

APPENDIX B

HYDROLOGY CALCULATIONS (TP108)

HYDRAULIC CALCULATIONS (HEC-HMS)

S-MAP SOIL DATA

STORMWATER FLOWS - Site Catchment
Existing Pervious Area

Hydrological Soil Group	Group_D		
	CN	Area	Product
Grassed	61	14.3643	876.2223
Grassed	80	3.1709	253.6720
	totals	17.5352	1129.8943
% Impervious		0.00%	
CN weighted		64.4358	
I _a weighted		5.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		0.4140 km	
Catchment Slope (S _c)		0.0196 m/m	
Runoff Factor		0.4753	
Time of Concentration (t _c)		0.3831 hrs	23.0 min
Use (t _c)		0.3831 hrs	23.0 min
Catchment Area		0.1754 km ²	
CN		64.4358	
Storage (S)		140.1909 mm	

Golding Road - GMA (Catchment East - Central Portion)

Table 3.3 - Curve numbers for typical Auckland conditions

Land use	Group A Soil (volcanic granular loam)	Group B Soil (alluvial)	Group C Soil (mudstone/sandstone)
Bush, humid-climate, not-grazed	30	55	70
Pasture, lightly grazed, good grass cover	39	61	74
Urban lawns	39	61	74
Crops, straight rows, minimal vegetative cover	72	81	88
Sealed roads, roofs	98	98	98

	WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	24.0000	34.50	72	110	130	152	180	200
c*	0.0476	0.0804	0.1811	0.2629	0.2997	0.3362	0.3775	0.4039
q* from ARC	0.024	0.024	0.044	0.061	0.067	0.072	0.078	0.081
Peak Flowrate (q _p)	0.1008	0.1448	0.5599	1.1680	1.5179	1.9190	2.4479	2.8356
Peak Flowrate (q _p)	101	145	560	1168	1518	1919	2448	2836
24 hour Runoff Depth (Q ₂₄)	2.27	5.13	21.67	44.96	58.92	75.24	97.16	113.44
24 hour Runoff Volume (V ₂₄)	398	899	3799	7885	10332	13194	17038	19892

STORMWATER FLOWS - Site Catchment
Existing Impervious

Hydrological Soil Group	Group_B_Impervious		
	CN	Area	Product
Building	98	0.8609	84.3682
	totals	0.8609	84.3682
% Impervious		100.00%	
CN weighted		98.0000	
I _a weighted		0.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		0.4140 km	
Catchment Slope (S _c)		0.0196 m/m	
Runoff Factor		0.9608	
Time of Concentration (t _c)		0.2602 hrs	15.6 min
Use (t _c)		0.2602 hrs	15.6 min
Catchment Area		0.0086 km ²	
CN		98.0000	
Storage (S)		5.1837 mm	

	WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	24.0000	34.50	72	110	130	152	180	200
c*	0.6983	0.7689	0.8741	0.9139	0.9261	0.9361	0.9455	0.9507
q* from ARC	0.125	0.131	0.139	0.141	0.142	0.143	0.143	0.144
Peak Flowrate (q _p)	0.0258	0.0388	0.0859	0.1339	0.1591	0.1869	0.2223	0.2476
Peak Flowrate (q _p)	26	39	86	134	159	187	222	248
24 hour Runoff Depth (Q ₂₄)	19.74	29.99	67.16	105.05	125.02	146.99	174.96	194.95
24 hour Runoff Volume (V ₂₄)	170	258	578	904	1076	1265	1506	1678

Existing Flows

	WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	24.0000	34.50	72	110	130	152	180	200
Peak Flowrate (q _p)	0.1266	0.1837	0.6458	1.3018	1.6770	2.1059	2.6702	3.0832
Peak Flowrate (q _p)	127	184	646	1302	1677	2106	2670	3083
24 hour Runoff Volume (V ₂₄)	568	1157	4377	8789	11408	14459	18544	21571

STORMWATER FLOWS - Site Catchment
Post Development Pervious

Hydrological Soil Group	Group_B		
	CN	Area	Product
Grass	61	4.5715	278.8589
Grass	80	0.3147	25.1794
Reserve	55	0.8310	45.7050
Reserve	78	1.9852	154.8456
totals		7.7024	504.5889
% Impervious		0.00%	
CN weighted		65.5106	
la weighted		5.0000	
Channelisation factor (C)		0.6000	
Catchment Length (l)		0.8000 km	
Catchment Slope (S _c)		0.0075 m/m	
Runoff Factor		0.4871	
Time of Concentration (t _c)		0.4673 hrs	28.0 min
Use (t _c)		0.4673 hrs	28.0 min
Catchment Area		0.0770 km ²	
CN		65.5106	
Storage (S)		133.7235 mm	

Golding Road - GMA (Catchment East - Central Portion)

Land use	Group A Soil (volcanic granular loam)	Group B Soil (alluvial)	Group C Soil (mudstone/sandstone)
Bush, humid-climate, not-grazed	30	55	70
Pasture, lightly grazed, good grass cover	39	61	74
Urban lawns	39	61	74
Crops, straight rows, minimal vegetative cover	72	81	88
Sealed roads, roofs	98	98	98

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210	234
c*		0.0570	0.0839	0.2039	0.2961	0.3391	0.3815	0.4281	0.4554
q* from ARC	Approx	0.022	0.022	0.046	0.061	0.067	0.072	0.077	0.080
Peak Flowrate (q _p)	cumecs	0.0445	0.0587	0.2752	0.5748	0.7574	0.9710	1.2505	1.4404
Peak Flowrate (q _p)	l/s	45	59	275	575	757	971	1250	1440
24 hour Runoff Depth (Q ₂₄)	mm	2.89	5.33	26.07	54.96	73.28	95.15	124.24	144.23
24 hour Runoff Volume (V ₂₄)	cu mtr	223	411	2008	4233	5645	7329	9569	11109

STORMWATER FLOWS - Site Catchment
Post Development Impervious

Hydrological Soil Group	Group_B_Impervious		
	CN	Area	Product
Buildings	98	6.1713	604.7874
Roading	98	4.5224	443.1952
totals		10.6937	1047.9826
% Impervious		100.00%	
CN weighted		98.0000	
la weighted		0.0000	
Channelisation factor (C)		0.6000	
Catchment Length (l)		0.8000 km	
Catchment Slope (S _c)		0.0075 m/m	
Runoff Factor		0.9608	
Time of Concentration (t _c)		0.3216 hrs	19.3 min
Use (t _c)		0.3216 hrs	19.3 min
Catchment Area		0.1069 km ²	
CN		98.0000	
Storage (S)		5.1837 mm	

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210	234
c*		0.7162	0.7689	0.8833	0.9220	0.9342	0.9441	0.9530	0.9575
q* from ARC	Approx	0.117	0.121	0.129	0.132	0.132	0.133	0.134	0.134
Peak Flowrate (q _p)	cumecs	0.3285	0.4478	1.0851	1.7254	2.0852	2.4903	3.0033	3.3444
Peak Flowrate (q _p)	l/s	329	448	1085	1725	2085	2490	3003	3344
24 hour Runoff Depth (Q ₂₄)	mm	21.84	29.99	73.64	117.53	142.19	169.97	205.14	228.53
24 hour Runoff Volume (V ₂₄)	cu mtr	2336	3207	7875	12568	15206	18176	21937	24438

Post Development Flows

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210	234
Peak Flowrate (q _p)	cumecs	0.3730	0.5065	1.3603	2.3001	2.8426	3.4613	4.2538	4.7849
Peak Flowrate (q _p)	l/s	373	507	1360	2300	2843	3461	4254	4785
24 hour Runoff Volume (V ₂₄)	cu mtr	2558	3618	9883	16801	20850	25505	31506	35547

STORMWATER FLOWS - Site Catchment
Existing Pervious Area

Hydrological Soil Group	Group_D		
Grassed	CN 80	Area 27.5910	Product 2207.2800
		totals	27.5910 2207.2800
% Impervious		0.00%	
CN weighted		80.0000	
I _a weighted		5.0000	
Channelisation factor (C)		0.8000	
Catchment Length (l)		0.8910 km	
Catchment Slope (S _c)		0.0074 m/m	
Runoff Factor		0.6667	
Time of Concentration (t _c)		0.5652 hrs	33.9 min
Use (t _c)		0.5652 hrs	33.9 min
Catchment Area		0.2759 km ²	
CN		80.0000	
Storage (S)		63.5000 mm	

Golding Road - GMB (Catchment East - Northern Portion)

Land use	Group A Soil (volcanic granular loam)	Group B Soil (alluvial)	Group C Soil (mudstone/sandstone)
Bush, humid-climate, not-grazed	30	55	70
Pasture, lightly grazed, good grass cover	39	61	74
Urban lawns	39	61	74
Crops, straight rows, minimal vegetative cover	72	81	88
Sealed roads, roofs	98	98	98

			WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm		16.6667	34.50	50	89	110	135	165	185
c*			0.0499	0.1617	0.2395	0.3835	0.4405	0.4960	0.5496	0.5795
q* from ARC	Approx		0.020	0.034	0.048	0.066	0.072	0.077	0.082	0.084
Peak Flowrate (q _p)	cumecs		0.0934	0.3213	0.6598	1.6322	2.1924	2.8779	3.7180	4.2856
Peak Flowrate (q _p)	l/s		93	321	660	1632	2192	2878	3718	4286
24 hour Runoff Depth (Q ₂₄)	mm		1.81	9.36	18.66	47.84	65.43	87.34	114.54	133.06
24 hour Runoff Volume (V ₂₄)	cu mtr		500	2582	5149	13199	18053	24098	31603	36712

STORMWATER FLOWS - Site Catchment
Existing Impervious

Hydrological Soil Group	Group_D_Impervious		
Building	CN 98	Area 2.9881	Product 292.8338
		totals	2.9881 292.8338
% Impervious		100.00%	
CN weighted		98.0000	
I _a weighted		0.0000	
Channelisation factor (C)		0.8000	
Catchment Length (l)		0.8910 km	
Catchment Slope (S _c)		0.0074 m/m	
Runoff Factor		0.9608	
Time of Concentration (t _c)		0.4623 hrs	27.7 min
Use (t _c)		0.4623 hrs	27.7 min
Catchment Area		0.0299 km ²	
CN		98.0000	
Storage (S)		5.1837 mm	

			WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm		16.6667	34.50	50	89	110	135	165	185
c*			0.6165	0.7689	0.8283	0.8957	0.9139	0.9287	0.9409	0.9469
q* from ARC	Approx		0.095	0.105	0.109	0.113	0.114	0.115	0.115	0.116
Peak Flowrate (q _p)	cumecs		0.0471	0.1086	0.1628	0.3001	0.3742	0.4625	0.5685	0.6392
Peak Flowrate (q _p)	l/s		47	109	163	300	374	463	568	639
24 hour Runoff Depth (Q ₂₄)	mm		12.71	29.99	45.30	84.10	105.05	130.01	159.97	179.96
24 hour Runoff Volume (V ₂₄)	cu mtr		380	896	1354	2513	3139	3885	4780	5377

Existing Flows

			WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm		16.6667	34.50	50	89	110	135	165	185
Peak Flowrate (q _p)	cumecs		0.1406	0.4299	0.8227	1.9323	2.5666	3.3404	4.2865	4.9247
Peak Flowrate (q _p)	l/s		141	430	823	1932	2567	3340	4287	4925
24 hour Runoff Volume (V ₂₄)	cu mtr		879	3478	6503	15712	21192	27982	36383	42090

