

Mate Geo-Technic Services

Report prepared by RC on Thursday 29 April 2021

"Ross Cottage" Eastergate Lane, Walberton, Arundel BN18 0BA Planning Reference WA/78/20/HH

The Design Parameters for the Proposed Geocellular Structure Soakaway Installation S/A #2 located in the front garden adjacent to driveway are as follows :-

The Soil Infiltration Rate for the Sides is 1.021E-5 metres / second and the Soil Infiltration Rate for the Base is 1.021E-5 metres / second.

The Installation consists of a Geocellular Structure of 8.00 metres Long by 1.50 metres Wide and 0.40 metres in Depth.

With a Cover Depth of 0.50 metres.

Percentage Void Space of 95%.

Impermeable Area specified as 66.5 square metres.

Using a Safety Factor of 2.0

The Design adopts a Factored Soil Infiltration Rate for the Sides of 5.105E-6 metres / second.

And a Factored Soil Infiltration Rate for the Base of 5.105E-6 metres / second.

Both the Side Areas and the Base Area are Included in the Calculations.

The Rainfall Ratio for the Location is $r=0.36$

Rainfall Base Rate M5-60min the 5 Year Return Period Rainfall of 60 minutes Duration is 19.0mm.

Lowest Incoming Pipe Invert Height is 300mm above the Installation Base.

All Levels are referenced to 'Above Ordinance Datum' (AOD)

The Highest Recorded Groundwater at the Location of the Proposed Soakaway is 11.550 metres at a depth of 1.075 metres Below Ground Level (BGL)

The Ground Level at the Location of the Proposed Soakaway is 12.625 metres.

The Soffit Level of the Proposed Soakaway is 12.125 metres.

The Invert Level of the Lowest Incoming Pipe on the Proposed Soakaway is 12.025 metres

The Base Level of the Proposed Soakaway is 11.725 metres

The Base of the Soakaway Structure is 0.175 metres above the Highest Recorded Groundwater at the location of the Soakaway. This meets Building Regulations.

The Design Summary for the Proposed Geocellular Structure Soakaway Installation S/A #2 is as follows :-

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

The Design requires storage of 2.17 cubic metres out of 3.42 cubic metres available.

Therefore Storage is Passed with a Critical Storm occurring at 3 hours.

And the Half Drain Time is OK within the Allowable 24 hours Period at 4.28 hours.

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

The Design requires storage of 4.10 cubic metres out of 4.56 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 7.23 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	0.758	0.023	64	0.735	-OK-
10 minutes	0.510	9.70	1.220	16.60	1.101	0.045	93	1.055	-OK-
15 minutes	0.620	11.80	1.220	20.10	1.338	0.068	111	1.270	-OK-
30 minutes	0.790	15.00	1.240	26.10	1.733	0.136	140	1.596	-OK-
1 hour	1.000	19.00	1.250	33.20	2.211	0.273	170	1.938	-OK-
2 hours	1.216	23.10	1.240	40.10	2.667	0.546	186	2.121	-OK-
3 hours	1.364	25.90	1.240	45.00	2.992	0.819	191	2.173	-OK-
4 hours	1.495	28.40	1.220	48.50	3.226	1.092	187	2.135	-OK-
5 hours	1.593	30.30	1.220	51.70	3.438	1.365	182	2.073	-OK-
6 hours	1.670	31.70	1.220	54.20	3.604	1.637	172	1.966	-OK-
7 hours	1.745	33.20	1.203	55.80	3.713	1.910	158	1.803	-OK-
8 hours	1.805	34.30	1.203	57.80	3.841	2.183	145	1.658	-OK-
9 hours	1.863	35.40	1.203	59.60	3.964	2.456	132	1.508	-OK-
10 hours	1.915	36.40	1.203	61.30	4.075	2.729	118	1.346	-OK-
11 hours	1.960	37.20	1.203	62.70	4.171	3.002	103	1.169	-OK-
12 hours	2.005	38.10	1.190	63.50	4.221	3.275	83	0.946	-OK-
14 hours	2.085	39.60	1.190	66.00	4.389	3.821	50	0.568	-OK-
16 hours	2.155	40.90	1.190	68.20	4.536	4.367	15	0.170	-OK-
18 hours	2.225	42.30	1.190	70.40	4.684	4.912	empty	none	-OK-
20 hours	2.295	43.60	1.180	72.00	4.790	5.458	empty	none	-OK-
22 hours	2.360	44.80	1.180	74.10	4.926	6.004	empty	none	-OK-
24 hours	2.430	46.20	1.180	76.30	5.072	6.550	empty	none	-OK-

