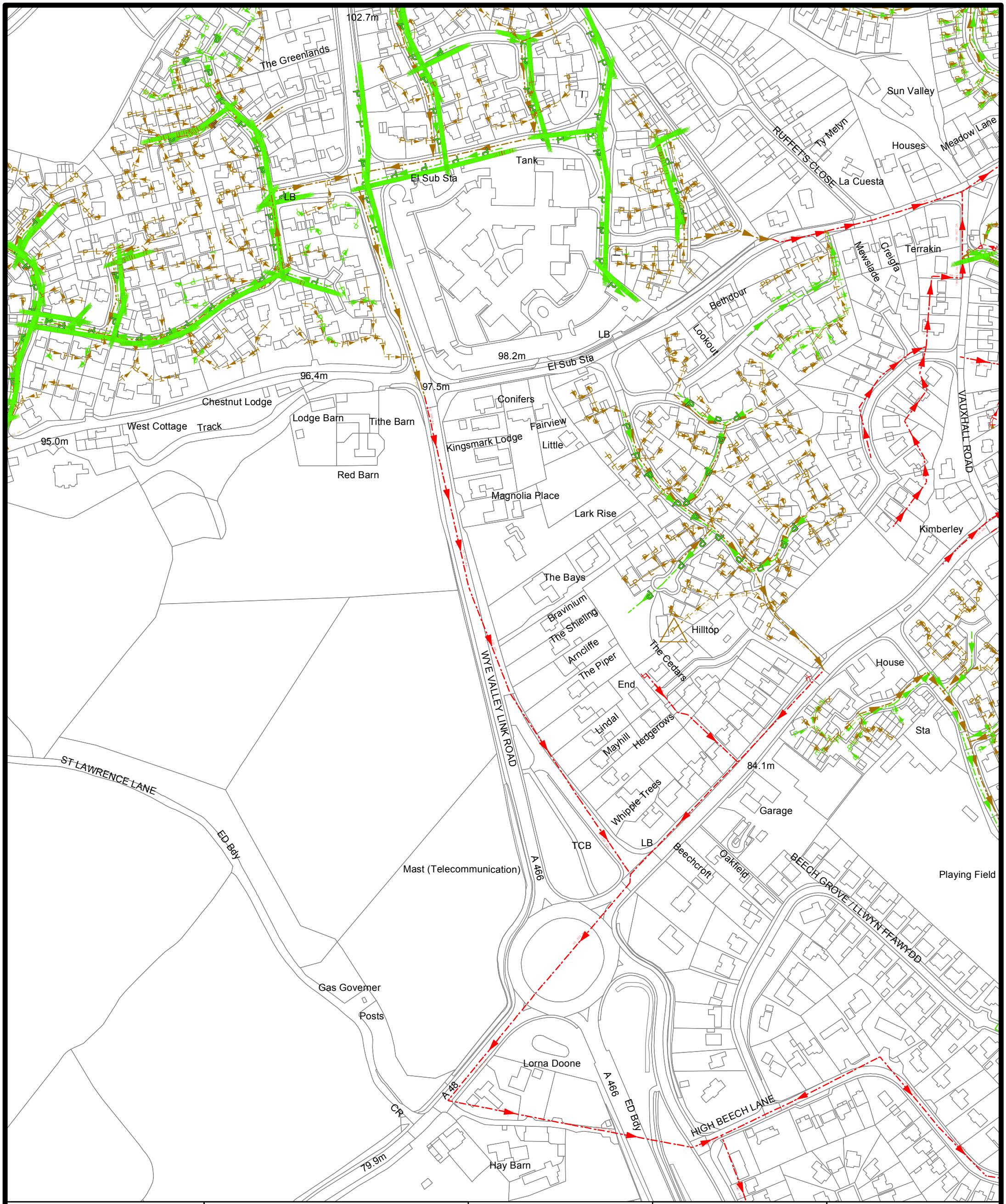
Appendix D – Sewer Records



Dŵr Cymru
Welsh Water

LEGEND(Representative of most common features)

Waste network:

- Foul chamber
- Surface water chamber
- Combined chamber
- Combined sewer overflow
- Special purpose chamber
- Treatment works
- Pumping station
- Outfall
- Lamphole
- Storm Overflow
- Rising main
- Gravity sewer
- Private sewer
- Private sewer subject to Sect. 104 adoption agreement
- Private Sewer Transfer
- Lateral Drain
- Inspection Chamber

Notes:

Dwr Cymru Cyf gives this information as to the position of its underground apparatus by way of general guidance only on the strict understanding that it is based on the best information available and no warranty as to its correctness is relied upon in the event of excavations or other works made in the vicinity of the Company's apparatus and any onus of locating the apparatus before carrying out any excavations rests entirely on you. It must be understood that the furnishing of the information is entirely without prejudice to the provision of the New Roads and Streetworks Act 1991 and of the Company's right to be compensated for any damage to its apparatus.