STORMWATER FLOWS - Site Catchment
Existing Pervious Area

Hydrological Soil Group	Group_D		
Grassed	CN 80	Area 8.7317	Product 698.5360
		totals	8.7317 698.5360
% Impervious		0.00%	
CN weighted		80.0000	
I _a weighted		5.0000	
Channelisation factor (C)		0.8000	
Catchment Length (l)		0.5800 km	
Catchment Slope (S _c)		0.0043 m/m	
Runoff Factor		0.6667	
Time of Concentration (t _c)		0.5011 hrs	30.1 min
Use (t _c)		0.5011 hrs	30.1 min
Catchment Area		0.0873 km ²	
CN		80.0000	
Storage (S)		63.5000 mm	

Golding Road - GMCa (Catchment East - Southern Portion)

Land use	Group A Soil (volcanic granular loam)	Group B Soil (alluvial)	Group C Soil (mudstone/sandstone)
Bush, humid-climate, not-grazed	30	55	70
Pasture, lightly grazed, good grass cover	39	61	74
Urban lawns	39	61	74
Crops, straight rows, minimal vegetative cover	72	81	88
Sealed roads, roofs	98	98	98

			WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	16.6667	34.50	50	89	110	135	165	185	
c*		0.0499	0.1617	0.2395	0.3835	0.4405	0.4960	0.5496	0.5795	
q* from ARC	Approx	0.021	0.036	0.050	0.070	0.076	0.082	0.086	0.089	
Peak Flowrate (q _p)	cumecs	0.0312	0.1073	0.2204	0.5451	0.7322	0.9611	1.2417	1.4312	
Peak Flowrate (q _p)	l/s	31	107	220	545	732	961	1242	1431	
24 hour Runoff Depth (Q ₂₄)	mm	1.81	9.36	18.66	47.84	65.43	87.34	114.54	133.06	
24 hour Runoff Volume (V ₂₄)	cu mtr	158	817	1630	4177	5713	7626	10001	11618	

STORMWATER FLOWS - Site Catchment
Existing Impervious

Hydrological Soil Group	Group_D_Impervious		
Building	CN 98	Area 1.4074	Product 137.9252
		totals	1.4074 137.9252
% Impervious		100.00%	
CN weighted		98.0000	
I _a weighted		0.0000	
Channelisation factor (C)		0.8000	
Catchment Length (l)		0.5800 km	
Catchment Slope (S _c)		0.0043 m/m	
Runoff Factor		0.9608	
Time of Concentration (t _c)		0.4098 hrs	24.6 min
Use (t _c)		0.4098 hrs	24.6 min
Catchment Area		0.0141 km ²	
CN		98.0000	
Storage (S)		5.1837 mm	

			WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	16.6667	34.50	50	89	110	135	165	185	
c*		0.6165	0.7689	0.8283	0.8957	0.9139	0.9287	0.9409	0.9469	
q* from ARC	Approx	0.099	0.111	0.115	0.119	0.120	0.120	0.121	0.121	
Peak Flowrate (q _p)	cumecs	0.0233	0.0537	0.0806	0.1485	0.1852	0.2289	0.2813	0.3163	
Peak Flowrate (q _p)	l/s	23	54	81	149	185	229	281	316	
24 hour Runoff Depth (Q ₂₄)	mm	12.71	29.99	45.30	84.10	105.05	130.01	159.97	179.96	
24 hour Runoff Volume (V ₂₄)	cu mtr	179	422	638	1184	1478	1830	2251	2533	

Existing Flows

			WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	16.6667	34.50	50	89	110	135	165	185	
Peak Flowrate (q _p)	cumecs	0.0545	0.1610	0.3009	0.6936	0.9174	1.1900	1.5230	1.7475	
Peak Flowrate (q _p)	l/s	55	161	301	694	917	1190	1523	1747	
24 hour Runoff Volume (V ₂₄)	cu mtr	337	1239	2267	5361	7192	9456	12253	14151	

STORMWATER FLOWS - Site Catchment
Existing Pervious Area

Hydrological Soil Group	Group_D		
Grassed	CN 80	Area 2.4911	Product 199.2880
		totals	2.4911 199.2880
% Impervious		0.00%	
CN weighted		80.0000	
I _a weighted		5.0000	
Channelisation factor (C)		0.8000	
Catchment Length (l)		0.5000 km	
Catchment Slope (S _c)		0.0050 m/m	
Runoff Factor		0.6667	
Time of Concentration (t _c)		0.4342 hrs	26.1 min
Use (t _c)		0.4342 hrs	26.1 min
Catchment Area		0.0249 km ²	
CN		80.0000	
Storage (S)		63.5000 mm	

Golding Road - GMCb (Catchment East - Southern Portion)

Land use	Group A Soil (volcanic granular loam)	Group B Soil (alluvial)	Group C Soil (mudstone/sandstone)
Bush, humid-climate, not-grazed	30	55	70
Pasture, lightly grazed, good grass cover	39	61	74
Urban lawns	39	61	74
Crops, straight rows, minimal vegetative cover	72	81	88
Sealed roads, roofs	98	98	98

			WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm		16.6667	34.50	50	89	110	135	165	185
c*			0.0499	0.1617	0.2395	0.3835	0.4405	0.4960	0.5496	0.5795
q* from ARC	Approx		0.023	0.038	0.054	0.075	0.081	0.087	0.092	0.094
Peak Flowrate (q _p)	cumecs		0.0095	0.0325	0.0668	0.1652	0.2219	0.2913	0.3763	0.4337
Peak Flowrate (q _p)	l/s		9	33	67	165	222	291	376	434
24 hour Runoff Depth (Q ₂₄)	mm		1.81	9.36	18.66	47.84	65.43	87.34	114.54	133.06
24 hour Runoff Volume (V ₂₄)	cu mtr		45	233	465	1192	1630	2176	2853	3315

STORMWATER FLOWS - Site Catchment
Existing Impervious

Hydrological Soil Group	Group_D_Impervious		
Building	CN 98	Area 0.9662	Product 94.6876
		totals	0.9662 94.6876
% Impervious		100.00%	
CN weighted		98.0000	
I _a weighted		0.0000	
Channelisation factor (C)		0.8000	
Catchment Length (l)		0.5000 km	
Catchment Slope (S _c)		0.0050 m/m	
Runoff Factor		0.9608	
Time of Concentration (t _c)		0.3551 hrs	21.3 min
Use (t _c)		0.3551 hrs	21.3 min
Catchment Area		0.0097 km ²	
CN		98.0000	
Storage (S)		5.1837 mm	

			WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm		16.6667	34.50	50	89	110	135	165	185
c*			0.6165	0.7689	0.8283	0.8957	0.9139	0.9287	0.9409	0.9469
q* from ARC	Approx		0.105	0.117	0.121	0.125	0.126	0.127	0.128	0.128
Peak Flowrate (q _p)	cumecs		0.0169	0.0390	0.0585	0.1078	0.1344	0.1661	0.2042	0.2296
Peak Flowrate (q _p)	l/s		17	39	58	108	134	166	204	230
24 hour Runoff Depth (Q ₂₄)	mm		12.71	29.99	45.30	84.10	105.05	130.01	159.97	179.96
24 hour Runoff Volume (V ₂₄)	cu mtr		123	290	438	813	1015	1256	1546	1739

Existing Flows

			WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm		16.6667	34.50	50	89	110	135	165	185
Peak Flowrate (q _p)	cumecs		0.0264	0.0715	0.1253	0.2730	0.3563	0.4574	0.5805	0.6633
Peak Flowrate (q _p)	l/s		26	72	125	273	356	457	580	663
24 hour Runoff Volume (V ₂₄)	cu mtr		168	523	903	2004	2645	3432	4399	5053

STORMWATER FLOWS - Site Catchment
Post Development Pervious

Hydrological Soil Group		Group_D	
Grass	CN	80	Product 10.0240
	Area	0.1253	
	Product		10.0240
	totals	0.1253	10.0240
% Impervious		0.00%	
CN weighted		80.0000	
la weighted		5.0000	
Channelisation factor	(C)	0.6000	
Catchment Length	(l)	0.5000 km	
Catchment Slope	(S _c)	0.0050 m/m	
Runoff Factor		0.6667	
Time of Concentration	(t _c)	0.3257 hrs	19.5 min
Use	(t _c)	0.3257 hrs	19.5 min
Catchment Area		0.0013 km ²	
CN		80.0000	
Storage	(S)	63.5000 mm	

Golding Road - GMCb (Catchment East - Southern Portion)

Land use	Group A Soil (volcanic granular loam)	Group B Soil (alluvial)	Group C Soil (mudstone/sandstone)
Bush, humid-climate, not-grazed	30	55	70
Pasture, lightly grazed, good grass cover	39	61	74
Urban lawns	39	61	74
Crops, straight rows, minimal vegetative cover	72	81	88
Sealed roads, roofs	98	98	98

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI	
24 hour rainfall depth	(P ₂₄)	mm	25.3333	34.50	76	111	136	163	187	210
c*			0.1077	0.1617	0.3420	0.4430	0.4980	0.5464	0.5822	0.6116
q* from ARC		Approx	0.027	0.042	0.077	0.091	0.097	0.102	0.105	0.108
Peak Flowrate	(q _p)	cumecs	0.0009	0.0018	0.0074	0.0126	0.0165	0.0208	0.0247	0.0285
Peak Flowrate	(q _p)	l/s	1	2	7	13	17	21	25	28
24 hour Runoff Depth	(Q ₂₄)	mm	4.93	9.36	37.48	66.29	88.23	112.70	134.92	156.52
24 hour Runoff Volume	(V ₂₄)	cu mtr	6	12	47	83	111	141	169	196

STORMWATER FLOWS - Site Catchment
Post Development Impervious

Hydrological Soil Group		Group_D_Impervious	
Building	CN	98	Product 279.8194
Roads	Area	2.8553	46.7166
	Product	0.4767	46.7166
	totals	3.3320	326.5360
% Impervious		100.00%	
CN weighted		98.0000	
la weighted		0.0000	
Channelisation factor	(C)	0.6000	
Catchment Length	(l)	0.5000 km	
Catchment Slope	(S _c)	0.0050 m/m	
Runoff Factor		0.9608	
Time of Concentration	(t _c)	0.2664 hrs	16.0 min
Use	(t _c)	0.2664 hrs	16.0 min
Catchment Area		0.0333 km ²	
CN		98.0000	
Storage	(S)	5.1837 mm	

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI	
24 hour rainfall depth	(P ₂₄)	mm	25.3333	34.50	76	111	136	163	187	210
c*			0.7096	0.7689	0.8800	0.9146	0.9292	0.9402	0.9475	0.9530
q* from ARC		Approx	0.125	0.130	0.138	0.140	0.141	0.142	0.142	0.143
Peak Flowrate	(q _p)	cumecs	0.1054	0.1491	0.3492	0.5188	0.6400	0.7710	0.8875	0.9991
Peak Flowrate	(q _p)	l/s	105	149	349	519	640	771	887	999
24 hour Runoff Depth	(Q ₂₄)	mm	21.03	29.99	71.15	106.05	131.01	157.98	181.96	204.94
24 hour Runoff Volume	(V ₂₄)	cu mtr	701	999	2371	3534	4365	5264	6063	6829