Effective Volume of the Geocellular Structure Soakaway Installation for an M10 Return Period is 3.42 cubic metres.

Maximum Available (Effective) Outflow Surface Area at M10 Return is 14.85 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 300mm.

For a 10 Year Return Period the Critical Storm occurs at 3 hours.

With a Maximum Internal Structure Critical Water Level of 191mm.

Requiring a Maximum (Critical) Storage Capacity of 2.17 cubic metres.

The Outflow Surface Area for the Critical Storm Duration for the M10 Return is 13.81 square metres referenced to the Critical Water Level.

Half Drain Time for a 10 Year Return Critical Storm is 4.28 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	1.140	0.024	98	1.116	-OK-
10 minutes	0.510	9.70	1.910	25.90	1.723	0.048	147	1.675	-OK-
15 minutes	0.620	11.80	1.910	31.50	2.095	0.073	177	2.022	-OK-
30 minutes	0.790	15.00	1.990	41.80	2.781	0.145	231	2.636	-OK-
1 hour	1.000	19.00	2.030	54.00	3.591	0.290	290	3.300	-OK-
2 hours	1.216	23.10	2.010	65.00	4.323	0.581	328	3.743	-OK-
3 hours	1.364	25.90	2.010	72.90	4.850	0.871	349	3.979	-OK-
4 hours	1.495	28.40	1.970	78.30	5.210	1.161	355	4.048	-OK-
5 hours	1.593	30.30	1.970	83.50	5.551	1.452	360	4.099	-OK-
6 hours	1.670	31.70	1.970	87.50	5.820	1.742	358	4.077	-OK-
7 hours	1.745	33.20	1.930	89.60	5.957	2.033	344	3.925	-OK-
8 hours	1.805	34.30	1.930	92.70	6.162	2.323	337	3.839	-OK-
9 hours	1.863	35.40	1.930	95.60	6.360	2.613	329	3.747	-OK-
10 hours	1.915	36.40	1.930	98.30	6.538	2.904	319	3.634	-OK-
11 hours	1.960	37.20	1.930	100.60	6.691	3.194	307	3.497	-OK-
12 hours	2.005	38.10	1.890	100.80	6.703	3.484	282	3.219	-OK-
14 hours	2.085	39.60	1.890	104.80	6.971	4.065	255	2.905	-OK-
16 hours	2.155	40.90	1.890	108.30	7.205	4.646	224	2.559	-OK-
18 hours	2.225	42.30	1.890	111.90	7.439	5.227	194	2.212	-OK-
20 hours	2.295	43.60	1.855	113.20	7.531	5.807	151	1.723	-OK-
22 hours	2.360	44.80	1.855	116.40	7.744	6.388	119	1.356	-OK-
24 hours	2.430	46.20	1.855	119.90	7.974	6.969	88	1.005	-OK-

Effective Volume of the Geocellular Structure Soakaway Installation for an M100 Return Period is 4.56 cubic metres.

Maximum Available (Effective) Outflow Surface Area at M100 Return is 15.80 square metres referenced to the top of the GeoCell Installation.

Maximum Allowable Pre-Flood Water Level for 100 Year Return (Soakaway Height) is 400mm.

For a 100 Year Return Period the Critical Storm occurs at 5 hours.

With a Maximum Internal Structure Critical Water Level of 360mm.

Requiring a Maximum (Critical) Storage Capacity of 4.10 cubic metres.

The Outflow Surface Area for the Critical Storm Duration for the M100 Return is 15.42 square metres referenced to the Critical Water Level.

Half Drain Time for a 100 Year Return Critical Storm is 7.23 hours.