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CITY OF SACRAMENTO

DEPARTMENT OF PUBLIC WORKS

OFFICE OF THE DIRECTOR

October 7, 1986

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Director

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Transportation and Community Development Committee
Budget and Finance Committee
Sacramento, California

Honorable Members in Session:

Subject: Solid Waste Rates

SUMMARY

The following report reviews the results of a comprehensive study of current rates charged for various solid waste services. Staff is requesting that the Committee approve the following recommendations to: repeal the garden refuse excise tax in favor of a garden refuse fee; permit voluntary garden refuse service in 90-gallon service areas; allow gradual adjustments of the solid waste rates over the next four year period to more accurately reflect the cost of service received; and modify the disabled exemption policy.

BACKGROUND

The Solid Waste Division is responsible for the collection and disposal of refuse for over 90,000 residential and commercial accounts. The major services available are:

- In-yard residential service or "Backyard" service in which sanitation workers empty residential cans located in the back yard and carry the waste curbside to the front in rolling tubs.

- Curbside service in which the residential customer places the can curbside for collection.

- 90-Gallon Container service in which the City provides a large container which is wheeled to the curbside by the resident. The container is emptied by the driver using a mechanical devise to lift the container. The 90-gallon container has approximately three times the capacity of a typical residential can.

- Commercial Can service for commercial users with small garbage disposal needs.

- Bin service in which metal containers ranging in size from 1 to 6 cubic yards are used for multi-account residential and large volume commercial accounts.

Transportation and Community Development Committee
Budget and Finance Committee
October 7, 1986
Page 2

- Compactor service in which metal containers with compression capability, ranging in size from 3 to 6 cubic yards, are used for certain large volume accounts.

In addition to the above services, residential users receive garden refuse service. This service allows residents to place uncontainerized yard waste in the street for weekly collection provided by garden refuse crews utilizing mechanized equipment. In areas without curbs or gutters, garden refuse must be containerized. Similarly, many customers on 90-gallon routes choose to place their garden refuse material in their 90-gallon container. However, since the revenue collected for this service is in the form of a tax, residents must pay the tax whether they place the yard waste in 90-gallon containers or not.

The Solid Waste Fund also pays for a number of community service programs such as: residential street sweeping, major thoroughfare street sweeping, code enforcement cleanup, neighborhood cleanup, community cleanup, household hazardous waste disposal, and a portion of the toxic substance commission.

DISCUSSION

During the past three years the Solid Waste Fund has experienced a significant strain on resources primarily due to landfill related costs. Consequently rates have increased sharply over the period to pay for this large expenditure and to restore fund balance to at least 4% of current resources. This recent period of sharp increases is in contrast to the long period of rate stability experienced over the prior five years. As a result of the rate increases, staff has worked with consultants from Touche Ross & Company over the last year developing a cost allocation model which separates costs into identifiable programs for distribution to the various type of services. Touche Ross's portion of the study concentrated on identifying costs associated with collection costs including garden refuse service. They worked to isolate direct and indirect costs associated with collection services and applied these costs to each type of service by using the results of sample time studies. City staff developed the remaining cost components such as disposal, debt service, capital spending, and additional community services. The combined effort has produced a model which permits close examination of cost behavior and acts as a tool in developing rates.

Attachment A is a copy of the executive summary of the Touche Ross Refuse Collection Cost Study. In general, staff concurs with the conclusions of the report which focused on fiscal year 1985-86. Staff has since updated the cost

model to reflect the changes in the current 1986-87 budget. Table 1 below contrasts the current rates charged for service and the updated costs associated with providing the various services. To illustrate the relationship between current rates to actual costs for commercial accounts, a 2 cubic yard bin account has been used. This is the commercial category with the largest number of accounts.

Following the table is a discussion of the results. The discussion is divided into three distinct categories: basic refuse service, garden refuse service, and additional community service programs.

Table 1
 Comparison of Current Monthly Rates to Actual Costs

CURRENT STATUS	<-----Curbside----->			<-----Backyard----->			<-----90 Gal----->			<-----Commercial 2 cu. yd.-->		
	current rate	actual cost	% current of actual	current rate	actual cost	% current of actual	current rate	actual cost	% current of actual	current rate	actual cost	% current of actual
Basic Refuse	6.44	6.44	100.00	9.56	9.56	100.00	6.38	6.38	100.00	40.83	40.83	100.00
Garden Refuse Tax	2.00	2.00	100.00	2.00	2.00	100.00	2.00	2.00	100.00	.00	.00	n/a
Garden Refuse Sub	1.96	1.96	100.00	1.96	1.96	100.00	1.38	1.96	70.41	.00	.00	n/a
Comm Pgms	.06	1.43	4.20	5.28	1.43	369.23	.00	1.43	.00	25.47	9.59	265.59
TOTAL	10.46	11.83	88.42	18.80	14.95	125.75	9.76	11.77	82.92	66.30	50.42	131.50

Basic Refuse Service

Basic refuse service refers to the collection and disposal of solid waste material. Besides the personnel and supply costs, this category includes all equipment, debt service, and CIP expenditures needed to collect and dispose of the solid waste.

Analysis of the results of the cost model reveal the following facts relative to basic service:

- There is a significant cost differential between 90-gallon containers and conventional 32 gallon cans. When all basic refuse costs are considered (collection, disposal, and other) and compared on an average weight basis, the 90-gallon container is currently \$1.50 per month less than the 32 gallon curbside can. This savings results from the combined effects of fewer personnel needed per route and higher number of collections per day. At this time, 90-gallon cans are 33% cheaper to collect than conventional 32 gallon cans.

