

Performance Audit of Solid Waste Transfer Station Capital Projects

Report No. 2011-03

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Executive Summary

The purpose of this performance audit was to assess whether the rate proposal submitted by King County's Solid Waste Division (SWD) of the Department of Natural Resources and Parks would be feasible within a sustainable financial plan, and to evaluate the cost effectiveness of the transfer station capital improvement projects which directly influences disposal rates.

An issue of concern to county policy-makers is that Solid Waste anticipates the completion of transfer station infrastructure projects that will have useful lives of fifty years, while the current interlocal agreements extend only to the year 2028. Two implications of this situation are that:

- if infrastructure financing is confined to the period of the current interlocal agreements, higher debt service will result in higher rates for waste disposal, and
- if some cities opt out of the system after 2028, near-term rate payers will pay for more infrastructure than they need over the long term.

In recognition of this issue, the King County Executive (Executive) is pursuing extensions of the interlocal agreements with the cities. The King County Council (Council) also included a proviso in the 2011 budget requiring SWD to produce a rate proposal within a balanced financial plan that would not result in debt service obligations beyond the term of the interlocal agreements. Disposal rates adopted by the Council support the capital investments in solid waste transfer stations. The Executive has proposed a one-year disposal rate, and a further rate proposal will need to be made in 2012.

SWD has a 2011 operating budget of \$91 million and will dispose of an estimated 828,000 tons of waste for the citizens of unincorporated King County and the thirty-seven cities that are served under interlocal agreements.

The 2006 Solid Waste Transfer and Waste Management Plan, approved by the Council in December 2007, identified (re)construction of five transfer facilities to support the capacity, service, and operational needs of the waste system into the future: Shoreline, Bow Lake, Factoria, Northeast, and South. Shoreline has been built and is in operation, Bow Lake is currently under construction, Factoria is being permitted, and Northeast and South are in the planning stages.

Key Audit Findings and Recommendations

Rate Model and Financial Plan: On the whole, the SWD's financial plan is comprehensive, sound, and based on reasonable financial assumptions. Where we identified opportunities to improve the plan, SWD has taken or has begun to take appropriate actions. One area not yet addressed in the plan relates to additional future rent payments to the county for SWD's use of the Cedar Hills Regional Landfill (Cedar Hills). SWD will be able to update the plan once a new appraisal is completed. Including future rents in the plan will affect the rates, but not necessarily the 2012 proposed rate. In addition, this report notes options for cost savings and revenue enhancement.

Transfer Station Project Costs: We determined that the transfer system plan was developed through an iterative and collaborative process; regional decisions on service levels and similar decisions made through that planning process have, in some cases, increased costs. These decisions contributed to King County's transfer stations having higher capital costs per ton, in general, than those of other jurisdictions we surveyed. The Executive, Council, and regional partners may have additional time for further review of the decisions that have increased costs and may increase solid waste rates into the future. This is possible because the life of Cedar Hills has been extended and Factoria, Northeast, and South stations are in the early stages of planning and permitting. The current, estimated remaining (post 2011) capital expenditures related to these three stations is \$220 million.

Summary of Recommendations: We make four recommendations in this report. The most important of these is that SWD should update transfer system and individual facility plans as they have indicated their intention to do. During this process, SWD should provide county policy-makers and regional partners systematic analysis of the incremental cost impacts of the number and capacities of the transfer stations, the functionalities of the stations, and an assessment of which project financing and delivery method is most likely to result in lower capital costs.

We make three other recommendations related to using appropriate economic assumptions, life-cycle cost analysis, and long-term investment strategies.

Executive Response: The Executive concurs with these recommendations. A response is attached in Appendix 1.

PART 1: RATE MODEL AND SUSTAINABILITY OF THE FINANCIAL PLAN

Summary of Findings

On the whole, SWD's financial plan is comprehensive, sound, and based on reasonable financial assumptions.

Where we identified opportunities to improve the financial plan, SWD has taken or has begun to take appropriate actions.

Changes to the financial plan related to audit findings would not necessarily change the 2012 rate calculation, but would result in different rates over the planning period (to 2030). Also, when any additional Cedar Hills rent payments to King County are factored in, rates will be impacted in future years.

There are cost savings opportunities and a revenue enhancement that SWD can pursue.

Approach

To determine if rate proposals would be feasible within a sustainable financial plan, we analyzed SWD's financial plan for:

- comprehensiveness,
- soundness,
- reasonableness of economic and financial assumptions, and
- risks to rate payers.

We also reviewed whether tonnage projections and project cash flows were adequately treated in the plan.

The discussion in this section focuses on the financial plan, rather than the "rate model," because there is not a rate model that is separate from the financial plan. They are integrated in two ways: tonnage, division expenditures, and other revenue are projected for the long term;¹ and an iterative

process is used to determine what rate structure would be adequate to make revenues and expenditures balance and meet minimum reserve targets.

SWD's financial plan is sustainable as long as the following conditions are met:

1. tonnage projections, project cash flows and other assumptions are reasonably accurate,
2. the plan calculations are free of substantive errors, and
3. the Executive proposes and Council approves the rates that are necessary to balance the financial plan.

Comprehensiveness of the Financial Plan

Our review found that the financial plan is thorough and competent, and covers in adequate detail all of the relevant expenditure and revenue categories. The 2007 Independent, Third-Party Review of the Solid Waste Transfer and Waste Export System Plan reached a similar conclusion.

We did find, however, that one part of the financial plan that will need to be updated relates to the amount that the utility will have to pay in rent in future years to King County for use of Cedar Hills, which the County owns. SWD is beginning the process of reappraising the value of the landfill, and will factor the new rents into the next iteration of the rate proposal.

