

## Appendix A: Assumed development characteristics

**Table A.1: Key residential development characteristics**

Characteristic	Very low density residential	Low density residential	Small lot/attached residential
Developable area (site area less minor roads)	1.0	0.9	0.9
Yield (dwellings/developable hectare)	1.0	12	25
Developable area for each dwelling (sqm)	10,000	750	360
Dwelling occupancy (people)	3	3	2.3
Trip generation (trips/day/developable hectare)	7	99	192
Impervious area (developable area)	0.1	0.5	0.6
Proportion of new residential development	0	0.9	0.1

**Table A.2: Key commercial, retail and industrial development characteristics**

Characteristic	Commercial & retail	Industrial
Site area (developable area less minor roads)	0.95	0.95
Plot ratio (% of developable hectare)	0.4	0.5
GFA for each employee (sqm)	40	100
Employees for each developable hectare	95	48
Trip generation (trips/day/developable hectare)	340	180
Impervious area (developable area)	0.9	0.9

**Table A.3: Planning Units contained within Contribution Areas**

Contribution Area	Planning Units
1	1, 2, 3, 8, 9, 10, 11
2	12, 13, 14, 15, 16, 17, 26
3	4, 5, 6, 7, 18, 19, 20, 21, 22, 23, 24, 25

**Table A.4: Planning Units contained within waterways catchments**

Catchment	Planning Units
Sandy Creek	1, 2, 3, 8, 9, 10, 11
Bullockhead Creek	4, 5, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 24, 25, 26
Blunder Creek	6, 7, 20

Table A.5: New growth development (Planning Units)

Planning Unit	Very low density residential (Ha)					Low density residential (Ha)					Small lot/attached residential (Ha)					Commercial and retail (Ha)					Industrial (Ha)									
	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	2021+	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	2021+	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	2021+	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	2021+	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	2021+
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	48.9	10.2	10.2	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.8	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.4	0.1	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	8.9	26.3	52.7	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.0	0.0	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.7	8.1	8.1	0.0	0.0	0.0
7	17.7	-1.3	-1.5	-2.9	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.0	6.9	6.9	13.9	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.8	7.2	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.5	0.1	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.5	0.4	0.0	0.0	0.0	0.0
11	9.1	0.0	0.0	0.0	0.0	-9.1	41.5	0.0	0.0	0.0	0.0	20.5	4.8	0.0	0.0	0.0	0.0	2.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
12	24.8	0.0	0.0	0.0	-24.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2	0.0	0.0	0.0	30.9	0.0
13	44.2	0.0	0.0	0.0	-44.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.1	0.0	0.0	0.0	48.7	0.0
14	21.4	0.0	0.0	0.0	-21.4	0.0	0.0	0.0	0.0	0.0	0.0	-6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	0.0	0.0	28.4	0.0	0.0
15	25.4	0.0	0.0	-25.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6	0.0	0.0	25.9	0.0	0.0
16	16.1	0.0	0.0	-16.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	28.4	0.0	0.0
17	15.3	0.0	0.0	-15.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.0	0.0	0.0	20.7	0.0	0.0
18	2.7	-1.4	-1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.2	12.2	12.2	0.0	0.0	0.0
19	28.8	-13.4	-13.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.9	13.2	13.2	0.0	0.0	0.0
20	50.1	0.0	0.0	-50.1	-22.6	0.0	13.4	0.0	0.0	28.9	22.1	0.0	1.8	0.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	161.9	0.0	0.0	0.0	0.0	0.0	161.9	0.0	0.0	0.0	0.0	121.0	0.0	0.0	0.0	0.0	0.0	13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	2.4	-2.4	0.0	0.0	0.0	0.0	62.8	3.9	0.0	0.0	0.0	0.0	5.9	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	3.5	-3.5	0.0	0.0	0.0	0.0	17.7	9.2	0.0	0.0	0.0	0.0	2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	12.3	0.0	0.0	-12.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	61.9	0.0	0.0	-61.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	12.7	0.0	0.0	-12.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	512.3	-22.5	-60.0	-133.0	-113.0	-177.0	124.3	12.6	42.2	62.1	22.0	142.0	13.8	1.4	4.7	8.9	2.4	15.0	3.4	0.1	0.1	0.3	0.0	0.0	349.1	100.4	103.3	96.1	103.0	0.0

Table A.6: New growth development (Contribution Areas)

Contribution area	Very low density residential (Ha)					Low density residential (Ha)					Small lot/attached residential (Ha)					Commercial and retail (Ha)					Industrial (Ha)									
	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	2021+	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	2021+	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	2021+	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	2021+	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	2021+
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	345.2	-22.5	-60.0	-66.4	-22.6	-161.9	82.6	12.6	42.2	62.1	22.0	121.5	9.2	1.4	4.7	8.9	2.5	13.0	3.3	0.1	0.1	0.3	0.0	0.0	143.7	72.5	93.1	13.9	0.0	0.0
Total	512.3	-22.5	-60.0	-133.0	-113.0	-177.0	124.3	12.6	42.2	62.1	22.0	142.0	13.8	1.4	4.7	8.9	2.4	15.0	3.4	0.1	0.1	0.3	0.0	0.0	349.1	100.4	103.3	96.1	103.0	0.0

Table A.7: New growth development (Waterway Catchments)

Contribution area	Very low density residential (Ha)					Low density residential (Ha)					Small lot/attached residential (Ha)					Commercial and retail (Ha)					Industrial (Ha)									
	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	2021+	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	2021+	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	2021+	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	2021+	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	2021+
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	434.6	-20.1	-58.1	-103.4	-161.9	-161.9	69.4	12.6	40.5	36.2	-9.1	121.0	7.7	1.4	4.5	3.9	0.0	13.5	3.3	0.1	0.1	0.3	0.0	0.0	162.7	13.5	78.1	82.2	103.0	0.0
3	68.7	-1.8	-1.8	-30.5	-22.6	0.0	13.4	0.0	1.7	26.0	22.1	0.0	1.0	0.0	0.0	0.0	0.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	15.0	13.9	0.0	0.0
Total	512.3	-22.5	-60.0	-133.0	-113.0	-177.0	124.3	12.6	42.2	62.1	22.0	142.0	13.8	1.4	4.7	8.9	2.4	15.0	3.4	0.1	0.1	0.3	0.0	0.0	349.1	100.4	103.3	96.1	103.0	0.0

Table A.8: Future development (Planning Units)

Planning Unit	Very low density residential (Ha)						Low density residential (Ha)						Small lot/attached residential (Ha)						Commercial and retail (Ha)						Industrial (Ha)					
	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	Ultimate	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	Ultimate	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	Ultimate	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	Ultimate	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	Ultimate
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	0.9	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	17.7	16.2	14.7	11.8	11.8	11.8	0.0	0.0	1.7	1.7	1.7	1.7	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	9.1	9.1	9.1	9.1	9.1	0.0	41.5	41.5	41.5	41.5	41.5	62.0	4.6	4.6	4.6	4.6	4.6	6.9	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0
12	24.8	24.8	24.8	24.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2	5.2	5.2	5.2	36.1	36.1
13	44.2	44.2	44.2	44.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.1	18.1	18.1	18.1	66.8	66.8
14	21.4	21.4	21.4	21.4	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	6.0	6.0	6.0	29.4	29.4
15	23.4	23.4	23.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6	5.6	5.6	31.2	31.2	31.2
16	16.1	16.1	16.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	3.8	3.8	32.2	32.2	32.2
17	15.3	15.3	15.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.0	17.0	17.0	37.7	37.7	37.7
18	2.7	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.2	22.4	34.6	34.6	34.6	34.6
19	26.8	13.4	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.9	65.1	78.3	78.3	78.3	78.3
20	50.1	50.1	50.1	22.5	-0.1	-0.1	13.4	13.4	13.4	40.3	62.4	62.4	1.5	1.5	1.5	4.5	6.9	6.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	161.9	161.9	161.9	161.9	161.9	0.0	0.2	0.2	0.2	0.2	0.2	121.7	0.0	0.0	0.0	0.0	0.0	13.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	2.4	0.0	0.0	0.0	0.0	0.0	50.8	54.2	54.2	54.2	54.2	54.2	5.6	6.0	6.0	6.0	6.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	3.5	0.0	0.0	0.0	0.0	0.0	17.7	26.9	26.9	26.9	26.9	26.9	2.0	3.0	3.0	3.0	3.0	3.0	3.3	3.3	3.3	3.3	3.3	3.3	0.0	0.0	0.0	0.0	0.0	0.0
24	17.3	17.3	17.3	0.0	0.0	0.0	0.0	0.0	0.0	18.0	18.0	18.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	61.9	61.9	18.6	0.0	0.0	0.0	0.2	0.2	40.7	58.1	58.1	58.1	0.0	0.0	4.5	6.5	6.5	6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	12.7	12.7	12.7	0.0	0.0	0.0	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5	7.5	7.5
Total	512.3	489.7	429.7	295.8	182.8	11.8	124.3	136.9	179.1	241.2	263.2	405.2	13.8	15.2	19.9	26.8	29.2	45.0	3.4	3.5	3.6	3.9	3.9	3.9	349.1	449.5	552.8	648.9	751.9	751.9

Table A.9: Future development (Contribution Areas)

Contribution area	Very low density residential (Ha)						Low density residential (Ha)						Small lot/attached residential (Ha)						Commercial and retail (Ha)						Industrial (Ha)					
	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	Ultimate	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	Ultimate	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	Ultimate	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	Ultimate	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	Ultimate
1	9.1	9.1	9.1	9.1	9.1	0.0	41.5	41.5	41.5	41.5	41.5	62.0	4.6	4.6	4.6	4.6	4.6	6.9	0.2	0.2	0.2	0.2	0.2	0.2	149.7	177.6	187.8	187.8	187.8	187.8
2	157.9	157.9	157.9	90.4	0.0	0.0	0.2	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	55.7	55.7	55.7	137.9	240.9	240.9
3	345.2	322.7	262.7	196.3	173.7	11.8	82.6	95.2	137.4	199.7	221.7	343.2	9.2	10.6	15.3	22.2	24.6	38.1	3.3	3.4	3.5	3.8	3.8	3.8	143.7	216.2	309.3	323.2	323.2	323.2
Total	512.3	489.7	429.7	295.8	182.8	11.8	124.3	136.9	179.1	241.2	263.2	405.2	13.8	15.2	19.9	26.8	29.2	45.0	3.4	3.5	3.6	3.9	3.9	3.9	349.1	449.5	552.8	648.9	751.9	751.9

