

		DRAINAGE CALCULATION							
KANE DESIGN		30 year and 100 year STORAGE				DRAFT			
Civil Engineering Design Services 15 Winchester Way, Gresford Wrexham LL12 8HH Tel: 01 9788 855888		Project PROPOSED STABLE BLOCK STONEBRIDGE, EYTOM, WREXHAM LL13 OSP		Scheme number 1545 DATE 24-Dec-21 BY AK checked		Sheet 1 of 2			
REVISION A : 21 February 2022 - CRATES USED									
NOTES									
Calculation Description		Proposed (post-development) PROPOSED STORAGE							
SURFACE WATER DESIGN:		MODIFIED RATIONAL METHOD							
		Refer to volume 4 The Wallingford Procedure (Vol 4)							
Site									
a	Site area (m2)	n/a							
b	PIMP (%)	0.00%							
A	Site Impermeable Area (m2)	759 [from drawings: 301m2 Stable, 458m2 Access]							
	M5-60 min rainfall	20		Figure A1	Vol4				
	Ratio "r"	0.4		Figure A2	Vol4				
YEAR	Climate Change %	30		Table B2	PPS 25				
	100 Permissible run-off	5.00	litres / s						
	30 Permissible run-off	5.00	litres / s						
Rational Method		Q= Peak flow (=run-off) $Q = 2.78 \times C_v \times C_r \times A/10000 \times i$ Where i = rainfall intensity $C_r = 1.30$ $C_v = 0.75$ From SUR calculations Formula: $M5-D = Z1 \times M5-60$ $Rainfall\ intensity\ (i) = (M5-60) \times Z2 / Duration\ per\ hour$ $Storge = (run-off-permissible\ discharge) / duration$							
		Equation 4 Vol 4							
		100-YEAR STORM							
30 % Include climate change		BRE 365 table A1 =Z1	(M5-D) mins	Vol 4 inrropolated table A1 =Z2	Storm Duration (mins)	Rainfall intensity (i) (mm/hr)	100 year Rainfall x 30%	Q Run-off (litres/s)	Storage Volume required (m3)
		0.617	12.34	1.93	15	95.26	123.84	25.45	18.41
		0.787	15.740	1.98	30	62.33	81.03	16.65	20.97
		0.894	17.880	2.00	45	47.68	61.98	12.74	20.89
		1.000	20.000	2.01	60	40.20	52.26	10.74	20.66
	DESIGNED TO 10 HOUR PEAK	1.111	22.220	2.03	90	30.07	39.09	8.03	16.38
		1.223	24.460	2.02	120	24.70	32.12	6.60	11.52
	100 year	1.360	27.200	2.01	180	18.22	23.69	4.87	-1.42
	WORST CASE	1.497	29.940	2.00	240	14.97	19.46	4.00	-14.41
	45.00 min storage value = 20.89 m3	1.690	33.800	1.97	360	11.10	14.43	2.96	-43.96

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	30 year and 100 year STORAGE DRAFT								
	Project	PROPOSED STABLE BLOCK				Scheme number		1545	
		STONEBRIDGE, EYTOM, WREXHAM				DATE		24-Dec-21	
	LL13 OSP				Sheet 2 of 2		BY	AK	
					checked				

Z2 = M30 (30 year)

BRE 365 table A1 =Z1		(M5-D) mins	Vol 4 inrerpolated table A1 =Z2	Storm Duration (mins)	Rainfall intensity (i) (mm/hr)	Q Run-off (litres/s)	Storage Volume required (m3)
0.617	12.340	1.535	15	75.77	15.57	9.51	
0.787	15.740	1.56	30	49.11	10.09	9.17	
0.894	17.880	1.57	45	37.43	7.69	7.27	
1.000	20.000	1.58	60	31.60	6.49	5.38	
1.111	22.220	1.575	90	23.33	4.79	-1.11	
1.223	24.460	1.57	120	19.20	3.95	-7.59	
1.360	27.200	1.56	180	14.14	2.91	-22.61	
1.497	29.940	1.55	240	11.60	2.38	-37.67	
1.690	33.800	1.525	360	8.59	1.77	-69.87	

30 year

WORST CASE

30.00 Min storage value = 9.17 m3

STORAGE REQUIRED;

100 year: 20.89 m3

Storage System: 100 year storm

STORAGE CRATES

CRATE SIZE 1m x 500mm x 400mm depth

Length / depth (m)	9.0	6.0	0.4	Total crates
Crate size	1	0.5	0.4	
Number of crates	9	12	1	
Void Rario =				0.95
Total volume				20.52 m3
Required				20.89 m3