Reasonableness of Economic and Financial Assumptions

The assumptions used in the overall financial plan for inflation, interest earning, and bond rates were based on credible sources; however, the assumptions for inflation and interest earning are different from the forecast issued by the King County Forecast Council. One of the reasons why the King County Forecast Council was created by Charter Amendment was to achieve more rigor and consistency in economic assumptions used by county agencies.

¹ The current plan extends to 2030.

This matter of inconsistency raises the issue of whether all funds within Solid Waste should be invested the same way. For the Landfill Reserve Fund, the fund balance is designed to grow over time such that by the year 2028 there are sufficient reserves in place to cover an additional thirty years (to 2058) of post closure monitoring, as required by federal regulations.

A possible solution to this issue is addressed below in the Cost Saving Opportunities section of this report on page 5.

Recommendation 1

In its financial plan, the Solid Waste Division should use the economic assumptions adopted by the King County's Forecast Council to the extent the assumptions apply, such as for general inflation and Investment Pool interest earning.

Finally, we examined the bond interest rate and debt service calculations for Bow Lake and the remaining three proposed transfer stations. We found these calculations to be reasonable (and updated when appropriate) and modeling of debt service was thorough. An important assumption in the plan, and a beneficial practice that is currently in place, is to issue Bond Anticipation Notes (BAN) when market conditions are favorable. BANs provide a means of financing capital project expenditures with short-term, interest-only debt, and then converting the principal into longer term bonds once the projects are completed.

Soundness of the Financial Plan

We identified several areas of the model where adjustments would enhance its soundness, and ultimately, the reasonableness of the rate proposal. In each of these areas SWD subsequently made the suggested adjustments. The SWD financial plan is a complex model and set of sub-models that must be updated and recalibrated as calculations and assumptions change.

The process for estimation of future replacement costs in one sub-model was one of the more significant areas needing adjustment. The Capital Equipment Recovery Program (CERP) model did not make appropriate inflationary adjustments, and the investments made to extend the useful lives of assets were included as replacement costs instead of being treated as separate budgeting decisions.

The CERP serves three main purposes: 1) save up money to replace equipment in a timely and cost-effective manner; 2) avoid significant fluctuations in the operating fund from purchasing equipment; and 3) mitigate the impact of dramatic tonnage decreases to the operating fund.

SWD has recast the CERP model to address the problems we identified earlier in our review. The effect of these defects was that the model overestimated the beginning annual amount of money needed to be transferred from the Operating Fund to CERP by approximately \$1 million. SWD has indicated to us that an appropriate change will be made to its budget request for 2012.

Another area that still needs to be addressed in future iterations of the rate model relates to decisions of how to estimate and include costs for capital project contingencies in the financial plan. For example, contingency costs were included in the expenditure assumptions for the Northeast transfer station but not for the South station.

Since there is uncertainty about what the ultimate expenditures for these projects will be, it is difficult to say what, if any, impact this inconsistency might have. SWD has indicated that the use of contingency in forecasting project cash flow is being standardized and clarified for capital projects, and that project managers will in the future be provided guidance on when and how to forecast the use of contingency.

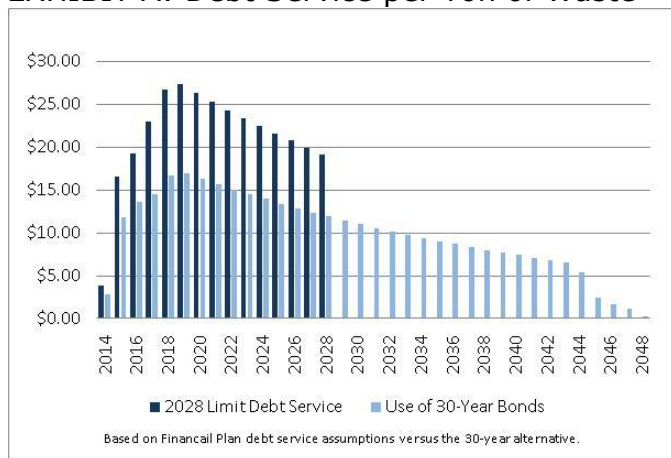
Risks to Rate Payers

In the current financial plan, near-term rate payers could be paying for infrastructure put in place to benefit future rate payers. An additional risk is that current rate payers could be financing more infrastructure than would be needed in the future, especially if cities drop out of the system after 2028 when the current interlocal agreement with the 37 city partners to the County's solid waste system expires.

The current financial plan for Solid Waste is based on financing capital improvements with debt from bonds. The terms of the bonds, per policy, are restricted to the years between the issuance of the bonds and 2028. Within the current financial plan, the bond terms range from 10 to 13 years, depending on when the transfer station projects are completed and the Bond Anticipation Notes are retired.

With the limited bond terms, interest rates are lower but annual debt service cost is significantly higher. Exhibit A shows the debt service per ton of waste with terms of 10 to 13 years compared to an alternative of using 30-year bonds.

EXHIBIT A: Debt Service per Ton of Waste



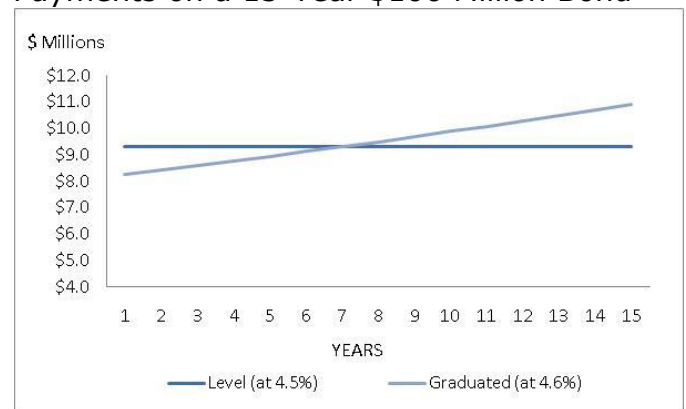
SOURCE: King County Auditor's Office

County policy-makers are aware of the risks noted here and are considering strategies to lower debt service payments and mitigate risk by pursuing extensions of the interlocal agreements with cities.