Table A.10: Future development (Catchments)

Catchment	Very low density residential (Ha)						Low density residential (Ha)						Small lot/attached residential (Ha)						Commercial and retail (Ha)						Industrial (Ha)					
	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	Ultimate	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	Ultimate	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	Ultimate	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	Ultimate	Existing	2001 - 2005	2006 - 2010	2011 - 2015	2016 - 2020	Ultimate
Sandy	9.1	9.1	9.1	9.1	9.1	0.0	41.5	41.5	41.5	41.5	41.5	62.0	4.6	4.6	4.6	4.6	4.6	6.9	0.2	0.2	0.2	0.2	0.2	0.2	149.7	177.6	187.8	187.8	187.8	187.8
Bullockhead	434.5	413.9	355.8	252.4	162.0	0.1	69.4	82.0	122.5	157.7	157.6	279.1	7.7	9.1	13.6	17.5	17.5	31.0	3.3	3.4	3.5	3.8	3.8	3.8	152.7	210.2	288.3	370.5	473.5	473.5
Blunder	68.7	66.8	64.9	34.4	11.8	11.8	13.4	13.4	15.1	42.0	64.1	64.1	1.5	1.5	1.7	4.7	7.1	7.1	0.0	0.0	0.0	0.0	0.0	0.0	46.7	61.7	76.7	90.6	90.6	90.6
Total	512.3	489.7	429.7	295.8	182.8	11.8	124.3	136.9	179.1	241.2	263.2	405.2	13.8	15.2	19.9	26.8	29.2	45.0	3.4	3.5	3.6	3.9	3.9	3.9	349.1	449.5	552.8	648.9	751.9	751.9

Table A.11: Future development (Contribution Area 1)

Year	Very low density residential	Low density residential	Small lot/attached residential	Commercial and retail	Industrial floor
Existing	9.1	41.5	4.6	0.2	149.7
End 2030	0.0	62.0	6.9	0.2	187.8

Table A.14: Future development (Sandy Creek)

Year	Very low density residential	Low density residential	Small lot/attached residential	Commercial and retail	Industrial floor
Existing	9.1	41.5	4.6	0.2	149.7
End 2030	0.0	62.0	6.9	0.2	187.8

Table A.17: New growth development (Contribution Area 1)

Year	Very low density residential	Low density residential	Small lot/attached residential	Commercial and retail	Industrial floor
2001 to 2005	0.0	0.0	0.0	0.0	27.9
2006 to 2010	0.0	0.0	0.0	0.0	10.2
2011 to 2015	0.0	0.0	0.0	0.0	0.0
2016 to 2020	0.0	0.0	0.0	0.0	0.0
2021 onwards	-9.1	20.5	2.3	0.0	0.0
Total	-9.1	20.5	2.3	0.0	38.1
NPV @ 6%	-2.1	4.7	0.5	0.0	29.9

Table A.20: New growth development (Sandy Creek)

Year	Very low density residential	Low density residential	Small lot/attached residential	Commercial and retail	Industrial floor
2001 to 2005	0.0	0.0	0.0	0.0	27.9
2006 to 2010	0.0	0.0	0.0	0.0	10.2
2011 to 2015	0.0	0.0	0.0	0.0	0.0
2016 to 2020	0.0	0.0	0.0	0.0	0.0
2021 onwards	-9.1	20.5	2.3	0.0	0.0
Total	-9.1	20.5	2.3	0.0	38.1
NPV @ 6%	-2.1	4.7	0.5	0.0	29.9

Table A.12: Future development (Contribution Area 2)

Year	Very low density residential	Low density residential	Small lot/attached residential	Commercial and retail	Industrial floor
Existing	157.9	0.2	0.0	0.0	55.7
End 2030	0.0	0.0	0.0	0.0	240.9

Table A.15: Future development (Bullockhead Creek)

Year	Very low density residential	Low density residential	Small lot/attached residential	Commercial and retail	Industrial floor
Existing	434.5	69.4	7.7	3.3	152.7
End 2030	0.1	279.1	31.0	3.8	473.5

Table A.18: New growth development (Contribution Area 2)

Year	Very low density residential	Low density residential	Small lot/attached residential	Commercial and retail	Industrial floor
2001 to 2005	0.0	0.0	0.0	0.0	0.0
2006 to 2010	0.0	0.0	0.0	0.0	0.0
2011 to 2015	-67.5	-0.2	0.0	0.0	82.2
2016 to 2020	-90.4	-0.1	0.0	0.0	103.0
2021 onwards	0.0	0.0	0.0	0.0	0.0
Total	-157.9	-0.3	0.0	0.0	185.2
NPV @ 6%	-63.5	-0.1	0.0	0.0	74.9

Table A.21: New growth development (Bullockhead Creek)

Year	Very low density residential	Low density residential	Small lot/attached residential	Commercial and retail	Industrial floor
2001 to 2005	-20.6	12.6	1.4	0.1	57.5
2006 to 2010	-58.1	40.5	4.5	0.1	78.1
2011 to 2015	-103.4	35.2	3.9	0.3	82.2
2016 to 2020	-90.4	-0.1	0.0	0.0	103.0
2021 onwards	-161.9	121.5	13.5	0.0	0.0
Total	-434.4	209.7	23.3	0.5	320.8
NPV @ 6%	-171.5	80.5	8.9	0.3	172.5

Table A.13: Future development (Contribution Area 3)

Year	Very low density residential	Low density residential	Small lot/attached residential	Commercial and retail	Industrial floor
Existing	345.2	82.6	9.2	0.2	143.7
End 2030	11.8	343.2	38.1	3.8	323.2

Table A.16: Future development (Blunder Creek)

Year	Very low density residential	Low density residential	Small lot/attached residential	Commercial and retail	Industrial floor
Existing	68.7	13.4	1.5	0.0	46.7
End 2030	11.8	64.1	7.1	0.0	90.6

Table A.19: New growth development (Contribution Area 3)

Year	Very low density residential	Low density residential	Small lot/attached residential	Commercial and retail	Industrial floor
2001 to 2005	-22.5	12.6	1.4	0.1	72.5
2006 to 2010	-60.0	42.2	4.7	0.1	93.1
2011 to 2015	-66.4	62.3	6.9	0.3	13.9
2016 to 2020	-22.6	22.1	2.5	0.0	0.0
2021 onwards	-161.9	121.5	13.5	0.0	0.0
Total	-333.5	260.7	29.0	0.5	179.5
NPV @ 6%	-133.1	102.1	11.3	0.3	126.2

Table A.22: New growth development (Blunder Creek)

Year	Very low density residential	Low density residential	Small lot/attached residential	Commercial and retail	Industrial floor
2001 to 2005	-1.9	0.0	0.0	0.0	15.0
2006 to 2010	-1.9	1.7	0.2	0.0	15.0
2011 to 2015	-30.5	26.9	3.0	0.0	13.9
2016 to 2020	-22.6	22.1	2.5	0.0	0.0
2021 onwards	0.0	0.0	0.0	0.0	0.0
Total	-56.9	50.7	5.6	0.0	43.9
NPV @ 6%	-25.1	21.5	2.4	0.0	28.6

## Appendix B: Waterways

**Table B.1: Waterways Equivalent Hectares conversion rates**

	ETs
Very low density residential (ha)	0.2222
Low density residential (ha)	1.0000
Small lot/attached residential (ha)	1.2000
Commercial and retail (ha)	1.9000
Industrial (ha)	1.9000

**Table B.2: Future development as waterways Equivalent Hectares (Sandy Creek)**

	Very low density residential	Low density residential	Small lot/attached residential	Commercial and retail	Industrial	Total
Existing situation	2.0	41.5	5.5	0.3	284.4	333.8
Ultimate situation	0.0	62.0	8.3	0.3	356.8	427.3

**Table B.4: New growth development as waterways Equivalent Hectares (Sandy Creek)**

	Very low density residential	Low density residential	Small lot/attached residential	Commercial and retail	Industrial	Total
2001 to 2005	0.0	0.0	0.0	0.0	53.0	53.0
2006 to 2010	0.0	0.0	0.0	0.0	19.4	19.4
2011 to 2015	0.0	0.0	0.0	0.0	0.0	0.0
2016 to 2020	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0	0.0	0.0	72.4	72.4
NPV @ 6%	0.0	0.0	0.0	0.0	56.9	56.9

**Table B.3: Future development as waterways Equivalents Hectares (Bullockhead Creek)**

	Very low density residential	Low density residential	Small lot/attached residential	Commercial and retail	Industrial	Total
Existing situation	96.6	69.4	9.3	6.2	290.1	471.5
Ultimate situation	0.0	279.1	37.2	7.1	899.6	1,223.1

**Table B.5: New growth development as waterways Equivalent Hectares (Bullockhead Creek)**

	Very low density residential	Low density residential	Small lot/attached residential	Commercial and retail	Industrial	Total
2001 to 2005	0.0	12.6	1.7	0.0	109.3	123.5
2006 to 2010	0.0	40.5	5.4	0.2	148.4	194.5
2011 to 2015	0.0	35.2	4.7	0.6	156.2	196.6
2016 to 2020	0.0	0.0	0.0	0.0	195.7	195.7
Total	0.0	88.3	11.8	0.8	609.5	710.3
NPV @ 6%	0.0	52.7	7.0	0.4	327.7	387.8

Note: Because existing very low density development will not be credited for prior waterways contributions, declines in the area of this type of development have been excluded from Table B.3 and Table B.5.