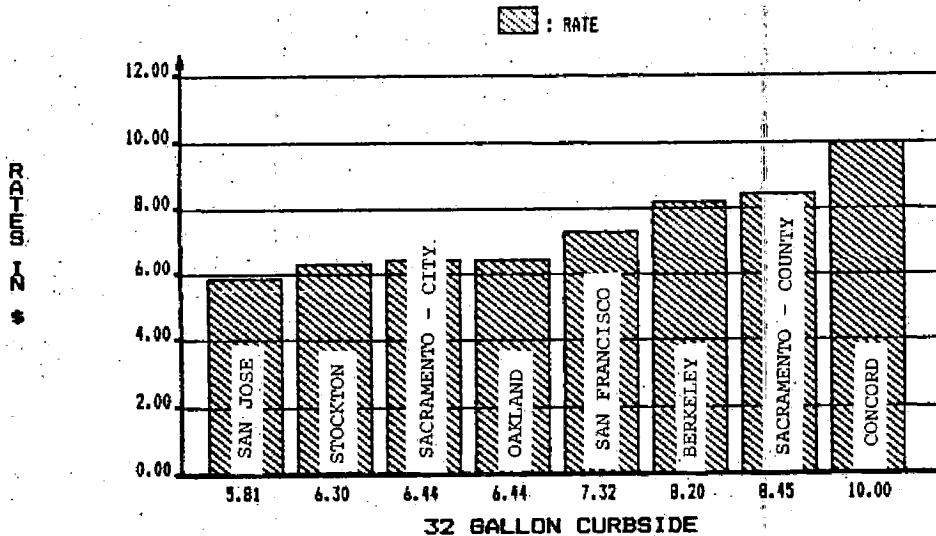
- Basic collection service can be broken down into three stages: the time needed for the crew to arrive at the collection site, the time to empty the waste into the truck, and the time needed to transport the waste to the landfill. The results of the cost model reveal that the dominate factor is the collection travel time needed to arrive at the site. The corresponding costs associated with this time segment range from 36% of total collection costs for backyard service to 75% of total collection costs for commercial can service.

Due to the relatively high collection travel costs, seemingly similar collections will vary widely in costs. For example, the cost model reports the collection of a commercial 32 gallon can is three times as costly as a residential 32 gallon can. This is due primarily to the distance between customers on commercial routes which limits the number of collections per day resulting in a higher cost per can than residential routes.

- The cost model suggests that the difference in bin costs are almost entirely attributable to the additional weight associated with the bin. In general, the current bin rates increase more sharply with the additional weight than the corresponding disposal costs would require.

- Included in the 1986-87 Proposed Budget document was a graphic comparison of Sacramento's rates with other Northern California jurisdictions. Sacramento's rates were generally higher due to the inclusion of garden refuse and other community services. However, as shown below, when basic rates are compared on an equal basis, Sacramento's rates compare favorably with other jurisdictions.

Figure 1
RESIDENTIAL GARBAGE COLLECTION RATES/MONTH



The 1986-87 Approved Budget provides enough funds collectively to fund all Solid Waste programs. With the exception of the commercial can rate, all current individual rates are sufficient to cover costs associated with their particular basic refuse service.

Garden Refuse Service

Garden refuse service consists of weekly collections of residential yard waste placed in the street. Revenue for this service is in the form of a tax and therefore subject to constraints. The tax rate has remained unchanged at \$2.00 per month since its inception in fiscal year 1976-77.

The results of the study reveal that the cost of this service is approximately twice as much as the tax receipts. Putting this cost into perspective, the garden refuse service is roughly 60% of the cost of the basic refuse service or 1.5 times the cost of a extra curbside can. Since the fund as a whole has sufficient resources, the garden refuse service shortfall is therefore offset in the general rates. The shortfall amount is noted in Table 1 as the "garden refuse subsidy."

At this point, as shown in Table 1, the current 90-gallon rate is unable to support both the basic refuse service and the garden refuse subsidy. All other residential rates are sufficient to cover both costs.

Transportation and Community Development Committee
Budget and Finance Committee
October 7, 1986
Page 6

Due to the above concerns, staff recommends the following actions:

- On March 1, 1987 repeal the garden refuse excise tax and institute a garden refuse fee which reflects the cost of the service (\$4.43 per month). This date, which follows the end of leaf season, allows for sufficient time to implement the changes to the computer billing program and provides a transition period to coordinate personnel changes.

- Permit garden refuse service in 90-gallon areas on a voluntary basis. The service would still be mandatory for the non 90-gallon residential customer. This action would allow 90-gallon customers to take advantage of the increased capacity of the container and drop the relatively costly garden refuse service.

The garden refuse service will still be available for those who choose it. However, due to relatively high collection travel costs, the service will be more costly than the fee charged to other mandatory route customers. It is estimated that garden refuse service on the 90-gallon routes will be \$5 per pick-up or about \$20 per month. In addition to the higher rate, staff recommends that residents who choose garden refuse service must subscribe to the service for a minimum of one year in order to prevent scheduling and staffing problems.

It should be noted that for those 90-gallon users who have insufficient space available for garden refuse, have a lower cost option available. These accounts have the option of ordering an additional 90-gallon container for roughly \$3.91 per month.

The impact of leaf season relative to voluntary garden refuse service for 90-gallon accounts is a special consideration currently being reviewed. The need for this service varies widely from the central city, which has substantial amounts of fallen leaves, to newly developed areas which have relatively minor amounts. Staff will return to this committee prior to the 1987-88 leaf season with a report specifically addressing this issue.

October 7, 1986

Page 7

Additional Community Programs

In addition to the basic refuse and garden refuse services, the Solid Waste rates also fund a number of other programs. Below in Table 2 is a listing of these programs with the total cost of the program and the impact of the programs on a monthly residential can bill:

Table 2
Community Programs Funded From Solid Waste Rates

	Total Cost	Cost/Mo.
Residential Street Sweeping	\$659,000	\$0.59
Neighborhood Cleanup	559,000	0.49
Major Thoroughfare Street Sweeping	460,000	*
Code Enforcement	170,000	0.15
Toxic Substance Commission	132,000	0.11
Special Community Cleanup	57,000	0.05
Household Hazardous Waste Disposal	50,000	0.04
	-----	-----
	\$2,087,000	\$1.43
	=====	=====

* The cost of this program is not applied to residential can customers.

Due to the nature of several of these programs, determination of the cost/benefit relationship is difficult to ascertain. Additionally, there may be no relationship with users of solid waste services and benefactors of the programs. This is especially true for commercial establishments which do not require solid waste services. These businesses do not contribute to the above community programs. For this reasons, Sacramento is relatively unique in the funding of these programs. Normally cities either fund these programs with general use resources or institute "community fees" with a broader user base than solid waste accounts.

The effect of the inclusions of all the above programs into the fund is that the following rates are not sufficient to cover their assigned costs: curbside, ninety gallon, commercial cans, commercial 1 cubic yard bins, and commercial 4 cubic yard bins. All other rates therefore contribute more than their share to make up the shortfall.

