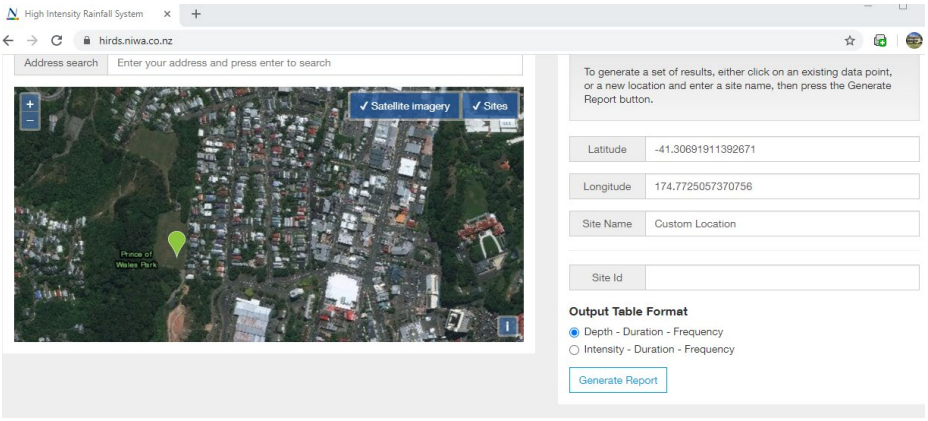
Appendix 5

Calculations supporting the selection of a 300mm diameter pipe that "feeds" SRP1 (Lower Playing Field SRP). Catchment Area: 5000m^2

HIRDs V4 Output:



Rainfall depths (mm) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	6.94	9.85	12.0	16.8	23.0	36.8	48.2	61.7	76.9	86.4	93.3	98.6
2	0.500	7.63	10.8	13.2	18.4	25.2	40.2	52.6	67.3	83.9	94.2	102	107
5	0.200	10.0	14.1	17.2	23.9	32.8	52.1	68.0	86.6	108	121	130	137
10	0.100	11.8	16.7	20.3	28.2	38.5	61.0	79.4	101	125	140	151	160
20	0.050	13.7	19.3	23.5	32.5	44.4	70.2	91.2	116	144	161	173	182
30	0.033	14.9	20.9	25.5	35.2	48.0	75.7	98.4	125	155	173	186	196
40	0.025	15.7	22.1	26.9	37.2	50.6	79.8	104	131	162	182	195	206
50	0.020	16.4	23.1	28.0	38.7	52.7	82.9	108	136	169	188	203	214
60	0.017	17.0	23.8	28.9	40.0	54.4	85.6	111	141	174	194	209	220
80	0.012	17.8	25.1	30.4	42.0	57.1	89.7	116	147	182	203	218	230
100	0.010	18.5	26.0	31.6	43.6	59.2	93.0	120	152	188	210	226	238
250	0.004	21.5	30.1	36.5	50.2	68.1	107	138	174	214	239	257	270

The 100yr ARI (AEP 0.01) for 10mins is 18.5mm. 5000m^2 x 0.018m = 92.5m^3

92.5m^3/10 minutes is the same as 154 Litres per second assuming all rainfall immediately runs off and is distributed over the 10-minute period evenly.

The capacity of the 300mm diameter pipe has been calculated as 135 L/s using Manning's equation, an assuming the slope is 1% on the pipe and Manning's "n" is 0.013

$$Q = A * V$$

$$V = \frac{1}{n} * A * R^{2/3} * \sqrt{S}$$

$$R = A/p$$

Conclusion: The flow capacity of the proposed 300mm diameter pipe (135L/s) will accommodate approximately 88% of the flow generated by the 100yr ARI for the 10minute event (154L/s). The assumptions made regarding how the flow is generated (namely zero infiltration and making no allowances for water travelling from distance) are unrealistic and conservative in nature and actual flows are likely to be considerably less.

Despite the pipe capacity being theoretical short of 20L/s over the minutes, the water that couldn't get through the pipe would back up behind the 550mm bunds and make its way through the pipe as the water levels behind the bund subsided.