**Table B.6: Cost of apportioned items (Sandy Creek)**

Item description	Cost				Year constructed	Discounted cost
	Estimated cost	Indirect costs		Total		
		Rate	Subtotal			
Waterways rehabilitation (Campbell Avenue reach)	\$290,000	10%	\$29,000	\$319,000	2003	\$267,839
Stormwater drainage upgrades(Wilruna Street region)	\$1,204,665	10%	\$120,467	\$1,325,132	2003	\$1,112,606
Stormwater drainage upgrades (Industrial 3)	\$1,175,587	10%	\$117,559	\$1,293,146	2003	\$1,085,750
Stormwater drainage (pipes, manholes, outlets and gullies)	\$244,196	10%	\$24,420	\$268,616	2018	\$94,108
Preparation	\$6,148	0%	\$0	\$6,148	2000	\$6,148
<b>Total</b>	<b>\$2,920,596</b>			<b>\$3,212,041</b>		<b>\$2,566,450</b>

Component	\$
Waterways rehabilitation	\$267,839
Stormwater drainage upgrades	\$2,198,356
Stormwater drainage	\$94,108
Preparation	\$6,148
<b>Total</b>	<b>\$2,566,450</b>

Note: A detailed breakdown of new stormwater drainage is presented in Table B.10 and displayed on maps 1 and 2 of this appendix.

**Table B.7: Cost of apportioned items (Bullockhead Creek)**

Item description	Cost				Year constructed	Discounted cost
	Estimated cost	Indirect costs		Total		
		Rate	Subtotal			
Acquisition of waterways corrior (Area 1)	\$5,302,665	10%	\$530,266.50	\$5,832,932	2001	\$5,502,766
Acquisition of waterways corrior (Area 2)	\$752,445	10%	\$75,244.50	\$827,690	2001	\$780,839
Acquisition of waterways corrior (Area 3)	\$1,815,264	10%	\$181,526.40	\$1,996,790	2001	\$1,883,765
Acquisition of waterways corrior (Area 4)	\$3,504,803	10%	\$350,480.30	\$3,855,283	2003	\$3,236,970
Waterways rehabilitation (McRoyle Street to Wacol Army Barracks)	\$85,000	10%	\$8,500	\$93,500	2003	\$78,504
Waterways rehabilitation (Centenary Highway to Boundary Road)	\$330,000	10%	\$33,000	\$363,000	2003	\$304,782
Waterways rehabilitation (Wacol Army Barracks to Richlands reach)	\$70,000	10%	\$7,000	\$77,000	2003	\$64,651
Waterways rehabilitation (Oakview Reach)	\$60,000	10%	\$6,000	\$66,000	2013	\$30,943
Waterways rehabilitation (north section of Waterford Reach)	\$200,000	10%	\$20,000	\$220,000	2025	\$51,260
Waterways rehabilitation (remainder Waterford Reach)	\$210,000	10%	\$21,000	\$231,000	2025	\$53,823
Waterways rehabilitation (tributary entering Waterford Reach)	\$20,000	10%	\$2,000	\$22,000	2025	\$5,126
Stormwater drainage upgrades	\$541,221	10%	\$54,122	\$595,343	2003	\$499,862
Stormwater drainage upgrades	\$473,208	10%	\$47,321	\$520,528	2013	\$244,044
Stormwater drainage (pipes, manholes, outlets and gullies)	\$2,884,265	10%	\$288,427	\$3,172,692	2003	\$2,663,853
Stormwater drainage (pipes, manholes, outlets and gullies)	\$1,494,581	10%	\$149,458	\$1,644,039	2008	\$1,031,490
Stormwater drainage (pipes, manholes, outlets and gullies)	\$4,169,979	10%	\$416,998	\$4,586,977	2013	\$2,150,554
Stormwater drainage (pipes, manholes, outlets and gullies)	\$853,433	10%	\$85,343	\$938,776	2018	\$328,894
Stormwater drainage (pipes, manholes, outlets and gullies)	\$32,228	10%	\$3,223	\$35,451	2025	\$8,260
Boundary Road culvert 1	\$436,735	10%	\$43,673	\$480,408	2003	\$403,360
Boundary Road culvert 2	\$244,125	10%	\$24,413	\$268,538	2003	\$225,469
Garden Road culvert 1	\$11,016	10%	\$1,102	\$12,118	2003	\$10,174
Garden Road culvert 2	\$13,770	10%	\$1,377	\$15,147	2003	\$12,718
Garden Road culvert 3	\$363,946	10%	\$36,395	\$400,340	2003	\$336,133
Garden Road culvert 4	\$30,173	10%	\$3,017	\$33,190	2003	\$27,867
Pine Road culvert 1	\$9,281	10%	\$928	\$10,209	2003	\$8,572
Pine Road culvert 2	\$218,367	10%	\$21,837	\$240,204	2003	\$201,680
Bukulla Street culvert	\$655,102	10%	\$65,510	\$720,612	2008	\$452,121
Teraba Street culvert	\$29,869	10%	\$2,987	\$32,856	2008	\$20,614
Coulston Road Culvert 1	\$582,313	10%	\$58,231	\$640,544	2013	\$300,312
Coulston Road culvert 2	\$85,050	10%	\$8,505	\$93,555	2013	\$43,862
Forest Lake Boulevard culvert	\$48,600	10%	\$4,860	\$53,460	2013	\$25,064
Government Road culvert	\$39,825	10%	\$3,983	\$43,808	2013	\$20,539
Tile Street culvert	\$60,750	10%	\$6,075	\$66,825	2018	\$23,412
Bagnell Street culvert 1	\$48,600	10%	\$4,860	\$53,460	2025	\$12,456
Bagnell Street culvert 2	\$63,281	10%	\$6,328	\$69,609	2025	\$16,219
Bagnell Street culvert 3	\$60,750	10%	\$6,075	\$66,825	2025	\$15,570
Considine Road culvert 1	\$48,600	10%	\$4,860	\$53,460	2025	\$12,456
Lovat Street culvert 1	\$29,869	10%	\$2,987	\$32,856	2025	\$7,655
Lovat Street culvert 3	\$39,825	10%	\$3,983	\$43,808	2025	\$10,207
Lovatt Street culvert 2	\$48,600	10%	\$4,860	\$53,460	2025	\$12,456
Roxwell Street culvert 1	\$218,367	10%	\$21,837	\$240,204	2025	\$55,967
Waterford Road culvert 1	\$50,625	10%	\$5,063	\$55,688	2025	\$12,975
LSMP preparation	\$150,000	0%	\$0	\$150,000	2000	\$150,000
Preparation	\$23,852	0%	\$0	\$23,852	2000	\$23,852
<b>Total</b>	<b>\$26,410,383</b>		<b>\$2,623,653</b>	<b>\$29,034,036</b>		<b>\$21,362,097</b>

<b>Base Year</b>	2001
<b>Discount Rate</b>	6%

Component	\$
Acquisition of waterways corridor	\$11,404,339
Waterways rehabilitation	\$589,089
Stormwater drainage upgrades	\$743,906
Stormwater drainage	\$6,183,052
Culverts	\$2,267,860
Preparation	\$173,852
<b>Total</b>	<b>\$21,362,097</b>

Note: A detailed breakdown of new stormwater drainage is presented in Table B.10 and displayed on maps 1 and 2 of this appendix.

**Table B.9: Cost apportionment (Bullockhead Creek)**

Item description	Discounted Cost	External use		Existing use		Future use		Contribution	
		% total use	Apportioned cost	% total use	Apportioned cost	% total use	Apportioned cost	NPV future demand	Contribution
Acquisition of waterways corrior (Area 1)	\$5,502,766	0%	\$0	39%	\$2,121,301	61%	\$3,381,464	388	\$8,719
Acquisition of waterways corrior (Area 2)	\$780,839	0%	\$0	39%	\$301,011	61%	\$479,828	388	\$1,237
Acquisition of waterways corrior (Area 3)	\$1,883,765	0%	\$0	39%	\$726,186	61%	\$1,157,578	388	\$2,985
Acquisition of waterways corrior (Area 4)	\$3,236,970	0%	\$0	39%	\$1,247,843	61%	\$1,989,127	388	\$5,129
Waterways rehabilitation (McRoyle Street to Wacol Army Barracks)	\$78,504	0%	\$0	39%	\$30,263	61%	\$48,241	388	\$124
Waterways rehabilitation (Centenary Highway to Boundary Road)	\$304,782	0%	\$0	39%	\$117,493	61%	\$187,289	388	\$483
Waterways rehabilitation (Wacol Army Barracks to Richlands Reach)	\$64,651	0%	\$0	39%	\$24,923	61%	\$39,728	388	\$102
Waterways rehabilitation (Oakview Reach)	\$30,943	0%	\$0	39%	\$11,929	61%	\$19,015	388	\$49
Waterways rehabilitation (north section of Waterford Reach)	\$51,260	0%	\$0	39%	\$19,760	61%	\$31,499	388	\$81
Waterways rehabilitation (remainder Waterford Reach)	\$53,823	0%	\$0	39%	\$20,748	61%	\$33,074	388	\$85
Waterways rehabilitation (tributary entering Waterford Reach)	\$5,126	0%	\$0	39%	\$1,976	61%	\$3,150	388	\$8
Stormwater drainage upgrades	\$499,862	0%	\$0	40%	\$199,945	60%	\$299,917	388	\$773
Stormwater drainage upgrades	\$244,044	0%	\$0	80%	\$195,235	20%	\$48,809	388	\$126
Stormwater drainage (pipes, manholes, outlets and gullies)	\$2,663,853	0%	\$0	40%	\$1,065,541	60%	\$1,598,312	388	\$4,121
Stormwater drainage (pipes, manholes, outlets and gullies)	\$1,031,490	0%	\$0	30%	\$309,447	70%	\$722,043	388	\$1,862
Stormwater drainage (pipes, manholes, outlets and gullies)	\$2,150,554	0%	\$0	10%	\$215,055	90%	\$1,935,498	388	\$4,991
Stormwater drainage (pipes, manholes, outlets and gullies)	\$328,894	0%	\$0	10%	\$32,889	90%	\$296,005	388	\$763
Stormwater drainage (pipes, manholes, outlets and gullies)	\$8,260	0%	\$0	5%	\$413	95%	\$7,847	388	\$20
Boundary Road culvert 1	\$403,360	0%	\$0	70%	\$282,352	30%	\$121,008	388	\$312
Boundary Road culvert 2	\$225,469	0%	\$0	70%	\$157,828	30%	\$67,641	388	\$174
Garden Road culvert 1	\$10,174	0%	\$0	70%	\$7,122	30%	\$3,052	388	\$8
Garden Road culvert 2	\$12,718	0%	\$0	0%	\$0	100%	\$12,718	388	\$33
Garden Road culvert 3	\$336,133	0%	\$0	0%	\$0	100%	\$336,133	388	\$867
Garden Road culvert 4	\$27,867	0%	\$0	0%	\$0	100%	\$27,867	388	\$72
Pine Road culvert 1	\$8,572	0%	\$0	0%	\$0	100%	\$8,572	388	\$22
Pine Road culvert 2	\$201,680	0%	\$0	0%	\$0	100%	\$201,680	388	\$520
Bukulla Street culvert	\$452,121	0%	\$0	0%	\$0	100%	\$452,121	388	\$1,166
Teraba Street culvert	\$20,614	0%	\$0	0%	\$0	100%	\$20,614	388	\$53
Coulston Road Culvert 1	\$300,312	0%	\$0	0%	\$0	100%	\$300,312	388	\$774
Coulston Road culvert 2	\$43,862	0%	\$0	0%	\$0	100%	\$43,862	388	\$113
Forest Lake Boulevard culvert	\$25,064	0%	\$0	100%	\$25,064	0%	\$0	388	\$0
Government Road culvert	\$20,539	0%	\$0	0%	\$0	100%	\$20,539	388	\$53
Tile Street culvert	\$23,412	0%	\$0	0%	\$0	100%	\$23,412	388	\$60
Bagnell Street culvert 1	\$12,456	0%	\$0	0%	\$0	100%	\$12,456	388	\$32
Bagnell Street culvert 2	\$16,219	0%	\$0	0%	\$0	100%	\$16,219	388	\$42
Bagnell Street culvert 3	\$15,570	0%	\$0	0%	\$0	100%	\$15,570	388	\$40
Considine Road culvert 1	\$12,456	0%	\$0	0%	\$0	100%	\$12,456	388	\$32
Lovat Street culvert 1	\$7,655	0%	\$0	0%	\$0	100%	\$7,655	388	\$20
Lovat Street culvert 3	\$10,207	0%	\$0	0%	\$0	100%	\$10,207	388	\$26
Lovatt Street culvert 2	\$12,456	0%	\$0	0%	\$0	100%	\$12,456	388	\$32
Roxwell Street culvert 1	\$55,967	0%	\$0	0%	\$0	100%	\$55,967	388	\$144
Waterford Road culvert 1	\$12,975	0%	\$0	0%	\$0	100%	\$12,975	388	\$33
LSMP preparation	\$150,000	0%	\$0	0%	\$0	100%	\$150,000	388	\$387
Preparation	\$23,852	0%	\$0	0%	\$0	100%	\$23,852	388	\$62
<b>Total</b>	<b>\$21,362,097</b>				<b>\$7,114,327</b>		<b>\$14,247,770</b>		<b>\$36,739</b>