Transportation and Community Development Committee
Budget and Finance Committee
October 7, 1986
Page 8

Staff recommends that the imbalances be eliminated by adjusting the rates gradually over the next four years. The gradual adjustment will prevent rate shock and allow time for the implementation of the accelerated 90 gallon plan. Therefore, the rate adjustments to the curbside rate will affect fewer people as more people are converted to 90 gallon accounts. The attached Exhibit A details the recommended changes as of March 1, 1987 and the subsequent four year phase in. In general, the phase in plan provides for increases of less than 5% annually and decreases up to 7% annually over a four year period for individual service categories. It should be noted that these adjustments would be independent of any changes caused by inflation or changes mandated by Council action.

Disabled Exemption

An analysis of solid waste rates and the cost of providing solid waste services would be incomplete without an evaluation of the City's waste collection disabled exemption. The City's current policy allows anyone that attests that he/she is physically unable to move a full 32 gallon garbage container to the curbside to receive in-yard waste collection and pay the same collection fee as those who place their container at the curbside. Under the existing policy a relatively large number of customers, in excess of 6,000 or 7% of our residential accounts, have requested and received the disabled exemption.

The number of disabled exemptions authorized for Sacramento's citizens greatly exceeds those of comparable waste collection agencies in our area. San Jose, a city with a population of over 500,000, has less than 1,000 disabled exemptions; San Francisco has slightly more than 500; and Sacramento County has less than 2,000 disabled exemptions.

The large number of disabled exemptions not only results in a direct revenue loss, it also decreases the overall crew productivity and thus adversely impacts the cost of waste collection services. This adverse impact on productivity will increase as we move to a greater number of automatic-lift containers (one person waste collection). The number of homes that can be automatically collected in a workday is directly related to the number of times a driver has to get out of his truck to retrieve, dump, and return the container.

Transportation and Community Development Committee
Budget and Finance Committee
October 7, 1986
Page 9

Hence, it is staff's opinion that a more realistic approach to disabled exemptions would be to provide exemptions similar to San Jose. It is recommended that:

- The disabled exemption be applied for on an annual basis.
- The disabled exemption request be accompanied by a statement from a physician attesting to the fact that the requestor is unable to move (roll) a full waste container to the curb.
- The requestor attest that there is no one else in the house able to move the container to the curb.

The above recommended actions would provide some assurance that the disabled exemption would be authorized for those who need it as opposed to those who simply want it.

FINANCIAL

The anticipated loss of revenue due to 90-gallon accounts dropping garden refuse service totals \$250,000 for the remainder of 1986-87. The corresponding reduction in expenses resulting from fewer routes totally offsets the revenue reduction. It appears that no additional funding is necessary.

In regards to individual rates, as of March 1, 1987, the 90-gallon customers who do not use the garden refuse service will receive a \$2.00 per month reduction in their overall bill. All other non 90-gallon rates will remain the

same for the balance of the fiscal year. Table 3 below compares the recommended rate changes to the current rates.

Table 3
 Rate Comparisons Effective March 1, 1987

	Current Rate -----	Rate as of 3/1/87 -----
Curbside		
General Rate	\$ 8.46	\$ 6.03
Garden Refuse	2.00	4.43
	-----	-----
Total	\$10.46	\$10.46
	=====	=====
Backyard		
General Rate	\$16.80	\$14.37
Garden Refuse	2.00	4.43
	-----	-----
Total	\$18.80	\$18.80
	=====	=====
90-Gallon		
General Rate	\$ 7.76	\$ 7.76
Garden Refuse	2.00	0.00
	-----	-----
Total	\$ 9.76	\$ 7.76
	=====	=====
90-Gallon with Garden Refuse		
General Rate	\$ 7.76	\$ 7.76
Garden Refuse	2.00	20.00
	-----	-----
Total	\$ 9.76	\$27.76
	=====	=====
90-Gallon with Additional Can		
General Rate	\$ 7.76	\$ 7.76
Extra Can	3.91	3.91
Garden Refuse	2.00	0.00
	-----	-----
Total	\$13.67	\$11.67
	=====	=====

Transportation and Community Development Committee
Budget and Finance Committee
October 7, 1986
Page 11

CONCLUSION

The Solid Waste Division now has the ability to better identify costs and accurately distribute program costs to individual service types. The results of the cost model indicate that the current rates are sufficient to cover basic refuse service. However when additional services are added, certain rates, curbside in particular, do not cover the cost of the service provided. In general, the shortfall is offset by higher rates for larger volume bin service. To bring rates more in line with actual costs, staff recommends that the rates be modified gradually over the next four years. The gradual increase combined with the aggressive 90-gallon implementation plan will result in fewer people who will be affected by the curbside service adjustment. The model also indicates that garden refuse service is a relatively expensive process that costs twice as much as it collects in tax revenue. For this reason, it is important to allow 90-gallon users to take advantage of the lower collection costs and the larger capacity by placing their yard waste in the container and thus reducing their current monthly charges.

RECOMMENDATION

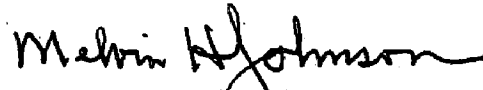
In summary, staff recommends the following:

- Repeal of the Garden Refuse Tax in favor of a Garden Refuse Fee equal to the cost of the Service effective March 1, 1987.
- Eliminate routine garden refuse service in 90-gallon areas and offer a one year subscriptions for special pickup service on a voluntary basis.
- Stronger measures to assure the disabled exemption will be authorized to those who need the service.

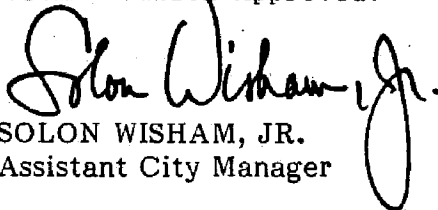
Transportation and Community Development Committee
Budget and Finance Committee
October 7, 1986
Page 12

Upon approval of the above recommendations, staff will prepare the required ordinance amendments and resolutions and forward them to the full council for adoption.

Respectfully submitted.