Service pipes are not generally shown but their presence should be anticipated.

EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.

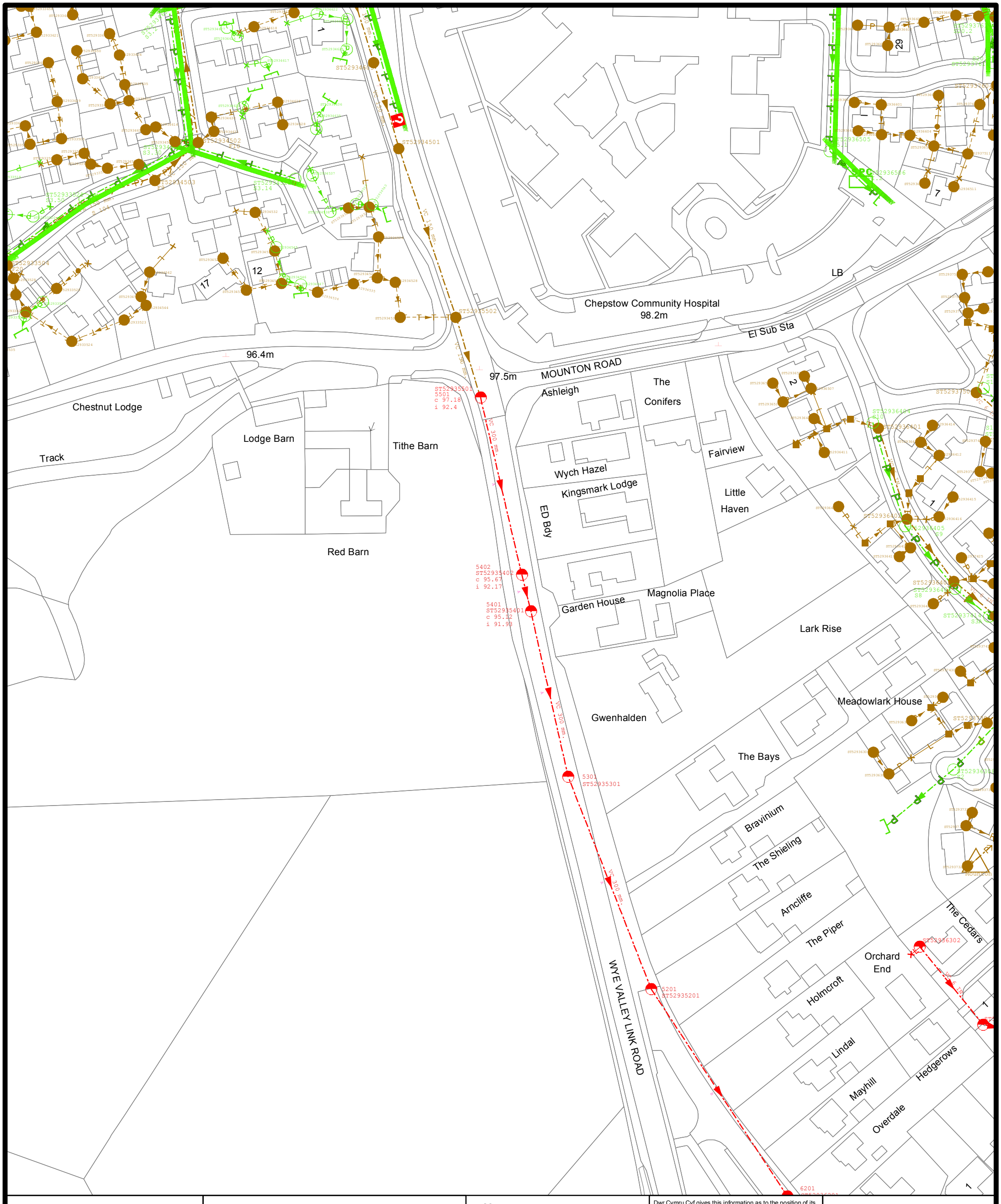
N W E S

Map Ref:

Map scale: 1:2,500

Printed by:

Printed on:



Dŵr Cymru Welsh Water

LEGEND(Representative of most common features)

Waste network:

- Foul chamber
- Surface water chamber
- Combined chamber
- Combined sewer overflow
- Special purpose chamber
- Treatment works
- Pumping station
- Outfall
- Lamphole
- Storm Overflow
- Rising main
- Gravity sewer
- Private sewer
- Private sewer subject to Sect. 104 adoption agreement
- Private Sewer Transfer
- Lateral Drain
- Inspection Chamber

Notes:

Dwr Cymru Cyf gives this information as to the position of its underground apparatus by way of general guidance only on the strict understanding that it is based on the best information available and no warranty as to its correctness is relied upon in the event of excavations or other works made in the vicinity of the Company's apparatus and any onus of locating the apparatus before carrying out any excavations rests entirely on you. It must be understood that the furnishing of the information is entirely without prejudice to the provision of the New Roads and Streetworks Act 1991 and of the Company's right to be compensated for any damage to its apparatus.

Service pipes are not generally shown but their presence should be anticipated.

EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.

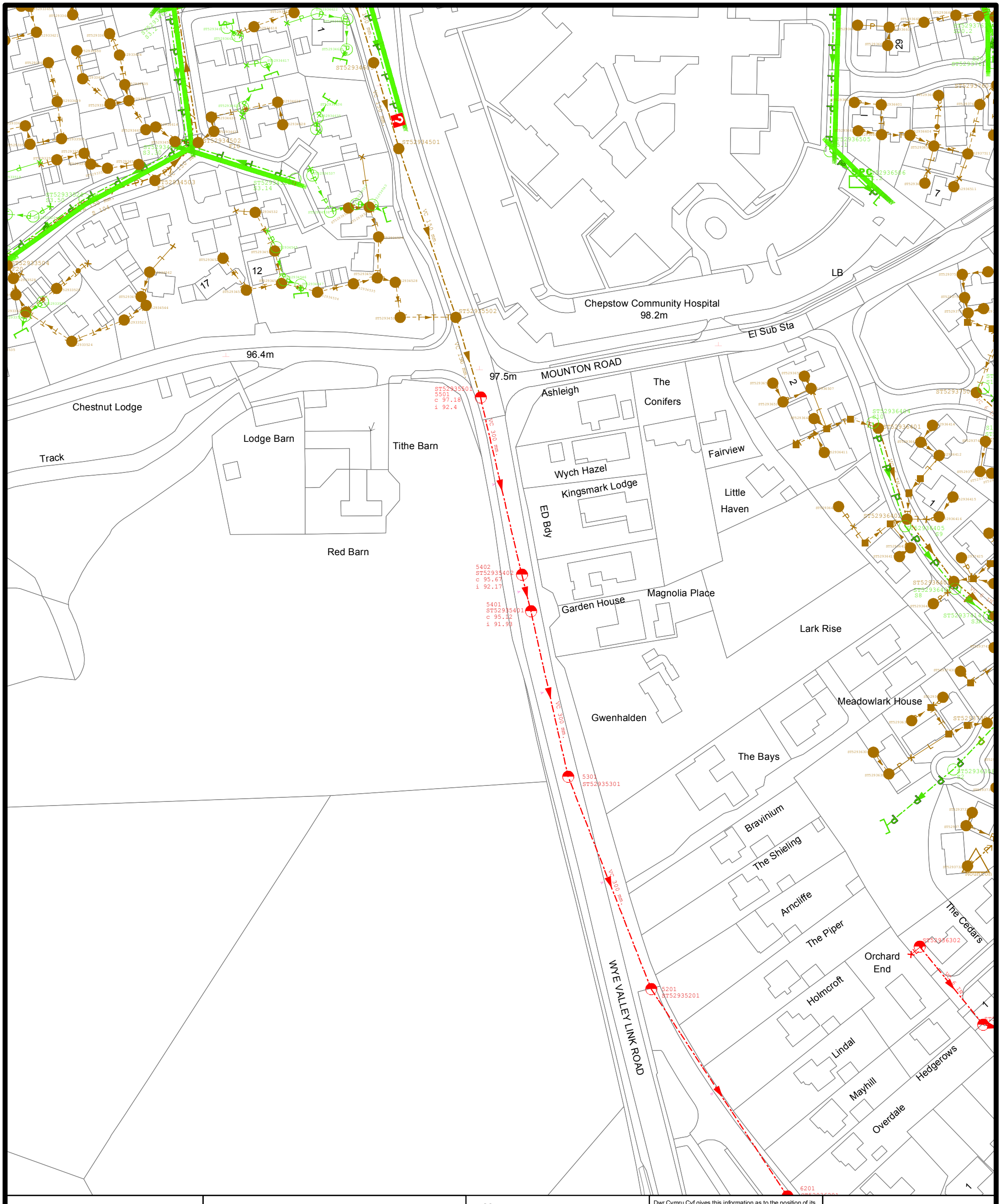
N W E S

Map Ref:

Map scale: 1:1,250

Printed by:

Printed on:



Dŵr Cymru Welsh Water

LEGEND(Representative of most common features)

Waste network:

- Foul chamber
- Surface water chamber
- Combined chamber
- Combined sewer overflow
- Special purpose chamber
- Treatment works
- Pumping station
- Outfall
- Lamphole
- Storm Overflow
- Rising main
- Gravity sewer
- Private sewer
- Private sewer subject to Sect. 104 adoption agreement
- Private Sewer Transfer
- Lateral Drain
- Inspection Chamber

Notes:

Dwr Cymru Cyf gives this information as to the position of its underground apparatus by way of general guidance only on the strict understanding that it is based on the best information available and no warranty as to its correctness is relied upon in the event of excavations or other works made in the vicinity of the Company's apparatus and any onus of locating the apparatus before carrying out any excavations rests entirely on you. It must be understood that the furnishing of the information is entirely without prejudice to the provision of the New Roads and Streetworks Act 1991 and of the Company's right to be compensated for any damage to its apparatus.

Service pipes are not generally shown but their presence should be anticipated.

EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.

N W E S

Map Ref:

Map scale: 1:1,250

Printed by:

Printed on:

Appendix E – MicroDrainage Calculations

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 95 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	0.367	0.367	58.4	374.3	O K
30 min Summer	0.479	0.479	62.6	498.2	O K
60 min Summer	0.566	0.566	66.0	598.6	O K
120 min Summer	0.601	0.601	67.3	640.3	O K
180 min Summer	0.596	0.596	67.1	633.8	O K
240 min Summer	0.582	0.582	66.6	617.4	O K
360 min Summer	0.549	0.549	65.3	579.1	O K
480 min Summer	0.513	0.513	63.9	537.7	O K
600 min Summer	0.477	0.477	62.5	496.2	O K
720 min Summer	0.441	0.441	61.2	456.0	O K
960 min Summer	0.374	0.374	58.6	381.6	O K
1440 min Summer	0.260	0.260	54.3	259.3	O K
2160 min Summer	0.138	0.138	49.8	134.7	O K
2880 min Summer	0.068	0.068	47.2	65.4	O K
4320 min Summer	0.041	0.041	38.3	39.3	O K
5760 min Summer	0.033	0.033	30.7	31.7	O K
7200 min Summer	0.028	0.028	26.1	26.8	O K
8640 min Summer	0.025	0.025	22.8	23.5	O K
10080 min Summer	0.022	0.022	20.0	20.5	O K
15 min Winter	0.367	0.367	58.4	374.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	125.216	0.0	23
30 min Summer	86.254	0.0	36
60 min Summer	56.713	0.0	62
120 min Summer	35.847	0.0	100
180 min Summer	26.880	0.0	134
240 min Summer	21.831	0.0	168
360 min Summer	16.267	0.0	236
480 min Summer	13.176	0.0	304
600 min Summer	11.178	0.0	372
720 min Summer	9.765	0.0	438
960 min Summer	7.881	0.0	566
1440 min Summer	5.811	0.0	810
2160 min Summer	4.273	0.0	1156
2880 min Summer	3.430	0.0	1496
4320 min Summer	2.516	0.0	2200
5760 min Summer	2.021	0.0	2896
7200 min Summer	1.706	0.0	3664
8640 min Summer	1.486	0.0	4400
10080 min Summer	1.323	0.0	4976
15 min Winter	125.216	0.0	23