Component	\$/EH
Acquisition of waterway	\$18,071
Waterways rehabilitation	\$933
Stormwater drainage upgrades	\$899
Stormwater drainage	\$11,757
Culverts	\$4,630
Preparation	\$448
<b>Total</b>	<b>\$36,739</b>

	Contribution (ICUs)	Credit (ICUs)
Very low density residential	8,164	0
Low density residential	36,739	36,290
Small lot/attached residential	44,086	43,549
Commercial and retail	69,804	68,952
Industrial	69,804	68,952

**Table B.10 - Proposed Stormwater Pipes, Outlets, Manholes and Gullies**

Maps 1 and 2 of this Appendix display the location of the proposed pipes. Culvert upgrades and waterway corridors are shown on Figure 5.2

Pipe ID	Years till Construction	Length (m)	Diameter (mm)	Pipe Costs per metre (\$/m)	Pipe Outlet required (y/n)	Cost of Pipe Outlet	Manholes Required	Cost for Manholes	Gully Assessment Required	Q @ d/s end of proposed Pipe (m <sup>3</sup> /s)	No. Gullies required @ 0.15 m <sup>3</sup> /s)	Cost for Gullies	Estimated Cost (\$)	Total Cost (\$) including 10% contingency
3-101	3	309.73	900	\$450	y	\$2,150	5	\$10,750	y	1.27	8	\$15,200	\$167,479	\$184,226
3-102	3	152.545	900	\$450	y	\$2,150	3	\$6,450	y	1.27	8	\$15,200	\$92,445	\$101,690
3-103	3	251.197	1050	\$550	y	\$2,350	4	\$9,400	y	1.73	12	\$22,800	\$172,708	\$189,979
3-104	3	144.394	900	\$450	y	\$2,150	2	\$4,300	y	1.27	8	\$15,200	\$86,627	\$95,290
3-105	3	106.823	450	\$210	n	\$0	2	\$4,100	n	-	0	\$0	\$26,533	\$29,186
3-106	3	53.3703	750	\$340	n	\$0	1	\$2,050	n	-	0	\$0	\$20,196	\$22,215
3-107	3	139.175	450	\$210	n	\$0	2	\$4,100	n	-	0	\$0	\$33,327	\$36,659
3-108	3	136.53	900	\$450	n	\$0	2	\$4,300	y	1.27	8	\$15,200	\$80,939	\$89,032
3-109	3	122.418	900	\$450	n	\$0	2	\$4,300	n	-	0	\$0	\$59,388	\$65,327
3-110	3	110.603	525	\$240	n	\$0	2	\$4,100	y	0.43	3	\$5,700	\$36,345	\$39,979
3-111	3	107.221	1200	\$590	y	\$2,350	2	\$4,700	y	2.26	15	\$28,500	\$98,810	\$108,691
3-112	3	97.9994	525	\$240	n	\$0	2	\$4,100	n	-	0	\$0	\$27,620	\$30,382
3-113	3	112.047	750	\$340	n	\$0	2	\$4,100	n	-	0	\$0	\$42,196	\$46,416
3-114	3	91.033	450	\$210	n	\$0	2	\$4,100	n	-	0	\$0	\$23,217	\$25,539
3-115	3	135.936	900	\$450	n	\$0	2	\$4,300	y	1.27	8	\$15,200	\$80,671	\$88,738
3-116	3	91.301	600	\$265	n	\$0	2	\$4,100	n	-	0	\$0	\$28,295	\$31,124
3-117	3	111.783	525	\$240	n	\$0	2	\$4,100	n	-	0	\$0	\$30,928	\$34,021
3-118	3	112.562	750	\$340	n	\$0	2	\$4,100	n	-	0	\$0	\$42,371	\$46,608
3-119	3	41.3487	750	\$340	n	\$0	1	\$2,050	n	-	0	\$0	\$16,109	\$17,719
3-120	3	102.207	1050	\$550	n	\$0	2	\$4,700	n	-	0	\$0	\$60,914	\$67,005
3-121	3	51.537	1200	\$590	n	\$0	1	\$2,350	n	-	0	\$0	\$32,757	\$36,033
3-122	3	91.8221	1350	\$720	y	\$2,550	2	\$5,100	y	2.86	19	\$36,100	\$109,862	\$120,848
3-123	3	109.32	450	\$210	n	\$0	2	\$4,100	n	-	0	\$0	\$27,057	\$29,763
3-124	3	127.831	750	\$340	n	\$0	2	\$4,100	n	-	0	\$0	\$47,563	\$52,319
3-125	3	112.059	525	\$240	n	\$0	2	\$4,100	n	-	0	\$0	\$30,994	\$34,094
3-126	3	157.076	750	\$340	y	\$2,050	3	\$6,150	y	0.88	6	\$11,400	\$73,006	\$80,306
3-127	3	113.978	600	\$265	n	\$0	2	\$4,100	n	-	0	\$0	\$34,304	\$37,735
3-128	3	94.8956	825	\$400	n	\$0	2	\$4,300	n	-	0	\$0	\$42,258	\$46,484
3-129	3	125.567	900	\$450	n	\$0	2	\$4,300	n	-	0	\$0	\$60,805	\$66,886
3-130	3	143.057	900	\$450	n	\$0	2	\$4,300	n	-	0	\$0	\$68,676	\$75,543
3-131	3	204.806	900	\$450	n	\$0	3	\$6,450	n	-	0	\$0	\$98,613	\$108,474
3-132	3	78.2387	1350	\$720	n	\$0	1	\$2,550	y	2.86	19	\$36,100	\$94,982	\$104,480
3-133	3	92.5256	525	\$240	n	\$0	2	\$4,100	n	-	0	\$0	\$26,306	\$28,937
3-134	3	59.4827	675	\$290	n	\$0	1	\$2,050	n	-	0	\$0	\$19,300	\$21,230
3-135	3	101.354	900	\$450	n	\$0	2	\$4,300	n	-	0	\$0	\$49,909	\$54,900
3-136	3	105.363	1050	\$550	n	\$0	2	\$4,700	y	1.73	12	\$22,800	\$85,450	\$93,995
3-137	3	124.939	1350	\$720	n	\$0	2	\$5,100	n	-	0	\$0	\$95,056	\$104,562
3-138	3	133.573	1500	\$750	n	\$0	2	\$6,400	n	-	0	\$0	\$106,580	\$117,238
3-139	3	40.7186	1500	\$750	n	\$0	1	\$3,200	n	-	0	\$0	\$33,739	\$37,113
3-140	3	98.3614	2100	\$1,400	n	\$0	2	\$6,800	y	6.93	46	\$87,400	\$231,906	\$255,097
3-141	3	81.5744	900	\$450	n	\$0	1	\$2,150	y	1.27	8	\$15,200	\$54,058	\$59,464
3-142	3	158.688	750	\$340	n	\$0	3	\$6,150	n	-	0	\$0	\$60,104	\$66,114
3-143	3	100.846	525	\$240	n	\$0	2	\$4,100	n	-	0	\$0	\$28,303	\$31,133
3-144	3	91.5843	750	\$340	n	\$0	2	\$4,100	n	-	0	\$0	\$35,239	\$38,763
3-145	3	58.1182	900	\$450	y	\$2,150	1	\$2,150	y	1.27	8	\$15,200	\$45,653	\$50,219
3-146	3	234.884	1200	\$590	y	\$2,350	4	\$9,400	y	2.26	15	\$28,500	\$178,832	\$196,715
8-101	8	220.024	1050	\$550	y	\$2,350	4	\$9,400	y	1.73	12	\$22,800	\$155,563	\$171,120
8-102	8	101.62	450	\$210	n	\$0	2	\$4,100	n	-	0	\$0	\$25,440	\$27,984
8-103	8	29.4999	750	\$340	y	\$2,050	1	\$2,050	y	0.88	6	\$11,400	\$25,530	\$28,083