Post Development Flows

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI	
24 hour rainfall depth	(P ₂₄)	mm	25.3333	34.50	76	111	136	163	187	210
Peak Flowrate	(q _p)	cumecs	0.1063	0.1510	0.3566	0.5314	0.6566	0.7919	0.9122	1.0276
Peak Flowrate	(q _p)	l/s	106	151	357	531	657	792	912	1028
24 hour Runoff Volume	(V ₂₄)	cu mtr	707	1011	2418	3617	4476	5405	6232	7025

STORMWATER FLOWS - Site Catchment
Post Development Pervious

Hydrological Soil Group	Group_D		
	CN	Area	Product
Grass	80	2.6046	208.3680
Reserve	78	0.2891	22.5498
		totals	2.8937 230.9178
% Impervious		0.00%	
CN weighted		79.8002	
la weighted		5.0000	
Channelisation factor (C)		0.6000	
Catchment Length (l)		0.4500 km	
Catchment Slope (S _c)		0.0067 m/m	
Runoff Factor		0.6639	
Time of Concentration (t _c)		0.2789 hrs	16.7 min
Use (t _c)		0.2789 hrs	16.7 min
Catchment Area		0.0289 km ²	
CN		79.8002	
Storage (S)		64.2950 mm	

Golding Road - GMD (Catchment West - to Station Road North)

Land use	Group A Soil (volcanic granular loam)	Group B Soil (alluvial)	Group C Soil (mudstone/sandstone)
Bush, humid-climate, not-grazed	30	55	70
Pasture, lightly grazed, good grass cover	39	61	74
Urban lawns	39	61	74
Crops, straight rows, minimal vegetative cover	72	81	88
Sealed roads, roofs	98	98	98

	WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI	
24 hour rainfall depth (P ₂₄)	mm	25.3333	34.50	76	111	136	163	187	210
c*		0.1065	0.1600	0.3392	0.4399	0.4949	0.5433	0.5792	0.6087
q* from ARC	Approx	0.028	0.044	0.081	0.096	0.102	0.107	0.111	0.114
Peak Flowrate (q _p)	cumecs	0.0209	0.0442	0.1789	0.3070	0.4021	0.5069	0.6014	0.6928
Peak Flowrate (q _p)	l/s	21	44	179	307	402	507	601	693
24 hour Runoff Depth (Q ₂₄)	mm	4.89	9.28	37.26	65.98	87.87	112.30	134.49	156.06
24 hour Runoff Volume (V ₂₄)	cu mtr	141	268	1078	1909	2543	3250	3892	4516

STORMWATER FLOWS - Site Catchment
Post Development Impervious

Hydrological Soil Group	Group_D_Impervious		
	CN	Area	Product
Building	98	13.1927	1292.8846
Roads	98	3.3197	325.3306
		totals	16.5124 1618.2152
% Impervious		100.00%	
CN weighted		98.0000	
la weighted		0.0000	
Channelisation factor (C)		0.6000	
Catchment Length (l)		0.4500 km	
Catchment Slope (S _c)		0.0067 m/m	
Runoff Factor		0.9608	
Time of Concentration (t _c)		0.2276 hrs	13.7 min
Use (t _c)		0.2276 hrs	13.7 min
Catchment Area		0.1651 km ²	
CN		98.0000	
Storage (S)		5.1837 mm	

	WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI	
24 hour rainfall depth (P ₂₄)	mm	25.3333	34.50	76	111	136	163	187	210
c*		0.7096	0.7689	0.8800	0.9146	0.9292	0.9402	0.9475	0.9530
q* from ARC	Approx	0.132	0.137	0.145	0.148	0.149	0.150	0.150	0.150
Peak Flowrate (q _p)	cumecs	0.5506	0.7787	1.8236	2.7089	3.3420	4.0260	4.6341	5.2171
Peak Flowrate (q _p)	l/s	551	779	1824	2709	3342	4026	4634	5217
24 hour Runoff Depth (Q ₂₄)	mm	21.03	29.99	71.15	106.05	131.01	157.98	181.96	204.94
24 hour Runoff Volume (V ₂₄)	cu mtr	3473	4953	11748	17511	21632	26086	30045	33841

Post Development Flows

	WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI	
24 hour rainfall depth (P ₂₄)	mm	25.3333	34.50	76	111	136	163	187	210
Peak Flowrate (q _p)	cumecs	0.5714	0.8229	2.0025	3.0159	3.7440	4.5329	5.2355	5.9098
Peak Flowrate (q _p)	l/s	571	823	2003	3016	3744	4533	5236	5910
24 hour Runoff Volume (V ₂₄)	cu mtr	3614	5221	12826	19420	24175	29335	33937	38356

STORMWATER FLOWS - Site Catchment
Post Development Pervious

Hydrological Soil Group	Group_D		
	CN	Area	Product
Crop	77	8.3978	642.4317
Grass	50	21.0240	1051.2000
Grass	61	1.5440	94.1840
Grass	80	0.2000	16.0000
totals		31.1658	1803.8157
% Impervious		0.00%	
CN weighted		57.8780	
la weighted		5.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		1.1410 km	
Catchment Slope (S _c)		0.0189 m/m	
Runoff Factor		0.4072	
Time of Concentration (t _c)		0.8233 hrs	49.4 min
Use (t _c)		0.8233 hrs	49.4 min
Catchment Area		0.3117 km ²	
CN		57.8780	
Storage (S)		184.8538 mm	

Catchment UL

Table 3.3 - Curve numbers for typical Auckland conditions

Land use	Group A Soil (volcanic granular loam)	Group B Soil (alluvial)	Group C Soil (mudstone/sandstone)
Bush, humid-climate, not-grazed	30	55	70
Pasture, lightly grazed, good grass cover	39	61	74
Urban lawns	39	61	74
Crops, straight rows, minimal vegetative cover	72	81	88
Sealed roads, roofs	98	98	98

	WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210
c*		0.0419	0.0622	0.1563	0.2333	0.2707	0.3086	0.3769
q* from ARC	Approx	0.017	0.017	0.027	0.039	0.043	0.048	0.052
Peak Flowrate (q _p)	cumecs	0.1371	0.1808	0.6604	1.4797	1.9934	2.6023	3.4084
Peak Flowrate (q _p)	l/s	137	181	660	1480	1993	2602	3408
24 hour Runoff Depth (Q ₂₄)	mm	2.17	4.06	20.91	45.66	61.83	81.44	107.95
24 hour Runoff Volume (V ₂₄)	cu mtr	678	1265	6517	14231	19269	25382	33644

STORMWATER FLOWS - Site Catchment
Post Development Impervious

Hydrological Soil Group	Group_D_Impervious		
	CN	Area	Product
Building	98	0.0000	
Roads	98	0.0000	
totals		0.0000	0.0000
% Impervious		100.00%	
CN weighted		0.0000	
la weighted		0.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		1.1410 km	
Catchment Slope (S _c)		0.0189 m/m	
Runoff Factor		0.0000	
Time of Concentration (t _c)		0.0000 hrs	0.0 min
Use (t _c)		0.1667 hrs	10.0 min
Catchment Area		0.0000 km ²	
CN		0.0000	
Storage (S)		0.0000 mm	

	WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210
c*		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
q* from ARC	Approx	0.169	0.169	0.169	0.169	0.169	0.169	0.169
Peak Flowrate (q _p)	cumecs	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Peak Flowrate (q _p)	l/s	0	0	0	0	0	0	0
24 hour Runoff Depth (Q ₂₄)	mm	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24 hour Runoff Volume (V ₂₄)	cu mtr	0	0	0	0	0	0	0

Post Development Flows

	WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210
Peak Flowrate (q _p)	cumecs	0.1371	0.1808	0.6604	1.4797	1.9934	2.6023	3.4084
Peak Flowrate (q _p)	l/s	137	181	660	1480	1993	2602	3408
24 hour Runoff Volume (V ₂₄)	cu mtr	678	1265	6517	14231	19269	25382	33644

STORMWATER FLOWS - Site Catchment
Post Development Pervious

Hydrological Soil Group

	CN	Area	Product
Grass	50	7.0180	350.9000
Grass	61	28.2370	1722.4570
Grass	80	0.7310	58.4800
totals		35.9860	2131.8370

% Impervious 0.00%
CN weighted 59.2407
la weighted 5.0000

Channelisation factor (C) 1.0000
Catchment Length (l) 1.0230 km
Catchment Slope (S_c) 0.0518 m/m

Runoff Factor 0.4209
Time of Concentration (t_c) 0.5560 hrs 33.4 min
Use (t_c) 0.5560 hrs 33.4 min
Catchment Area 0.3599 km²
CN 59.2407
Storage (S) 174.7590 mm

Catchment UK

Table 3.3 - Curve numbers for typical Auckland conditions

Land use	Group A Soil (volcanic granular loam)	Group B Soil (alluvial)	Group C Soil (mudstone/sandstone)
Bush, humid-climate, not-grazed	30	55	70
Pasture, lightly grazed, good grass cover	39	61	74
Urban lawns	39	61	74
Crops, straight rows, minimal vegetative cover	72	81	88
Sealed roads, roofs	98	98	98

	WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	26.1667	34.50	79	123	147	175	210	234
c*	0.0442	0.0655	0.1639	0.2435	0.2819	0.3207	0.3642	0.3901
q* from ARC	0.020	0.020	0.034	0.049	0.055	0.060	0.065	0.068
Peak Flowrate (q _p)	0.1928	0.2541	0.9733	2.1521	2.8872	3.7563	4.9042	5.6898
Peak Flowrate (q _p)	193	254	973	2152	2887	3756	4904	5690
24 hour Runoff Depth (Q ₂₄)	2.29	4.26	21.76	47.24	63.80	83.83	110.82	129.56
24 hour Runoff Volume (V ₂₄)	823	1533	7831	17000	22958	30166	39880	46622

STORMWATER FLOWS - Site Catchment
Post Development Impervious

Hydrological Soil Group

Group_B_Impervious

	CN	Area	Product
Building	98	0.0000	
Roads	98	0.0000	
totals		0.0000	0.0000

% Impervious 100.00%
CN weighted 0.0000
la weighted 0.0000

Channelisation factor (C) 1.0000
Catchment Length (l) 1.0230 km
Catchment Slope (S_c) 0.0518 m/m

Runoff Factor 0.0000
Time of Concentration (t_c) 0.0000 hrs 0.0 min
Use (t_c) 0.1667 hrs 10.0 min
Catchment Area 0.0000 km²
CN 0.0000
Storage (S) 0.0000 mm

	WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	26.1667	34.50	79	123	147	175	210	234
c*	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
q* from ARC	0.169	0.169	0.169	0.169	0.169	0.169	0.169	0.169
Peak Flowrate (q _p)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Peak Flowrate (q _p)	0	0	0	0	0	0	0	0
24 hour Runoff Depth (Q ₂₄)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24 hour Runoff Volume (V ₂₄)	0	0	0	0	0	0	0	0

Post Development Flows

	WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	26.1667	34.50	79	123	147	175	210	234
Peak Flowrate (q _p)	0.1928	0.2541	0.9733	2.1521	2.8872	3.7563	4.9042	5.6898
Peak Flowrate (q _p)	193	254	973	2152	2887	3756	4904	5690
24 hour Runoff Volume (V ₂₄)	823	1533	7831	17000	22958	30166	39880	46622

