

Mate Geo-Technic Services

Report prepared by RC on 18th April 2019

#25 the Layne , Elmer Sands, Bognor Regis PO22 6JL Planning Reference M/131/17/HH

The Design Parameters for the Proposed Geocellular Structure Soakaway is as follows :-

Soil Infiltration Rate for the Sides is $7.117\text{E-}6$ metres / second.

Soil Infiltration Rate for the Base is $7.117\text{E-}6$ metres / second.

The Full GeoCellular Installation is 8.0 metres Long by 2.00 metres Wide at 0.333 metres in Depth.

With a Cover Depth of 0.40 metres.

Percentage Void Space of 95%.

Impermeable Area specified as 74 square metres.

Using a Safety Factor of 2

The Design adopts a Factored Soil Infiltration Rate for the Sides of $3.558\text{E-}6$ metres / second.

And a Factored Soil Infiltration Rate for the Base of $3.558\text{E-}6$ metres / second.

The Rainfall Ratio for the Location is 0.36

Rainfall Base Rate M5-60min the 5 Year Return Period Rainfall of 60 minutes Duration is 19mm.

Lowest Incoming Pipe Invert Height is 233mm above the Installation Base.

The Base Area of the Installation is Included in the calculation.

The Design Summary for the Proposed Geocellular Structure Soakaway Installation is as follows :-

For a 10 Year Return Storm Includes a 40% Increase for Climate Change.

The Design requires storage of 2.62 cubic metres out of 3.54 cubic metres available.

Therefore Storage is Passed with a Critical Storm occurring at 5 hours.

And the Half Drain Time is OK within the Allowable 24 hours Period at 5.77 hours.

For a 100 Year Return Storm Includes a 40% Increase for Climate Change.

The Design requires storage of 4.95 cubic metres out of 5.06 cubic metres available.

Therefore Storage is Passed with a Critical Storm occurring at 6 hours.

And the Half Drain Time is OK within the Allowable 24 hours Period at 10.04 hours.

10 Year Return Storm Includes a 40% Increase for Climate Change.

Storm Duration	Factor Z1-5	M5 Return Rainfall	Factor Z2-10	M10 Return Rainfall	Inflow Cu Metres	Outflow Cu Metres	Internal Water Level	Required Storage	Soakaway Status
5 minutes	0.360	6.80	1.190	11.40	0.843	0.020	54	0.824	-OK-
10 minutes	0.510	9.70	1.220	16.60	1.225	0.039	78	1.186	-OK-
15 minutes	0.620	11.80	1.220	20.10	1.489	0.059	94	1.430	-OK-
30 minutes	0.790	15.00	1.240	26.10	1.928	0.117	119	1.811	-OK-
1 hour	1.000	19.00	1.250	33.20	2.460	0.235	146	2.226	-OK-
2 hours	1.220	23.20	1.240	40.20	2.978	0.470	165	2.508	-OK-
3 hours	1.360	25.80	1.240	44.90	3.320	0.704	172	2.615	-OK-
4 hours	1.480	28.10	1.220	48.00	3.554	0.939	172	2.615	-OK-
6 hours	1.660	31.50	1.220	53.90	3.986	1.409	170	2.577	-OK-
8 hours	1.795	34.10	1.203	57.40	4.251	1.879	156	2.372	-OK-
10 hours	1.905	36.20	1.203	61.00	4.511	2.348	142	2.163	-OK-
12 hours	2.000	38.00	1.190	63.30	4.685	2.818	123	1.867	-OK-
14 hours	2.090	39.70	1.190	66.20	4.896	3.287	106	1.608	-OK-
16 hours	2.180	41.40	1.190	69.00	5.106	3.757	89	1.349	-OK-
18 hours	2.250	42.80	1.180	70.60	5.226	4.227	66	0.999	-OK-
20 hours	2.320	44.10	1.180	72.80	5.389	4.696	46	0.692	-OK-
22 hours	2.380	45.20	1.180	74.70	5.528	5.166	24	0.362	-OK-
24 hours	2.430	46.20	1.180	76.30	5.644	5.636	1	0.009	-OK-

Effective Volume of the Geocellular Structure Soakaway Installation for an M10 Return Period is 3.54 cubic metres.