One option we explored with SWD was the idea that issuing bonds with graduated payments could help lower initial debt service and increase the debt service over time to take into account inflation and the expectation that there will be more rate payers in the future among whom the cost can be spread. Other options may also be feasible or can be explored.

Exhibit B shows the difference between level debt service payments versus graduated payments increasing at 2 percent per year using a 15-year bond term as an example.

EXHIBIT B: Level vs. Graduated Debt Service Payments on a 15-Year \$100 Million Bond



SOURCE: King County Auditor's Office

We are not recommending this or any other particular approach, but we note that this and other approaches can be considered.

Implications of Audit Findings for the Current Rate Proposal

A proviso in the 2011 county budget required that SWD conduct a rate study and submit a proposed rate adjustment ordinance by March 30, 2011. In fulfilling this mandate the agency updated its financial plan and submitted a new rate proposal for 2012 only, with the rate proposal for future years pending progress on extending the terms of the interlocal agreements with the utility's city partners. The basic fee proposed for 2012 was \$108 per ton, which would be an increase over the current basic fee of \$95 per ton.

The cumulative effect of all of the technical modifications to the financial plan related to audit findings would not necessarily change the 2012 rate calculation, but would result in different rates over the planning period (to 2030). However, when the new appraisal for Cedar Hills is completed, and additional rent payments to the County are factored in, rates will be higher than currently shown in the plan.

Cost Saving Opportunities

There were two areas where we identified opportunities for savings or revenue enhancement:

1. life-cycle cost analysis for equipment replacement decisions, and
2. a new investment strategy for the Landfill Reserve Fund.

Life-cycle cost analysis should be used for decisions about when to replace or purchase new kinds of equipment. In reviewing CERP we learned that the FASTER asset management program provides useful information on the age, use, and condition of equipment, but routine economic analysis of optimal replacement dates or use of alternative equipment has not been performed. Currently the value of the assets in CERP totals \$51 million.

Use of life-cycle cost analysis helps to ensure that the decisions about replacement timing and alternatives are in the best economic interest of the utility. At the time we were completing our audit, SWD had begun piloting a life-cycle cost approach to review its replacement decisions, beginning with asset types with large numbers (for example, refuse trailers are 40 percent of the fleet) and/or currently have regular rebuild schedules (for example, trailers and bulldozers).

Recommendation 2

The Solid Waste Division should continue to develop and then formally adopt life-cycle cost analysis as part of its asset management program.

Finally, as previously noted, part of the Landfill Reserve Fund (LRF) balance has an investment horizon extending to the year 2058. Nevertheless, the fund is invested in the same investment pool as other funds, whose overall liquidity objectives and needs are shorter term, for example, less than one year. It may be to the benefit of the Landfill Reserve Fund to have an alternative investment strategy.

As an example, increasing the real (before inflation) rate of return on the LRF balance by a full one-percent could result in lowering the tipping fee by \$.87 per ton in 2012. At the estimated 826,000 tons of waste for 2012, this would translate into a savings to rate payers of \$717,000.

Our understanding is that the Executive Finance Committee would consider a request from SWD for an alternative investment approach. SWD has informed us that they have already begun discussions.

Recommendation 3

The Solid Waste Division, in cooperation with the Executive Finance Committee, should review the feasibility of a new investment strategy for the Landfill Reserve Fund.

PART 2: COST EFFECTIVENESS OF TRANSFER STATION PROJECTS

Summary of Findings

Policy decisions about King County transfer facility design and other elements such as services provided and service levels increased total project cost, which affects disposal fees. In some cases, decisions were not informed by cost analysis or analysis was not complete. In some other cases, when analysis was done, it is now many years out of date. Cost was not, however, the sole factor considered in developing the transfer system plan.

As currently programmed and reflected in the SWD financial plan, the capital

cost per ton varies among King County’s five large transfer stations and is generally higher in comparison to other regional transfer stations. This is primarily due to paying higher capital costs initially to accommodate the forecasted waste tonnage growth that was assumed at the time the system plan was adopted.

In response to a changed forecast that assumes lower system tonnage in the long term, SWD has initiated reviews of transfer facility plans, and additionally will consider changes to system plans based on the outcome of the current interlocal agreement discussions.

Background

Decisions about the structure and details of the King County transfer system and stations over the past 20 years have involved a wide range of stakeholder groups (shown in Exhibit C) and have been guided by several documents. The progressive process was designed to both incorporate the needs of the stakeholder groups and obtain the support of the Council at key intervals.

EXHIBIT C: Stakeholders Involved in Transfer System Decisions

King County Executive
King County Council
Solid Waste Division of the Department of Natural Resources and Parks
Metropolitan Solid Waste Management Advisory Committee
Interjurisdictional Technical Staff Group
Labor unions representing SWD staff
Solid Waste Advisory Committee
Private solid waste companies

SOURCE: King County Auditor’s Office and SWD

1992 Comprehensive Plan

The 1992 Comprehensive Solid Waste Management Plan was adopted by the suburban cities and Council. It set out service level decisions for the system and required new and replacement facilities to meet the standards.

1995 Transfer System Report

The 1995 Transfer System Report describes conditions existing in 1995 and puts forward program alternatives, identifying areas which need further evaluation prior to selecting transfer station alternatives.

1996 Final Policy Report

In SWD’s 1996 Final Policy Report, SWD performed a further evaluation of the transfer stations’ existing conditions as requested by the Council. This analysis, and the finding that the then-current transfer station configuration was near or past traffic capacity, became the basis for upgrading and replacing transfer stations.