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	0.479	0.479	62.6	499.1	O K
60 min Winter	0.569	0.569	66.1	602.1	O K
120 min Winter	0.602	0.602	67.4	641.4	O K
180 min Winter	0.591	0.591	66.9	627.9	O K
240 min Winter	0.568	0.568	66.0	600.9	O K
360 min Winter	0.514	0.514	64.0	538.3	O K
480 min Winter	0.457	0.457	61.8	473.9	O K
600 min Winter	0.402	0.402	59.7	412.6	O K
720 min Winter	0.350	0.350	57.7	355.5	O K
960 min Winter	0.256	0.256	54.2	255.8	O K
1440 min Winter	0.114	0.114	48.9	111.0	O K
2160 min Winter	0.045	0.045	41.6	42.9	O K
2880 min Winter	0.036	0.036	33.5	34.5	O K
4320 min Winter	0.027	0.027	24.7	25.4	O K
5760 min Winter	0.022	0.022	20.0	20.6	O K
7200 min Winter	0.018	0.018	16.8	17.3	O K
8640 min Winter	0.016	0.016	14.9	15.3	O K
10080 min Winter	0.014	0.014	13.1	13.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
30 min Winter	86.254	0.0	36
60 min Winter	56.713	0.0	62
120 min Winter	35.847	0.0	102
180 min Winter	26.880	0.0	140
240 min Winter	21.831	0.0	180
360 min Winter	16.267	0.0	254
480 min Winter	13.176	0.0	324
600 min Winter	11.178	0.0	394
720 min Winter	9.765	0.0	460
960 min Winter	7.881	0.0	586
1440 min Winter	5.811	0.0	816
2160 min Winter	4.273	0.0	1104
2880 min Winter	3.430	0.0	1452
4320 min Winter	2.516	0.0	2196
5760 min Winter	2.021	0.0	2904
7200 min Winter	1.706	0.0	3560
8640 min Winter	1.486	0.0	4384
10080 min Winter	1.323	0.0	5048

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.950
Region	England and Wales	Cv (Winter)	0.950
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.302	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 1.462

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.487	4	8	0.487	8	12	0.487

Model Details

Storage is Online Cover Level (m) 1.000

Infiltration Basin Structure

Invert Level (m) 0.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.33840 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.33840

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	951.0	1.000	1350.0

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 84 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	0.362	0.362	32.4	191.7	O K
30 min Summer	0.466	0.466	35.4	254.1	O K
60 min Summer	0.545	0.545	37.6	302.8	O K
120 min Summer	0.575	0.575	38.4	322.3	O K
180 min Summer	0.569	0.569	38.2	318.0	O K
240 min Summer	0.554	0.554	37.8	308.6	O K
360 min Summer	0.521	0.521	36.9	287.6	O K
480 min Summer	0.485	0.485	35.9	265.4	O K
600 min Summer	0.450	0.450	34.9	243.9	O K
720 min Summer	0.415	0.415	33.9	223.2	O K
960 min Summer	0.351	0.351	32.2	185.8	O K
1440 min Summer	0.245	0.245	29.2	126.1	O K
2160 min Summer	0.133	0.133	26.2	66.6	O K
2880 min Summer	0.068	0.068	24.5	33.2	O K
4320 min Summer	0.041	0.041	19.7	20.0	O K
5760 min Summer	0.033	0.033	15.8	16.1	O K
7200 min Summer	0.028	0.028	13.4	13.6	O K
8640 min Summer	0.025	0.025	11.7	11.9	O K
10080 min Summer	0.022	0.022	10.5	10.7	O K
15 min Winter	0.362	0.362	32.4	191.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	125.216	0.0	23
30 min Summer	86.254	0.0	36
60 min Summer	56.713	0.0	62
120 min Summer	35.847	0.0	96
180 min Summer	26.880	0.0	130
240 min Summer	21.831	0.0	164
360 min Summer	16.267	0.0	234
480 min Summer	13.176	0.0	302
600 min Summer	11.178	0.0	368
720 min Summer	9.765	0.0	432
960 min Summer	7.881	0.0	560
1440 min Summer	5.811	0.0	802
2160 min Summer	4.273	0.0	1152
2880 min Summer	3.430	0.0	1484
4320 min Summer	2.516	0.0	2184
5760 min Summer	2.021	0.0	2936
7200 min Summer	1.706	0.0	3648
8640 min Summer	1.486	0.0	4408
10080 min Summer	1.323	0.0	5096
15 min Winter	125.216	0.0	23