STORMWATER FLOWS - Site Catchment
Post Development Pervious

Hydrological Soil Group	Group_B		
	CN	Area	Product
Grass	50	4.0187	200.9350
Grass	61	15.4193	940.5773
	totals	19.4380	1141.5123
% Impervious		0.00%	
CN weighted		58.7258	
la weighted		5.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		0.6360 km	
Catchment Slope (S _c)		0.0542 m/m	
Runoff Factor		0.4157	
Time of Concentration (t _c)		0.4035 hrs	24.2 min
Use (t _c)		0.4035 hrs	24.2 min
Catchment Area		0.1944 km ²	
CN		58.7258	
Storage (S)		178.5185 mm	

Catchment UJ

Land use	Group A Soil (volcanic granular loam)	Group B Soil (alluvial)	Group C Soil (mudstone/sandstone)
Bush, humid-climate, not-grazed	30	55	70
Pasture, lightly grazed, good grass cover	39	61	74
Urban lawns	39	61	74
Crops, straight rows, minimal vegetative cover	72	81	88
Sealed roads, roofs	98	98	98

	WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210
c*		0.0433	0.0642	0.1610	0.2396	0.2776	0.3161	0.3593
q* from ARC	Approx	0.023	0.023	0.039	0.055	0.062	0.068	0.074
Peak Flowrate (q _p)	cumecs	0.1193	0.1573	0.5919	1.3153	1.7673	2.3022	3.0093
Peak Flowrate (q _p)	l/s	119	157	592	1315	1767	2302	3009
24 hour Runoff Depth (Q ₂₄)	mm	2.24	4.18	21.44	46.64	63.05	82.92	109.73
24 hour Runoff Volume (V ₂₄)	cu mtr	436	813	4167	9066	12255	16118	21330

STORMWATER FLOWS - Site Catchment
Post Development Impervious

Hydrological Soil Group	Group_B_Impervious		
	CN	Area	Product
Building	98	0.0000	
Roads	98	0.0000	
	totals	0.0000	0.0000
% Impervious		100.00%	
CN weighted		0.0000	
la weighted		0.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		0.6360 km	
Catchment Slope (S _c)		0.0542 m/m	
Runoff Factor		0.0000	
Time of Concentration (t _c)		0.0000 hrs	0.0 min
Use (t _c)		0.1667 hrs	10.0 min
Catchment Area		0.0000 km ²	
CN		0.0000	
Storage (S)		0.0000 mm	

	WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210
c*		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
q* from ARC	Approx	0.169	0.169	0.169	0.169	0.169	0.169	0.169
Peak Flowrate (q _p)	cumecs	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Peak Flowrate (q _p)	l/s	0	0	0	0	0	0	0
24 hour Runoff Depth (Q ₂₄)	mm	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24 hour Runoff Volume (V ₂₄)	cu mtr	0	0	0	0	0	0	0

Post Development Flows

	WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210
Peak Flowrate (q _p)	cumecs	0.1193	0.1573	0.5919	1.3153	1.7673	2.3022	3.0093
Peak Flowrate (q _p)	l/s	119	157	592	1315	1767	2302	3009
24 hour Runoff Volume (V ₂₄)	cu mtr	436	813	4167	9066	12255	16118	21330

STORMWATER FLOWS - Site Catchment
Post Development Pervious

Hydrological Soil Group	Group_D		
	CN	Area	Product
Grass	50	5.5372	276.8600
Grass	61	9.5534	582.7574
Grass	80	0.3964	31.7120
	totals	15.4870	891.3294
% Impervious		0.00%	
CN weighted		57.5534	
la weighted		5.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		0.5970 km	
Catchment Slope (S _c)		0.0837 m/m	
Runoff Factor		0.4040	
Time of Concentration (t _c)		0.3451 hrs	20.7 min
Use (t _c)		0.3451 hrs	20.7 min
Catchment Area		0.1549 km ²	
CN		57.5534	
Storage (S)		187.3293 mm	

Catchment UI

Table 3.3 - Curve numbers for typical Auckland conditions

Land use	Group A Soil (volcanic granular loam)	Group B Soil (alluvial)	Group C Soil (mudstone/sandstone)
Bush, humid-climate, not-grazed	30	55	70
Pasture, lightly grazed, good grass cover	39	61	74
Urban lawns	39	61	74
Crops, straight rows, minimal vegetative cover	72	81	88
Sealed roads, roofs	98	98	98

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210	234
c*		0.0414	0.0614	0.1546	0.2309	0.2680	0.3057	0.3483	0.3738
q* from ARC	Approx	0.025	0.025	0.040	0.057	0.064	0.070	0.077	0.080
Peak Flowrate (q _p)	cumecs	0.1010	0.1331	0.4808	1.0808	1.4575	1.9044	2.4962	2.9020
Peak Flowrate (q _p)	l/s	101	133	481	1081	1458	1904	2496	2902
24 hour Runoff Depth (Q ₂₄)	mm	2.15	4.01	20.71	45.29	61.36	80.88	107.27	125.64
24 hour Runoff Volume (V ₂₄)	cu mtr	333	622	3208	7014	9503	12526	16613	19458

STORMWATER FLOWS - Site Catchment
Post Development Impervious

Hydrological Soil Group	Group_B_Impervious		
	CN	Area	Product
Building	98	0.0000	
Roads	98	0.0000	
	totals	0.0000	0.0000
% Impervious		100.00%	
CN weighted		0.0000	
la weighted		0.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		0.5970 km	
Catchment Slope (S _c)		0.0837 m/m	
Runoff Factor		0.0000	
Time of Concentration (t _c)		0.0000 hrs	0.0 min
Use (t _c)		0.1667 hrs	10.0 min
Catchment Area		0.0000 km ²	
CN		0.0000	
Storage (S)		0.0000 mm	

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210	234
c*		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
q* from ARC	Approx	0.169	0.169	0.169	0.169	0.169	0.169	0.169	0.169
Peak Flowrate (q _p)	cumecs	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Peak Flowrate (q _p)	l/s	0	0	0	0	0	0	0	0
24 hour Runoff Depth (Q ₂₄)	mm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24 hour Runoff Volume (V ₂₄)	cu mtr	0	0	0	0	0	0	0	0

Post Development Flows

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210	234
Peak Flowrate (q _p)	cumecs	0.1010	0.1331	0.4808	1.0808	1.4575	1.9044	2.4962	2.9020
Peak Flowrate (q _p)	l/s	101	133	481	1081	1458	1904	2496	2902
24 hour Runoff Volume (V ₂₄)	cu mtr	333	622	3208	7014	9503	12526	16613	19458

STORMWATER FLOWS - Site Catchment
Post Development Pervious

Hydrological Soil Group	Group_B		
	CN	Area	Product
Crop	77	1.6310	124.7715
Grass	50	19.9922	999.6100
Grass	61	7.2948	444.9828
totals		28.9180	1569.3643
% Impervious		0.00%	
CN weighted		54.2695	
la weighted		5.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		1.1990 km	
Catchment Slope (S _c)		0.0343 m/m	
Runoff Factor		0.3724	
Time of Concentration (t _c)		0.7473 hrs	44.8 min
Use (t _c)		0.7473 hrs	44.8 min
Catchment Area		0.2892 km ²	
CN		54.2695	
Storage (S)		214.0349 mm	

Catchment UH

Land use	Group A Soil (volcanic granular loam)	Group B Soil (alluvial)	Group C Soil (mudstone/sandstone)
Bush, humid-climate, not-grazed	30	55	70
Pasture, lightly grazed, good grass cover	39	61	74
Urban lawns	39	61	74
Crops, straight rows, minimal vegetative cover	72	81	88
Sealed roads, roofs	98	98	98

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210	234
c*		0.0364	0.0541	0.1379	0.2081	0.2427	0.2782	0.3187	0.3431
q* from ARC	Approx	0.018	0.018	0.025	0.037	0.042	0.047	0.051	0.054
Peak Flowrate (q _p)	cumecs	0.1340	0.1767	0.5664	1.3160	1.7938	2.3643	3.1240	3.6471
Peak Flowrate (q _p)	l/s	134	177	566	1316	1794	2364	3124	3647
24 hour Runoff Depth (Q ₂₄)	mm	1.90	3.57	18.79	41.64	56.76	75.25	100.44	118.06
24 hour Runoff Volume (V ₂₄)	cu mtr	551	1033	5433	12042	16415	21762	29045	34141

STORMWATER FLOWS - Site Catchment
Post Development Impervious

Hydrological Soil Group	Group_B_Impervious		
	CN	Area	Product
Building	98	0.0000	
Roads	98	0.0000	
totals		0.0000	0.0000
% Impervious		100.00%	
CN weighted		0.0000	
la weighted		0.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		1.1990 km	
Catchment Slope (S _c)		0.0343 m/m	
Runoff Factor		0.0000	
Time of Concentration (t _c)		0.0000 hrs	0.0 min
Use (t _c)		0.1667 hrs	10.0 min
Catchment Area		0.0000 km ²	
CN		0.0000	
Storage (S)		0.0000 mm	

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210	234
c*		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
q* from ARC	Approx	0.169	0.169	0.169	0.169	0.169	0.169	0.169	0.169
Peak Flowrate (q _p)	cumecs	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Peak Flowrate (q _p)	l/s	0	0	0	0	0	0	0	0
24 hour Runoff Depth (Q ₂₄)	mm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24 hour Runoff Volume (V ₂₄)	cu mtr	0	0	0	0	0	0	0	0

Post Development Flows

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210	234
Peak Flowrate (q _p)	cumecs	0.1340	0.1767	0.5664	1.3160	1.7938	2.3643	3.1240	3.6471
Peak Flowrate (q _p)	l/s	134	177	566	1316	1794	2364	3124	3647
24 hour Runoff Volume (V ₂₄)	cu mtr	551	1033	5433	12042	16415	21762	29045	34141

STORMWATER FLOWS - Site Catchment
Post Development Pervious

Hydrological Soil Group	Group_B		
	CN	Area	Product
Crop	77	7.5827	580.0766
Grass	50	13.0550	652.7500
Grass	61	0.3623	22.1003
	totals	21.0000	1254.9269
% Impervious		0.00%	
CN weighted		59.7584	
la weighted		5.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		0.6360 km	
Catchment Slope (S _c)		0.0371 m/m	
Runoff Factor		0.4261	
Time of Concentration (t _c)		0.4460 hrs	26.8 min
Use (t _c)		0.4460 hrs	26.8 min
Catchment Area		0.2100 km ²	
CN		59.7584	
Storage (S)		171.0447 mm	

Catchment UG

Table 3.3 - Curve numbers for typical Auckland conditions

Land use	Group A Soil (volcanic granular loam)	Group B Soil (alluvial)	Group C Soil (mudstone/sandstone)
Bush, humid-climate, not-grazed	30	55	70
Pasture, lightly grazed, good grass cover	39	61	74
Urban lawns	39	61	74
Crops, straight rows, minimal vegetative cover	72	81	88
Sealed roads, roofs	98	98	98

	WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210
c*		0.0451	0.0668	0.1668	0.2475	0.2863	0.3254	0.3692
q* from ARC	Approx	0.023	0.023	0.039	0.054	0.061	0.066	0.072
Peak Flowrate (q _p)	cumecs	0.1238	0.1632	0.6361	1.3995	1.8745	2.4357	3.1763
Peak Flowrate (q _p)	l/s	124	163	636	1399	1875	2436	3176
24 hour Runoff Depth (Q ₂₄)	mm	2.33	4.34	22.09	47.85	64.55	84.74	111.91
24 hour Runoff Volume (V ₂₄)	cu mtr	489	911	4639	10048	13556	17795	23502