## Richlands Area ICP

Pipe ID	Years till Construction	Length (m)	Diameter (mm)	Pipe Costs per metre (\$/m)	Pipe Outlet required (y/n)	Cost of Pipe Outlet	Manholes Required	Cost for Manholes	Gully Assessment Required	Q @ d/s end of proposed Pipe (m <sup>3</sup> /s)	No. Gullies required @ 0.15 m <sup>3</sup> /s)	Cost for Gullies	Estimated Cost (\$)	Total Cost (\$) including 10% contingency
8-104	8	91.4832	750	\$340	n	\$0	2	\$4,100	n	-	0	\$0	\$35,204	\$38,725
8-105	8	95.4183	1050	\$550	n	\$0	2	\$4,700	n	-	0	\$0	\$57,180	\$62,898
8-106	8	128.256	1200	\$590	n	\$0	2	\$4,700	n	-	0	\$0	\$80,371	\$88,408
8-107	8	68.4933	575	\$240	n	\$0	1	\$2,050	n	-	0	\$0	\$18,488	\$20,337
8-108	8	103.531	900	\$450	n	\$0	2	\$4,300	n	-	0	\$0	\$50,889	\$55,978
8-109	8	97.1614	600	\$265	n	\$0	2	\$4,100	n	-	0	\$0	\$29,848	\$32,833
8-110	8	103.746	600	\$265	n	\$0	2	\$4,100	n	-	0	\$0	\$31,593	\$34,752
8-111	8	172.424	600	\$265	n	\$0	3	\$6,150	y	0.57	4	\$7,600	\$59,442	\$65,387
8-112	8	71.0313	900	\$450	n	\$0	1	\$2,150	y	1.27	8	\$15,200	\$49,314	\$54,245
8-113	8	47.8936	525	\$240	n	\$0	1	\$2,050	n	-	0	\$0	\$13,544	\$14,899
8-114	8	50.6912	750	\$340	n	\$0	1	\$2,050	n	-	0	\$0	\$19,285	\$21,214
8-115	8	52.8535	1050	\$550	n	\$0	1	\$2,350	n	-	0	\$0	\$31,419	\$34,561
8-116	8	102.916	1050	\$550	n	\$0	2	\$4,700	n	-	0	\$0	\$61,304	\$67,434
8-117	8	47.8936	1350	\$720	n	\$0	1	\$2,550	y	2.86	19	\$36,100	\$73,133	\$80,447
8-118	8	88.6603	450	\$210	n	\$0	1	\$2,050	n	-	0	\$0	\$20,669	\$22,736
8-119	8	78.3111	525	\$240	n	\$0	1	\$2,050	n	-	0	\$0	\$20,845	\$22,929
8-120	8	212.754	675	\$290	n	\$0	4	\$8,200	n	-	0	\$0	\$69,899	\$76,889
8-121	8	69.2125	600	\$265	n	\$0	1	\$2,050	n	-	0	\$0	\$20,391	\$22,430
8-122	8	122.42	750	\$340	n	\$0	2	\$4,100	n	-	0	\$0	\$45,723	\$50,295
8-123	8	135.503	600	\$265	n	\$0	2	\$4,100	y	0.57	4	\$7,600	\$47,608	\$52,369
8-124	8	93.4432	450	\$210	n	\$0	2	\$4,100	n	-	0	\$0	\$23,723	\$26,095
8-125	8	82.9102	600	\$265	n	\$0	1	\$2,050	n	-	0	\$0	\$24,021	\$26,423
8-126	8	99.1754	750	\$340	n	\$0	2	\$4,100	n	-	0	\$0	\$37,820	\$41,602
8-127	8	96.7321	750	\$340	n	\$0	2	\$4,100	n	-	0	\$0	\$36,989	\$40,688
8-128	8	91.3753	450	\$210	n	\$0	2	\$4,100	n	-	0	\$0	\$23,289	\$25,618
8-129	8	87.1404	600	\$265	n	\$0	1	\$2,050	n	-	0	\$0	\$25,142	\$27,656
8-130	8	96.4561	750	\$340	n	\$0	2	\$4,100	y	0.88	6	\$11,400	\$48,295	\$53,125
8-131	8	178.299	825	\$400	n	\$0	3	\$6,450	n	-	0	\$0	\$77,770	\$85,547
8-132	8	37.0792	750	\$340	n	\$0	1	\$2,050	y	0.88	6	\$11,400	\$26,057	\$28,663
8-133	8	97.1763	1500	\$750	n	\$0	2	\$6,400	n	-	0	\$0	\$79,282	\$87,210
8-134	8	90.207	600	\$265	n	\$0	2	\$4,100	n	-	0	\$0	\$28,005	\$30,805
8-135	8	87.4151	750	\$340	n	\$0	1	\$2,050	n	-	0	\$0	\$31,771	\$34,948
8-136	8	90.7155	900	\$450	n	\$0	2	\$4,300	n	-	0	\$0	\$45,122	\$49,634
8-137	8	106.652	1050	\$550	n	\$0	2	\$4,700	n	-	0	\$0	\$63,359	\$69,694
8-138	8	183.554	1200	\$590	n	\$0	3	\$7,050	n	-	0	\$0	\$115,347	\$126,882
8-139	8	66.9692	525	\$240	n	\$0	1	\$2,050	n	-	0	\$0	\$18,123	\$19,935
8-140	8	92.2182	575	\$240	n	\$0	2	\$4,100	n	-	0	\$0	\$26,232	\$28,856
8-141	8	85.059	900	\$450	n	\$0	1	\$2,150	n	-	0	\$0	\$40,427	\$44,469
8-142	8	92.5278	1650	\$850	n	\$0	2	\$6,400	n	-	0	\$0	\$85,049	\$93,553
8-143	8	114.464	1800	\$950	n	\$0	2	\$6,400	n	-	0	\$0	\$115,141	\$126,655
8-144	8	127.594	1200	\$590	n	\$0	2	\$4,700	n	-	0	\$0	\$79,980	\$87,979
8-145	8	103.382	1350	\$720	n	\$0	2	\$5,100	n	-	0	\$0	\$79,535	\$87,489
8-146	8	66.1795	1950	\$1,250	n	\$0	1	\$3,400	n	-	0	\$0	\$86,124	\$94,737
8-147	8	56.6355	2100	\$1,400	n	\$0	1	\$3,400	n	-	0	\$0	\$82,690	\$90,959
8-148	8	144.739	825	\$400	n	\$0	2	\$4,300	y	1.07	7	\$13,300	\$75,496	\$83,045
8-149	8	87.7154	825	\$400	n	\$0	1	\$2,150	y	1.07	7	\$13,300	\$50,536	\$55,590
8-150	8	48.6109	450	\$210	n	\$0	1	\$2,050	n	-	0	\$0	\$12,258	\$13,484
13-101	13	75.281	1500	\$750	y	\$3,200	1	\$3,200	y	3.53	24	\$45,600	\$108,461	\$119,307
13-102	13	99.6515	1200	\$590	y	\$2,350	2	\$4,700	y	2.26	15	\$28,500	\$94,344	\$103,779
13-103	13	194.227	900	\$450	n	\$0	3	\$6,450	n	-	0	\$0	\$93,852	\$103,237
13-104	13	145.414	450	\$210	n	\$0	2	\$4,100	n	-	0	\$0	\$34,637	\$38,101
13-105	13	148.466	750	\$340	n	\$0	2	\$4,100	n	-	0	\$0	\$54,578	\$60,036
13-106	13	116.94	900	\$450	n	\$0	2	\$4,300	n	-	0	\$0	\$56,923	\$62,615