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	0.467	0.467	35.4	254.6	O K
60 min Winter	0.548	0.548	37.7	304.6	O K
120 min Winter	0.575	0.575	38.4	322.1	O K
180 min Winter	0.561	0.561	38.0	313.2	O K
240 min Winter	0.537	0.537	37.4	297.9	O K
360 min Winter	0.483	0.483	35.8	264.2	O K
480 min Winter	0.428	0.428	34.3	230.9	O K
600 min Winter	0.376	0.376	32.8	199.8	O K
720 min Winter	0.326	0.326	31.5	171.5	O K
960 min Winter	0.240	0.240	29.1	123.2	O K
1440 min Winter	0.110	0.110	25.6	54.7	O K
2160 min Winter	0.045	0.045	21.4	21.9	O K
2880 min Winter	0.036	0.036	17.2	17.5	O K
4320 min Winter	0.027	0.027	12.7	12.9	O K
5760 min Winter	0.022	0.022	10.3	10.5	O K
7200 min Winter	0.018	0.018	8.6	8.8	O K
8640 min Winter	0.016	0.016	7.6	7.8	O K
10080 min Winter	0.014	0.014	6.7	6.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
30 min Winter	86.254	0.0	36
60 min Winter	56.713	0.0	62
120 min Winter	35.847	0.0	100
180 min Winter	26.880	0.0	138
240 min Winter	21.831	0.0	176
360 min Winter	16.267	0.0	250
480 min Winter	13.176	0.0	320
600 min Winter	11.178	0.0	388
720 min Winter	9.765	0.0	454
960 min Winter	7.881	0.0	578
1440 min Winter	5.811	0.0	810
2160 min Winter	4.273	0.0	1104
2880 min Winter	3.430	0.0	1468
4320 min Winter	2.516	0.0	2200
5760 min Winter	2.021	0.0	2920
7200 min Winter	1.706	0.0	3568
8640 min Winter	1.486	0.0	4384
10080 min Winter	1.323	0.0	5136

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.950
Region	England and Wales	Cv (Winter)	0.950
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.302	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.754

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.251	4	8	0.251	8	12	0.251

Model Details

Storage is Online Cover Level (m) 1.000

Infiltration Basin Structure

Invert Level (m) 0.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.33840 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.33840

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	482.0	1.000	775.0

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 90 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	0.423	0.423	31.3	201.3	O K
30 min Summer	0.542	0.542	34.7	267.1	O K
60 min Summer	0.633	0.633	37.4	320.3	O K
120 min Summer	0.671	0.671	38.5	343.5	O K
180 min Summer	0.667	0.667	38.4	341.0	O K
240 min Summer	0.654	0.654	38.0	332.6	O K
360 min Summer	0.620	0.620	37.0	312.7	O K
480 min Summer	0.585	0.585	36.0	291.8	O K
600 min Summer	0.549	0.549	35.0	271.2	O K
720 min Summer	0.515	0.515	34.0	251.5	O K
960 min Summer	0.450	0.450	32.1	215.5	O K
1440 min Summer	0.339	0.339	28.9	157.0	O K
2160 min Summer	0.214	0.214	25.4	95.4	O K
2880 min Summer	0.127	0.127	23.1	55.0	O K
4320 min Summer	0.049	0.049	20.4	20.6	O K
5760 min Summer	0.039	0.039	16.3	16.6	O K
7200 min Summer	0.033	0.033	13.8	14.1	O K
8640 min Summer	0.029	0.029	12.1	12.3	O K
10080 min Summer	0.026	0.026	10.8	11.0	O K
15 min Winter	0.423	0.423	31.3	201.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	125.216	0.0	23
30 min Summer	86.254	0.0	36
60 min Summer	56.713	0.0	62
120 min Summer	35.847	0.0	98
180 min Summer	26.880	0.0	132
240 min Summer	21.831	0.0	166
360 min Summer	16.267	0.0	234
480 min Summer	13.176	0.0	302
600 min Summer	11.178	0.0	370
720 min Summer	9.765	0.0	434
960 min Summer	7.881	0.0	564
1440 min Summer	5.811	0.0	812
2160 min Summer	4.273	0.0	1172
2880 min Summer	3.430	0.0	1528
4320 min Summer	2.516	0.0	2196
5760 min Summer	2.021	0.0	2936
7200 min Summer	1.706	0.0	3672
8640 min Summer	1.486	0.0	4312
10080 min Summer	1.323	0.0	5104
15 min Winter	125.216	0.0	23