STORMWATER FLOWS - Site Catchment
Post Development Impervious

Hydrological Soil Group	Group_B_Impervious		
	CN	Area	Product
Building	98	0.0000	
Roads	98	0.0000	
	totals	0.0000	0.0000
% Impervious		100.00%	
CN weighted		0.0000	
la weighted		0.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		0.6360 km	
Catchment Slope (S _c)		0.0371 m/m	
Runoff Factor		0.0000	
Time of Concentration (t _c)		0.0000 hrs	0.0 min
Use (t _c)		0.1667 hrs	10.0 min
Catchment Area		0.0000 km ²	
CN		0.0000	
Storage (S)		0.0000 mm	

	WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210
c*		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
q* from ARC	Approx	0.169	0.169	0.169	0.169	0.169	0.169	0.169
Peak Flowrate (q _p)	cumecs	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Peak Flowrate (q _p)	l/s	0	0	0	0	0	0	0
24 hour Runoff Depth (Q ₂₄)	mm	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24 hour Runoff Volume (V ₂₄)	cu mtr	0	0	0	0	0	0	0

Post Development Flows

	WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210
Peak Flowrate (q _p)	cumecs	0.1238	0.1632	0.6361	1.3995	1.8745	2.4357	3.1763
Peak Flowrate (q _p)	l/s	124	163	636	1399	1875	2436	3176
24 hour Runoff Volume (V ₂₄)	cu mtr	489	911	4639	10048	13556	17795	23502

STORMWATER FLOWS - Site Catchment
Post Development Pervious

Hydrological Soil Group	Group_B		
	CN	Area	Product
Crop	77	14.2400	1089.3600
Grass	50	9.3286	466.4300
Crop	81	0.8456	68.4936
Grass	61	2.0635	125.8735
totals		26.4777	1750.1571
% Impervious		0.00%	
CN weighted		66.0993	
la weighted		5.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		0.6050 km	
Catchment Slope (S _c)		0.0506 m/m	
Runoff Factor		0.4936	
Time of Concentration (t _c)		0.3626 hrs	21.8 min
Use (t _c)		0.3626 hrs	21.8 min
Catchment Area		0.2648 km ²	
CN		66.0993	
Storage (S)		130.2704 mm	

Catchment UF

Land use	Group A Soil (volcanic granular loam)	Group B Soil (alluvial)	Group C Soil (mudstone/sandstone)
Bush, humid-climate, not-grazed	30	55	70
Pasture, lightly grazed, good grass cover	39	61	74
Urban lawns	39	61	74
Crops, straight rows, minimal vegetative cover	72	81	88
Sealed roads, roofs	98	98	98

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210	234
c*		0.0584	0.0860	0.2082	0.3016	0.3449	0.3877	0.4345	0.4618
q* from ARC	Approx	0.024	0.024	0.051	0.068	0.075	0.081	0.086	0.089
Peak Flowrate (q _p)	cumecs	0.1694	0.2234	1.0662	2.2156	2.9149	3.7322	4.8004	5.5260
Peak Flowrate (q _p)	l/s	169	223	1066	2216	2915	3732	4800	5526
24 hour Runoff Depth (Q ₂₄)	mm	2.96	5.45	26.51	55.72	74.21	96.25	125.52	145.62
24 hour Runoff Volume (V ₂₄)	cu mtr	783	1442	7020	14754	19650	25484	33234	38556

STORMWATER FLOWS - Site Catchment
Post Development Impervious

Hydrological Soil Group	Group_B_Impervious		
	CN	Area	Product
Building	98	0.0000	
Roads	98	0.0000	
totals		0.0000	0.0000
% Impervious		100.00%	
CN weighted		0.0000	
la weighted		0.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		0.6050 km	
Catchment Slope (S _c)		0.0506 m/m	
Runoff Factor		0.0000	
Time of Concentration (t _c)		0.0000 hrs	0.0 min
Use (t _c)		0.1667 hrs	10.0 min
Catchment Area		0.0000 km ²	
CN		0.0000	
Storage (S)		0.0000 mm	

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210	234
c*		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
q* from ARC	Approx	0.169	0.169	0.169	0.169	0.169	0.169	0.169	0.169
Peak Flowrate (q _p)	cumecs	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Peak Flowrate (q _p)	l/s	0	0	0	0	0	0	0	0
24 hour Runoff Depth (Q ₂₄)	mm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24 hour Runoff Volume (V ₂₄)	cu mtr	0	0	0	0	0	0	0	0

Post Development Flows

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210	234
Peak Flowrate (q _p)	cumecs	0.1694	0.2234	1.0662	2.2156	2.9149	3.7322	4.8004	5.5260
Peak Flowrate (q _p)	l/s	169	223	1066	2216	2915	3732	4800	5526
24 hour Runoff Volume (V ₂₄)	cu mtr	783	1442	7020	14754	19650	25484	33234	38556

STORMWATER FLOWS - Site Catchment
Existing Pervious Area

Catchment UE

Hydrological Soil Group	Group_AB		
	CN	Area	Product
Crop	77	16.0265	1226.0273
Grass	50	6.4842	324.2100
Grass	61	0.6521	39.7781
totals		23.1628	1590.0154
% Impervious		0.00%	
CN weighted		68.6452	
I _a weighted		5.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		1.5290 km	
Catchment Slope (S _c)		0.0435 m/m	
Runoff Factor		0.5226	
Time of Concentration (t _c)		0.6781 hrs	40.7 min
Use (t _c)		0.6781 hrs	40.7 min
Catchment Area		0.2316 km ²	
CN		68.6452	
Storage (S)		116.0185 mm	

Land use	Group A Soil (volcanic granular loam)	Group B Soil (alluvial)	Group C Soil (mudstone/sandstone)
Bush, humid-climate, not-grazed	30	55	70
Pasture, lightly grazed, good grass cover	39	61	74
Urban lawns	39	61	74
Crops, straight rows, minimal vegetative cover	72	81	88
Sealed roads, roofs	98	98	98

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	25.3667	34.50	76	104	113	133	174	199
c*		0.0621	0.0955	0.2217	0.2883	0.3066	0.3461	0.4147	0.4494
q* from ARC	Approx	0.019	0.019	0.041	0.050	0.053	0.057	0.064	0.067
Peak Flowrate (q _p)	cumecs	0.1094	0.1488	0.7259	1.2138	1.3722	1.7554	2.5807	3.0933
Peak Flowrate (q _p)	l/s	109	149	726	1214	1372	1755	2581	3093
24 hour Runoff Depth (Q ₂₄)	mm	3.04	5.98	27.02	45.58	51.77	66.99	100.54	121.74
24 hour Runoff Volume (V ₂₄)	cu mtr	704	1385	6258	10558	11992	15516	23288	28199

STORMWATER FLOWS - Site Catchment
Existing Impervious

Hydrological Soil Group	Group_B_Impervious		
	CN	Area	Product
Building	98	0.0000	
totals		0.0000	0.0000
% Impervious		100.00%	
CN weighted		0.0000	
I _a weighted		0.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		1.5290 km	
Catchment Slope (S _c)		0.0435 m/m	
Runoff Factor		0.0000	
Time of Concentration (t _c)		0.0000 hrs	0.0 min
Use (t _c)		0.1667 hrs	10.0 min
Catchment Area		0.0000 km ²	
CN		0.0000	
Storage (S)		0.0000 mm	

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	25.3667	34.50	76	104	113	133	174	199
c*		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
q* from ARC	Approx	0.169	0.169	0.169	0.169	0.169	0.169	0.169	0.169
Peak Flowrate (q _p)	cumecs	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Peak Flowrate (q _p)	l/s	0	0	0	0	0	0	0	0
24 hour Runoff Depth (Q ₂₄)	mm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24 hour Runoff Volume (V ₂₄)	cu mtr	0	0	0	0	0	0	0	0

Existing Flows

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	25.3667	34.50	76	104	113	133	174	199
Peak Flowrate (q _p)	cumecs	0.1094	0.1488	0.7259	1.2138	1.3722	1.7554	2.5807	3.0933
Peak Flowrate (q _p)	l/s	109	149	726	1214	1372	1755	2581	3093
24 hour Runoff Volume (V ₂₄)	cu mtr	704	1385	6258	10558	11992	15516	23288	28199

STORMWATER FLOWS - Site Catchment
Existing Pervious Area

Catchment UD

Hydrological Soil Group	Group_AB		
	CN	Area	Product
Crop	77	6.0940	466.1910
Grass	50	10.9010	545.0500
Grass	61	20.1279	1227.8019
totals		37.1229	2239.0429
% Impervious		0.00%	
CN weighted		60.3143	
I _a weighted		5.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		0.5430 km	
Catchment Slope (S _c)		0.0942 m/m	
Runoff Factor		0.4318	
Time of Concentration (t _c)		0.3016 hrs	18.1 min
Use (t _c)		0.3016 hrs	18.1 min
Catchment Area		0.3712 km ²	
CN		60.3143	
Storage (S)		167.1271 mm	

Land use	Group A Soil (volcanic granular loam)	Group B Soil (alluvial)	Group C Soil (mudstone/sandstone)
Bush, humid-climate, not-grazed	30	55	70
Pasture, lightly grazed, good grass cover	39	61	74
Urban lawns	39	61	74
Crops, straight rows, minimal vegetative cover	72	81	88
Sealed roads, roofs	98	98	98

			WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm		25.3667	34.50	76	104	113	133	174	199
c*			0.0440	0.0683	0.1651	0.2195	0.2349	0.2687	0.3297	0.3617
q* from ARC	Approx		0.026	0.026	0.044	0.057	0.061	0.067	0.078	0.083
Peak Flowrate (q _p)	cumecs		0.2464	0.3352	1.2536	2.2161	2.5354	3.3165	5.0295	6.1085
Peak Flowrate (q _p)	l/s		246	335	1254	2216	2535	3316	5030	6109
24 hour Runoff Depth (Q ₂₄)	mm		2.21	4.43	21.22	36.83	42.14	55.38	85.27	104.53
24 hour Runoff Volume (V ₂₄)	cu mtr		821	1643	7878	13672	15645	20558	31655	38806

STORMWATER FLOWS - Site Catchment
Existing Impervious

Hydrological Soil Group	Group_B_Impervious		
	CN	Area	Product
Building	98	0.0000	
totals		0.0000	0.0000
% Impervious		100.00%	
CN weighted		0.0000	
I _a weighted		0.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		0.5430 km	
Catchment Slope (S _c)		0.0942 m/m	
Runoff Factor		0.0000	
Time of Concentration (t _c)		0.0000 hrs	0.0 min
Use (t _c)		0.1667 hrs	10.0 min
Catchment Area		0.0000 km ²	
CN		0.0000	
Storage (S)		0.0000 mm	

			WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm		25.3667	34.50	76	104	113	133	174	199
c*			1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
q* from ARC	Approx		0.169	0.169	0.169	0.169	0.169	0.169	0.169	0.169
Peak Flowrate (q _p)	cumecs		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Peak Flowrate (q _p)	l/s		0	0	0	0	0	0	0	0
24 hour Runoff Depth (Q ₂₄)	mm		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24 hour Runoff Volume (V ₂₄)	cu mtr		0	0	0	0	0	0	0	0

Existing Flows

			WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm		25.3667	34.50	76	104	113	133	174	199
Peak Flowrate (q _p)	cumecs		0.2464	0.3352	1.2536	2.2161	2.5354	3.3165	5.0295	6.1085
Peak Flowrate (q _p)	l/s		246	335	1254	2216	2535	3316	5030	6109
24 hour Runoff Volume (V ₂₄)	cu mtr		821	1643	7878	13672	15645	20558	31655	38806