2001 Comprehensive Solid Waste Management Plan

This adopted plan describes King County’s strategy for managing garbage and recycling over a 20-year timeframe.

2004, 2005, 2006 Milestone Reports 1-4

In the council adopted Milestone Reports, SWD worked with the Solid Waste Advisory Committee, Metropolitan Solid Waste Management Committee, the Interjurisdictional Technical Staff Group, the commercial haulers, and labor unions representing Solid Waste Division staff. Milestone Report #1 developed criteria and standards by which the existing solid waste facilities would be evaluated. Milestone Report #2 applied the adopted criteria to the existing stations. Milestone Report #3 discussed private vs. public ownership of the facilities. The final Milestone Report, #4, developed six different transfer station alternatives to consider.

2006 Solid Waste Transfer and Waste Management Plan

The Solid Waste Transfer and Waste Management Plan was adopted in December 2007. It is the culmination of the four Milestone Reports and contains recommendations to “guide King County as it prepares the solid waste system for waste export, during which time the transfer system will be upgraded, a public or private intermodal facility or facilities will be added

to the system, and the County’s Cedar Hills Regional Landfill will be closed.”

2011 Draft Comprehensive Solid Waste Management Plan

This draft plan updates the 2001 Comprehensive Solid Waste Management Plan. It incorporates transfer system decisions approved in the 2006 Solid Waste Transfer and Waste Management Plan.

Decisions that Impacted Transfer Station Costs

In their independent review of the Solid Waste Transfer and Waste Export System Plan, Gershman, Brickner, and Bratton (GGB) stated that “Transfer cost projections appear excessive and should be reviewed.” Our analysis indicates, and staff at SWD and GGB concurred, that a number of policy decisions have contributed to the final cost of Shoreline and the estimated costs for King County’s four remaining transfer station projects.

These policy decisions fall in three categories:

1. number and throughput² of stations,
2. functionality criteria/decisions, and
3. project financing and delivery.

As decisions were made about the transfer system, in some cases SWD performed and communicated cost analysis of the alternatives. In other cases, analysis was not performed or the analysis that was performed was incomplete. The completeness of cost analysis is discussed in the sections describing policy decisions that follow. SWD notes that policy choices were based on the collaborative decision-making process described in the background section above and that cost was not one of the agreed-upon criteria although some cost information was presented in Milestone Report #4.

If cost analysis had been regularly and thoroughly executed and updated as the

² Productive capacity in terms of cost per ton.

environment changed, we would be better able to identify the cost impacts of decisions. Effective cost analysis fully informs policy decisions about long-term investments and supports decision-makers in allocating the appropriate amount of funds to projects.

Exhibit D identifies some of the decisions that influenced the costs of King County and other jurisdictions’ transfer stations. Cost estimates for the impacts of decisions made regarding the number/throughput and self-haul resulted from analysis completed by SWD and a value engineering study. This exhibit also includes information from the other jurisdictions we included in our capital cost comparison.

EXHIBIT D: Transfer Station Cost Drivers

Policy Decision	Comparison With Other Transfer Station Projects		SWD Cost Analysis ³
	SWD	4 Others ⁴	
NUMBER OF STATIONS AND THROUGHPUT CAPACITY			
Number and Throughput	.3-1.3M tons/yr	N/A	Unknown, but cost > \$49 million
FUNCTIONALITY CRITERIA/DECISIONS			
Self-Haul	Yes	Yes	Cost \$49-97 million
Compaction	Yes	Yes	Unknown, net benefit of \$1.1 million for Bow Lake only ⁵
Mitigation	Varies	Varies	Unknown
Open During Construction ⁶	2 Yes	No	Cost > \$6.1 million
LEED Certification	1 Platinum 4 Gold	1 Gold 1 Silver 2 no LEED	Unknown
PROJECT FINANCING AND DELIVERY			
Project Delivery Method	Design Bid Build, Low Bid, Negotiated	Design Build, Design Bid Build, Low Bid	NA

SOURCE: King County Auditor’s Office and SWD

³ In cases where no cost analysis was done or analysis was incomplete, “unknown” appears in the table.

⁴ These stations include two in Snohomish County (ARTS and SWRTS), one in the City of Seattle, and one in the City of Tacoma.

⁵ This analysis is 20 years old. Many assumptions and inputs have changed.

⁶ This count of stations open during construction does not include Shoreline, since it has been completed.

Number of Stations and Throughput Capacity

Costs and service considerations can affect the decision about how many transfer stations to have, and what their functionalities should be, e.g. self-haul, enclosed buildings, compaction. The transfer station alternatives proposed by SWD in the Milestone Report #4 had significantly different cost profiles, ranging in costs from \$155 million to \$197 million.⁷ The transfer station package ultimately selected did not have full cost data associated with it. In the report, SWD noted that the costs of the Factoria facility could increase due to additional environmental mitigation costs. At the time of SWD's analysis, the package selected had the highest initial capital costs, but the lowest long-term operating costs.

Since the focus of this audit was on the costs of the individual stations, we did not attempt specifically to revisit the issues of how many stations to have, how large to make them or where to site them. However, new information in this audit concerning the costs and capacities of the facilities in the current capital improvement plan, together with issues related to risks in the SWD financial plan, provide some additional context for county decision-makers to consider.

This new information emerged when we compared the capital cost per ton of waste to be handled at transfer stations over their expected useful lives. This is similar to the comparisons made for other kinds of services, such as transit. Routes that have fewer passengers per bus have relatively higher capital costs per passenger.