MELVIN H. JOHNSON
Director of Public Works

Recommendation Approved:


SOLON WISHAM, JR.
Assistant City Manager

CURRENT STATUS

EXHIBIT A

	<-----Curbside----->			<-----Backyard----->			<-----90 Gal----->			<--Commercial 2 cu. yd.-->		
	current rate	actual cost	% current of actual	current rate	actual cost	% current of actual	current rate	actual cost	% current of actual	current rate	actual cost	% current of actual
Basic Refuse	6.44	6.44	100.00	9.56	9.56	100.00	6.38	6.38 a	100.00	40.83	40.83	100.00
Garden Refuse Tax	2.00	2.00	100.00	2.00	2.00	100.00	2.00	2.00	100.00	.00	.00	n/a
Garden Refuse Sub	1.96	1.96	100.00	1.96	1.96	100.00	1.38	1.96	70.41	.00	.00	n/a
Comm Pgms	.06	1.43	4.20	5.28	1.43	369.23	.00	1.43	.00	25.47	9.59	265.59
TOTAL	10.46	11.83	88.42	18.80	14.95	125.75	9.76	11.77	82.92	66.30	50.42	131.50

PHASE 1 - FY 86-87

	<-----Curbside----->			<-----Backyard----->			<-----90 Gal----->			<--Commercial 2 cu. yd.-->		
	revised rate	actual cost	% revised of actual	revised rate	actual cost	% revised of actual	revised rate	actual cost	% revised of actual	revised rate	actual cost	% revised of actual
Basic Refuse	6.03	6.44	93.63	9.56	9.56	100.00	7.09	7.09 a	100.00	40.83	40.83	100.00
Garden Refuse Fee	4.43	4.43 b	100.00	4.43	4.43	100.00	.00	.00	n/a	.00	.00	n/a
Comm Pgms	.00	1.43	.00	4.81	1.43	336.36	.67	1.43	46.85	25.47	9.59	265.59
TOTAL	10.46	12.30	85.04	18.80	15.42	121.92	7.76	8.52	91.08	66.30	50.42	131.50

\$ chg fr cur	.00	.47		.00	.47		-2.00	-3.25		.00	.00	
% chg fr cur	.00	3.97		.00	3.14		-20.49	-27.61		.00	.00	

PHASE 2 - FY 87-88

	<-----Curbside----->			<-----Backyard----->			<-----90 Gal----->			<--Commercial 2 cu. yd.-->		
	revised rate	actual cost	% revised of actual	revised rate	actual cost	% revised of actual	revised rate	actual cost	% revised of actual	revised rate	actual cost	% revised of actual
Basic Refuse	6.44	6.44	100.00	9.56	9.56	100.00	7.09	7.08	100.14	40.83	40.83	100.00
Garden Refuse Fee	4.43	4.43	100.00	4.43	4.43	100.00	.00	.00	n/a	.00	.00	n/a
Comm Pgms	.09	1.43	6.29	3.81	1.43	266.43	.87	1.43	60.84	20.83	9.59	217.21
TOTAL	10.96	12.30	89.11	17.80	15.42	115.43	7.96	8.51	93.54	61.66	50.42	122.29

\$ chg fr ph 1	.50			-1.00			.20			-4.64		
% chg fr ph 1	4.78			-5.32			2.58			-7.00		

EXHIBIT A

PHASE 3 - FY 88-89

	<-----Curbside----->			<-----Backyard----->			<-----90 Gal----->			<-----Commercial 2 cu. yd.----->		
	revised	actual	% revised	revised	actual	% revised	revised	actual	% revised	revised	actual	% revised
	rate	cost	of actual	rate	cost	of actual	rate	cost	of actual	rate	cost	of actual
Basic Refuse	6.44	6.44	100.00	9.56	9.56	100.00	7.09	7.09	100.00	40.83	40.83	100.00
Garden Refuse Fee	4.43	4.43	100.00	4.43	4.43	100.00	.00	.00	n/a	.00	.00	n/a
Comm Pgms	.59	1.43	41.26	2.88	1.43	201.40	1.07	1.43	74.83	16.51	9.59	172.16
TOTAL	11.46	12.30	93.17	16.87	15.42	109.40	8.16	8.52	95.77	57.34	50.42	113.72
\$ chg fr ph 2	.50			-.93			.20			-4.32		
% chg fr ph 2	4.56			-5.22			2.51			-7.01		

PHASE 4 - FY 89-90

	<-----Curbside----->			<-----Backyard----->			<-----90 Gal----->			<-----Commercial 2 cu. yd.----->		
	revised	actual	% revised	revised	actual	% revised	revised	actual	% revised	revised	actual	% revised
	rate	cost	of actual	rate	cost	of actual	rate	cost	of actual	rate	cost	of actual
Basic Refuse	6.44	6.44	100.00	9.56	9.56	100.00	7.09	7.09	100.00	40.83	40.83	100.00
Garden Refuse Fee	4.43	4.43	100.00	4.43	4.43	100.00	.00	.00	n/a	.00	.00	n/a
Comm Pgms	1.09	1.43	76.22	2.01	1.43	140.56	1.27	1.43	88.81	12.50	9.59	130.34
TOTAL	11.96	12.30	97.24	16.00	15.42	103.76	8.36	8.52	98.12	53.33	50.42	
\$ chg fr ph 3	.50			-.87			.20			-4.01		
% chg fr ph 3	4.36			-5.16			2.45			-6.99		

PHASE 5 FY 90-91

	<-----Curbside----->			<-----Backyard----->			<-----90 Gal----->			<-----Commercial 2 cu. yd.----->		
	revised	actual	% revised	revised	actual	% revised	revised	actual	% revised	revised	actual	% revised
	rate	cost	of actual	rate	cost	of actual	rate	cost	of actual	rate	cost	of actual
PHASE 5 FY 90/01												
Basic Refuse	6.44	6.44	100.00	9.56	9.56	100.00	7.09	7.09	100.00	40.83	40.83	100.00
Garden Refuse Fee	4.43	4.43	100.00	4.43	4.43	100.00	.00	.00	n/a	.00	.00	n/a
Comm Pgms	1.43	1.43	100.00	1.43	1.43	100.00	1.43	1.43	100.00	9.59	9.59	100.00
TOTAL	12.30	12.30	100.00	15.42	15.42	100.00	8.52	8.52	100.00	50.42	50.42	100.00
\$ chg fr ph 4	.34			-.58			.16			-2.91		
% chg fr ph 4	2.84			-3.63			1.91			-5.46		

a. The change in basic refuse rates for 90-gallon accounts from the current status to phase one reflects the inclusion of disposal costs associated with yard waste.

b. The change in total garden refuse cost from the current status to phase one reflects the increase in garden refuse due to fewer accounts to spread costs to.