STORMWATER FLOWS - Site Catchment
Existing Pervious Area

Hydrological Soil Group	Group_AB		
	CN	Area	Product
Crop	77	8.4281	644.7497
Grass	50	6.8598	342.9900
Grass	61	1.9121	116.6381
totals		17.2000	1104.3778
% Impervious		0.00%	
CN weighted		64.2080	
I _a weighted		5.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		0.6300 km	
Catchment Slope (S _c)		0.0949 m/m	
Runoff Factor		0.4728	
Time of Concentration (t _c)		0.3158 hrs	18.9 min
Use (t _c)		0.3158 hrs	18.9 min
Catchment Area		0.1720 km ²	
CN		64.2080	
Storage (S)		141.5893 mm	

Catchment UC

Land use	Group A Soil (volcanic granular loam)	Group B Soil (alluvial)	Group C Soil (mudstone/sandstone)
Bush, humid-climate, not-grazed	30	55	70
Pasture, lightly grazed, good grass cover	39	61	74
Urban lawns	39	61	74
Crops, straight rows, minimal vegetative cover	72	81	88
Sealed roads, roofs	98	98	98

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	25.3667	34.50	76	104	113	133	174	199
c*		0.0515	0.0796	0.1892	0.2492	0.2660	0.3025	0.3673	0.4008
q* from ARC	Approx	0.026	0.026	0.050	0.063	0.066	0.072	0.082	0.087
Peak Flowrate (q _p)	cumecs	0.1123	0.1528	0.6499	1.1182	1.2719	1.6459	2.4589	2.9675
Peak Flowrate (q _p)	l/s	112	153	650	1118	1272	1646	2459	2968
24 hour Runoff Depth (Q ₂₄)	mm	2.56	5.09	23.77	40.74	46.46	60.63	92.27	112.48
24 hour Runoff Volume (V ₂₄)	cu mtr	441	875	4088	7007	7991	10428	15871	19346

STORMWATER FLOWS - Site Catchment
Existing Impervious

Hydrological Soil Group	Group_B_Impervious		
	CN	Area	Product
Building	98	0.0000	
totals		0.0000	0.0000
% Impervious		100.00%	
CN weighted		0.0000	
I _a weighted		0.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		0.6300 km	
Catchment Slope (S _c)		0.0949 m/m	
Runoff Factor		0.0000	
Time of Concentration (t _c)		0.0000 hrs	0.0 min
Use (t _c)		0.1667 hrs	10.0 min
Catchment Area		0.0000 km ²	
CN		0.0000	
Storage (S)		0.0000 mm	

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	25.3667	34.50	76	104	113	133	174	199
c*		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
q* from ARC	Approx	0.169	0.169	0.169	0.169	0.169	0.169	0.169	0.169
Peak Flowrate (q _p)	cumecs	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Peak Flowrate (q _p)	l/s	0	0	0	0	0	0	0	0
24 hour Runoff Depth (Q ₂₄)	mm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24 hour Runoff Volume (V ₂₄)	cu mtr	0	0	0	0	0	0	0	0

Existing Flows

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	25.3667	34.50	76	104	113	133	174	199
Peak Flowrate (q _p)	cumecs	0.1123	0.1528	0.6499	1.1182	1.2719	1.6459	2.4589	2.9675
Peak Flowrate (q _p)	l/s	112	153	650	1118	1272	1646	2459	2968
24 hour Runoff Volume (V ₂₄)	cu mtr	441	875	4088	7007	7991	10428	15871	19346

STORMWATER FLOWS - Site Catchment
Existing Pervious Area

Catchment UB

Hydrological Soil Group	Group_B		
	CN	Area	Product
Crop	77	16.1117	1232.5451
Grass	50	10.8925	544.6250
Crop	81	0.4865	39.4065
Grass	61	3.0055	183.3355
totals		30.4962	1999.9121
% Impervious		0.00%	
CN weighted		65.5791	
I _a weighted		5.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		1.2260 km	
Catchment Slope (S _c)		0.0650 m/m	
Runoff Factor		0.4879	
Time of Concentration (t _c)		0.5396 hrs	32.4 min
Use (t _c)		0.5396 hrs	32.4 min
Catchment Area		0.3050 km ²	
CN		65.5791	
Storage (S)		133.3188 mm	

Land use	Group A Soil (volcanic granular loam)	Group B Soil (alluvial)	Group C Soil (mudstone/sandstone)
Bush, humid-climate, not-grazed	30	55	70
Pasture, lightly grazed, good grass cover	39	61	74
Urban lawns	39	61	74
Crops, straight rows, minimal vegetative cover	72	81	88
Sealed roads, roofs	98	98	98

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	25.3667	34.50	76	104	113	133	174	199
c*		0.0545	0.0842	0.1987	0.2606	0.2779	0.3153	0.3814	0.4153
q* from ARC	Approx	0.021	0.021	0.042	0.052	0.055	0.060	0.068	0.071
Peak Flowrate (q _p)	cumecs	0.1605	0.2183	0.9698	1.6537	1.8774	2.4206	3.5980	4.3329
Peak Flowrate (q _p)	l/s	161	218	970	1654	1877	2421	3598	4333
24 hour Runoff Depth (Q ₂₄)	mm	2.70	5.34	24.73	42.19	48.06	62.55	94.80	115.32
24 hour Runoff Volume (V ₂₄)	cu mtr	823	1630	7542	12866	14655	19075	28909	35167

STORMWATER FLOWS - Site Catchment
Existing Impervious

Hydrological Soil Group	Group_B_Impervious		
	CN	Area	Product
Building	98	0.0000	
totals		0.0000	0.0000
% Impervious		100.00%	
CN weighted		0.0000	
I _a weighted		0.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		1.2260 km	
Catchment Slope (S _c)		0.0650 m/m	
Runoff Factor		0.0000	
Time of Concentration (t _c)		0.0000 hrs	0.0 min
Use (t _c)		0.1667 hrs	10.0 min
Catchment Area		0.0000 km ²	
CN		0.0000	
Storage (S)		0.0000 mm	

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	25.3667	34.50	76	104	113	133	174	199
c*		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
q* from ARC	Approx	0.169	0.169	0.169	0.169	0.169	0.169	0.169	0.169
Peak Flowrate (q _p)	cumecs	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Peak Flowrate (q _p)	l/s	0	0	0	0	0	0	0	0
24 hour Runoff Depth (Q ₂₄)	mm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24 hour Runoff Volume (V ₂₄)	cu mtr	0	0	0	0	0	0	0	0

Existing Flows

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	25.3667	34.50	76	104	113	133	174	199
Peak Flowrate (q _p)	cumecs	0.1605	0.2183	0.9698	1.6537	1.8774	2.4206	3.5980	4.3329
Peak Flowrate (q _p)	l/s	161	218	970	1654	1877	2421	3598	4333
24 hour Runoff Volume (V ₂₄)	cu mtr	823	1630	7542	12866	14655	19075	28909	35167

STORMWATER FLOWS - Site Catchment
Post Development Pervious

Hydrological Soil Group	Group_B		
	CN	Area	Product
Crop	77	6.2534	478.3851
Grass	50	8.3200	416.0000
Crop	81	1.1577	93.7737
Grass	61	7.1647	437.0467
totals		22.8958	1425.2055
% Impervious		0.00%	
CN weighted		62.2475	
la weighted		5.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		0.7200 km	
Catchment Slope (S _c)		0.0455 m/m	
Runoff Factor		0.4519	
Time of Concentration (t _c)		0.4409 hrs	26.5 min
Use (t _c)		0.4409 hrs	26.5 min
Catchment Area		0.2290 km ²	
CN		62.2475	
Storage (S)		154.0487 mm	

Catchment UAB

Land use	Group A Soil (volcanic granular loam)	Group B Soil (alluvial)	Group C Soil (mudstone/sandstone)
Bush, humid-climate, not-grazed	30	55	70
Pasture, lightly grazed, good grass cover	39	61	74
Urban lawns	39	61	74
Crops, straight rows, minimal vegetative cover	72	81	88
Sealed roads, roofs	98	98	98

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210	234
c*		0.0499	0.0737	0.1819	0.2675	0.3081	0.3488	0.3939	0.4205
q* from ARC	Approx	0.023	0.023	0.042	0.058	0.064	0.070	0.075	0.078
Peak Flowrate (q _p)	cumecs	0.1356	0.1788	0.7566	1.6264	2.1627	2.7934	3.6226	4.1881
Peak Flowrate (q _p)	l/s	136	179	757	1626	2163	2793	3623	4188
24 hour Runoff Depth (Q ₂₄)	mm	2.56	4.74	23.74	50.84	68.26	89.18	117.21	136.57
24 hour Runoff Volume (V ₂₄)	cu mtr	585	1086	5436	11641	15628	20419	26836	31269

STORMWATER FLOWS - Site Catchment
Post Development Impervious

Hydrological Soil Group	Group_B_Impervious		
	CN	Area	Product
Building	98	0.0000	
Roads	98	0.0000	
totals		0.0000	0.0000
% Impervious		100.00%	
CN weighted		0.0000	
la weighted		0.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		0.7200 km	
Catchment Slope (S _c)		0.0455 m/m	
Runoff Factor		0.0000	
Time of Concentration (t _c)		0.0000 hrs	0.0 min
Use (t _c)		0.1667 hrs	10.0 min
Catchment Area		0.0000 km ²	
CN		0.0000	
Storage (S)		0.0000 mm	

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210	234
c*		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
q* from ARC	Approx	0.169	0.169	0.169	0.169	0.169	0.169	0.169	0.169
Peak Flowrate (q _p)	cumecs	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Peak Flowrate (q _p)	l/s	0	0	0	0	0	0	0	0
24 hour Runoff Depth (Q ₂₄)	mm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24 hour Runoff Volume (V ₂₄)	cu mtr	0	0	0	0	0	0	0	0

Post Development Flows

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210	234
Peak Flowrate (q _p)	cumecs	0.1356	0.1788	0.7566	1.6264	2.1627	2.7934	3.6226	4.1881
Peak Flowrate (q _p)	l/s	136	179	757	1626	2163	2793	3623	4188
24 hour Runoff Volume (V ₂₄)	cu mtr	585	1086	5436	11641	15628	20419	26836	31269

STORMWATER FLOWS - Site Catchment
Post Development Pervious

Hydrological Soil Group	Group_B		
	CN	Area	Product
Crop	77	2.7510	210.4515
Grass	50	36.7426	1837.1300
Grass	61	5.3846	328.4606
totals		44.8782	2376.0421
% Impervious		0.00%	
CN weighted		52.9442	
la weighted		5.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		1.8210 km	
Catchment Slope (S _c)		0.0230 m/m	
Runoff Factor		0.3600	
Time of Concentration (t _c)		1.1309 hrs	67.9 min
Use (t _c)		1.1309 hrs	67.9 min
Catchment Area		0.4488 km ²	
CN		52.9442	
Storage (S)		225.7500 mm	

Catchment UAA

Table 3.3 - Curve numbers for typical Auckland conditions

Land use	Group A Soil (volcanic granular loam)	Group B Soil (alluvial)	Group C Soil (mudstone/sandstone)
Bush, humid-climate, not-grazed	30	55	70
Pasture, lightly grazed, good grass cover	39	61	74
Urban lawns	39	61	74
Crops, straight rows, minimal vegetative cover	72	81	88
Sealed roads, roofs	98	98	98