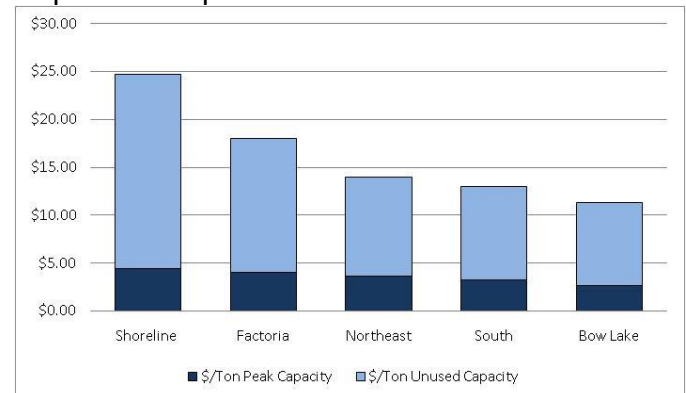
In conducting our comparative cost analysis, we used the cost-per-ton metric suggested by the GBB independent review, which is also similar to the method used by SWD in the cost analysis of system alternatives in the Milestone Report #4.

It should be noted that capital cost per ton of waste is an important metric, but it does

not fully answer the question about the total system-wide costs and benefits. For example, some of the costs may be considered investments that will save on operating costs (see compaction discussion in next section), and providing excess capacity may have a value in mitigating the risk of unexpected tonnage increases. Using this metric does, however, point out how important the cost of capacity is, and why it should be explicitly taken into consideration when making facility decisions.

Exhibit E shows the comparison of the five existing or planned SWD transfer stations. Land costs were excluded, and for all the stations we assumed the same financing, the same growth rate in tonnage, and then calculated and annualized the net present value.

EXHIBIT E: King County Transfer Stations Capital Cost per Ton of Waste



SOURCE: King County Auditor's Office

The dark blue parts of the bars represent the annualized cost per ton if each of the stations were to always operate at 90 percent of their peak capacity. This is a way of portraying how the **As Built** (or to be built) costs compare.

The light blue parts of the bars represent the portion of total cost per ton attributable to paying for capacity that will not be used until sometime in the future. This is a way of portraying how the **As Used** (or to be used) costs compare. Paying more now to accommodate future growth has the effect of increasing the capital cost per ton of waste

⁷ 2005 dollars

that will be handled, and ultimately impacts rates.

Looking at the highest and lowest stations in the chart, Shoreline has the highest cost per ton because it handles only about 6 percent of system tonnage, whereas the Bow Lake station handles about 33 percent of system tonnage. This percentage for Bow Lake should increase when the current Renton station closes.⁸

When SWD conducted its own analysis of cost per ton in 2005, it included labor costs and an estimate of savings from compaction. After taking those operational costs and savings into account, the same kind of difference between Bow Lake and the other stations was shown. This is because the relative difference in operating costs among the stations was small in comparison to the differences in tonnage to be handled.

To see how King County's transfer station costs compared to peers, we looked at similar facilities that were built or planned within the last eight years, use compaction, allow self-haul, are enclosed, and all but one provide recycling. We asked those jurisdictions to provide us with the same kind of cost and capacity information that we received from SWD.

In comparing the peers to SWD we did not take into account overall system costs or the criteria established for the systems, such as providing for emergency storage. Therefore we did not attempt to evaluate cost-effectiveness. What we found, however, underscores the observation from our internal comparison—namely that cost per ton decreases as station utilization increases. Because the peer facilities were (or are) planned to operate at a higher utilization upon opening, our estimates of their capital

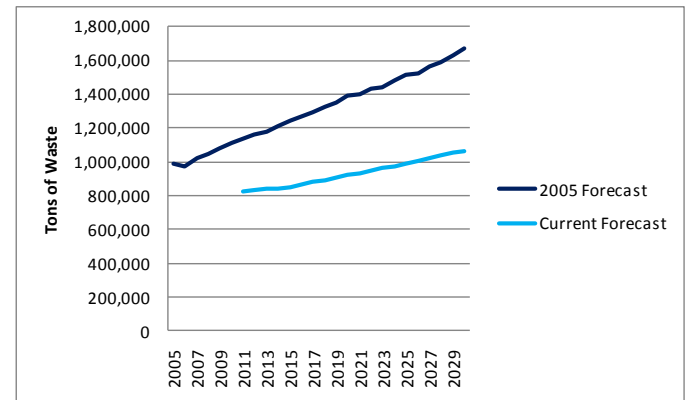
⁸ The results of our sensitivity analysis indicate that the relative differences in annualized Net Present Value (NPV) cost per ton of waste for the nine transfer stations we compared are dominated by the cost and tonnage values instead of the economic variables, such as discount rate and financing.

costs per ton were generally lower than the comparable King County facilities.

As a final note regarding cost per ton, we want to emphasize that neither our analysis nor previous analyses by SWD attempted to quantify the full life-cycle costs and benefits of the number and types of transfer stations planned for the King County system. An important element to be included in such an analysis would be the cost to haulers of having fewer stations.

Also, the situation facing the County now, in terms of the economy and tonnage forecasts, is far different than it was six years ago when system alternatives were being analyzed. SWD's current tonnage forecast for year 2030 is about 600K lower than the former forecast, as shown in Exhibit F.

EXHIBIT F: Change in Waste Tonnage Forecasts



SOURCE: King County Auditor's Office

Based on data and assumptions provided by SWD for the five large transfer stations, and given the assumptions reflected in the current system and financial plan, by the time the stations reach the end of their expected useful lives, collectively they will be utilizing about 42 percent of their total capacity.

After experiencing several years of declining tonnage and a revised forecast that assumes lower system utilization in the long term, SWD has begun reviewing transfer facility plans. Additionally, SWD indicates it will consider changes to system plans based on

the outcome of the current interlocal agreement discussions with its partner cities.

