

Job No.	435358	Sheet	1	Date	Jun-21
Job	Land Adj Mistletoe	By	TB	Checked	EG

Access Road Storage inc Driveway & Parking within RPA

Total Surface Area

Area	113.000 m ²
Urban Creep	1.000 m ²
	113.000 m ²

10 year return period

		Storm duration (Min.)
R5	0.009 m	5
R10	0.012 m	10
R15	0.015 m	15
R30	0.020 m	30
R60	0.025 m	60
R120	0.030 m	120
R240	0.036 m	240
R360	0.041 m	360
R600	0.047 m	600
R1440	0.058 m	1440

Inflow to attenuation system

I5	0.98 m ³
I10	1.40 m ³
I15	1.73 m ³
I30	2.21 m ³
I60	2.80 m ³
I120	3.42 m ³
I240	4.10 m ³
I360	4.62 m ³
I600	5.27 m ³
I1440	6.53 m ³

Outflow from Tank

f	2.00E-03 m ³ /s
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Soakaway dims:

Length	10.35 m
Width	10.35 m
Depth	0.2 m

As50	1
Void ratio	30 %

Outflow from Tank:

O5	0.6000 m ³
O10	1.2000 m ³
O15	1.8000 m ³
O30	3.6000 m ³
O60	7.2000 m ³
O120	14.4000 m ³
O240	28.8000 m ³
O360	43.2000 m ³
O600	72.0000 m ³
O1440	172.8000 m ³

Storage required:

S5	0.38 m ³
S10	0.20 m ³
S15	-0.07 m ³
S30	-1.39 m ³
S60	-4.40 m ³
S120	-10.98 m ³
S240	-24.70 m ³
S360	-38.58 m ³
S600	-66.73 m ³
S1440	-166.27 m ³

Storage provided **6.4** m³

Time to drain:

ts50	0.03 hours
ts50	0.01 hours
ts50	0.00 hours
ts50	-0.10 hours
ts50	-0.31 hours
ts50	-0.76 hours
ts50	-1.72 hours
ts50	-2.68 hours
ts50	-4.63 hours
ts50	-11.55 hours

Critical storm =	S5		
Storage required =	0.38		
Time to discharge =	0.03	Hours	0.00 Days

Tank size proposed is satisfactory

Allowance for extra rain during storage period (assume average rainfall)

Average daily rain	2.60 mm
Extra rain during storage	0.00 m ³

Proposed permeable sub-base material requires a void ratio $\geq 30\%$. The use of Type 3 granular sub-base is recommended. Proposed design includes for 40% increase due to Climate Change.

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Total Surface Area

Area	113.000 m ²
Urban Creep	1.000 m ²
	113.000 m ²

30 year return period + 40%

		Storm duration (Min.)
R5	0.022 m	5
R10	0.028 m	10
R15	0.031 m	15
R30	0.039 m	30
R60	0.048 m	60
R120	0.059 m	120
R240	0.073 m	240
R360	0.082 m	360
R600	0.095 m	600
R1440	0.123 m	1440

Inflow to attenuation system

I5	2.49 m ³
I10	3.12 m ³
I15	3.54 m ³
I30	4.39 m ³
I60	5.43 m ³
I120	6.69 m ³
I240	8.21 m ³
I360	9.26 m ³
I600	10.75 m ³
I1440	13.87 m ³

Outflow from Tank

f 2.00E-03 m³/s

Soakaway dims:

L	10.35 m
W	10.35 m
Depth	0.2 m

As50 1
Void ratio 30 %

Outflow from Tank:

O5	0.6000 m ³
O10	1.2000 m ³
O15	1.8000 m ³
O30	3.6000 m ³
O60	7.2000 m ³
O120	14.4000 m ³
O240	28.8000 m ³
O360	43.2000 m ³
O600	72.0000 m ³
O1440	172.8000 m ³

Storage required:

S5	1.89 m ³
S10	1.92 m ³
S15	1.74 m ³
S30	0.79 m ³
S60	-1.77 m ³
S120	-7.71 m ³
S240	-20.59 m ³
S360	-33.94 m ³
S600	-61.25 m ³
S1440	-158.93 m ³