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Pipe ID	Years till Construction	Length (m)	Diameter (mm)	Pipe Costs per metre (\$/m)	Pipe Outlet required (y/n)	Cost of Pipe Outlet	Manholes Required	Cost for Manholes	Gully Assessment Required	Q @ d/s end of proposed Pipe (m <sup>3</sup> /s)	No. Gullies required @ 0.15 m <sup>3</sup> /s)	Cost for Gullies	Estimated Cost (\$)	Total Cost (\$) including 10% contingency
13-107	13	183.531	1200	\$590	n	\$0	3	\$7,050	n	-	0	\$0	\$115,333	\$126,867
13-108	13	104.811	1500	\$750	n	\$0	2	\$6,400	n	-	0	\$0	\$85,008	\$93,509
13-109	13	46.9104	450	\$210	n	\$0	1	\$2,050	n	-	0	\$0	\$11,901	\$13,091
13-110	13	53.2886	600	\$265	n	\$0	1	\$2,050	n	-	0	\$0	\$16,171	\$17,789
13-111	13	63.4506	750	\$340	n	\$0	1	\$2,050	n	-	0	\$0	\$23,623	\$25,986
13-112	13	63.5831	750	\$340	n	\$0	1	\$2,050	n	-	0	\$0	\$23,668	\$26,035
13-113	13	142.77	600	\$265	n	\$0	2	\$4,100	n	-	0	\$0	\$41,934	\$46,127
13-114	13	50.1078	900	\$450	n	\$0	1	\$2,150	n	-	0	\$0	\$24,699	\$27,168
13-115	13	12.3932	600	\$265	n	\$0	1	\$2,050	y	0.57	4	\$7,600	\$12,934	\$14,228
13-116	13	46.4248	900	\$450	n	\$0	1	\$2,150	n	-	0	\$0	\$23,041	\$25,345
13-117	13	30.7121	1050	\$550	y	\$2,350	1	\$2,350	y	1.73	12	\$22,800	\$44,392	\$48,831
13-118	13	60.9076	1050	\$550	n	\$0	1	\$2,350	n	-	0	\$0	\$35,849	\$39,434
13-119	13	124.644	525	\$240	n	\$0	2	\$4,100	n	-	0	\$0	\$34,015	\$37,416
13-120	13	139.462	1050	\$550	y	\$2,350	2	\$4,700	y	1.73	12	\$22,800	\$106,554	\$117,210
13-121	13	203.553	750	\$340	y	\$2,050	3	\$6,150	y	0.88	6	\$11,400	\$88,808	\$97,689
13-122	13	108.398	1950	\$1,250	n	\$0	2	\$6,800	n	-	0	\$0	\$142,298	\$156,527
13-123	13	142.743	1050	\$550	n	\$0	2	\$4,700	n	-	0	\$0	\$83,209	\$91,530
13-124	13	119.122	825	\$400	n	\$0	2	\$4,300	n	-	0	\$0	\$51,949	\$57,144
13-125	13	87.1683	600	\$265	n	\$0	1	\$2,050	n	-	0	\$0	\$25,150	\$27,665
13-126	13	100.925	750	\$340	n	\$0	2	\$4,100	n	-	0	\$0	\$38,415	\$42,256
13-127	13	80.2179	750	\$340	n	\$0	1	\$2,050	n	-	0	\$0	\$29,324	\$32,256
13-128	13	107.427	900	\$450	n	\$0	2	\$4,300	n	-	0	\$0	\$52,642	\$57,906
13-129	13	205.342	900	\$450	n	\$0	3	\$6,450	n	-	0	\$0	\$98,854	\$108,739
13-130	13	101.893	1050	\$550	n	\$0	2	\$4,700	n	-	0	\$0	\$60,741	\$66,815
13-131	13	156.632	1200	\$590	y	\$2,350	3	\$7,050	y	2.26	15	\$28,500	\$130,313	\$143,344
13-132	13	89.5242	750	\$340	y	\$2,050	1	\$2,050	y	0.88	6	\$11,400	\$45,938	\$50,532
13-133	13	97.2216	900	\$450	n	\$0	2	\$4,300	n	-	0	\$0	\$48,050	\$52,855
13-134	13	154.102	1200	\$590	n	\$0	3	\$7,050	n	-	0	\$0	\$97,970	\$107,767
13-135	13	126.625	1500	\$750	y	\$3,200	2	\$6,400	y	3.53	24	\$45,600	\$150,169	\$165,186
13-136	13	110.625	450	\$210	n	\$0	2	\$4,100	n	-	0	\$0	\$27,331	\$30,064
13-137	13	95.6255	600	\$265	n	\$0	2	\$4,100	n	-	0	\$0	\$29,441	\$32,385
13-138	13	101.226	750	\$340	n	\$0	2	\$4,100	n	-	0	\$0	\$38,517	\$42,369
13-139	13	48.5985	900	\$450	y	\$2,150	1	\$2,150	y	1.27	8	\$15,200	\$41,369	\$45,506
13-140	13	195.108	1500	\$750	n	\$0	3	\$9,600	n	-	0	\$0	\$155,931	\$171,524
13-141	13	59.6809	900	\$450	n	\$0	1	\$2,150	n	-	0	\$0	\$29,006	\$31,907
13-142	13	224.029	900	\$450	n	\$0	4	\$8,600	y	1.27	8	\$15,200	\$124,613	\$137,074
13-143	13	195.404	1050	\$550	y	\$2,350	3	\$7,050	y	1.73	12	\$22,800	\$139,672	\$153,639
13-144	13	189.364	450	\$210	n	\$0	3	\$6,150	n	-	0	\$0	\$45,916	\$50,508
13-145	13	191.492	600	\$265	n	\$0	3	\$6,150	n	-	0	\$0	\$56,895	\$62,585
13-146	13	105.353	750	\$340	n	\$0	2	\$4,100	n	-	0	\$0	\$39,920	\$43,912
13-147	13	93.4736	1200	\$590	n	\$0	2	\$4,700	y	2.26	15	\$28,500	\$88,349	\$97,184
13-148	13	89.868	1050	\$550	n	\$0	1	\$2,350	n	-	0	\$0	\$51,777	\$56,955
13-149	13	193.651	525	\$240	n	\$0	3	\$6,150	n	-	0	\$0	\$52,626	\$57,889
13-150	13	98.57	450	\$210	n	\$0	2	\$4,100	n	-	0	\$0	\$24,800	\$27,280
13-151	13	188.454	525	\$240	n	\$0	3	\$6,150	n	-	0	\$0	\$51,379	\$56,517
13-152	13	89.11	750	\$340	n	\$0	1	\$2,050	n	-	0	\$0	\$32,347	\$35,582
13-153	13	91.2856	525	\$240	n	\$0	2	\$4,100	n	-	0	\$0	\$26,009	\$28,609
13-154	13	92.3753	750	\$340	n	\$0	2	\$4,100	n	-	0	\$0	\$35,508	\$39,058
13-155	13	91.2876	900	\$450	n	\$0	2	\$4,300	n	-	0	\$0	\$45,379	\$49,917
13-156	13	85.3742	1050	\$550	y	\$2,350	1	\$2,350	y	1.73	12	\$22,800	\$74,456	\$81,901
13-157	13	94.3504	450	\$210	n	\$0	2	\$4,100	n	-	0	\$0	\$23,914	\$26,305
13-158	13	88.0141	750	\$340	n	\$0	1	\$2,050	n	-	0	\$0	\$31,975	\$35,172
13-159	13	91.5282	825	\$400	n	\$0	2	\$4,300	n	-	0	\$0	\$40,911	\$45,002

Pipe ID	Years till Construction	Length (m)	Diameter (mm)	Pipe Costs per metre (\$/m)	Pipe Outlet required (y/n)	Cost of Pipe Outlet	Manholes Required	Cost for Manholes	Gully Assessment Required	Q @ d/s end of proposed Pipe (m <sup>3</sup> /s)	No. Gullies required @ 0.15 m <sup>3</sup> /s)	Cost for Gullies	Estimated Cost (\$)	Total Cost (\$) including 10% contingency
13-160	13	90.1905	900	\$450	n	\$0	2	\$4,300	n	-	0	\$0	\$44,886	\$49,374
13-161	13	82.3235	1050	\$550	y	\$2,350	1	\$2,350	y	1.73	12	\$22,800	\$72,778	\$80,056
13-162	13	98.0749	525	\$240	n	\$0	2	\$4,100	n	-	0	\$0	\$27,638	\$30,402
13-163	13	93.4736	675	\$290	n	\$0	2	\$4,100	n	-	0	\$0	\$31,207	\$34,328
13-164	13	93.0471	900	\$450	n	\$0	2	\$4,300	n	-	0	\$0	\$46,171	\$50,788
13-165	13	84.5074	900	\$450	n	\$0	1	\$2,150	n	-	0	\$0	\$40,178	\$44,196
13-166	13	36.1516	1050	\$550	y	\$2,350	1	\$2,350	y	1.73	12	\$22,800	\$47,383	\$52,122
13-167	13	59.5616	450	\$210	n	\$0	1	\$2,050	n	-	0	\$0	\$14,558	\$16,014
13-168	13	59.8675	600	\$265	n	\$0	1	\$2,050	y	0.57	4	\$7,600	\$25,515	\$28,066
13-169	13	69.3953	450	\$210	n	\$0	1	\$2,050	n	-	0	\$0	\$16,623	\$18,285
13-170	13	60.4125	600	\$265	n	\$0	1	\$2,050	n	-	0	\$0	\$18,059	\$19,865
13-171	13	59.8264	750	\$340	n	\$0	1	\$2,050	n	-	0	\$0	\$22,391	\$24,630
13-172	13	61.99	825	\$400	n	\$0	1	\$2,150	n	-	0	\$0	\$26,946	\$29,641
13-173	13	59.5674	900	\$450	n	\$0	1	\$2,150	n	-	0	\$0	\$28,955	\$31,851
13-174	13	202.663	525	\$240	n	\$0	3	\$6,150	n	-	0	\$0	\$54,789	\$60,268
13-175	13	49.7209	750	\$340	n	\$0	1	\$2,050	n	-	0	\$0	\$18,955	\$20,851
13-176	13	131.851	525	\$240	n	\$0	2	\$4,100	n	-	0	\$0	\$35,744	\$39,319
13-177	13	133.071	675	\$290	n	\$0	2	\$4,100	n	-	0	\$0	\$42,691	\$46,960
13-178	13	36.5269	750	\$340	y	\$2,050	1	\$2,050	y	0.88	6	\$11,400	\$27,919	\$30,711
13-179	13	50.8882	750	\$340	y	\$2,050	1	\$2,050	y	0.88	6	\$11,400	\$32,802	\$36,082
18-101	18	126.054	450	\$210	n	\$0	2	\$4,100	n	-	0	\$0	\$30,571	\$33,628
18-102	18	67.5635	750	\$340	n	\$0	1	\$2,050	n	-	0	\$0	\$25,022	\$27,524
18-103	18	147.578	1200	\$590	n	\$0	2	\$4,700	n	-	0	\$0	\$91,771	\$100,948
18-104	18	126.812	1500	\$750	y	\$3,200	2	\$6,400	y	3.53	24	\$45,600	\$150,309	\$165,340
18-105	18	120.005	750	\$340	n	\$0	2	\$4,100	n	-	0	\$0	\$44,902	\$49,392
18-106	18	86.7599	450	\$210	n	\$0	1	\$2,050	n	-	0	\$0	\$20,270	\$22,297
18-107	18	89.375	675	\$290	n	\$0	1	\$2,050	n	-	0	\$0	\$27,969	\$30,766
18-108	18	95.4827	825	\$400	y	\$2,150	2	\$4,300	y	1.07	7	\$13,300	\$57,943	\$63,737
18-109	18	81.7674	600	\$265	n	\$0	1	\$2,050	n	-	0	\$0	\$23,718	\$26,090
18-110	18	81.4027	900	\$450	n	\$0	1	\$2,150	n	-	0	\$0	\$38,781	\$42,659
18-111	18	69.9512	1200	\$590	n	\$0	1	\$2,350	y	2.26	15	\$28,500	\$72,121	\$79,333
18-112	18	83.8108	525	\$240	y	\$2,050	1	\$2,050	y	0.43	3	\$5,700	\$29,915	\$32,906
18-113	18	95.577	525	\$240	n	\$0	2	\$4,100	n	-	0	\$0	\$27,038	\$29,742
18-114	18	44.8496	675	\$290	y	\$2,050	1	\$2,050	y	0.72	5	\$9,500	\$26,606	\$29,267
18-115	18	84.8857	450	\$210	n	\$0	1	\$2,050	n	-	0	\$0	\$19,876	\$21,864
18-116	18	80.877	525	\$240	n	\$0	1	\$2,050	n	-	0	\$0	\$21,460	\$23,607
18-117	18	79.8718	750	\$340	n	\$0	1	\$2,050	n	-	0	\$0	\$29,206	\$32,127
18-118	18	30.5212	825	\$400	y	\$2,150	1	\$2,150	y	1.07	7	\$13,300	\$29,808	\$32,789
18-119	18	116.341	525	\$240	n	\$0	2	\$4,100	n	-	0	\$0	\$32,022	\$35,224
18-120	18	89.0121	450	\$210	n	\$0	1	\$2,050	n	-	0	\$0	\$20,743	\$22,817
18-121	18	76.1501	645	\$265	n	\$0	1	\$2,050	n	-	0	\$0	\$22,230	\$24,453
18-122	18	51.5151	825	\$400	y	\$2,150	1	\$2,150	y	1.07	7	\$13,300	\$38,206	\$42,027
18-123	18	98.7345	750	\$340	n	\$0	2	\$4,100	n	-	0	\$0	\$37,670	\$41,437
18-124	18	77.0835	1050	\$550	y	\$2,350	1	\$2,350	y	1.73	12	\$22,800	\$69,896	\$76,886
18-125	18	85.8644	525	\$240	n	\$0	1	\$2,050	n	-	0	\$0	\$22,657	\$24,923
18-126	18	73.291	675	\$290	n	\$0	1	\$2,050	n	-	0	\$0	\$23,304	\$25,635
18-127	18	98.0293	900	\$450	n	\$0	2	\$4,300	y	1.27	8	\$15,200	\$63,613	\$69,975
23-162	23	133.944	450	\$210	n	\$0	2	\$4,100	n	-	0	\$0	\$32,228	\$35,451