Functionality Criteria and Decisions

Analysis performed by SWD to produce the Comprehensive Solid Waste Management Plan confirmed the observation from the Gershman, Brickner, and Bratton (GBB) independent review that adding functionalities comes at a cost.

Self Haul

SWD has conducted and communicated analysis of self-haul costs during planning processes. For example, in Milestone Report #4, SWD indicated a range of cost from \$49 million to \$97 million (expressed here in 2011 dollars) depending on how many transfer stations would have self-haul capability. Providing service to self-haul customers instead of limiting service to commercial haulers drives transfer station costs in several ways. Inclusion of self-haul has resulted in exceeding space available at our existing facilities, and requiring that they expanded or replaced much earlier.

Though self-haul customers contribute only 23 percent of the tonnage brought to transfer stations, they account for 84 percent of the traffic. The heavy traffic was a primary driver for replacing the Houghton and Algona transfer stations, which had exceeded their traffic capacity. Examples of other drivers included recycling services, emergency storage, and compaction.

The inclusion of self-haul in SWD's new stations is an approved policy which requires:

1. larger properties for vehicle queuing,
2. more space and additional safety measures for tipping,⁹ and
3. additional scale operators and site attendants for operations.

⁹ "Tipping" is the act of depositing waste onto the transfer station floor.

Compaction

Compacting waste adds cost by requiring purchase of expensive machinery that reduces the size of waste before transport. It also reduces cost by allowing more efficient transfer to the ultimate disposal site and more accurate weight control.

SWD reviewed the life-cycle costs of preload compaction in 1992, using data that is now 20 years old. In 1996 an additional cash flow analysis was completed, and in 2004 SWD conducted analysis of the costs of installation of preload compaction systems at individual stations. These additional evaluations provided valuable information, but the life-cycle cost analysis from 1992 has not been updated.

Mitigation

Mitigation of impacts can add substantial cost to projects and ultimately to the rates paid by rate payers. Transfer stations can have negative impacts on communities. Mitigation of these impacts is an approved policy and in some cases required by law.

Mitigation actions have been determined through negotiation with communities, but in most cases have not been backed by cost analysis.

Examples of actions taken by SWD to mitigate the impact of their transfer stations include,¹⁰ but are not limited to, the actions listed in Exhibit G. Northeast and South sites have not yet been selected, so several mitigation elements are yet to be determined.

¹⁰ Since the sites for the Northeast and South transfer stations have not yet been selected, in some cases it is unclear which mitigation actions would be undertaken for those stations.

EXHIBIT G: Sample Mitigation Actions

	Shoreline	Bow Lake	Factoria	Northeast	South
New freeway ramps	✓				
Improving/adding streets, sidewalks, paved trails	✓	✓	TBD	TBD	TBD
Stream/wetland restoration/mitigation	✓	✓	✓	TBD	TBD
Fully enclosing transfer buildings	✓	✓	✓	✓	✓
Buffering active area of station	✓	✓	✓	✓	✓
Adding property space for queuing	✓	✓	✓	TBD	TBD
Purchasing neighboring properties	✓	✓	✓		
Lowering building heights	✓				
Sound walls	✓				
Placing compactor below ground	✓				
Extensive landscaping	✓	✓	✓	✓	✓
Flood protection	✓		✓	TBD	TBD
Truck/self-haul traffic separation	✓	✓	✓	✓	✓
Methane barrier	✓	✓			

SOURCE: King County Auditor's Office and SWD

Open During Construction

Keeping transfer stations open while constructing new stations adds cost to the projects. At the same time, keeping station open resolves other challenges such as accommodating waste elsewhere and hauler transportation costs. Both the Bow Lake and Factoria transfer stations will continue to accept waste while construction of the new facilities occurs to reduce the distance that customers must travel to dispose of waste. A value engineering study of the Bow Lake design found that the County could save \$5.8 million by closing the facility during the construction of the new transfer station.

LEED Certification

Achieving LEED¹¹ Platinum at Shoreline and the goal of LEED Gold at other stations adds to transfer station cost. SWD reports that the Shoreline transfer station was the first industrial building to achieve LEED certification. King County's recent LEED ordinance will require any future project to quantify the incremental costs of attaining LEED certification. This ordinance was not in effect when Shoreline and Bow Lake were

being planned but will apply to the Factoria, Northeast, and South transfer stations.

Although attainment of LEED Gold is an approved policy and there are strategic objectives for LEED that extend beyond cost, SWD notes that specific analysis was not done to determine the cost of meeting LEED standards for Shoreline and Bow Lake.

For example, SWD has presented a high level estimate of the cost of LEED, which was assumed to be three percent of construction cost. In addition, SWD has provided estimates of potential savings as a result of LEED elements. However, none of these considerations of achieving LEED included comparison to cost.

One industry expert and staff in two other jurisdictions stated that meeting many LEED standards, especially those leading to Gold and Platinum certifications, results in high costs that may not produce long-term economic benefit.

Project Financing and Delivery

There are several project delivery options available to SWD, each with varying opportunities and risks. SWD analyzed project delivery methods during planning efforts for Shoreline and Bow Lake but the analysis did not include all the viable options for project delivery, such as public-private partnerships.

Industry experts believe that the public-private partnership financing and project delivery approach, also called 63-20, could be beneficial. A previous report from our office, Alternative Capital Project Delivery Methods Study, also determined that the County has consistently had favorable experiences using the public-private partnership approach.

¹¹ LEED (Leadership in Energy and Environmental Design) is a green building certification. Platinum is the highest rating followed by Gold, Silver, and Certified.

There May Be Additional Time for Further Consideration of Transfer Station Decisions

Since 2007, with the adoption of the Solid Waste Transfer and Waste Management Plan, SWD has taken actions to extend the useful life of the landfill. Cedar Hills is now estimated to be available to accept waste into year 2025, which means that King County now has 14 more years before the waste export plan starts to go into effect. This extension of the useful life of the landfill has been an economic benefit to SWD, partner local governments, and the rate payers by delaying the need to export waste from King County to a distant site.