Time to half drain:

ts50	0.13 hours
ts50	0.13 hours
ts50	0.12 hours
ts50	0.06 hours
ts50	-0.12 hours
ts50	-0.54 hours
ts50	-1.43 hours
ts50	-2.36 hours
ts50	-4.25 hours
ts50	-11.04 hours

Storage provided 6.4 m³

Critical storm = S10

Storage required = 1.92

Time to half discharge = 0.13 Hours (Acceptable time as 1/30 year storm)

Tank size proposed is satisfactory

For increase from 10 year storm to 30 year storm use,

Bilham's formula $r \text{ (mm)} = (((1.25T)/N)^{(1/3.55)}) \times 25.4$

T = storm duration in hours

N = No. of storms in 10 years

T	N	r	0.4 10 year return period
0.083333	0.333333	0.015764	0.022069124 R5 0.0087 m
0.166667	0.333333	0.01971	0.027594367 R10 0.0124 m
0.25	0.333333	0.022402	0.031363365 R15 0.0153 m
0.5	0.333333	0.02778	0.038892614 R30 0.0196 m
1	0.333333	0.034318	0.048045307 R60 0.0248 m
2	0.333333	0.042265	0.059171486 R120 0.0303 m
4	0.333333	0.051926	0.072696672 R240 0.0363 m
6	0.333333	0.058516	0.081922764 R360 0.0409 m
10	0.333333	0.07	0.095151657 R600 0.0466 m
24	0.333333	0.087685	0.122758323 R1440 0.0578 m

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Total Surface Area

Area	113.000 m ²
Urban Creep	1.000 m ²
	113.000 m ²

100 year return period + 40%

		Storm duration (Min.)
R5	0.032 m	5
R10	0.040 m	10
R15	0.045 m	15
R30	0.056 m	30
R60	0.069 m	60
R120	0.084 m	120
R240	0.103 m	240
R360	0.116 m	360
R600	0.135 m	600
R1440	0.174 m	1440

Inflow to attenuation system

I5	3.66 m ³
I10	4.54 m ³
I15	5.14 m ³
I30	6.33 m ³
I60	7.78 m ³
I120	9.55 m ³
I240	11.69 m ³
I360	13.16 m ³
I600	15.26 m ³
I1440	19.63 m ³

Outflow from Tank

f	2.00E-03 m ³ /s
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Soakaway dims:

L	10.35 m
W	10.35 m
Depth	0.2 m

As50	1
Void ratio	30 %

Outflow from Tank:

O5	0.6000 m ³
O10	1.2000 m ³
O15	1.8000 m ³
O30	3.6000 m ³
O60	7.2000 m ³
O120	14.4000 m ³
O240	28.8000 m ³
O360	43.2000 m ³
O600	72.0000 m ³
O1440	172.8000 m ³

Storage required:

S5	3.06 m ³
S10	3.34 m ³
S15	3.34 m ³
S30	2.73 m ³
S60	0.58 m ³
S120	-4.85 m ³
S240	-17.11 m ³
S360	-30.04 m ³
S600	-56.74 m ³
S1440	-153.17 m ³

Time to half drain:

ts50	0.21 hours
ts50	0.23 hours
ts50	0.23 hours
ts50	0.19 hours
ts50	0.04 hours
ts50	-0.34 hours
ts50	-1.19 hours
ts50	-2.09 hours
ts50	-3.94 hours
ts50	-10.64 hours

Storage provided	6.4 m ³
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Critical storm = **S10**

Storage required = **3.34**

Time to half discharge = **0.23** Hours (Acceptable time as 1/100 year storm)

Tank size proposed is satisfactory

For increase from 10 year storm to 100 year storm use,

Bilham's formula $r \text{ (mm)} = (((1.25T)/N)^{(1/3.55)}) \times 25.4$

T = storm duration in hours

N = No. of storms in 10 years

T	N	r	0.4 10 year return period
0.083333	0.1	0.023154	0.03241527 R5
0.166667	0.1	0.028694	0.040171329 R10
0.25	0.1	0.032473	0.045462061 R15
0.5	0.1	0.040022	0.056031245 R30
1	0.1	0.0492	0.068879338 R60
2	0.1	0.060356	0.084497712 R120
4	0.1	0.073917	0.103483692 R240
6	0.1	0.083168	0.116434821 R360
10	0.1	0.10	0.135004879 R600
24	0.1	0.124113	0.173757739 R1440