CITY OF SACRAMENTO

REFUSE COLLECTION COST OF SERVICE STUDY FINAL REPORT

MARCH 1986

 **Touche Ross**

SECTION I

EXECUTIVE SUMMARY,

CONCLUSIONS

AND

RECOMMENDATIONS

I. EXECUTIVE SUMMARY

STUDY OBJECTIVES

The objective of the study was to develop a cost of service analysis for the refuse collection services provided by the City of Sacramento. Specifically the objective was to:

- Identify the elements of cost for manual residential, automatic-lift residential, commercial and garden refuse collection services.
- Identify route and customer related use of resources.
- Prepare cost of service analysis by service category and service type

OVERVIEW OF APPROACH

Our overall approach to performing the project was to work closely with the City's staff, draw upon prior experience and utilize pragmatic methods for quickly developing the cost of service analysis.

In developing the cost of service, the following activities were undertaken:

- A detailed workplan was prepared and agreed upon (Appendix A).
- A review of the accounting reports and general route reports was conducted to gain an understanding of the available information. Data sources were reduced to key reports required for the study. City personnel, responsible for data collection, were informed as to the desired format of the required data as well as the appropriate sources of the data.
- Route observations were conducted for all 5 service categories to determine the appropriate elements for costing.
- A conceptual overview of the elements of cost was prepared and reviewed. This overview separated the cost of service into four major areas, Productive Collection Time, Travel Collection Time, Disposal Time (travel & discharge), and Landfill Cost (Appendix A). It was decided on early that our study would not be concerned with the landfill cost section.

OVERVIEW OF APPROACH (Cont'd)

- Work sample time studies were designed for each of the service categories (Appendix A). City personnel conducted the time studies measuring the time required to collect each container type by service category (Appendix B).
- Route surveys were designed and implemented to provide information on the average time spent performing collection and disposal activities on a route (Appendix A). Route personnel completed the surveys over a two week period. All surveys were combined to calculate average total time for a route and the break down for collection time and disposal time. Productive collection time was subtracted from total collection time to identify collection travel time (Appendix B).
- All cost data, route data and time study data was incorporated into a Lotus model designed to identify the cost of service by service category and container type (Appendix C).

SUMMARY OF RESULTS

- Applying the cost allocations by service category, time study data and route survey data with the costing model, a cost of service analysis was prepared for each of the service categories.
 - Residential Manual Exhibit 1
 - Residential Automatic Exhibit 2
 - Commercial Rearload Exhibit 3
 - Commercial Frontload Exhibit 4
 - Garden Refuse Exhibit 5

Appendix C provides a detailed description of how the cost of service was calculated for each of the service categories.

- Exhibit 6 shows the comparison between the projected monthly cost for a particular service (based on the model) verses the actual present monthly fees charged for that service. (Note land disposal, garden refuse and auxiliary service charges are not included in these costs.)

OVERVIEW OF APPROACH (Cont'd)

- Exhibit 7 extends the cost data for an average route within each service category to project the annual cost for each service category. Also a comparison is shown between projected annual costs and present budgeted costs.

CONCLUSIONS

CONCLUSIONS (Cont'd)

- Between Commercial Rearload and Residential Manual there is a significant difference for 1 can collection. This difference is because of the higher collection travel cost associated with Commercial Rearload due to the greater distance between customers. This is a real cost and justifies a higher charge for commercial cans. Increasing the charge for commercial cans will encourage migration toward more cost-effective bin service.
- The cost of collection of 1 and 2 cubic bins is higher for Commercial Rearload than for Commercial Frontload. This difference in cost is due to the lower productivity associated with collecting bins on a rearloader.
- There is at least a \$1.00 difference between Residential Automated and Residential Manual 1 Can Collection. A reduction in the monthly fee charged for Residential Automated to reflect the lower cost will encourage migration from Residential Manual to Residential Automated.
- The cost gap between Residential Manual and Residential Automated could actually be greater. This additional cost difference is because of the reduced usage of Garden Refuse for Residential Automated customers. If Garden Refuse was allocated appropriately based on use, the cost of service for customers who use the 90 gallon can to collect leaves would be much less than the total cost for Residential Manual customers

RECOMMENDATIONS

- Service rates should be adjusted to more accurately reflect service costs and thus encourage more effective Rate-Payer behavior.
 - Residential Manual customers would migrate to Residential Automated
 - Commercial customers would move from small bins to large bins with reduced collect frequencies.
- The weighted cost of service for 1 and 2 cubic yard bins must be applied to all 1 and 2 cubic yard bin customers, regardless of type of vehicle used to collect the bin. When and where appropriate Rearload bin collections should be converted to Frontload collection to take advantage of the cost savings.

RECOMMENDATIONS (Cont'd)

- Cost accounting by service category should be implemented to facilitate service cost and rate analysis. Segregating costs by service category will facilitate future analysis and help promote cost-based rates.
- Methods should be developed to provide for amortization of capital expenditures over the useful life of the equipment. Current practices of expensing capital costs in the year of acquisition seriously distorts service costs.

EXHIBIT 1

COST OF SERVICE ANALYSIS SERVICE CALCULATIONS RESIDENTIAL MANUAL ROUTES

PRODUCTIVE COST = TOTAL ROUTE PRODUCTIVE COST ÷ AVERAGE SERVICE TIME / AVERAGE PRODUCTIVE TIME ON ROUTE

COLL TRAVEL COST = TOTAL ROUTE COLLECTION COST / AVERAGE # CUSTOMERS

DISPOSAL COST = AVERAGE WEIGHT OF SERVICE ÷ AVERAGE ROUTE COST PER WEIGHT

1) OFF CURB

		1 CAN 1 PICKUP/WK -----	2 CAN 1 PICKUP/WK -----	
32 GALLON	PRODUCTIVE COST	\$1.04	\$1.74	
	COLL TRAVEL COST	\$0.64	\$0.64	■ EACH ADDITIONAL CAN \$3.48 /MONTH
	DISPOSAL COST	\$0.10	\$0.20	
	TOTAL COST/WK	\$1.79	\$2.59	■ MULTIPLE PICKUPS X 1 CAN RATE
	TOTAL COST/MTH	\$7.75	\$11.23	

2) ON CURB

		1 CAN 1 PICKUP/WK -----	2 CAN 1 PICKUP/WK -----	
32 GALLON	PRODUCTIVE COST	\$0.34	\$0.63	
	COLL TRAVEL COST	\$0.64	\$0.64	■ EACH ADDITIONAL CAN \$1.70 /MONTH
	DISPOSAL COST	\$0.10	\$0.20	
	TOTAL COST/WK	\$1.09	\$1.48	■ MULTIPLE PICKUPS X 1 CAN RATE
	TOTAL COST/MTH	\$4.71	\$6.41	

