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Unit C9, Wem Industrial Estate, Soulton Road, Wem, Shrewsbury SY4 5SD		Revision	
	Job No: **2304005**	Page:	**1 of 1**
Section: **Cellular Attenuation Storage Calculations**	Prepared By: **RAK**	Date:	**23/10/2023**

GENERAL DATA	
site location:	**England and Wales**
60 min rainfall depth of 5 year return period 'R' *[mm]* =	**20**
M5-60 to M5-2d rainfall ratio 'r' =	**0.40**
proposed discharge rate 'v_1' *[litre/s]* =	**5.00**
proposed discharge rate 'v_2' *[litre/s]* =	**47.00**
allowance for climate change:	**40%**

SUMMARY OF CALCULATIONS		
required storage volume for discharge rate 'v_1' =	**184.46**	m^3
required storage volume for discharge rate 'v_2' =	**68.51**	m^3

AREA DATA		impermeability *[%]*	effective area *[m^2]*
impermeable area 'A_1' *[m^2]* =	**3200**	100.00	3200
landscaping and/or green roof area 'A_2' *[m^2]* =	**0**	**80.00**	0
other partially permeable area 'A_3' *[m^2]* =	**0**	**20.00**	0
AREA DRAINED TO ATTENUATION TANK =			**3200 m^2**

REQUIRED STORAGE VOLUME PER RAINFALL DURATION FOR DISCHARGE RATE v_1

rainfall duration *[min]*	rainfall factor Z1	**M5-D** rainfalls *[mm]*	M10-D Z2	M10-D rainfalls *[mm]*	M10-D inflow *[m^3]*	M30-D Z2	M30-D rainfalls *[mm]*	M30-D inflow *[m^3]*	M100-D Z2	M100-D rainfalls *[mm]*	M100-D inflow *[m^3]*	outflow from attenuation tank *[m^3]*	required storage *[m^3]*
5	0.37	7.47	1.20	12.59	40.30	1.46	15.24	48.77	1.85	19.33	61.86	1.50	60.36
10	0.52	10.47	1.22	17.90	57.29	1.49	21.88	70.03	1.92	28.10	89.91	3.00	86.91
15	0.63	12.67	1.23	21.82	69.84	1.51	26.77	85.66	1.95	34.63	110.81	4.50	106.31
30	0.80	16.07	1.24	27.89	89.25	1.53	34.42	110.14	2.00	44.95	143.85	9.00	134.85
60	1.00	20.00	1.24	34.72	111.10	1.54	43.21	138.28	2.03	56.84	181.89	18.00	163.89
120	1.21	24.13	1.24	41.90	134.07	1.54	51.86	165.97	2.01	68.03	217.69	36.00	181.69
240	1.45	28.93	1.22	49.59	158.69	1.52	61.47	196.71	1.98	80.14	256.46	72.00	**184.46**
360	1.60	32.07	1.21	54.49	174.37	1.50	67.51	216.02	1.95	87.70	280.63	108.00	172.63
600	1.79	35.87	1.20	60.38	193.20	1.49	74.61	238.77	1.92	96.56	309.00	180.00	129.00
1440	2.24	44.80	1.18	74.03	236.91	1.44	90.58	289.87	1.85	116.13	371.62	432.00	0.00

** Z2 is a growth factor from M5 rainfalls*

REQUIRED STORAGE VOLUME PER RAINFALL DURATION FOR DISCHARGE RATE v_2

rainfall duration *[min]*	rainfall factor Z1	**M5-D** rainfalls *[mm]*	M10-D Z2	M10-D rainfalls *[mm]*	M10-D inflow *[m^3]*	M30-D Z2	M30-D rainfalls *[mm]*	M30-D inflow *[m^3]*	M100-D Z2	M100-D rainfalls *[mm]*	M100-D inflow *[m^3]*	outflow from attenuation tank *[m^3]*	required storage *[m^3]*
5	0.37	7.47	1.20	12.59	40.30	1.46	15.24	48.77	1.85	19.33	61.86	14.10	47.76
10	0.52	10.47	1.22	17.90	57.29	1.49	21.88	70.03	1.92	28.10	89.91	28.20	61.71
15	0.63	12.67	1.23	21.82	69.84	1.51	26.77	85.66	1.95	34.63	110.81	42.30	**68.51**
30	0.80	16.07	1.24	27.89	89.25	1.53	34.42	110.14	2.00	44.95	143.85	84.60	59.25
60	1.00	20.00	1.24	34.72	111.10	1.54	43.21	138.28	2.03	56.84	181.89	169.20	12.69
120	1.21	24.13	1.24	41.90	134.07	1.54	51.86	165.97	2.01	68.03	217.69	338.40	0.00
240	1.45	28.93	1.22	49.59	158.69	1.52	61.47	196.71	1.98	80.14	256.46	676.80	0.00
360	1.60	32.07	1.21	54.49	174.37	1.50	67.51	216.02	1.95	87.70	280.63	1015.20	0.00
600	1.79	35.87	1.20	60.38	193.20	1.49	74.61	238.77	1.92	96.56	309.00	1692.00	0.00
1440	2.24	44.80	1.18	74.03	236.91	1.44	90.58	289.87	1.85	116.13	371.62	4060.80	0.00

** Z2 is a growth factor from M5 rainfalls*