Maximum Available (Effective) Outflow Surface Area at M10 Return is 18.33 square metres referenced to the Invert of the lowest incoming pipe.

Maximum Allowable Pre-Flood Water Level for 10 Year Return (Lowest Pipe Invert Level for Building Control) is 233mm.

For a 10 Year Return Period the Critical Storm occurs at 5 hours

With a Maximum Internal Structure Critical Water Level of 172mm.

Requiring a Maximum (Critical) Storage Capacity of 2.62 cubic metres.

The Outflow Surface Area for the Critical Storm Duration for the M10 Return is 17.72 square metres referenced to the Critical Water Level.

Half Drain Time for a 10 Year Return Critical Storm is 5.77 hours.

100 Year Return Storm Includes a 40% Increase for Climate Change.

Storm Duration	Factor Z1-5	M5 Return Rainfall	Factor Z2-100	M100 Return Rainfall	Inflow Cu Metres	Outflow Cu Metres	Internal Water Level	Required Storage	Soakaway Status
5 minutes	0.360	6.80	1.790	17.10	1.268	0.021	82	1.248	-OK-
10 minutes	0.510	9.70	1.910	25.90	1.917	0.041	123	1.876	-OK-
15 minutes	0.620	11.80	1.910	31.50	2.331	0.062	149	2.269	-OK-
30 minutes	0.790	15.00	1.990	41.80	3.095	0.124	195	2.971	-OK-
1 hour	1.000	19.00	2.030	54.00	3.996	0.248	247	3.748	-OK-
2 hours	1.220	23.20	2.010	65.20	4.827	0.495	285	4.332	-OK-
3 hours	1.360	25.80	2.010	72.70	5.381	0.743	305	4.638	-OK-
4 hours	1.480	28.10	1.970	77.60	5.739	0.991	312	4.749	-OK-
5 hours	1.580	30.00	1.970	82.80	6.127	1.238	322	4.889	-OK-
8 hours	1.795	34.10	1.930	92.20	6.819	1.981	318	4.838	-OK-
10 hours	1.905	36.20	1.930	97.80	7.237	2.476	313	4.761	-OK-
12 hours	2.000	38.00	1.890	100.50	7.441	2.972	294	4.469	-OK-
14 hours	2.090	39.70	1.890	105.10	7.775	3.467	283	4.309	-OK-
16 hours	2.180	41.40	1.890	109.60	8.110	3.962	273	4.148	-OK-
18 hours	2.250	42.80	1.855	111.00	8.216	4.457	247	3.758	-OK-
20 hours	2.320	44.10	1.855	114.50	8.471	4.953	231	3.519	-OK-
22 hours	2.380	45.20	1.855	117.40	8.690	5.448	213	3.242	-OK-
24 hours	2.430	46.20	1.855	119.90	8.873	5.943	193	2.930	-OK-

Effective Volume of the Geocellular Structure Soakaway Installationn for an M100 Return Period is 5.06 cubic metres.

Maximum Available (Effective) Outflow Surface Area at M100 Return is 19.33 square metres referenced to the top of the GeoCell Installation.

Maximum Allowable Pre-Flood Water Level for 100 Year Return (Soakaway Height) is 333mm.

For a 100 Year Return Period the Critical Storm occurs at 6 hours

With a Maximum Internal Structure Critical Water Level of 326mm.

Requiring a Maximum (Critical) Storage Capacity of 4.95 cubic metres.

The Outflow Surface Area for the Critical Storm Duration for the M100 Return is 19.26 square metres referenced to the Critical Water Level.

Half Drain Time for a 100 Year Return Critical Storm is 10.04 hours.

***** END of REPORT *****