EXHIBIT 3

COST OF SERVICE ANALYSIS
SERVICE CALCULATIONS
COMMERCIAL REARLOAD

PRODUCTIVE COST = TOTAL ROUTE PRODUCTIVE COST ÷ AVERAGE SERVICE TIME / AVERAGE PRODUCTIVE TIME ON ROUTE

COLL TRAVEL COST = TOTAL ROUTE COLLECTION COST / AVERAGE # CUSTOMERS

DISPOSAL COST = AVERAGE WEIGHT OF SERVICE ÷ AVERAGE ROUTE COST PER WEIGHT

1) CANS

		1 CAN 1 PICKUP/WK	2 CAN 1 PICKUP/WK	2 COLL/WK PER CAN	3 COLL/WK PER CAN	4 COLL/WK PER CAN	5 COLL/WK PER CAN	6 COLL/WK PER CAN
32 GALLON	PRODUCTIVE COST	\$1.00	\$1.34	\$2.00	\$3.00	\$4.00	\$5.00	6.00
	COLL TRAVEL COST	\$3.35	\$3.35	\$6.69	\$10.04	\$13.39	\$16.73	20.08
	DISPOSAL COST	\$0.14	\$0.28	\$0.28	\$0.43	\$0.57	\$0.71	0.85
	TOTAL COST/WK	\$4.49	\$4.97	\$8.98	\$13.47	\$17.96	\$22.45	26.94
	TOTAL COST/MTH	\$19.45	\$21.55	\$38.91	\$58.36	\$77.81	\$97.27	\$107.74

2) BINS

		1 CU YD 1 COLL/WK	1 CU YD 2 COLL/WK	1 CU YD 3 COLL/WK	1 CU YD 4 COLL/WK	1 CU YD 5 COLL/WK	1 CU YD 6 COLL/WK
1 CU YD BIN	PRODUCTIVE COST	\$1.99	\$3.98	\$5.97	\$7.97	\$9.96	11.95
	COLL TRAVEL COST	\$3.35	\$6.69	\$10.04	\$13.39	\$16.73	20.08
	DISPOSAL COST	\$0.89	\$1.78	\$2.67	\$3.56	\$4.45	5.34
	TOTAL COST/WK	\$6.23	\$12.46	\$18.69	\$24.92	\$31.14	\$37.37
	TOTAL COST/MTH	\$26.99	\$53.98	\$80.97	\$107.97	\$134.96	\$161.95
		2 CU YD 1 COLL/WK	2 CU YD 2 COLL/WK	2 CU YD 3 COLL/WK	2 CU YD 4 COLL/WK	2 CU YD 5 COLL/WK	2 CU YD 6 COLL/WK
2 CU YD BIN	PRODUCTIVE COST	\$2.19	\$4.38	\$6.57	\$8.77	\$10.96	13.15
	COLL TRAVEL COST	\$3.35	\$6.69	\$10.04	\$13.39	\$16.73	20.08
	DISPOSAL COST	\$1.78	\$3.56	\$5.34	\$7.12	\$8.90	10.68
	TOTAL COST/WK	\$7.32	\$14.64	\$21.96	\$29.28	\$36.60	\$43.92
	TOTAL COST/MTH	\$31.72	\$63.43	\$97.87	\$126.87	\$158.58	\$170.38

EXHIBIT 4
COST OF SERVICE ANALYSIS
SERVICE CALCULATIONS
COMMERCIAL FRONTLOAD

1781NS

1 to 3 CU YD

	1 CU YD 1 COLL/WK	1 CU YD 2 COLL/WK	1 CU YD 3 COLL/WK	1 CU YD 4 COLL/WK	1 CU YD 5 COLL/WK	1 CU YD 6 COLL/WK
PRODUCTIVE COST	\$0.95	\$1.90	\$2.86	\$3.81	\$4.76	5.71
COLL TRAVEL COST	\$3.43	\$6.85	\$10.28	\$13.71	\$17.14	20.56
DISPOSAL COST	\$0.30	\$0.61	\$0.91	\$1.21	\$1.51	1.82
TOTAL COST/WK	\$4.68	\$9.36	\$14.05	\$18.73	\$23.41	\$28.09
TOTAL COST/MTH	\$20.29	\$40.58	\$60.86	\$81.15	\$101.44	\$121.73
	2 CU YD 1 COLL/WK	2 CU YD 2 COLL/WK	2 CU YD 3 COLL/WK	2 CU YD 4 COLL/WK	2 CU YD 5 COLL/WK	2 CU YD 6 COLL/WK
PRODUCTIVE COST	\$0.95	\$1.90	\$2.86	\$3.81	\$4.76	5.71
COLL TRAVEL COST	\$3.43	\$6.85	\$10.28	\$13.71	\$17.14	20.56
DISPOSAL COST	\$0.61	\$1.21	\$1.82	\$2.42	\$3.03	3.63
TOTAL COST/WK	\$4.98	\$9.97	\$14.95	\$19.94	\$24.92	\$29.91
TOTAL COST/MTH	\$21.60	\$43.20	\$64.80	\$86.40	\$108.00	\$129.60
	3 CU YD 1 COLL/WK	3 CU YD 2 COLL/WK	3 CU YD 3 COLL/WK	3 CU YD 4 COLL/WK	3 CU YD 5 COLL/WK	3 CU YD 6 COLL/WK
PRODUCTIVE COST	\$0.95	\$1.90	\$2.86	\$3.81	\$4.76	5.71
COLL TRAVEL COST	\$3.43	\$6.85	\$10.28	\$13.71	\$17.14	20.56
DISPOSAL COST	\$0.91	\$1.82	\$2.72	\$3.63	\$4.54	5.45
TOTAL COST/WK	\$5.29	\$10.57	\$15.86	\$21.15	\$26.44	\$31.72
TOTAL COST/MTH	\$22.91	\$45.82	\$68.73	\$91.64	\$114.55	\$137.47

EXHIBIT 4

COST OF SERVICE ANALYSIS
SERVICE CALCULATIONS
COMMERCIAL FRONTLOAD

1) BINS

4 to 6 CU YD :