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	0.543	0.543	34.8	267.7	O K
60 min Winter	0.636	0.636	37.5	322.2	O K
120 min Winter	0.672	0.672	38.5	343.8	O K
180 min Winter	0.661	0.661	38.2	337.3	O K
240 min Winter	0.638	0.638	37.5	323.4	O K
360 min Winter	0.585	0.585	36.0	292.0	O K
480 min Winter	0.531	0.531	34.4	260.5	O K
600 min Winter	0.478	0.478	32.9	231.0	O K
720 min Winter	0.428	0.428	31.5	203.8	O K
960 min Winter	0.339	0.339	28.9	157.0	O K
1440 min Winter	0.197	0.197	25.0	87.5	O K
2160 min Winter	0.064	0.064	21.3	27.2	O K
2880 min Winter	0.043	0.043	17.8	18.2	O K
4320 min Winter	0.032	0.032	13.2	13.3	O K
5760 min Winter	0.026	0.026	10.6	10.8	O K
7200 min Winter	0.022	0.022	8.9	9.1	O K
8640 min Winter	0.019	0.019	7.9	8.0	O K
10080 min Winter	0.017	0.017	7.1	7.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
30 min Winter	86.254	0.0	36
60 min Winter	56.713	0.0	62
120 min Winter	35.847	0.0	100
180 min Winter	26.880	0.0	140
240 min Winter	21.831	0.0	178
360 min Winter	16.267	0.0	250
480 min Winter	13.176	0.0	322
600 min Winter	11.178	0.0	390
720 min Winter	9.765	0.0	458
960 min Winter	7.881	0.0	586
1440 min Winter	5.811	0.0	830
2160 min Winter	4.273	0.0	1152
2880 min Winter	3.430	0.0	1472
4320 min Winter	2.516	0.0	2176
5760 min Winter	2.021	0.0	2856
7200 min Winter	1.706	0.0	3672
8640 min Winter	1.486	0.0	4360
10080 min Winter	1.323	0.0	5136

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.950
Region	England and Wales	Cv (Winter)	0.950
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.302	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.782

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.261	4	8	0.261	8	12	0.261

Model Details

Storage is Online Cover Level (m) 1.000

Infiltration Basin Structure

Invert Level (m) 0.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.33800 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.33800

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	418.0	1.000	719.0

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 3973 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	0.212	0.212	1.6	238.8	O K
30 min Summer	0.287	0.287	1.7	328.5	O K
60 min Summer	0.370	0.370	1.8	430.3	O K
120 min Summer	0.457	0.457	1.9	540.0	O K
180 min Summer	0.506	0.506	1.9	603.1	O K
240 min Summer	0.540	0.540	2.0	648.7	O K
360 min Summer	0.591	0.591	2.0	715.8	O K
480 min Summer	0.626	0.626	2.1	763.6	O K
600 min Summer	0.653	0.653	2.1	800.2	O K
720 min Summer	0.674	0.674	2.1	829.4	O K
960 min Summer	0.705	0.705	2.2	872.7	O K
1440 min Summer	0.742	0.742	2.2	924.8	O K
2160 min Summer	0.766	0.766	2.3	958.6	O K
2880 min Summer	0.770	0.770	2.3	965.5	O K
4320 min Summer	0.763	0.763	2.3	955.4	O K
5760 min Summer	0.753	0.753	2.2	940.6	O K
7200 min Summer	0.740	0.740	2.2	922.9	O K
8640 min Summer	0.727	0.727	2.2	904.1	O K
10080 min Summer	0.714	0.714	2.2	885.4	O K
15 min Winter	0.212	0.212	1.6	238.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	125.216	0.0	27
30 min Summer	86.254	0.0	42
60 min Summer	56.713	0.0	72
120 min Summer	35.847	0.0	132
180 min Summer	26.880	0.0	190
240 min Summer	21.831	0.0	250
360 min Summer	16.267	0.0	370
480 min Summer	13.176	0.0	490
600 min Summer	11.178	0.0	608
720 min Summer	9.765	0.0	728
960 min Summer	7.881	0.0	968
1440 min Summer	5.811	0.0	1446
2160 min Summer	4.273	0.0	2164
2880 min Summer	3.430	0.0	2880
4320 min Summer	2.516	0.0	3628
5760 min Summer	2.021	0.0	4376
7200 min Summer	1.706	0.0	5128
8640 min Summer	1.486	0.0	5968
10080 min Summer	1.323	0.0	6848
15 min Winter	125.216	0.0	27