According to the latest timeline for the remaining transfer station projects, design and permitting for the Northeast and South stations will not take place until 2014-15, and construction will not take place until 2016-17. This time may afford the County and its partners the opportunity to revisit some of the decisions regarding the two transfer stations that have not been sited; and there may be a further possibility for review of Factoria, depending on when the permitting process is completed.

Conclusion

We concur with SWD's recent initiative to review transfer facility plans and consider changes to system plans based on the outcome of discussions with the cities in regard to interlocal agreements. There have been changes in the economy and declines in system tonnage over recent years that have resulted in a revised tonnage forecast. SWD's review is also reinforced by our findings that capital cost per ton is an important consideration and that collaborative policy decisions, which may not have been supported by complete cost analysis, have led to higher transfer station costs.

Recommendation 4

SWD should update transfer system and individual facility plans as they have indicated. During this process, SWD should provide county policy-makers and regional partners systematic analysis of:

- the incremental cost impacts of the number and capacities of the transfer stations,
- the functionalities of the stations, and
- an assessment of which project financing and delivery method is most likely to result in lower capital costs.

Acknowledgements

We appreciate the cooperation from the management and staff of the Solid Waste Division of the Department of Natural Resources and Parks throughout the audit process. We would also like to acknowledge the assistance provided by Treasury Services within the Department of Executive Services and to the Office of Economic and Financial Analysis.

Auditor's Office Project Team

Rob McGowan
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Appendix 1 **Executive Response**



King County

Dow Constantine
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August 22, 2011

Cheryle A. Broom
King County Auditor
Room 1033
C O U R T H O U S E

Dear Ms. Broom:

Thank you for your August 3rd letter and the opportunity to comment on the Proposed Final Report (Report) – Performance Audit of Solid Waste Transfer Station Capital Projects. I thank the staff of the County Auditor's Office for working cooperatively with staff from the Solid Waste Division (SWD) throughout the performance audit.

I appreciate that the Report concludes that SWD's financial plan is comprehensive, sound and based on reasonable assumptions. SWD continues to maximize value for its stakeholders by analyzing opportunities to improve the plan and taking appropriate actions. A number of the recommendations identified in the Report have already been initiated.

As the Report notes, current interlocal agreements with cities expire in 2028. Cooperation between the County and the 37 cities in a regional system has allowed us to achieve economies of scale that translate into lower fees for system ratepayers. A significant benefit is the savings realized by using an in-county landfill for solid waste disposal. Economies of scale will continue to be beneficial once the Cedar Hills landfill reaches capacity and closes, and the region transitions to a new method of solid waste disposal. The benefits also extend to the network of recycling and transfer stations that provide convenient, geographically dispersed transfer points around the county.

With the implementation of the 2006 Solid Waste Transfer and Waste Management Plan, the County is underway in its plan to renovate the aging transfer system to better serve its customers. The facility renovation plan is designed to meet demands created by the growth in population over the last five decades, technological changes in the industry, and ongoing advances in the recycling and salvage of materials from the waste disposal stream. This investment in the transfer system will ensure the provision of high-quality services at the



Cheryle A. Broom
August 22, 2011
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lowest possible rates far beyond the expiration of the current interlocal agreements in 2028. Executive staff are pursuing extension of these agreements with our partner cities. We have already extended our agreement with the City of Bothell to 2057 and discussions with other cities have been productive; we expect to conclude discussions in the first quarter of 2012.

We concur with the recommendations and plan to take the following actions:

- Future financial plans will be developed utilizing economic assumptions adopted by the King County's Forecast Council, to the extent the assumptions apply;
- Work has begun on developing the life-cycle cost analysis model for the Capital Equipment Recovery Program;
- A comprehensive review of the investment strategy options available to the Landfill Reserve Fund will be pursued with the Executive Finance Committee; and
- Transfer system plans will be updated as needed based on the outcome of interlocal agreement discussions with the cities. Capacity and functionality of specific facilities will be updated, using the most current information, as facility master plans are developed and through the design process; project financing and delivery methods will be assessed for each project as appropriate; and service priorities will be revisited with future comprehensive solid waste management plan updates.

In closing, we again wish to express our appreciation for the process undertaken by your staff conducting this review. I am proud of the accomplishments of the SWD and your performance audit affirms our progress and direction in these areas.

Sincerely,



Dow Constantine
King County Executive

Enclosure

cc: Fred Jarrett, Deputy County Executive, King County Executive Office (KCEO)
Rhonda Berry, Assistant Deputy County Executive, KCEO
Sung Yang, Director of External Affairs and Government Relations, KCEO
Carrie Cihak, Director of Policy and Strategic Initiatives, KCEO
Christie True, Director, Department of Natural Resources and Parks (DNRP)
Kevin Kiernan, Division Director, Solid Waste Division, DNRP

Attachment A

Recommendation #	Agency Position	Schedule of Implementation	Comments
<p>1. In its financial plan, the Solid Waste Division (SWD) should use the economic assumptions adopted by the King County's Forecast Council to the extent the assumptions apply, such as for general inflation and Investment Pool interest earning.</p>	<p>Concur</p>	<p>The most current Forecast Council assumptions will be used for the next rate study to be completed in 2012, to the extent that the assumptions apply (see also recommendation 3).</p>	
<p>2. The Solid Waste Division should continue to develop and then formally adopt life-cycle cost analysis as part of its asset management program.</p>	<p>Concur</p>	<p>SWD has developed the basic model and initiated life-cycle cost analysis for its most heavily populated asset types (refuse trailers and long haul tractors) and those that currently have regular rebuild schedules (dozers and excavators). The asset management system has historical data from 2003, when the system was implemented. For assets acquired prior to 2003, the system data is limited; therefore assumptions are being made in order to conduct the life-cycle cost analysis. Initial work on a majority of the fleet should be complete in fall 2011.</p>	
<p>3. The Solid Waste Division, in cooperation with the Executive Finance Committee, should review the feasibility of a new investment strategy for the Landfill Reserve Fund.</p>	<p>Concur</p>	<p>Discussions are underway. Feasibility of a new investment strategy will be determined for inclusion in the next rate study to be completed in 2012.</p>	