Total Pipe Length = 21112.6 m

Total Manholes required = 361 manholes

Total Gullies = 583 gullies

## Appendix C: Transport apportionment

**Table C.1: Transport Equivalent Hectare conversion rates**

	Conversion rates
Very low density residential	0.0727
Low density residential	1.0000
Small lot/attached residential	1.9394
Commercial and retail	3.4343
Industrial	1.8182

**Table C.2: Future development as transport Equivalent Hectares (Contributions Areas 1, 2 & 3)**

	Very low density residential	Low density residential	Small lot/attached residential	Commercial and retail	Industrial floor	Total
Existing	37	124	27	1	635	824
Year 2015	1	405	87	14	1,367	1,874

**Table C.3: New growth as transport Equivalent Hectares (Contributions Areas 1, 2 & 3)**

Year	Very low density residential	Low density residential	Small lot/attached residential	Commercial and retail	Industrial floor	Total
2001 to 2005	0.0	12.6	2.7	0.0	182.5	197.9
2006 to 2010	0.0	42.2	9.1	0.3	187.8	239.5
2011 to 2015	0.0	62.1	13.4	1.0	174.7	251.2
Total	0.0	116.9	25.2	1.4	545.1	688.6
NPV @ 6%	0.0	66.4	14.3	0.7	354.2	435.7

Note: Because existing very low density development will not be credited for prior transport contributions, declines in the area of this type of development have been excluded from Table C.3.

**Table C.4: Cost of apportioned items**

Item description	Cost					Total Cost*	Year constructed	Discounted cost
	Construction			Contingency				
	Quantity	Rate	Subtotal	Rate	Subtotal			
Bullockhead Creek - Ipswich Motorway to Boundary Road			\$151,000	10%	\$15,100	\$166,100	2003	\$139,461
Connections to Wacol and Gailes stations			\$80,000	10%	\$8,000	\$88,000	2003	\$73,887
Bullockhead Creek - Boundary Road to Progress Road			\$171,000	10%	\$17,100	\$188,100	2008	\$118,016
Bullockhead Creek - Progress Road to Forest Lake			\$504,000	10%	\$50,400	\$554,400	2013	\$259,924
Preparation			\$21,591	0%	\$0	\$21,591	2000	\$21,591
<b>Total</b>	0.00	\$0	\$927,591		\$90,600	\$1,018,191		\$612,879

<b>Base year</b>	2001
<b>Discount rate</b>	6%

Component	NPV
Pedestrian and cycle paths	\$591,288
Preparation	\$21,591
<b>Total</b>	<b>\$612,879</b>

\* Fees, acquisition and contingency included in total cost.

**Table C.5: Cost apportionment**

Item description	Discounted Cost	External use		Existing use		Future use		Contribution	
		% total use	Apportioned cost	% total use	Apportioned cost	% total use	Apportioned cost	NPV future demand	Contribution (\$/Ha)
Bullockhead Creek - Ipswich Motorway to Boundary Road	\$139,461	0%	\$0	44%	\$61,342	56%	\$78,119	436	\$179
Connections to Wacol and Gailes stations	\$73,887	0%	\$0	44%	\$32,499	56%	\$41,387	436	\$95
Bullockhead Creek - Boundary Road to Progress Road	\$118,016	0%	\$0	44%	\$51,910	56%	\$66,106	436	\$152
Bullockhead Creek - Progress Road to Forest Lake	\$259,924	0%	\$0	44%	\$114,329	56%	\$145,596	436	\$334
Preparation	\$21,591	0%	\$0	0%	\$0	100%	\$21,591	436	\$50
<b>Total</b>	<b>\$612,879</b>		<b>\$0</b>		<b>\$260,080</b>		<b>\$352,799</b>		<b>\$810</b>

Component	Contribution Area 1 (\$/EH)	Contribution Area 2 (\$/EH)	Contribution Area 3 (\$/EH)
Pedestrian and cycle paths	\$760	\$760	\$760
Major roads	\$7,425	\$6,435	\$6,435
Minor roads	\$0	\$17,787	\$0
Preparation	\$50	\$50	\$50
<b>Total</b>	<b>\$8,235</b>	<b>\$25,032</b>	<b>\$7,245</b>

Type of development	(ICUs)	(ICUs)	(ICUs)	Credit (ICUs)
Very low density residential	599	1,820	527	0
Low density residential	8,235	25,032	7,245	0
Small lot/attached residential	15,971	48,547	14,051	0
Commercial and retail	28,281	85,968	24,881	0
Industrial	14,972	45,512	13,172	0

## Appendix D: Community purposes apportionment

**Table D.1: Community purposes Equivalent Hectare conversion rates**

	Conversion rates
Very low density residential	0.0833
Low density residential	1.0000
Small lot/attached residential	1.5972
Commercial and retail	0.6597
Industrial	0.3299

**Table D.2: Future development less Carole Park and Forest Lake as community purposes Equivalent Hectares**

	Very low density residential	Low density residential	Small lot/attached residential	Commercial and retail	Industrial floor	Total
Existing	41	14	3	0	115	173
Year 2015	0	295	52	0	248	595

**Table D.3: New growth development as community purposes Equivalent Hectares**

Year	Very low density residential	Low density residential	Small lot/attached residential	Commercial and retail	Industrial floor	Total
2001 to 2005	0	13	2	0	33	48
2006 to 2010	0	42	7	0	34	84
2011 to 2015	0	62	11	0	32	105
2016 to 2020	0	22	4	0	34	60
2021 onwards	0	142	25	0	0	167
Total	0	281	50	0	133	464
NPV @ 6%	0	107	19	0	76	202

Note: Because existing very low density development will not be credited for prior community purposes contributions, declines in the area of this type of development have been excluded from Table D.3.

**Table D.4: Cost of apportioned items**

Item description	Cost						Total Cost	Year constructed	Discounted cost
	Land acquisition			Improvements					
	Quantity	Rate	Subtotal	Quantity	Rate	Subtotal			
X1 - CJ Greenfield	26.50	\$150,000	\$3,982,500	26.50	\$75,000	\$1,987,500	\$5,970,000	2000	\$5,970,000
X2 - Darra recreation reserve	0.00	0.00	\$0	2.30	\$28,152	\$64,750	\$64,750	2005	\$48,385
S2	5.42	\$200,000	\$1,094,000	5.42	\$222,500	\$1,205,950	\$2,299,950	2003	\$1,931,082
A1	4.80	\$150,000	\$727,500	4.80	\$222,500	\$1,068,000	\$1,795,500	2013	\$841,800
S1	5.48	\$150,000	\$829,500	5.48	\$220,500	\$1,208,340	\$2,037,840	2013	\$955,419
C1	1.50	\$150,000	\$232,500	0.00	\$0	\$0	\$232,500	2008	\$145,873
C2	0.50	\$150,000	\$82,500	0.00	\$0	\$0	\$82,500	2008	\$51,762
F9	0.20	\$300,000	\$75,000	0.20	\$185,000	\$37,000	\$112,000	2003	\$94,037
F7	0.00	\$0	\$0	0.43	\$104,500	\$44,935	\$44,935	2001	\$42,392
D1	0.50	\$250,000	\$137,500	0.50	\$95,000	\$47,500	\$185,000	2003	\$155,330
D2	1.00	\$150,000	\$157,500	1.00	\$170,000	\$170,000	\$327,500	2003	\$274,975
F1	1.50	\$250,000	\$387,500	1.50	\$68,000	\$102,000	\$489,500	2003	\$410,994
F10	1.50	\$250,000	\$387,500	1.50	\$55,000	\$82,500	\$470,000	2003	\$394,621
F11	1.00	\$500,000	\$525,000	1.00	\$190,000	\$190,000	\$715,000	2003	\$600,328
F2	2.50	\$250,000	\$637,500	2.50	\$227,500	\$568,750	\$1,206,250	2003	\$1,012,791
F3	1.96	\$250,000	\$502,500	1.96	\$50,000	\$98,000	\$600,500	2003	\$504,191
C1	1.50	\$150,000	\$232,500	1.50	\$115,000	\$172,500	\$405,000	2008	\$254,102
C2	0.50	\$150,000	\$82,500	0.50	\$125,000	\$62,500	\$145,000	2008	\$90,975
F4	0.50	\$250,000	\$137,500	0.50	\$95,000	\$47,500	\$185,000	2008	\$116,071
F5	0.00	\$0	\$0	1.48	\$55,000	\$81,400	\$81,400	2008	\$51,071
L3	0.50	\$150,000	\$82,500	0.50	\$140,000	\$70,000	\$152,500	2008	\$95,680
B1	0.20	\$120,000	\$30,000	0.20	\$97,500	\$19,500	\$49,500	2013	\$23,208
B2	0.50	\$120,000	\$66,000	0.50	\$125,000	\$62,500	\$128,500	2013	\$60,246
B3	0.86	\$120,000	\$108,600	0.86	\$175,000	\$149,625	\$258,225	2013	\$121,066
B4	1.00	\$120,000	\$126,000	1.00	\$155,000	\$155,000	\$281,000	2013	\$131,744
B5	1.00	\$120,000	\$126,000	1.00	\$80,000	\$80,000	\$206,000	2013	\$96,581
F8	2.72	\$150,000	\$415,500	3.31	\$104,000	\$344,240	\$759,740	2013	\$356,196
L2	0.60	\$120,000	\$78,000	0.60	\$347,500	\$208,500	\$286,500	2013	\$134,322
E2	1.62	\$200,000	\$333,800	1.62	\$142,500	\$230,708	\$564,508	2018	\$197,772
A2	1.60	\$100,000	\$165,000	1.60	\$110,000	\$176,000	\$341,000	2025	\$79,453
A3	0.50	\$100,000	\$55,000	0.50	\$125,000	\$62,500	\$117,500	2025	\$27,377
A4	1.00	\$100,000	\$105,000	1.00	\$80,000	\$80,000	\$185,000	2025	\$43,105
E1	2.10	\$100,000	\$215,000	2.10	\$106,200	\$223,020	\$438,020	2025	\$102,058
L4	0.66	\$100,000	\$71,000	0.66	\$158,000	\$104,280	\$175,280	2025	\$40,840
L1	0.90	\$100,000	\$95,000	0.90	\$257,000	\$231,300	\$326,300	2025	\$76,027
Preparation	0.00	\$0	\$0	0.00	\$0	\$15,000	\$15,000	2001	\$14,151
<b>Total</b>	<b>28.21</b>		<b>\$12,283,400</b>	<b>30.71</b>		<b>\$9,451,297</b>	<b>\$21,734,697</b>		<b>\$15,546,024</b>