	4 CU YD 1 COLL/WK	4 CU YD 2 COLL/WK	4 CU YD 3 COLL/WK	4 CU YD 4 COLL/WK	4 CU YD 5 COLL/WK	4 CU YD 6 COLL/WK
PRODUCTIVE COST	\$0.99	\$1.97	\$2.96	\$3.95	\$4.94	5.92
COLL TRAVEL COST	\$3.43	\$6.85	\$10.28	\$13.71	\$17.14	20.56
DISPOSAL COST	\$1.21	\$2.42	\$3.63	\$4.84	\$6.05	7.26
TOTAL COST/WK	\$5.62	\$11.25	\$16.87	\$22.50	\$28.12	\$33.75
TOTAL COST/MTH	\$24.37	\$48.75	\$73.12	\$97.50	\$121.87	\$146.25
	5 CU YD 1 COLL/WK	5 CU YD 2 COLL/WK	5 CU YD 3 COLL/WK	5 CU YD 4 COLL/WK	5 CU YD 5 COLL/WK	5 CU YD 6 COLL/WK
PRODUCTIVE COST	\$0.99	\$1.97	\$2.96	\$3.95	\$4.94	5.92
COLL TRAVEL COST	\$3.43	\$6.85	\$10.28	\$13.71	\$17.14	20.56
DISPOSAL COST	\$1.51	\$3.03	\$4.54	\$6.05	\$7.57	9.08
TOTAL COST/WK	\$5.93	\$11.85	\$17.78	\$23.71	\$29.64	\$35.56
TOTAL COST/MTH	\$25.69	\$51.37	\$77.06	\$102.74	\$128.43	\$154.11
	6 CU YD 1 COLL/WK	6 CU YD 2 COLL/WK	6 CU YD 3 COLL/WK	6 CU YD 4 COLL/WK	6 CU YD 5 COLL/WK	6 CU YD 6 COLL/WK
PRODUCTIVE COST	\$0.99	\$1.97	\$2.96	\$3.95	\$4.94	5.92
COLL TRAVEL COST	\$3.43	\$6.85	\$10.28	\$13.71	\$17.14	20.56
DISPOSAL COST	\$1.82	\$3.63	\$5.45	\$7.26	\$9.08	10.89
TOTAL COST/WK	\$6.23	\$12.46	\$18.69	\$24.92	\$31.15	\$37.38
TOTAL COST/MTH	\$27.00	\$53.99	\$80.99	\$107.99	\$134.98	\$161.98

EXHIBIT 4
COST OF SERVICE ANALYSIS
SERVICE CALCULATIONS
COMMERCIAL FRONTLOAD

2)COMPACTORS

3 to 6 CU YOS	3 CU YD 1 COLL/WK	3 CU YD 2 COLL/WK	3 CU YD 3 COLL/WK	3 CU YD 4 COLL/WK	3 CU YD 5 COLL/WK	3 CU YD 6 COLL/WK
PRODUCTIVE COST	\$2.09	\$4.19	\$6.28	\$8.38	\$10.47	12.57
COLL TRAVEL COST	\$3.43	\$6.85	\$10.28	\$13.71	\$17.14	20.56
DISPOSAL COST	\$1.82	\$3.63	\$5.45	\$7.26	\$9.08	10.89
TOTAL COST/WK	\$7.34	\$14.68	\$22.01	\$29.35	\$36.69	\$44.03
TOTAL COST/MTH	\$31.80	\$63.59	\$95.39	\$127.18	\$158.98	\$190.70
	4 CU YD 1 COLL/WK	4 CU YD 2 COLL/WK	4 CU YD 3 COLL/WK	4 CU YD 4 COLL/WK	4 CU YD 5 COLL/WK	4 CU YD 6 COLL/WK
PRODUCTIVE COST	\$2.09	\$4.19	\$6.28	\$8.38	\$10.47	12.57
COLL TRAVEL COST	\$3.43	\$6.85	\$10.28	\$13.71	\$17.14	20.56
DISPOSAL COST	\$2.42	\$4.84	\$7.26	\$9.68	\$12.10	14.53
TOTAL COST/WK	\$7.94	\$15.89	\$23.83	\$31.77	\$39.71	\$47.66
TOTAL COST/MTH	\$36.42	\$68.84	\$103.26	\$137.68	\$172.09	\$206.51
	5 CU YD 1 COLL/WK	5 CU YD 2 COLL/WK	5 CU YD 3 COLL/WK	5 CU YD 4 COLL/WK	5 CU YD 5 COLL/WK	5 CU YD 6 COLL/WK
PRODUCTIVE COST	\$2.09	\$4.19	\$6.28	\$8.38	\$10.47	12.57
COLL TRAVEL COST	\$3.43	\$6.85	\$10.28	\$13.71	\$17.14	20.56
DISPOSAL COST	\$3.03	\$6.05	\$9.08	\$12.10	\$15.13	18.16
TOTAL COST/WK	\$8.55	\$17.10	\$25.64	\$34.19	\$42.74	\$51.29
TOTAL COST/MTH	\$37.04	\$74.08	\$111.12	\$148.17	\$185.21	\$222.25
	6 CU YD 1 COLL/WK	6 CU YD 2 COLL/WK	6 CU YD 3 COLL/WK	6 CU YD 4 COLL/WK	6 CU YD 5 COLL/WK	6 CU YD 6 COLL/WK
PRODUCTIVE COST	\$2.09	\$4.19	\$6.28	\$8.38	\$10.47	12.57
COLL TRAVEL COST	\$3.43	\$6.85	\$10.28	\$13.71	\$17.14	20.56
DISPOSAL COST	\$3.63	\$7.26	\$10.89	\$14.53	\$18.16	21.79
TOTAL COST/WK	\$9.15	\$18.31	\$27.46	\$36.61	\$45.77	\$54.92
TOTAL COST/MTH	\$39.66	\$79.33	\$118.99	\$158.66	\$178.32	\$237.98

11

EXHIBIT 5

COST OF SERVICE ANALYSIS
SERVICE CALCULATIONS
GARDEN REFUSE

PRODUCTIVE COST = TOTAL ROUTE PRODUCTIVE COST ÷ AVERAGE SERVICE TIME / AVERAGE PRODUCTIVE TIME ON ROUTE

COLL TRAVEL COST = TOTAL ROUTE COLLECTION COST / AVERAGE # CUSTOMERS

DISPOSAL COST = AVERAGE WEIGHT OF SERVICE ÷ AVERAGE ROUTE COST PER WEIGHT

1 PICKUP/LK

PRODUCTIVE COST	\$1.76
COLL TRAVEL COST	\$0.42
DISPOSAL COST	\$1.35
=====	
TOTAL COST/LK	\$3.54

COST / MONTH DUE TO USE OF SERVICE IS \$3.54

DATA NOT AVAILABLE, BUT EACH CUSTOMER IS ESTIMATED TO RECEIVE 1 COLLECTION/MONTH

		PROJECTED	BUDGETED
		ANNUAL COST	ANNUAL COST
		-----	-----
94969 CUSTOMERS ÷	\$3.54 ÷ 12 MONTHS / YR =	\$4,030,796	\$4,062,007