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210	234
c*		0.0346	0.0515	0.1317	0.1995	0.2331	0.2676	0.3072	0.3312
q* from ARC	Approx	0.014	0.014	0.019	0.028	0.032	0.036	0.039	0.041
Peak Flowrate (q _p)	cumecs	0.1627	0.2145	0.6536	1.5394	2.1080	2.7887	3.6976	4.3244
Peak Flowrate (q _p)	l/s	163	214	654	1539	2108	2789	3698	4324
24 hour Runoff Depth (Q ₂₄)	mm	1.81	3.41	18.05	40.22	54.96	73.03	97.71	115.02
24 hour Runoff Volume (V ₂₄)	cu mtr	814	1530	8102	18051	24663	32773	43849	51618

STORMWATER FLOWS - Site Catchment
Post Development Impervious

Hydrological Soil Group	Group_B_Impervious		
	CN	Area	Product
Building	98	0.0000	
Roads	98	0.0000	
totals		0.0000	0.0000
% Impervious		100.00%	
CN weighted		0.0000	
la weighted		0.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		1.8210 km	
Catchment Slope (S _c)		0.0230 m/m	
Runoff Factor		0.0000	
Time of Concentration (t _c)		0.0000 hrs	0.0 min
Use (t _c)		0.1667 hrs	10.0 min
Catchment Area		0.0000 km ²	
CN		0.0000	
Storage (S)		0.0000 mm	

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210	234
c*		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
q* from ARC	Approx	0.169	0.169	0.169	0.169	0.169	0.169	0.169	0.169
Peak Flowrate (q _p)	cumecs	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Peak Flowrate (q _p)	l/s	0	0	0	0	0	0	0	0
24 hour Runoff Depth (Q ₂₄)	mm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24 hour Runoff Volume (V ₂₄)	cu mtr	0	0	0	0	0	0	0	0

Post Development Flows

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210	234
Peak Flowrate (q _p)	cumecs	0.1627	0.2145	0.6536	1.5394	2.1080	2.7887	3.6976	4.3244
Peak Flowrate (q _p)	l/s	163	214	654	1539	2108	2789	3698	4324
24 hour Runoff Volume (V ₂₄)	cu mtr	814	1530	8102	18051	24663	32773	43849	51618

STORMWATER FLOWS - Site Catchment
Post Development Pervious

Hydrological Soil Group	Group_B		
	CN	Area	Product
Crop	77	10.0117	765.8951
Grass	50	50.8391	2541.9550
Grass	61	0.3527	21.5147
totals		61.2035	3329.3648
% Impervious		0.00%	
CN weighted		54.3983	
la weighted		5.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		1.9570 km	
Catchment Slope (S _c)		0.0410 m/m	
Runoff Factor		0.3736	
Time of Concentration (t _c)		0.9770 hrs	58.6 min
Use (t _c)		0.9770 hrs	58.6 min
Catchment Area		0.6120 km ²	
CN		54.3983	
Storage (S)		212.9266 mm	

Catchment CX

Table 3.3 - Curve numbers for typical Auckland conditions

Land use	Group A Soil (volcanic granular loam)	Group B Soil (alluvial)	Group C Soil (mudstone/sandstone)
Bush, humid-climate, not-grazed	30	55	70
Pasture, lightly grazed, good grass cover	39	61	74
Urban lawns	39	61	74
Crops, straight rows, minimal vegetative cover	72	81	88
Sealed roads, roofs	98	98	98

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210	234
c*		0.0366	0.0544	0.1386	0.2090	0.2437	0.2793	0.3198	0.3443
q* from ARC	Approx	0.015	0.015	0.022	0.032	0.036	0.040	0.044	0.046
Peak Flowrate (q _p)	cumecs	0.2437	0.3213	1.0346	2.4008	3.2711	4.3099	5.6930	6.6452
Peak Flowrate (q _p)	l/s	244	321	1035	2401	3271	4310	5693	6645
24 hour Runoff Depth (Q ₂₄)	mm	1.91	3.59	18.86	41.78	56.94	75.47	100.70	118.36
24 hour Runoff Volume (V ₂₄)	cu mtr	1171	2197	11544	25573	34849	46191	61634	72439

STORMWATER FLOWS - Site Catchment
Post Development Impervious

Hydrological Soil Group	Group_B_Impervious		
	CN	Area	Product
Building	98	0.0000	
Roads	98	0.0000	
totals		0.0000	0.0000
% Impervious		100.00%	
CN weighted		0.0000	
la weighted		0.0000	
Channelisation factor (C)		1.0000	
Catchment Length (l)		1.9570 km	
Catchment Slope (S _c)		0.0410 m/m	
Runoff Factor		0.0000	
Time of Concentration (t _c)		0.0000 hrs	0.0 min
Use (t _c)		0.1667 hrs	10.0 min
Catchment Area		0.0000 km ²	
CN		0.0000	
Storage (S)		0.0000 mm	

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210	234
c*		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
q* from ARC	Approx	0.169	0.169	0.169	0.169	0.169	0.169	0.169	0.169
Peak Flowrate (q _p)	cumecs	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Peak Flowrate (q _p)	l/s	0	0	0	0	0	0	0	0
24 hour Runoff Depth (Q ₂₄)	mm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24 hour Runoff Volume (V ₂₄)	cu mtr	0	0	0	0	0	0	0	0

Post Development Flows

		WQV 1/3 2yr	Ex. Det.	50% AEP 2yr ARI	20% AEP 5yr ARI	10% AEP 10yr ARI	5% AEP 20yr ARI	2% AEP 50yr ARI	1% AEP 100yr ARI
24 hour rainfall depth (P ₂₄)	mm	26.1667	34.50	79	123	147	175	210	234
Peak Flowrate (q _p)	cumecs	0.2437	0.3213	1.0346	2.4008	3.2711	4.3099	5.6930	6.6452
Peak Flowrate (q _p)	l/s	244	321	1035	2401	3271	4310	5693	6645
24 hour Runoff Volume (V ₂₄)	cu mtr	1171	2197	11544	25573	34849	46191	61634	72439

Pre Development Hydrology

Job Name Golding Meadow & ATC
 Job No. 4603
 Date 06 · 07 · 2021

TP108 Analysis

Subcatchment			Catchment GMA		Catchment GMB		Catchment GMCa		Catchment GMCb		Catchment GMD	
Total Area	Ha		18.3961		30.5791		10.1391		3.4573		19.4061	
Area Pervious / Impervious	Ha / Ha		17.5352	0.8609	27.5910	2.9881	8.7317	1.4074	2.4911	0.9662	13.1582	6.2479
Fraction Impervious	%		0%	100%	0%	100%	0%	100%	0%	100%	0%	100%
			Perv.	Imperv.	Perv.	Imperv.	Perv.	Imperv.	Perv.	Imperv.	Perv.	Imperv.
Area	Ha		17.5352	0.8609	27.591	2.9881	8.7317	1.4074	2.4911	0.9662	13.1582	6.2479
	km ²		0.17535	0.00861	0.2759	0.0299	0.0873	0.0141	0.0249	0.0097	0.1316	0.0625
Initial Abstraction	Ia	mm	5	0	5	0	5	0	5	0	5	0
SCS Curve Number		CN	64.44	98	80	98	80	98	80	98	80	98
Channelisation Factor		C	1	1	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Catchment Length	L	km	0.414	0.414	0.891	0.891	0.58	0.58	0.5	0.5	0.45	0.45
Catchment Slope	S	m/m	0.0196	0.0196	0.0074	0.0074	0.0043	0.0043	0.005	0.005	0.0067	0.0067
Runoff Factor		RF	0.4754	0.9608	0.6667	0.9608	0.6667	0.9608	0.6667	0.9608	0.6667	0.9608
Time of Concentration		hrs	0.3831	0.2602	0.5652	0.4623	0.5011	0.4098	0.4342	0.3551	0.3710	0.3034
		min	22.9858	15.6091	33.9132	27.738	30.0636	24.5893	26.0525	21.3086	22.2596	18.2063
Catchment Storage	S	mm	140.165	5.184	63.500	5.184	63.500	5.184	63.500	5.184	63.500	5.184
Lag Time		min	15.3239	10.4061	22.6088	18.4920	20.0424	16.3929	17.3683	14.2057	14.8397	12.1376
		FlowPath (m)	414		891		580		500		450	
		Slope - Equal Area (m/m)	0.0196		0.0074		0.0043		0.005		0.0067	

Rainfall Data from TP108

Rainfall Event		24hr Rainfall Depth
90%		25.0 mm
95%		34.0 mm
WQV	¹ / ₃ 2yr	24.000 mm
Ex. Det.		34.5 mm
50% AEP	2yr ARI	72.0 mm
20% AEP	5yr ARI	110.0 mm
10% AEP	10yr ARI	130.0 mm
5% AEP	20yr ARI	152.0 mm
2% AEP	50yr ARI	180.0 mm
1% AEP	100yr ARI	200.0 mm

Catchment UL		Catchment UK		Catchment UJ		Catchment UI		Catchment UH		Catchment UG		Catchment UF		Catchment UE		Catchment UD	
31.1658		35.9860		19.4380		15.4870		28.9180		21.0000		26.4777		23.1628		37.1229	
31.1658	0.0000	35.9860	0.0000	19.4380	0.0000	15.4870	0.0000	28.9180	0.0000	21.0000	0.0000	26.4777	0.0000	23.1628	0.0000	37.1229	0.0000
3%	100%	3%	100%	3%	100%	3%	100%	3%	100%	3%	100%	3%	100%	3%	100%	3%	100%
Perv.	Imperv.	Perv.	Imperv.	Perv.	Imperv.	Perv.	Imperv.	Perv.	Imperv.	Perv.	Imperv.	Perv.	Imperv.	Perv.	Imperv.	Perv.	Imperv.
30.3867	0.7791	35.0864	0.8997	18.9521	0.4860	15.0998	0.3872	28.1951	0.7230	20.4750	0.5250	25.8158	0.6619	22.5837	0.5791	36.1948	0.9281
0.3039	0.0078	0.3509	0.0090	0.1895	0.0049	0.1510	0.0039	0.2820	0.0072	0.2048	0.0053	0.2582	0.0066	0.2258	0.0058	0.3619	0.0093
5	0	5	0	5	0	5	0	5	0	5	0	5	0	5	0	5	0
57.88	98	59.24	98	58.73	98	57.55	98	54.27	98	59.76	98	66.1	98	68.65	98	60.31	98
1	0.6	1	0.6	1	0.6	1	0.6	1	0.6	1	0.6	1	0.6	1	0.6	1	0.6
1.141	1.141	1.023	1.023	0.636	0.636	0.597	0.597	1.199	1.199	0.636	0.636	0.605	0.605	1.529	1.529	0.543	0.543
0.0189	0.0189	0.0518	0.0518	0.0542	0.0542	0.0837	0.0837	0.0343	0.0343	0.0371	0.0371	0.0506	0.0506	0.0435	0.0435	0.0942	0.0942
0.4073	0.9608	0.4209	0.9608	0.4157	0.9608	0.4040	0.9608	0.3724	0.9608	0.4261	0.9608	0.4937	0.9608	0.5226	0.9608	0.4317	0.9608
0.8233	0.3081	0.5560	0.2119	0.4035	0.1527	0.3451	0.1286	0.7473	0.2662	0.4460	0.1711	0.3626	0.1509	0.6781	0.2911	0.3017	0.1166
49.3991	18.4866	33.3598	12.7117	24.2112	9.16364	20.7059	7.71457	44.839	15.9742	26.761	10.2673	21.7576	9.05106	40.6842	17.4642	18.0992	6.99421
184.839	5.184	174.764	5.184	178.488	5.184	187.355	5.184	214.030	5.184	171.033	5.184	130.266	5.184	115.993	5.184	167.157	5.184
32.9327	12.3244	22.2399	8.4745	16.1408	6.1091	13.8039	5.1430	29.8927	10.6495	17.8407	6.8449	14.5051	6.0340	27.1228	11.6428	12.0661	4.6628
1141		1023		636		597		1199		636		605		1529		543	
0.019		0.0518		0.0542		0.0837		0.0343		0.0371		0.0506		0.0435		0.0942	

