

APPENDIX 35

Benefit cost analyses

Full SMP flood mitigation works (Parts A and B)



2016 STORMWATER MANAGEMENT PLAN (CATCHMENT-WIDE WORKS) - LOWER BOUND

Values in \$ '000 (Real Terms)	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	24	25	26	27	28	29	30
		2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2037/38	2038/39	2039/40	2040/41	2041/42	2042/43	2043/44
Base Case AAD (Average Annual Damage)												5,960	5,960	5,960	5,960	5,960	5,960	5,960	5,960	5,960	5,960	5,960
Post Mitigation AAD												1,924	1,924	1,924	1,924	1,924	1,924	1,924	1,924	1,924	1,924	1,924
Assumed Incremental Benefit during Construction of Works (% of Year 11 Total Benefit)		-	-	10%	10%	20%	20%	40%	50%	70%	80%	100%										
Benefits (AAD Reduction = Base Case - Post Mitigation)		-	-	400	400	810	810	1,620	2,020	2,830	3,230	4,040	4,040	4,040	4,040	4,040	4,040	4,040	4,040	4,040	4,040	4,040
Costs	Previous	Future																				
Ridge Park Detention System	-	2,634	171	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
South Park Lands Detention System	-	566	-	1,000	5,000	5,000	5,000	834	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lower Brown Hill Creek Channel Upgrade	-	315	100	100	5,000	12,000	12,000	9,000	585	-	-	-	-	-	-	-	-	-	-	-	-	-
Keswick Creek Diversion Culverts	-	141	-	-	-	-	2,300	10,000	12,000	9,500	9,159	-	-	-	-	-	-	-	-	-	-	-
Anzac Hwy to Forestville Reserve Channel Upgrade (Area 1)	-	-	-	-	-	-	-	400	6,000	1,600	-	-	-	-	-	-	-	-	-	-	-	-
DPTI Culvert	-	5,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glen Osmond Creek Minor Works	-	-	-	-	-	-	-	-	-	-	-	800	-	-	-	-	-	-	-	-	-	-
Upper Brown Hill Creek Works (excluding DPTI Culvert and Area 1 Works)	184	-	-	-	-	-	-	-	700	8,000	8,000	6,100	-	-	-	-	-	-	-	-	-	-
Maintenance (0.3% of CAPEX to previous 2 yrs)	-	-	-	27	27	31	61	112	170	230	288	345	397	418	418	418	418	418	418	418	418	418
SMP Administration Costs	-	-	100	100	150	150	150	150	150	150	150	100	100	100	100	100	100	100	100	100	100	100
SMP Study and Consultation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Costs	184	8,656	371	1,227	10,177	17,181	19,511	20,496	19,605	19,480	17,597	7,345	497	518	518	518	518	518	518	518	518	518
Net Balance		- 8,656	- 371	- 827	- 9,777	-16,371	-18,701	-18,876	-17,585	-16,650	-14,367	- 3,305	3,543	3,522	3,522	3,522	3,522	3,522	3,522	3,522	3,522	3,522

Present value of Benefits	33,528
Present value of Costs	98,369
Net Present Value	- 64,841
Internal rate return (%)	-4.2%
Benefit Cost Ratio	0.34
Real Discount Rate (%)	6%

Note:
Previous and Year 1 expenditure includes allowance for previous design work, particularly for South Park Lands and Keswick Creek Diversions
Dollar values as at September 2015



2016 STORMWATER MANAGEMENT PLAN (CATCHMENT-WIDE WORKS) - UPPER BOUND

Values in \$ '000 (Real Terms)