COST OF SERVICE ANALYSIS
SUMMARY OF TIME STUDY DATA
GARDEN REFUSE

# SAMPLES	MEAN TIME (MIN)	STANDARD DEVIATION (MIN)	90% CONFIDENCE INTERVAL	
			TIME(MIN)	PERCENT
163	0.921	0.679	±/- .088	±/- 10%

EXHIBIT 6

COST OF SERVICE FOR ONE COLLECTION / WEEK

<u>TYPE OF SERVICE /CATEGORY</u>	<u>PROJECTED COST**</u>	<u>PRESENT FEES</u>
RESIDENTIAL MANUAL		
1 can off curb	\$7.75/month	\$14.00/month
Each additional can	\$3.48/month	\$4.90/month
1 can on curb	\$4.71/month	\$7.05/month
Each additional can	\$1.70/month	\$2.50/month
RESIDENTIAL AUTOMATIC		
1 can	\$3.70/month	\$7.05/month
Each additional can	\$2.54/month	\$3.55/month
COMMERCIAL FRONTLOAD		
1 cubic yard bin	\$20.29/month	\$43.95/month *
2 cubic yard bin	\$21.60/month	\$57.65/month *
3 cubic yard bin	\$22.91/month	\$75.95/month *
4 cubic yard bin	\$24.37/month	\$62.45/month
5 cubic yard bin	\$25.69/month	\$77.90/month
6 cubic yard bin	\$27.00/month	\$97.45/month
3 cubic yard compactor	\$31.80/month	\$96.35/month
4 cubic yard compactor	\$34.42/month	\$128.65/month
5 cubic yard compactor	\$37.04/month	\$160.80/month
6 cubic yard compactor	\$39.66/month	\$192.85/month
COMMERCIAL REARLOAD		
1 can	\$19.45/month	\$7.05/month
Each additional can	\$2.10/month	\$2.50/month
1 cubic yard bin	\$26.99/month	\$43.95/month *
2 cubic yard bin	\$31.72/month	\$57.65/month *

* included in present fee is a charge for bin rental

** not included, Landfill cost, costs for Garden Refuse (estimated to be \$3.54) and other auxiliary programs such as street cleaning.

EXHIBIT
COST OF SERVICE ANALYSIS
EXTENSION OF COST OF SERVICE
FOR ALL ROUTES

RESIDENTIAL MANUAL		AVERAGE WEEKLY COLLECTIONS		PROJECTED MONTHLY COST OF SERVICE		PROJECTED ANNUAL COSTS	BUDGETED ANNUAL COSTS
12	MONTHS	1260	1 CAN ON CURB	4.71	COST OF SERVICE	\$71,676.0	
12	MONTHS	357	2 CAN ON CURB	6.41	COST OF SERVICE	\$27,445.9	
12	MONTHS	224	1 CAN OFF CURB	7.75	COST OF SERVICE	\$20,801.4	
12	MONTHS	63	2 CAN OFF CURB	11.23	COST OF SERVICE	\$8,478.5	
12	MONTHS	15	1 CU YRD BIN	26.99	COST OF SERVICE	\$4,858.4	
12	MONTHS	28	2 CU YRD BIN	31.72	COST OF SERVICE	\$10,618.7	
				TOTAL COST / ROUTE =		\$143,878.9	41.7 RTS
						\$5,999,751	\$5,669,461
RESIDENTIAL AUTOMATIC							
12	MONTHS	2323	1 CAN ON CURB	3.70	COST OF SERVICE	\$103,069.3	
12	MONTHS	139	2 CAN ON CURB	6.24	COST OF SERVICE	\$10,422.4	
				TOTAL COST / ROUTE =		\$113,491.7	4.1 RTS
						\$465,316	\$462,071
COMMERCIAL REARLOAD							
12	MONTHS	98	1 CAN	19.45	COST OF SERVICE	\$22,877.3	
12	MONTHS	74	2 CAN	21.55	COST OF SERVICE	\$19,003.7	
12	MONTHS	131	1 CU YRD BIN	26.99	COST OF SERVICE	\$42,466.3	
12	MONTHS	237	2 CU YRD BIN	31.72	COST OF SERVICE	\$70,074.6	
				TOTAL COST / ROUTE =		\$174,421.9	10.4 RTS
						\$1,813,988	\$1,856,074
COMMERCIAL FRONTLOAD							
12	MONTHS	12	1 CU YRD BIN	20.29	COST OF SERVICE	\$2,921.5	
12	MONTHS	24	2 CU YRD BIN	21.60	COST OF SERVICE	\$6,220.7	
12	MONTHS	336	3 CU YRD BIN	22.91	COST OF SERVICE	\$92,376.9	
12	MONTHS	60	4 CU YRD BIN	24.37	COST OF SERVICE	\$17,549.4	
12	MONTHS	12	5 CU YRD BIN	25.69	COST OF SERVICE	\$3,698.7	
12	MONTHS	6	6 CU YRD BIN	27.00	COST OF SERVICE	\$1,943.8	
12	MONTHS	25	3 CU YRD COMPACTOR	31.80	COST OF SERVICE	\$9,615.1	
12	MONTHS	2	4 CU YRD COMPACTOR	34.42	COST OF SERVICE	\$619.5	
12	MONTHS	0	5 CU YRD COMPACTOR	37.04	COST OF SERVICE	\$0.0	
12	MONTHS	4	6 CU YRD COMPACTOR	39.66	COST OF SERVICE	\$1,713.5	
				TOTAL COST / ROUTE =		\$136,659.2	4 RTS
						\$546,637	\$594,843

* PROJECTED ANNUAL COST FOR RESIDENTIAL MANUAL IS HIGHER THAN BUDGETED ANNUAL COST DUE TO AN INABILITY TO EXTEND COST FOR CUSTOMERS WITH MORE THAN 2 CANS AND SHOW COST REDUCTION FOR SERVICING CUSTOMERS WITH MULTIPLE CANS