Catchment UC		Catchment UB		Catchment UAB		Catchment UAA		Catchment CW		Catchment CX		Catchment CY		Catchment CZ	
17.2000		30.4962		22.8958		44.8782		14.9204		61.2035		15.7616		7.8327	
17.2000	0.0000	30.4962	0.0000	22.8958	0.0000	44.8782	0.0000	14.9204	0.0000	61.2035	0.0000	15.7616	0.0000	7.8327	0.0000
3%	100%	3%	100%	3%	100%	3%	100%	3%	100%	3%	0%	3%	100%	3%	100%
Perv.	Imperv.	Perv.	Imperv.	Perv.	Imperv.	Perv.	Imperv.	Perv.	Imperv.	Perv.	Imperv.	Perv.	Imperv.	Perv.	Imperv.
16.7700	0.4300	29.7338	0.7624	22.3234	0.5724	43.7562	1.1220	14.5474	0.3730	59.6734	1.5301	15.3676	0.3940	7.6369	0.1958
0.1677	0.0043	0.2973	0.0076	0.2232	0.0057	0.4376	0.0112	0.1455	0.0037	0.5967	0.0153	0.1537	0.0039	0.0764	0.0020
5	0	5	0	5	0	5	0	5	0	5	0	5	0	5	0
64.21	98	65.58	98	62.25	98	52.94	98	50	98	54.4	98	50	98	50	98
1	0.6	1	0.6	1	0.6	1	0.6	1	0.6	1	0.6	1	0.6	1	0.6
0.63	0.63	1.226	1.226	0.72	0.72	1.821	1.821	0.341	0.341	1.957	1.957	0.8	0.8	0.415	0.415
0.0949	0.0949	0.065	0.065	0.0455	0.0455	0.023	0.023	0.053	0.053	0.041	0.041	0.0075	0.0075	0.033	0.033
0.4729	0.9608	0.4879	0.9608	0.4519	0.9608	0.3600	0.9608	0.3333	0.9608	0.3736	0.9608	0.3333	0.9608	0.3333	0.9608
0.3158	0.1283	0.5396	0.2230	0.4408	0.1747	1.1310	0.3955	0.3040	0.1019	0.9770	0.3487	0.9595	0.3216	0.3989	0.1337
18.9479	7.69788	32.3772	13.3818	26.4508	10.4815	67.8588	23.7286	18.2403	6.11394	58.621	20.9219	57.5728	19.2978	23.9361	8.02313
141.577	5.184	133.313	5.184	154.032	5.184	225.788	5.184	254.000	5.184	212.912	5.184	254.000	5.184	254.000	5.184
12.6319	5.1319	21.5848	8.9212	17.6339	6.9876	45.2392	15.8191	12.1602	4.0760	39.0807	13.9479	38.3818	12.8652	15.9574	5.3488
630		1226		720		1821		341		1957		800		415	
0.0949		0.065		0.0455		0.023		0.053		0.041		0.0075		0.033	

Post Development Hydrology

Job Name Golding Meadow & ATC
 Job No. 4294
 Date 06 · 07 · 2021

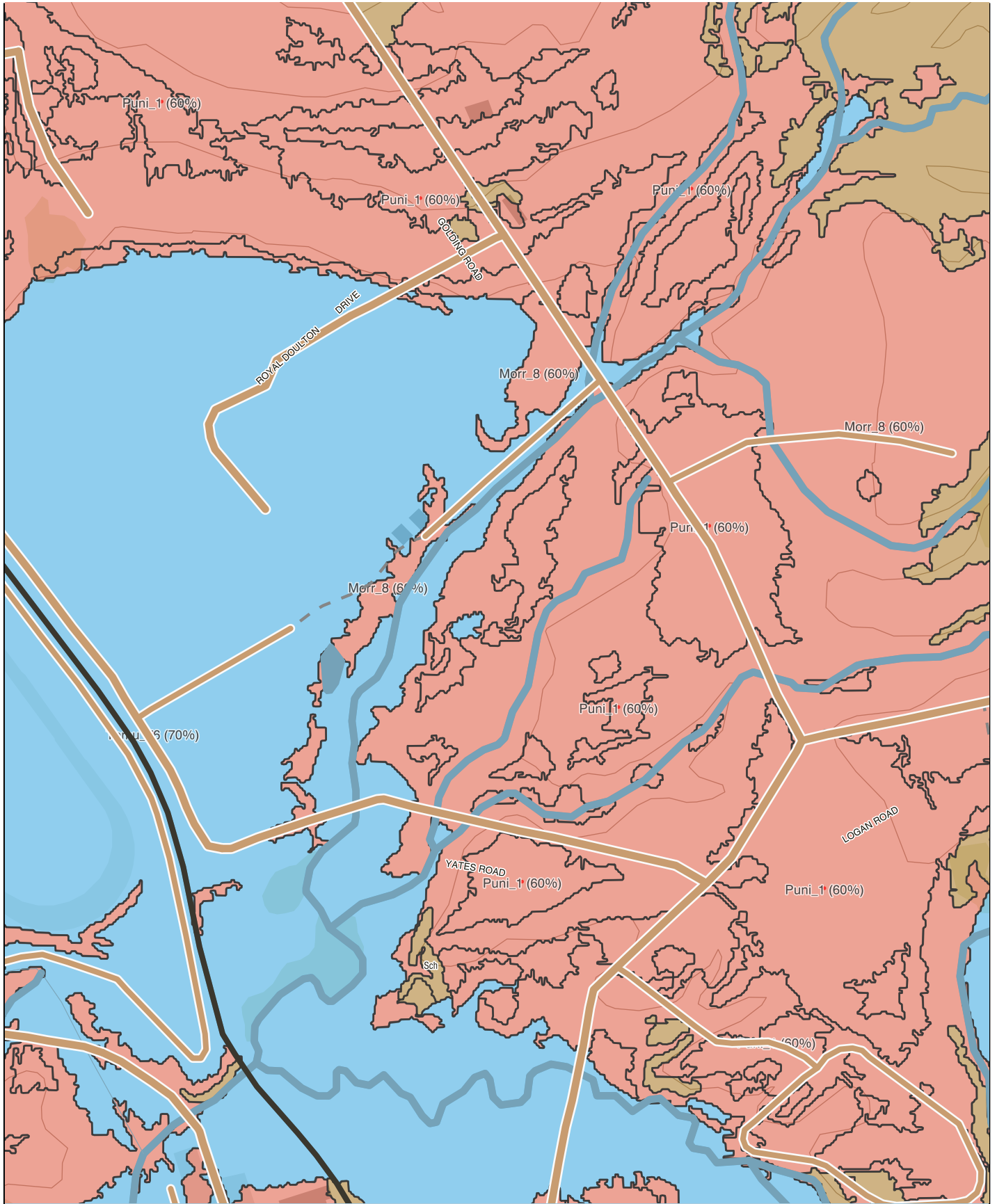
TP108 Analysis

Subcatchment			Catchment GMA		Catchment GMB		Catchment GMCa		Catchment GMCb		Catchment GMD	
Total Area	Ha		18.3961		30.5791		10.1391		3.4573		19.4061	
Area Pervious / Impervious	Ha / Ha		7.7024	10.6937	11.4766	19.1025	3.7446	6.3945	0.1253	3.3320	2.8937	16.5124
Fraction Impervious	%		0%	100%	0%	100%	0%	100%	0%	100%	0%	100%
			Perv.	Imperv.	Perv.	Imperv.	Perv.	Imperv.	Perv.	Imperv.	Perv.	Imperv.
Area	Ha		7.7024	10.6937	11.4766	19.1025	3.7446	6.3945	0.1253	3.3320	2.8937	16.5124
	km ²		0.0770	0.1069	0.1148	0.1910	0.0374	0.0639	0.0013	0.0333	0.0289	0.1651
Initial Abstraction	Ia	mm	5	0	5	0	5	0	5	0	5	0
SCS Curve Number	CN		65.510	98.000	79.540	98.000	78.460	98.000	80.000	98.000	79.800	98.000
Channelisation Factor	C		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Catchment Length	L	km	0.8	0.8	0.88	0.88	0.6	0.6	0.55	0.55	0.5	0.5
Catchment Slope	S	m/m	0.0075	0.0075	0.0075	0.0075	0.005	0.005	0.005	0.005	0.0067	0.0067
Runoff Factor	RF		0.4871	0.9608	0.6603	0.9608	0.6455	0.9608	0.6667	0.9608	0.6639	0.9608
Time of Concentration		hrs	0.4673	0.3216	0.4210	0.3425	0.3739	0.3004	0.3468	0.2837	0.2990	0.2440
		min	28.039	19.2978	25.2588	20.5507	22.4315	18.025	20.8079	17.019	17.938	14.6381
Catchment Storage	S	mm	133.727	5.184	65.336	5.184	69.732	5.184	63.500	5.184	64.296	5.184
Lag Time		min	18.6926	12.8652	16.8392	13.7005	14.9543	12.0167	13.8720	11.3460	11.9587	9.7587
WQV Volume		m ³	222.8	2335.5	594.4	4172.0	184.6	1396.6	6.6	727.7	151.7	3606.3
Total ED Volume		m ³	410.7	3207.4	1053.1	5729.5	328.4	1917.9	11.7	999.4	268.5	4952.6
	FlowPath (m)		800		880		600		550		500	
	Slope - Equal Area (m/m)		0.0075		0.0075		0.005		0.005		0.0067	

Rainfall Data from TP108 with 2.1° Climate Change Factor

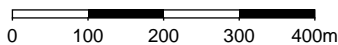
Rainfall Event		24hr Rainfall Depth		
90%		25 mm	PWV	SMAF 2
95%		34 mm		SMAF 1
WQV	1/3 2yr	26.1667 mm	PWV	SMAF 2
Ex. Det.		34.5 mm		SMAF 1
50% AEP	2yr ARI	78.5 mm		
20% AEP	5yr ARI	122.5 mm		
10% AEP	10yr ARI	147.2 mm		
5% AEP	20yr ARI	175.0 mm		
2% AEP	50yr ARI	210.2 mm		
1% AEP	100yr ARI	233.6 mm		

Golding Road



S-MAPONLINE

Scale: 1:10,000



Manaaki Whenua
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



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Legend

NZSC Soil Order

-  Allophanic Soil
-  Anthropic Soil
-  Brown Soil
-  Gley Soil
-  Granular Soil
-  Melanic Soil
-  Organic Soil
-  Oxidic Soil
-  Pallic Soil
-  Podzol Soil
-  Pumice Soil
-  Raw Soil
-  Recent Soil
-  Semiarid Soil
-  Ultic Soil

S-map Polygons & Labels

-  S-map soil data

S-MAPONLINE



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