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	24	25	26	27	28	29	30
	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2037/38	2038/39	2039/40	2040/41	2041/42	2042/43	2043/44
Base Case AAD (Average Annual Damage)											8,066	8,066	8,066	8,066	8,066	8,066	8,066	8,066	8,066	8,066	8,066
Post Mitigation AAD											2,130	2,130	2,130	2,130	2,130	2,130	2,130	2,130	2,130	2,130	2,130
Assumed Incremental Benefit during Construction of Works (% of Year 11 Total Benefit)	-	-	10%	10%	20%	20%	40%	50%	70%	80%	100%										
Benefits (AAD Reduction = Base Case - Post Mitigation)	-	-	590	590	1,190	1,190	2,380	2,970	4,160	4,750	5,940	5,940	5,940	5,940	5,940	5,940	5,940	5,940	5,940	5,940	5,940
Costs	Previous	Future																			
Ridge Park Detention System	-	2,634	171	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
South Park Lands Detention System	-	566	-	1,000	5,000	5,000	834	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lower Brown Hill Creek Channel Upgrade	-	315	100	100	5,000	12,000	9,000	585	-	-	-	-	-	-	-	-	-	-	-	-	-
Keswick Creek Diversion Culverts	-	141	-	-	-	2,300	10,000	12,000	9,500	9,159	-	-	-	-	-	-	-	-	-	-	-
Anzac Hwy to Forestville Reserve Channel Upgrade (Area 1)	-	-	-	-	-	-	400	6,000	1,600	-	-	-	-	-	-	-	-	-	-	-	-
DPTI Culvert	-	5,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glen Osmond Creek Minor Works	-	-	-	-	-	-	-	-	-	-	800	-	-	-	-	-	-	-	-	-	-
Upper Brown Hill Creek Works (excluding DPTI Culvert and Area 1 Works)	184	-	-	-	-	-	-	700	8,000	8,000	6,100	-	-	-	-	-	-	-	-	-	-
Maintenance (0.3% of CAPEX to previous 2 yrs)	-	-	27	27	31	61	112	170	230	288	345	397	418	418	418	418	418	418	418	418	418
SMP Administration Costs	-	-	100	100	150	150	150	150	150	150	100	100	100	100	100	100	100	100	100	100	100
SMP Study and Consultation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Costs	184	8,656	371	1,227	10,177	17,181	19,511	20,496	19,605	19,480	17,597	7,345	497	518	518	518	518	518	518	518	518
Net Balance	-	8,656	- 371	- 637	- 9,587	-15,991	-18,321	-18,116	-16,635	-15,320	-12,847	- 1,405	5,443	5,422	5,422	5,422	5,422	5,422	5,422	5,422	5,422

Present value of Benefits	49,296
Present value of Costs	98,369
Net Present Value	- 49,073
Internal rate return (%)	-0.9%
Benefit Cost Ratio	0.50
Real Discount Rate (%)	6%

Note:
Previous and Year 1 expenditure includes allowance for previous design work, particularly for South Park Lands and Keswick Creek Diversions
Dollar values as at September 2015



2016 STORMWATER MANAGEMENT PLAN (CATCHMENT-WIDE WORKS) - LOWER BOUND

Values in \$ '000 (Real Terms)	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	24	25	26	27	28	29	30
		2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2037/38	2038/39	2039/40	2040/41	2041/42	2042/43	2043/44
Base Case AAD (Average Annual Damage)												5,960	5,960	5,960	5,960	5,960	5,960	5,960	5,960	5,960	5,960	5,960
Post Mitigation AAD												1,924	1,924	1,924	1,924	1,924	1,924	1,924	1,924	1,924	1,924	1,924
Assumed Incremental Benefit during Construction of Works (% of Year 11 Total Benefit)		-	-	10%	10%	20%	20%	40%	50%	70%	80%	100%										
Benefits (AAD Reduction = Base Case - Post Mitigation)		-	-	400	400	810	810	1,620	2,020	2,830	3,230	4,040	4,040	4,040	4,040	4,040	4,040	4,040	4,040	4,040	4,040	4,040
Costs	Previous	Future																				
Ridge Park Detention System	-	2,634	171	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
South Park Lands Detention System	-	566	-	1,000	5,000	5,000	5,000	834	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lower Brown Hill Creek Channel Upgrade	-	315	100	100	5,000	12,000	12,000	9,000	585	-	-	-	-	-	-	-	-	-	-	-	-	-
Keswick Creek Diversion Culverts	-	141	-	-	-	-	2,300	10,000	12,000	9,500	9,159	-	-	-	-	-	-	-	-	-	-	-
Anzac Hwy to Forestville Reserve Channel Upgrade (Area 1)	-	-	-	-	-	-	-	400	6,000	1,600	-	-	-	-	-	-	-	-	-	-	-	-
DPTI Culvert	-	5,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glen Osmond Creek Minor Works	-	-	-	-	-	-	-	-	-	-	-	800	-	-	-	-	-	-	-	-	-	-
Upper Brown Hill Creek Works (excluding DPTI Culvert and Area 1 Works)	184	-	-	-	-	-	-	-	700	8,000	8,000	6,100	-	-	-	-	-	-	-	-	-	-
Maintenance (0.3% of CAPEX to previous 2 yrs)	-	-	-	27	27	31	61	112	170	230	288	345	397	418	418	418	418	418	418	418	418	418
SMP Administration Costs	-	-	100	100	150	150	150	150	150	150	150	100	100	100	100	100	100	100	100	100	100	100
SMP Study and Consultation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Costs	184	8,656	371	1,227	10,177	17,181	19,511	20,496	19,605	19,480	17,597	7,345	497	518	518	518	518	518	518	518	518	518
Net Balance		- 8,656	- 371	- 827	- 9,777	-16,371	-18,701	-18,876	-17,585	-16,650	-14,367	- 3,305	3,543	3,522	3,522	3,522	3,522	3,522	3,522	3,522	3,522	3,522