<b>Base Year</b>	2001
<b>Discount Rate</b>	6%

<b>Component</b>	<b>NPV</b>
Acquisition and improvement of district parks	\$9,746,686
Acquisition and improvement of local parks	\$5,785,187
Preparation	\$14,151
<b>Total</b>	<b>\$15,546,024</b>



Table D.5: Cost apportionment

Item description	Discounted Cost	External use		Existing use		Future use		contribution	
		% total use	Apportioned cost	% total use	Apportioned cost	% total use	Apportioned cost	NPV future demand	contribution (\$/EH)
X1 - CJ Greenfield	\$5,970,000	51%	\$3,056,281	14%	\$3,056,281	35%	\$2,064,653	202	\$10,221
X2 - Darra recreation reserve	\$48,385	0%	\$0	29%	\$14,099	71%	\$34,285	202	\$170
S2	\$1,931,082	0%	\$0	29%	\$562,723	71%	\$1,368,359	202	\$6,774
A1	\$841,800	0%	\$0	29%	\$245,303	71%	\$596,497	202	\$2,953
S1	\$955,419	0%	\$0	29%	\$278,412	71%	\$677,007	202	\$3,352
C1	\$145,873	0%	\$0	29%	\$42,508	71%	\$103,365	202	\$512
C2	\$51,762	0%	\$0	29%	\$15,083	71%	\$36,678	202	\$182
F9	\$94,037	0%	\$0	29%	\$27,403	71%	\$66,635	202	\$330
F7	\$42,392	0%	\$0	29%	\$12,353	71%	\$30,038	202	\$149
D1	\$155,330	0%	\$0	29%	\$45,263	71%	\$110,066	202	\$545
D2	\$274,975	0%	\$0	29%	\$80,129	71%	\$194,847	202	\$965
F1	\$410,994	0%	\$0	29%	\$119,765	71%	\$291,229	202	\$1,442
F10	\$394,621	0%	\$0	29%	\$114,994	71%	\$279,627	202	\$1,384
F11	\$600,328	0%	\$0	29%	\$174,937	71%	\$425,390	202	\$2,106
F2	\$1,012,791	0%	\$0	29%	\$295,130	71%	\$717,661	202	\$3,553
F3	\$504,191	0%	\$0	29%	\$146,923	71%	\$357,269	202	\$1,769
C1	\$254,102	0%	\$0	29%	\$74,046	71%	\$180,056	202	\$891
C2	\$90,975	0%	\$0	29%	\$26,510	71%	\$64,464	202	\$319
F4	\$116,071	0%	\$0	29%	\$33,824	71%	\$82,248	202	\$407
F5	\$51,071	0%	\$0	29%	\$14,882	71%	\$36,189	202	\$179
L3	\$95,680	0%	\$0	29%	\$27,882	71%	\$67,799	202	\$336
B1	\$23,208	0%	\$0	29%	\$6,763	71%	\$16,445	202	\$81
B2	\$60,246	0%	\$0	29%	\$17,556	71%	\$42,690	202	\$211
B3	\$121,066	0%	\$0	29%	\$35,279	71%	\$85,787	202	\$425
B4	\$131,744	0%	\$0	29%	\$38,391	71%	\$93,353	202	\$462
B5	\$96,581	0%	\$0	29%	\$28,144	71%	\$68,437	202	\$339
F8	\$356,196	0%	\$0	29%	\$103,796	71%	\$252,399	202	\$1,250
L2	\$134,322	0%	\$0	29%	\$39,142	71%	\$95,180	202	\$471
E2	\$197,772	0%	\$0	29%	\$57,631	71%	\$140,140	202	\$694
A2	\$79,453	0%	\$0	29%	\$23,153	71%	\$56,300	202	\$279
A3	\$27,377	0%	\$0	29%	\$7,978	71%	\$19,400	202	\$96
A4	\$43,105	0%	\$0	29%	\$12,561	71%	\$30,544	202	\$151
E1	\$102,058	0%	\$0	29%	\$29,740	71%	\$72,318	202	\$358
L4	\$40,840	0%	\$0	29%	\$11,901	71%	\$28,939	202	\$143
L1	\$76,027	0%	\$0	29%	\$22,155	71%	\$53,873	202	\$267
Preparation	\$14,151	0%	\$0	0%	\$0	100%	\$14,151	202	\$70
<b>Total</b>	<b>\$15,546,024</b>		<b>\$3,056,281</b>		<b>\$5,842,639</b>		<b>\$8,854,319</b>		<b>\$43,834</b>

Component	\$/EH
Acquisition and improvement of district parks	\$23,470
Acquisition and improvement of local parks	\$20,294
Preparation	\$70
<b>Total</b>	<b>\$43,834</b>

	contribution (ICUs)	Credit (ICUs)
Very low density residential	3,653	0
Low density residential	43,834	43,764
Small lot/attached residential	70,013	69,901
Commercial and retail	28,918	28,872
Industrial	14,459	14,436

## Appendix E: Infrastructure Contribution Rates

**Table E.1: Infrastructure Contribution Rates (Contribution Area 1)**

	Waterways (ICUs/developable hectare)	Transport (ICUs/developable hectare)	Community purposes (ICUs/developable hectare)	Total (ICUs/developable hectare)
Very low density residential	2,298	599	3,653	6,550
Low density residential	10,340	8,235	43,834	62,409
Small lot/attached residential	12,408	15,971	70,013	98,391
Commercial and retail	19,646	28,281	28,918	76,846
Industrial	19,646	14,972	14,459	49,078

**Table E.2: Infrastructure Contribution Rates (Contribution Area 2)**

	Waterways (ICUs/developable hectare)	Transport (ICUs/developable hectare)	Community purposes (ICUs/developable hectare)	Total (ICUs/developable hectare)
Very low density residential	8,164	1,820	3,653	13,637
Low density residential	36,739	25,032	43,834	105,605
Small lot/attached residential	44,086	48,547	70,013	162,646
Commercial and retail	69,804	85,968	28,918	184,690
Industrial	69,804	45,512	14,459	129,775

**Table E.3: Infrastructure Contribution Rates (Contribution Area 3)**

	Waterways (ICUs/developable hectare)	Transport (ICUs/developable hectare)	Community purposes (ICUs/developable hectare)	Total (ICUs/developable hectare)
Very low density residential	8,164	527	3,653	12,344
Low density residential	36,739	7,245	43,834	87,818
Small lot/attached residential	44,086	14,051	70,013	128,150
Commercial and retail	69,804	24,881	28,918	123,603
Industrial	69,804	13,172	14,459	97,435

**Table E.4: Infrastructure Credits (Contribution Area 1)**

	Waterways (ICUs/developable hectare)	Transport (ICUs/developable hectare)	Community purposes (ICUs/developable hectare)	Total (ICUs/developable hectare)
Very low density residential	0	0	0	0
Low density residential	10,232	0	43,764	53,996
Small lot/attached residential	12,278	0	69,901	82,179
Commercial and retail	19,441	0	28,872	48,313
Industrial	19,441	0	14,436	33,877

**Table E.5: Infrastructure Credits (Contribution Area 2)**

	Waterways (ICUs/developable hectare)	Transport (ICUs/developable hectare)	Community purposes (ICUs/developable hectare)	Total (ICUs/developable hectare)
Very low density residential	0	0	0	0
Low density residential	36,290	0	43,764	80,054
Small lot/attached residential	43,549	0	69,901	113,449
Commercial and retail	68,952	0	28,872	97,824
Industrial	68,952	0	14,436	83,388

**Table E.6: Infrastructure Credits (Contribution Area 3)**

	Waterways (ICUs/developable hectare)	Transport (ICUs/developable hectare)	Community purposes (ICUs/developable hectare)	Total (ICUs/developable hectare)
Very low density residential	0	0	0	0
Low density residential	36,290	0	43,764	80,054
Small lot/attached residential	43,549	0	69,901	113,449
Commercial and retail	68,952	0	28,872	97,824
Industrial	68,952	0	14,436	83,388