



4.0 Cost-Effectiveness Evaluation

4.1 Basis of Evaluation

Each alternative was evaluated for the planning period from January 1, 2003 to December 31, 2025. Capital costs for wastewater treatment and collection were based on data from previous projects and cost curves developed by Black & Veatch. All previous project costs were indexed to 4th quarter 2002 dollars using Engineering News Record indexes. Operation and maintenance costs were developed from City Utilities Department data for wastewater treatment and Black & Veatch data for wastewater collection.

Capital costs for the cost-effectiveness evaluation are based on year 2002 dollars and do not include allowances for inflation. Capital costs include costs for construction, a 20 percent service factor for collection system contingencies, a 25 percent service factor for treatment system contingencies, and a 20 percent service factor for engineering and administration. A discount rate of 5 7/8 percent was used for present worth calculations.

4.2 Cost-Effectiveness Analysis

A cost-effectiveness analysis was performed to compare the life cycle costs of the three alternatives during the planning period. The present worth of capital and operation and maintenance costs for the alternative differences shown in “red” in the collection and treatment system figures was calculated to determine the most cost-effective alternative for the planning period. The analysis does not include the majority of the collection system improvements that are identical to each alternative. A full capital improvements plan for the entire collection system is provided in a subsequent chapter of the Master Plan based on the selected wastewater system alternative.

The present worth of capital and operation and maintenance costs for the three collection and treatment system alternatives is summarized in Table II-4.



Table II-4 Cost-Effectiveness Analysis Design Year 2025			
Present Worth	Alternative 1 All Flow to Kansas River WWTP	Alternative 2 Wakarusa River WWTP (Site A)	Alternative 3 Wakarusa River WWTP (Site B)
Capital Costs: WWTP and Collection	\$56,600,000	\$52,000,000	\$48,400,000
O&M Costs: WWTP and Collection	\$25,400,000	\$26,200,000	\$25,900,000
Total Present Worth	\$82,000,000	\$78,200,000	\$74,300,000

A detailed summary of the cost-effectiveness analysis showing individual project capital costs, project implementation year, operation and maintenance costs, and present worth for each alternative is shown in Appendix E, Cost Effectiveness Analysis.