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	0.287	0.287	1.7	328.5	O K
60 min Winter	0.370	0.370	1.8	430.4	O K
120 min Winter	0.457	0.457	1.9	540.2	O K
180 min Winter	0.506	0.506	1.9	603.4	O K
240 min Winter	0.541	0.541	2.0	649.1	O K
360 min Winter	0.591	0.591	2.0	716.5	O K
480 min Winter	0.627	0.627	2.1	764.7	O K
600 min Winter	0.654	0.654	2.1	801.5	O K
720 min Winter	0.675	0.675	2.1	830.9	O K
960 min Winter	0.707	0.707	2.2	874.9	O K
1440 min Winter	0.744	0.744	2.2	928.4	O K
2160 min Winter	0.770	0.770	2.3	964.9	O K
2880 min Winter	0.777	0.777	2.3	975.2	O K
4320 min Winter	0.768	0.768	2.3	962.1	O K
5760 min Winter	0.754	0.754	2.2	942.2	O K
7200 min Winter	0.738	0.738	2.2	919.0	O K
8640 min Winter	0.719	0.719	2.2	892.9	O K
10080 min Winter	0.700	0.700	2.2	865.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
30 min Winter	86.254	0.0	41
60 min Winter	56.713	0.0	70
120 min Winter	35.847	0.0	130
180 min Winter	26.880	0.0	188
240 min Winter	21.831	0.0	246
360 min Winter	16.267	0.0	364
480 min Winter	13.176	0.0	482
600 min Winter	11.178	0.0	600
720 min Winter	9.765	0.0	716
960 min Winter	7.881	0.0	952
1440 min Winter	5.811	0.0	1416
2160 min Winter	4.273	0.0	2100
2880 min Winter	3.430	0.0	2768
4320 min Winter	2.516	0.0	3980
5760 min Winter	2.021	0.0	4504
7200 min Winter	1.706	0.0	5416
8640 min Winter	1.486	0.0	6392
10080 min Winter	1.323	0.0	7264

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.950
Region	England and Wales	Cv (Winter)	0.950
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.302	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.809

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.270	4	8	0.270	8	12	0.270

Model Details

Storage is Online Cover Level (m) 1.100

Infiltration Basin Structure

Invert Level (m) 0.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00900 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.00900

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1081.0	1.100	1600.0

Appendix F – Drainage Strategy

Parcel 1
Developable area: 0.81ha
Estimated imp area: 0.526ha
Basin: 1

Parcel 2
Developable area: 0.51ha
Estimated imp area: 0.331ha
Basin: 2

Parcel 3
Developable area: 0.66ha
Estimated imp area: 0.429ha
Basin: 2

Parcel 4
Developable area: 0.78ha
Estimated imp area: 0.507ha
Basin: 3

Parcel 5
Developable area: 0.85ha
Estimated imp area: 0.553ha
Basin: 3 & 4

Parcel 6
Developable area: 0.81ha
Estimated imp area: 0.526ha
Basin: 4

Commercial/Hotel Parcels
Developable area: 1.44ha
Estimated imp area:0.936ha
Basin: 1

Bioretention Planters

Basin 1
Estimated imp area: 1.462ha
Infiltration rate: 0.338m/hr
Storage required: 641.4m^3

Basin 2
Estimated imp area: 0.754ha
Infiltration rate: 0.338m/hr
Storage required: 322.1m^3

Basin 3
Estimated imp area: 0.782ha
Infiltration rate: 0.338m/hr
Storage required: 343.8m^3

Basin 4
Estimated imp area: 0.809ha
Infiltration rate: 0.009m/hr
Storage required: 975.2m^3

Proposed connection to existing Welsh Water Combined Sewer (300mm dia).
IL: TBC

TP01
TP02
TP03
TP04
TP05
TP06

CH
H
0.35ha

90m
85m
80m
75m
70m

N

Notes:

1. Scale for planning purposes only.
2. The proposed drainage aims to provide a SuDS management train through incorporating, where practical, swales, detention basins, bioretention features, tree pits and permeable paving across the site.
3. At this stage of the masterplan is indicative of establishing land use as per the requirements of an outline planning application. As such, it is not possible to provide further detail of SuDS features however, as the plan progresses the proposals will be refined and incorporate treatment train measures.
4. This drawing is for information purposes only

Calculations

Discharge rates and surface water storage calculations have been based on 65% of the developable area. This 65% accounts for an estimated 55% to become impermeable + 10% allowance for urban creep.

Key:

- Basin 1 Catchment
- Basin 2 Catchment
- Basin 3 Catchment
- Basin 4 Catchment
- Existing Welsh Water Combined Sewer
- Proposed Foul Sewer
- Proposed Road Side Swale
- 3m Maintenance Easement

Rev	Date	Details	By	Chkd
P5	05.11.25	New RLB	SR	SM
P4	22.10.25	Updated Following Client Comment	SR	SM
P3	09.10.25	Revised Layout	SR	SM
P2	27.03.24	Updated Concept Plan	SR	SM
P1	06.02.24	First Issue	SR	SM

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CLIENT: Barwood Land

PROJECT: Land at Mounton Road Chepstow

TITLE: Drainage Strategy Sheet 1

SCALE @ A1:	DATE:	DRAWN:	CHECKED:	APPROVED:
1:1000	06/02/24	SR	BF	SM

STATUS: PLANNING

DRAWING NO: 240137-RAP-XX-XX-DR-D-3100

REVISION: P5

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