Attachment A

Recommendation #	Agency Position	Schedule of Implementation	Comments
<p>4. SWD should update transfer system and individual facility plans as they have indicated. During this process, SWD should provide county policymakers and regional partners systematic analysis of:</p> <ul style="list-style-type: none"> • the incremental cost impacts of the number and capacities of the transfer stations; • the functionalities of the stations; and • an assessment of which project financing and delivery method is most likely to result in lower capital costs. 	<p>Concur</p>	<p>The transfer system plan will be updated as needed based on the outcome of interlocal agreement discussions with the cities, for inclusion in the next rate study to be completed in 2012.</p> <p>Capacity and functionality of specific facilities will be updated, using the most current information, as facility master plans are developed and through the facility design process. Updates to the Factoria transfer facility are being addressed right now through the value engineering and design process, with specific attention to future capacity needs.</p> <p>Project financing and delivery methods will be assessed for each project as appropriate.</p> <p>Additionally, service priorities related to recycling, customers, and other elements, such as household hazardous waste service, will be revisited with future comprehensive solid waste management plan updates. Transfer facilities are being designed for flexibility to meet changing needs over the next 30 to 50 years.</p>	

Appendix 2 **Scope, Objectives, and Methodology**

Statement of Compliance with Government Auditing Standards

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Audit Scope and Objectives

The scope and objectives for the performance audit of the Solid Waste Division's (SWD) transfer station replacements and rate model were based on our assessment of risks and potential for long-term financial impact.

Our objectives fell into two primary areas. First, we evaluated the adequacy of SWD's rate model and sub-models, and the relationship of the rate proposal to the development of a sustainable financial plan. Second, we evaluated the cost effectiveness of the Bow Lake, Factoria, northeast King County, and south King County transfer station projects. Our original objectives also included analysis of SWD's cost estimation practices; however, changes in staffing levels in the auditor's office made it necessary to focus solely on the first two objectives.

Methodology

To achieve the objectives noted above, the King County Auditor's Office:

- interviewed SWD leadership, management and staff;
- interviewed council budget and treasury staff and analysts;
- interviewed consultants with direct knowledge of SWD transfer station projects;
- interviewed staff at Snohomish County, City of Seattle, and City of Tacoma who recently completed transfer station capital projects that are in urban areas;
- performed analyses of SWD data and documentation; and
- surveyed relevant industry literature and best practices.

Scope of Work on Internal Controls

We assessed internal controls relevant to the audit objectives. This included review of selected policies, plans, processes, and reports. In many areas of this audit, we relied on computer-generated data. We tested the reliability of the data using a variety of techniques depending on the data and our purposes. Data reliability testing techniques included evaluating SWD actions to ensure data reliability, increasing the use of corroborating evidence, tracing data back to source documentation, excluding questionable data from analyses, and developing our own models to replicate and check the logic of SWD's models. We determined that the data used was sufficiently reliable for our intended purposes.

Appendix 3

Summary of Recommendations and Implementation Schedule

Recommendation 1

In its financial plan, the Solid Waste Division should use the economic assumptions adopted by the King County's Forecast Council to the extent the assumptions apply, such as for general inflation and Investment Pool interest earning.

Implementation Date: In time for the completion of the next rate study in 2012.

Estimate of Impact: The effect of using the Forecast Council assumptions will be to have SWD assumptions align with those of other county financial plans and will make the financial planning process more transparent.

Recommendation 2

The Solid Waste Division should continue to develop and then formally adopt life-cycle cost analysis as part of its asset management program.

Implementation Date: According to the Executive Response, initial work in response to the recommendation will be completed in the fall of 2011.

Estimate of Impact: Use of life-cycle cost analysis helps to ensure that the decisions about replacement timing and alternatives are in the best economic interest of the utility. As it applies life-cycle cost analysis, SWD will be able to quantify the effects of the use of this tool on a decision-by-decision basis.

Recommendation 3

The Solid Waste Division, in cooperation with the Executive Finance Committee, should review the feasibility of a new investment strategy for the Landfill Reserve Fund (LRF).

Implementation Date: Completed in time for the next rate study in 2012.

Estimate of Impact: Discussions with the Executive Finance Committee are currently under way. As mentioned in the report, an example of potential impact is that increasing the real (before inflation) rate of return on the LRF balance by a full one-percent could result in lowering the tipping fee by \$.87 per ton in 2012. At the estimated 826,000 tons of waste for 2012, this would translate into a savings to rate payers of \$717,000.

Recommendation 4

SWD should update transfer system and individual facility plans as they have indicated. During this process, SWD should provide county policy-makers and regional partners systematic analysis of:

- the incremental cost impacts of the number and capacities of the transfer stations;
- the functionalities of the stations; and
- an assessment of which project financing and delivery method is most likely to result in lower capital costs.

Implementation Date: Begin in time for consideration in the next rate study in 2012, and as progress is made on negotiating interlocal agreements.

Estimate of Impact: Potential impacts may be significant in terms of the capital improvement plan and the effect on rates. The current, estimated remaining (post 2011) capital expenditures related to the three yet-to-be-built stations total \$220 million. Modifications to the system and facility plans could affect this total.