Present value of Benefits	45,973
Present value of Costs	112,645
Net Present Value	- 66,673
Internal rate return (%)	-4.2%
Benefit Cost Ratio	0.41
Real Discount Rate (%)	4%

Note:
Previous and Year 1 expenditure includes allowance for previous design work, particularly for South Park Lands and Keswick Creek Diversions
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Base Case AAD (Average Annual Damage)												8,066	8,066	8,066	8,066	8,066	8,066	8,066	8,066	8,066	8,066	8,066
Post Mitigation AAD												2,130	2,130	2,130	2,130	2,130	2,130	2,130	2,130	2,130	2,130	2,130
Assumed Incremental Benefit during Construction of Works (% of Year 11 Total Benefit)		-	-	10%	10%	20%	20%	40%	50%	70%	80%	100%										
Benefits (AAD Reduction = Base Case - Post Mitigation)		-	-	590	590	1,190	1,190	2,380	2,970	4,160	4,750	5,940	5,940	5,940	5,940	5,940	5,940	5,940	5,940	5,940	5,940	5,940
Costs	Previous	Future																				
Ridge Park Detention System	-	2,634	171	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
South Park Lands Detention System	-	566	-	1,000	5,000	5,000	5,000	834	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lower Brown Hill Creek Channel Upgrade	-	315	100	100	5,000	12,000	12,000	9,000	585	-	-	-	-	-	-	-	-	-	-	-	-	-
Keswick Creek Diversion Culverts	-	141	-	-	-	-	2,300	10,000	12,000	9,500	9,159	-	-	-	-	-	-	-	-	-	-	-
Anzac Hwy to Forestville Reserve Channel Upgrade (Area 1)	-	-	-	-	-	-	-	400	6,000	1,600	-	-	-	-	-	-	-	-	-	-	-	-
DPTI Culvert	-	5,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glen Osmond Creek Minor Works	-	-	-	-	-	-	-	-	-	-	-	800	-	-	-	-	-	-	-	-	-	-
Upper Brown Hill Creek Works (excluding DPTI Culvert and Area 1 Works)	184	-	-	-	-	-	-	-	700	8,000	8,000	6,100	-	-	-	-	-	-	-	-	-	-
Maintenance (0.3% of CAPEX to previous 2 yrs)	-	-	-	27	27	31	61	112	170	230	288	345	397	418	418	418	418	418	418	418	418	418
SMP Administration Costs	-	-	100	100	150	150	150	150	150	150	150	100	100	100	100	100	100	100	100	100	100	100
SMP Study and Consultation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Costs	184	8,656	371	1,227	10,177	17,181	19,511	20,496	19,605	19,480	17,597	7,345	497	518	518	518	518	518	518	518	518	518
Net Balance		- 8,656	- 371	- 637	- 9,587	-15,991	-18,321	-18,116	-16,635	-15,320	-12,847	- 1,405	5,443	5,422	5,422	5,422	5,422	5,422	5,422	5,422	5,422	5,422

Present value of Benefits	67,594
Present value of Costs	112,645
Net Present Value	- 45,052
Internal rate return (%)	-0.9%
Benefit Cost Ratio	0.60
Real Discount Rate (%)	4%

Note:
Previous and Year 1 expenditure includes allowance for previous design work, particularly for South Park Lands and Keswick Creek Diversions
Dollar values as at September 2015